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Development of Market Prices of Agricultural Land within the Conditions of the EU

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Anotace

Tržní ceny zemědělské půdy ve světě v posledních letech výrazně vzrostly. Důležitými faktory tohoto trendu je nejen to, že půda je základním, nenahraditelným zdrojem produkce potravin a přírodního bohatství každé země, ale i to, že je obecně chápána jako výhodný tezaurus kapitálu, nepodléhající vlivu inflace. Tržní ceny zemědělské půdy a výše nájemného jsou v jednotlivých členských zemích EU ovlivněny historickým vývojem, velikostní strukturou zemědělských podniků, legislativou, regulací trhu s půdou, přírodními podmínkami a intenzitou zemědělské výroby (např. Nizozemsko). Tržní ceny zemědělské půdy v ČR sledují Český statistický úřad (ČSÚ), Ústav zemědělské ekonomiky a informací (UZEI) a Ministerstvo zemědělství (Mze), ale výstup z datové základny není srovnatelný v časové řadě 1993-2012, neboť instituce pracují s odlišnou metodikou. Na základě deskripce cen zemědělské půdy a regresní analýzy nebylo potvrzeno, že tržní cena zemědělské půdy pro zemědělské využití v ČR je ovlivněna zejména její bonitou. Úřední (administrativní) cena je pro stanovení tržní ceny jen orientačním a podpůrným nástrojem. Rozvoj trhu se zemědělskou půdou v ČR ovlivnila privatizace půdy po roce 2000. Dle odhadu (autorky) mohou po skončení privatizace, i vzhledem ke změnám v daňové politice, poklesnout ceny půdy pro zemědělské využití do roku 2014 až o 30 %, zároveň bude výrazně klesat i podíl obchodované státní půdy. Je pravděpodobné, že poptávka bude orientována na obchody s půdou pro spekulativní a investiční účely, neboť dle světových trendů je průměrné zhodnocení investice do půdy v době ekonomické krize vyšší (6-7% p. a.) v porovnání s investicemi do akciových trhů (1,8-2,2%).

Článek byl zpracován v rámci VZ MSM 6046070906 „Ekonomika zdrojů českého zemědělství a jejich efektivní využívání v rámci multifunkčních zemědělskopotravinářských systémů“.

Klíčová slova

Zemědělská půda, orná půda, tržní cena zemědělské půdy, úřední cena zemědělské půdy, bonita půdy, dotace, pacht.

Abstract

Market prices of agricultural land in the world have increased significantly in recent years. Important factors in regard to this trend are not only the fact that land is a basic, irreplaceable resource for the production of food and natural resources of each country, but also the fact that it is generally perceived as a favorable holder of capital, not succumbing to the effects of inflation. Market prices of agricultural land and the rent level in individual EU member countries are affected by historical development, the size structure of agricultural businesses, legislation, regulation of the land market, natural conditions and the intensity of agricultural production (e.g. the Netherlands). Market prices of agricultural land in the Czech Republic are monitored by the Czech Statistical Office (CSO), Institute for Agricultural Economics and Information (IAEI) and Ministry of Agriculture (MoA), but output of the data base is not comparable within a time series 1993-2012, as institutions work with differing methodology. On the basis of the description of prices of agricultural land and regression analysis, the hypothesis that the market price of agricultural land for agricultural use in the Czech Republic is affected primarily by its quality was not confirmed. The official (administrative) price is only an orientational and subsidiary tool for the determination of the market price. The development of the agricultural land market in the Czech Republic was affected by the privatization of land after 2000. According to an estimate (of the author), after the completion of privatization, and also in view of changes in tax policy, the prices of transacted land for agricultural use can decline within 3 years (2014) by up

to 30%. It is probable that the demand will be focused on transactions with land for speculative and investment purposes, as, according to world trends, the average increase in value of investments in land in a time of economic crisis is higher (6-7% p.a.) as compared to investments in stock markets (1.8-2.2%).

The article has been processed as part of VZ MSM 6046070906 "The economy of resources of Czech agriculture and their effective utilization within multifunctional agricultural-food systems".

Key words

Agricultural land, arable land, market price of agricultural land, official price of agricultural land, quality of land, subsidies, tenure.

Introduction

Main objective: To analyze the development of market prices of agricultural land in terms of the transformation of agriculture, quality and the effect of privatization of land on the development of the market within the years 1993-2012 in the Czech Republic.

The main objective is fulfilled on the basis of partial objectives:

- Quantification of market prices of agricultural land in terms of production capability and the purpose of utilization for the period of 1993-2012 according to available databases in the Czech Republic;
- Statistical analysis, assessing the correlation of the selected factor (land quality) on the market price of agricultural land.

Land plot markets act as a medium for the transfer of agricultural land from passive farmers to active farmers, or, more generally, from less effective farming to more productive agricultural producers (Deininger et al., 2004).

Factors that potentially affect the prices of agricultural land in the Czech Republic are: size, accessibility and natural fertility of a land plot. The conclusions of the work of authors further show a significant effect of projects for land adjustments and zone planning on the price of agricultural land. A significant role is also played by zone planning. That protects agricultural land from runaway proliferation of urban development (Sklenicka et al., 2013).

According to an analysis of market prices of agricultural land in the Czech Republic on the basis of a regression model, it was ascertained that relevant determinants of market prices in 2008-2009 were: type and quality of land, location of the district, the nature of the acquirer (agricultural or non-agricultural entity), the area of the land plot, distance from the district seat. An analysis in 5 selected districts in the Czech Republic (monitoring approximately 450 purchase agreements) did not confirm a significant effect of conducted land adjustments within the cadastral area on market prices of agricultural land (Medonos et al., 2011). Vopravil et al. (2011) focus on the current manner of valuating land in the Czech Republic. It is based on quality-rated land-ecological units (BPEJ) and represents a unique system on a global scale. The quality-rating was based on a comprehensive study of land, which took place in the 1960's, and was conducted on the entire territory of Czechoslovakia. The quality-rating of the agricultural land fund is understood to mean the classification and valuation of land for tax and pricing purposes and for the purposes of the exchange of land plots (in the case of land adjustments). The existing system of quality-rating is based on the conditions of the socialist manner of farming on land. The authors propose an innovation of the system as a tool for the protection of agricultural land.

Rent for agricultural land is a significant factor in the valuation of agricultural land and costs of production. That is given by the fact that rented land comprises a significant proportion in the Czech Republic (86%), and 54% in the EU (Střeleček et al., 2011).

In the future it is expected that the market price of agricultural land will be the basis for calculating taxes and replacing the official prices. The assumption is , however, developing land market and the corresponding market prices (Rejfek et al., 1990).

Three significant causes of the inflexibility of the land plot market in Slovakia: (1) the effect of taxes, which are determined for non-agricultural use of land, (2) laws complicate foreign ownership relations in regard to land, and (3) administrative price of transacted agricultural land that is used for the calculation of property taxes, instead

of market prices. The agricultural land market is at a low level and market prices of land are undervalued. For example, the interest rate on savings exceeds the rate of return on agricultural land. That leads to a low demand for agricultural land and it is very difficult to use agricultural land to secure an investment loan. That makes financial investments for the purchase of agricultural land ineffective (Duke at al., 2004). The agricultural land market in Poland has its specifics. Among farmers, there are accepted internal rules regarding how to conduct a market exchange of land plots with the goal of preventing the sale of agricultural land to foreigners. A second objective is to protect farmers from an explosion of land plot prices, which would exclude many local buyers from participating in transactions regarding land plots (negotiations only within the local group or without any negotiations at all). The market price is understood to be the price that was paid for land plots of a similar quality or in a recent transaction in the given area (Hurrelmann, 2008). The price of agricultural land in Great Britain has a tendency to reflect 1) the profitability of raising animals, growing cultured crops, and 2) the effect of production subsidies and support of agricultural income. Factors that play a significant role here are a limited supply of land plots for sale (usually less than 0.2 percent of the total area each year), a strong demand for small land plots, and tax advantages of land ownership. In 2008, an increase in the number of purchases of land plots adjacent to family farms was seen, with the purpose of retaining savings from economies of scale and taking advantage of the exemption of agricultural land from inheritance tax. Prices of land plots will develop according to changes in the utilization of the area in the future. The main question is how to deal with arising conflict regarding the utilization of agricultural land for food, fuel and ecosystem services (Angus et al., 2009). The most significant factor in spatial fluctuation of agricultural land prices in Bulgaria is the proximity of land plots to settlements. In such cases, there is a significant increase in the prices of agricultural land up to approximately 100 m. from the edge of built-up areas. The highest prices are paid by purchasers for agricultural land plots directly adjacent to built-up areas. The willingness of farmers themselves to pay higher prices for agricultural land is also growing in cases where they themselves own agricultural land adjacent to transacted land plots. That then leads to a consolidation of land plots owned by one owner and to a decrease in the fragmentation of ownership relations. The fragmentation of land ownership is a negative factor that leads to decreases in agricultural profitability (Falco et al., 2010). Authors Lloyd et al. (1991) analyze land in terms of agricultural utilization. The most common factors (determinants) determining the price level of agricultural land are: land quality, availability of water on the land or in its vicinity, the option of lease and rent, the location of land plots, the size of the farm interested in land, the size of agricultural subsidies. Skaloš (2010) states that the spatial variability of prices of agricultural land is given by factors that reflect agricultural utilization, and also specific characteristics that are significant for the conversion of agricultural land to non-agricultural purposes. Despite the fact that motives for the acquisition of agricultural land for non-agricultural or speculative purposes are immense, non-agricultural utilization of agricultural land is usually a less significant driving force for the growth of prices of agricultural land.

A significant portion of agricultural businesses in the monitored regions are truly interested in the expansion of their business. The authors provide the following factors that affect transactions in agricultural land: (1) The number of potential tenants, i.e. the number of company and agrarian farms, (2) the quality of the agricultural land, (3) the physical accessibility and affordability of agricultural land in the region. The developing public registry of plans and maps is nevertheless creating a number of procedural obstacles that complicate transactions in land plots. Real estate agents do not have real access to information on market prices (Lerman, Shagaida, 2007). The main difference of Czech agriculture as compared to the EU 15 is a higher average area of businesses, non-family type farms, a high proportion of tenure, approximately half the intensity of agricultural production, and a significantly higher proportion of intermediate consumption. The competitive advantage is the size of the business and the lower price of land (Baška, 2010). Authors Buday et al., (2011) evaluate the development of the agricultural land market within the period of 2001-2009 in selected regions of Slovakia (12 districts). The analysis of market prices shows that land plots with small area sizes were sold for the highest prices, and the average market price falls with increasing area. More than 85% of farmed land is rented. Agreements on rent are entered into for 5-10 years. The largest area of agricultural land in Slovakia is farmed

by business companies and cooperatives. In an analysis of the factors affecting market prices of agricultural land in Slovakia (Buday, Bradáčová (2010), it was ascertained that the greatest effect is had by the size and location of a land plot, the manner of utilization and the amount of provided aid. A smaller effect on the amount of the market price is had by the quality of the land and the expended investments. In an analysis of the impact of CAP (Common agricultural policy) on the price of agricultural land and rent in EU states, the conclusion was formulated that the Single payment scheme has a greater effect on rent than on the price of agricultural land (Ciaian et al., 2010).

Materials and methods

1. The article was processed on the basis of the following materials

- Research reports and studies of the Institute of Agricultural Economics and Information (IAEI) in the area of statistical evaluation of the state of the agricultural land fund within the period of 1990-2011.
- Final annual and situational reports of the Ministry of Agriculture of the Czech Republic (MoA) from the years 1999, 2003, 2009, 2011, 2012.
- FAOSTAT-Agriculture database (FAO, 2013).
- Němec et al. "Analysis of the Evaluation of Agricultural Land Market up to the Year 2006". Editorially adjusted final report for the year 2007. Project NAZV QF 3081. Praha:IAEI, 2008.
- Vilhelm V. et al., Report on results of thematic assignment TÚ 22 (4233) "Development of the Agricultural Land Market and Identification of Factors Affecting the Development of Prices of Agricultural Land in the Conditions of the Czech Republic", Prague, December 2012, IAEI.

2. Utilized correlations, methods and procedures

- The basic methods of research are utilized in the article, such as the method of secondary data collection, analysis and synthesis of documents, comparison, qualified estimate.
- The article utilizes the Microsoft Excel 2007 software program and Statistica version 10. On the basis of the work with those programs, regression and correlation analysis is conducted, which proves or disproves the effect of factors affecting the price of agricultural land according to the specified hypotheses. As part of the regression analysis, the t-test is conducted, which tests the statistical significance of the absolute element and the beta coefficient of the function at a significance level of $\alpha = 0.05$. If the achieved significance is $p < 0.05$ for both elements, then the entire model is statistically significant. The zero hypothesis, representing a zero correlation between the analyzed variables, is ruled out. In the case of $p > 0.05$, it is possible to leave out from the analyzed values such values that show the greatest variances from the average analyzed values.
- Creation of prognoses according to the Statistika program, version 10.

Results and Discussion

1. Factors Affecting Market Prices of Agricultural Land in the World

Decrease of Agricultural Land

Market prices of agricultural land are growing all over the world in recent years. The decisive factors of this trend are the decrease in agricultural land per capita globally and, at the same time, the exponential demographic development. The decline in the state of agricultural land in the world within the past 19 years (the period of 1993-2011) is approximately 1.847 mil. ha. (FAO, 2013). The deterioration of agricultural land is occurring as a result of climatic changes, urbanization, growth in petroleum prices, the production of first generation biofuels, etc. On the other hand, the growth in demand for agricultural products may double by the year 2050 (Alterová, 2009). Such increase will have to be ensured with the current state of disposable resources of agricultural land or even with declining areas of arable land and a lack of water resources. This issue also relates to the level of the world population living in poverty – 1 billion people with an income of USD 1.25/per capita and day (Ravallion at al., 2009). The number of undernourished people is estimated to be at 870 mil. (UN, 2012). The factors of poverty will affect the growth of demand for food in the poorest countries of the world and thereby also the global demand for food. Growth of global prices of agricultural commodities within recent years was not affected only by the global recession,

but such prices grew even despite the record harvest of grains in 2009 (FAO, 2013). The growth in prices of agricultural commodities in 2007 and 2008 (FAO, 2013) brought about distrust on the part of grain importers in regard to global markets and thereby also the demand for agricultural land, or lease of agricultural land abroad for the purpose of ensuring their own food self-sufficiency. Research is showing that growth in the use of biomass, and primarily biofuels, leads to the growth of demands for agricultural land, primarily in tropical areas. In view of the growing global demand for food and other agricultural products, the demand for the use of arable land for the production of biofuels should also decline. (Bringezu, 2009)

The European Union also subscribes to such opinion, and proposes a fundamental change, pertaining to the restriction and utilization of first generation biofuels and the complete elimination of state subsidies for their production. However, current EU legislation does not allow this change until 2020. (Cabinet of the Czech Republic, 2012).

On the basis of regression analysis and FAOSTAT-Agriculture data on the area of agricultural land in the period of 1993-2011, a prognosis was conducted for the period until the year 2050 (Table 1).

Regression no. 1: The correlation that expresses the development of the state of agricultural land in the world in time. The years 1993-2011 correspond to the values of the independent variable $x \subset (1\text{-}19)$. The values of the independent variable of time $x \subset (20\text{-}58)$, correspond to the prognosticated years 2012-2050, which were subsequently inserted into the regression function $y = 4{,}931604.10^{9}\text{-}1{,}304737.10^{6}x$. In this way, the extent of agricultural land from the year 2012 until the year 2050 was prognosticated. Table no. 1 shows the example of the year 2012 (x = 20) with the prognosticated value of 4 905 509.415 thousand ha of agricultural land (Y_{20}) along with the possible variance value of 5% thousand ha.

The Examples of selected observed values of agricultural land (y)

Year: 2011: 4 911 622 650 ha

Year: 2012: 4 905 509 415 ha (y_{20})

Year: 2020: 4 895 071 517 ha (y_{28})

Year: 2050: 4 855 929 400 ha (y_{58})

According to a prognosis of the UN (FAO, 2013), the number of people on Earth will increase to 9.3 billion people by the year 2050. The development of agricultural land per capita globally in the years 1993-2011 (methodology 2.2.par.3,4) is set out in graph no. 1. While in 1993, there was 0.88 ha. per capita, in 2009 it was 0.72 ha., 0.70 in 2011, and in 2050 it may only be 0.52 ha.

An indicator of the growth of demand for agricultural land, as a result of the worldwide decrease of agricultural land per capita and its degradation, is, for example, the development of the index of prices of agricultural land (NCREIF Farmland Index). The average return on investment in land is estimated to be at 6-7 % annually (NCREIF, 2012). For the past 10 years, this Index has exceeded the return on investments in stock markets S&P 500. Dividend yield ranged from 1.8 - 2.2 % in 2007-2012 (Standard & Poor´s, 2013)

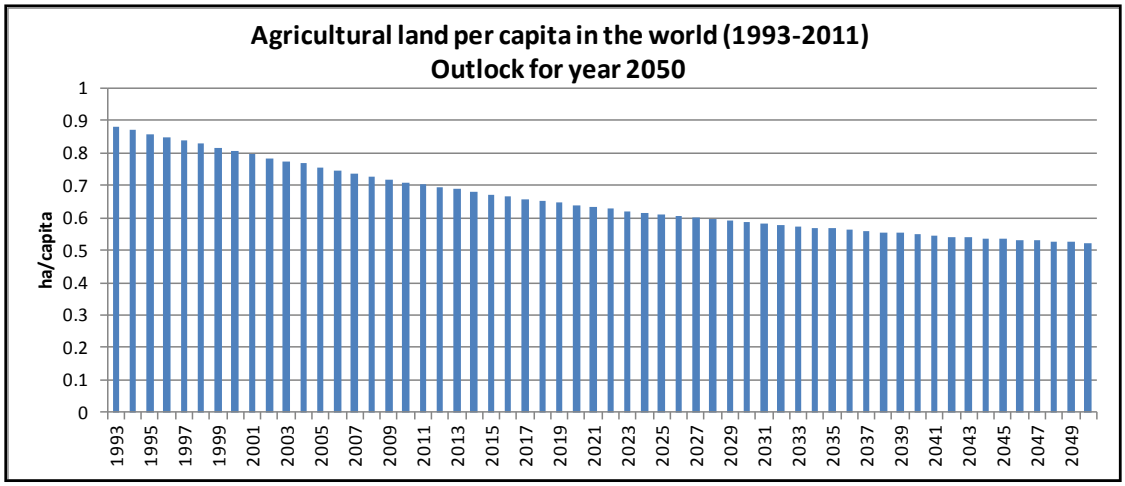
Note: *"The **NCREIF index** of prices of agricultural land is ascertained from quarterly time data and informs of the return on investments, is a measure of the performance of a large set of agricultural land plots acquired on the private market for investment purposes"(NCREIF, 2012).*

*The **S & P 500 Index** covers 75% of stocks in leading sectors of companies with a high level*

	in absolute terms	the regression coefficient (beta)	p-value of absolute member	p-value independent variable	
N=19	4.931604*109	(-)1.304737*106	0.0000000	0.008893	
	The regression function:		Agricultural land:	-0,95	0,95
X=20	y20= 4.931604*109-1.304737*106x		4 905 509 415	4 894 882 620	4 916 136 209

Legend:
y1 = dependent variable: the area of agricultural land in the world
x = independent variable: time (years 1993-2011).
N = number of values of the sample (1993-2011)
Results of t-test: p-value <0.05 is demonstrated a statistically significant model
Source: Statistica 10 software, data: database FAOSTAT-Agriculture (FAO, 2013)

Table 1: The Basic statistical characteristics of the development of the acreage of agricultural land in the world (hectares).



Source: Authors by Statistica 10 software, MS Exel, database FAOSTAT-Agriculture (2013), Methodology: 2.2 paragraph 3)

Graph 1: Agricultural land per capita in the world (1993-2011), outlock for year 2050 .

Selected states of the European Union	Slovakia	Czech Republic	Bulgaria	France	Belgium	Germany	Poland	EU average (25)
Leased land (% of the agricultural land fund)	90.9	83.8	83.0	75.1	67.9	63.3	22.VII	46.0

Source: Vilhelm at al. (2012)

Table 2: The proportion of leased agricultural land in the selected EU countries in the year 2007.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Netherlands	35713	37150	40150	34160	31432	30235	31276	35 969	40 916	47 051	-
Denmark	10330	12211	12920	14669	15995	18787	22791	27 112	31 652	25 919	-
Germany	9081	9427	9465	9184	9233	8692	8909	9 205	9955	10 908	11 854
Spain	7292	7553	8026	8553	9024	9714	10402	11 070	10 974	10 465	-
France[2)]	3590	3710	3860	3970	4110	4260	4370	4 900	5 160	5 130	5 230
Sweden	1989	1988	2019	2126	2455	3351	3706	3 957	4 181	3 748	-
Czech Republic > 5 ha	1611	1275	986	1121	1176	1245	1275	1 867	2 375	2 250	2 230
Slovakia	895	878	888	912	946	981	1017	1 121	1 211	1 256	-
Lithuania	294	321	468	390	406	536	734	831	1 075	971	-

[1)] conversion to the corresponding to the average rate for the years
[2)] in 2006, the prices of arable land
Source: MoA (2009b)

Table 3: The average price of farmland in the selected EU countries 27 (€/ha from LA)[1)].

of market capitalization (at least USD 4 billion) listed on United States stock markets.

2. Factors Affecting Market Prices of Agricultural Land in the EU

Market prices of agricultural land and the level of rent are, to a great extent, affected by historical development, size structure of agricultural land plots, location, traditions, legislation, etc. in the individual EU states. For such reasons, the comparison of the development of prices provided by Eurostat is very difficult. Statistical data on prices of agricultural land provided by Eurostat are acquired on the principle of optionality from individual EU member states, without there being a uniform methodology for the monitoring of such data, and thus their validity in terms of comparability is limited. In terms of the structure of agricultural land plots and the high proportion of leased land, prices in the Czech Republic are comparable to Slovakia, the new federal lands of Germany, and the other new EU member states (Tab. 2, 3). Common for all of the EU states is the fact that the proportion of leased land is

lower among small farms and higher among large agricultural businesses (Vilhelm, 2012).

The average annual rate of growth of prices in selected EU countries ranged from 4-8%, with the exception of Denmark and Lithuania (20-26%). Greater interest on the part of investors in purchasing agricultural land, as a favorable investment, was seen as a result of the economic crisis primarily in countries with higher economic performance, e.g. in Germany.

2.1. Czech Republic

Market prices of agricultural land were undervalued on a long-term basis, and it was therefore anticipated that they would grow not only because of their gradual balancing out with adjacent states, but also as a result of the worldwide trend. The Czech agricultural land market is, in terms of the structure and other conditions, unattractive for large investors. Foreigners who purchased agricultural land for the purpose of doing business in agriculture in the Czech Republic made such purchases prior to the termination of the moratorium (2011) by way of legal entities. In 2010, there were 378 farms with foreign participation within the territory of the Czech Republic, which farmed on (not owned) 230 thousand ha. of agricultural land (i.e. approximately 6.5% of the total farmed area of agricultural land). The area of agricultural land and the numbers of owners with permanent residence abroad for the year 2012 were ascertained on the basis of data for a selected set of owners (Table 4). That represents approximately 6% of all owners of all agricultural land and approximately 14% of the area of agricultural land in the Czech Republic according to the cadastral records (in 5 districts: Prague – east (Praha – východ), Klatovy, Havlíčkův Brod, Znojmo, Olomouc). The purchase of agricultural land by foreigners was not considered to be significant in any of the 5 selected districts in terms of the development of prices of agricultural land. (MoA, 2012)

Economic Factors

The lesser interest of farmers in expanding their farms in the period of 1990-2004 was affected mainly by the following economic factors: a lack of capital and its low rate of return in agriculture (2-3% p.a.), unclear and unstable agricultural policy, an excess of the supply of agricultural commodities over demand within the EU, the state of land adjustments and lower subsidies as compared to the EU-15 countries. Land adjustments have a significant effect on increases in the market price of agricultural land plots, primarily because of the specification of ownership of land plots in regard to area and location, the option of integration of land plots, real division of co-ownership, increased access to land plots, creation of a network of field roads, execution of new lease agreements and thereby an increase in the effectiveness of doing business in agriculture. As of 31 December 2010, the status of completed comprehensive land plot adjustments (i.e. the comprehensive resolution of an entire cadastral area) in the Czech Republic was 505 744.87 ha. of agricultural land (MoA, 2011b). The agriculture land market was suppressed by a low rent price, determined by large business companies, which thereby also influenced the price of agricultural land plots.

Effect of Official Price on the Level of Market Prices of Agricultural Land

The institute of the official price of agricultural land was introduced in the Czech Republic in 1990, primarily for the purposes of settling restitution claims and for tax purposes. Official prices express the production capability of lands (quality) and were calculated by way of the yield method. They are regulated by Act No. 151/1997 Coll., on appraisal of property including implementary Ministry of Finance Decree No. 364/2010 Coll. and Ministry of Agriculture Decree No. 412/2012 Coll., on the setting of a list of cadastral areas with assigned average basic prices of agricultural

	The quantity	%
The total quantity of owners of agricultural land	172 396	100
- which of the number of owners with permanent residency in the foreign countries	1 443	0.84
Total agricultural land area (ha)	592 089	100
-of which area of the LA owner residing abroad (ha)	2 725.28	0.46

Source: MoA (2012)

Table 4: Number of farms and acreage owners residing abroad (2012).

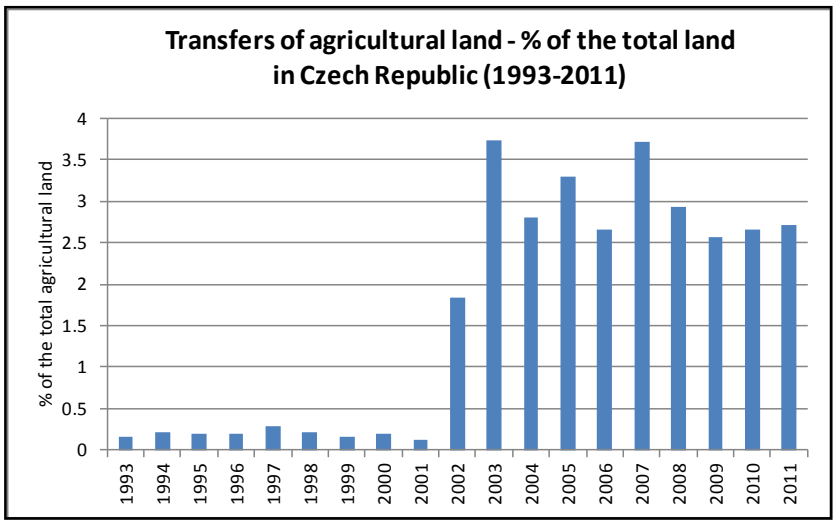
land plots, as amended. The existence of official prices of agricultural land affected, to a great extent, the level of market prices (primarily among land plots of over 5 ha.) because of the low level of the agricultural land market. The absence of experience on the part of owners in regard to doing business pertaining to agricultural real estate often led to unilaterally very unfavorable business transactions. The basis of market prices up to the year 2000 was, to a great extent, official prices, and in the size category of over 5 ha. (for agricultural use) they fluctuated below the threshold of the official price. For example, in the year 2000, the average market price of land plots in the Czech Republic, purchased for agricultural use (CZK 3.04/m2), was at 60% of the average official price.

Transformation of Agriculture, Privatization of Land

In the period of 1990-2000, the agricultural land market was, to a great extent, affected by restitutions, the privatization of land, and the transformation of cooperatives. The transformation process brought about a high level of fragmentation in the ownership of the agricultural land fund – approximately 2.5 mil. owners (MoA, 2001) and thereby also an excess of the supply of agricultural land over demand. The most purchased were land plots with an area of up to 0.10 ha. with the option of transformation into a building plot, and least purchased were those with an area of over 5 ha, primarily for agricultural market use (MoA, 1999). The low area size of land plots being sold (e.g. 0.72 ha. in 1999; MoA, 2001) negatively affected the amount of the market price. The above factors affected the low level of the agricultural land market in that period and thereby also the market price. Market prices of land plots were significantly higher for land plots of up to 1 ha., as much as a hundred-fold, up to 5 ha. as much as ten-fold as compared to the average market price of agricultural land plots. The average market price of land for agricultural use (1993-2003) was CZK 4.59/ m2, the average market price of land plots being sold overall (1993-2003) was CZK 24.36/m^2 (MoA, 2003).

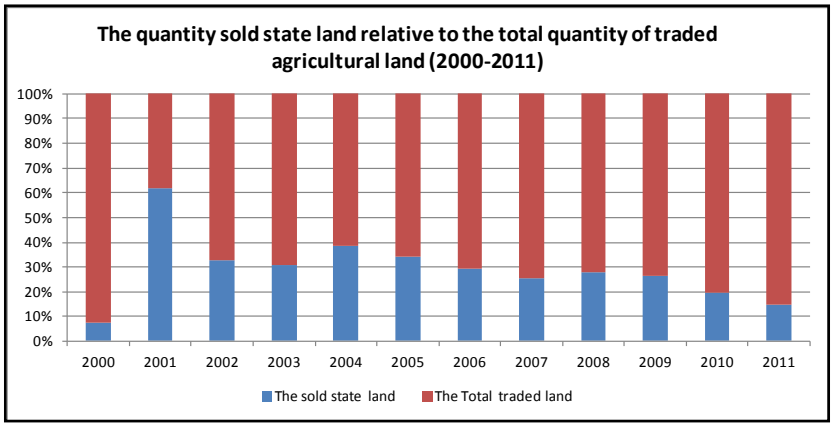
The period of 2001-2011 explains price changes on the agricultural land market after the introduction of the law on the sale of state land into practice (1999) and after the accession of the Czech Republic to the European Union. The sale of government land played a significant role share in the development of the agricultural land market for agricultural use in the Czech Republic. The development of the proportion of transactions out of the whole agricultural land fund (% of the agricultural land fund) is shown in graph 2,3.

For the comparison of market prices in the government and private sector (graph 4), various sources of information on market prices were utilized, i.e. the Czech Statistical Office, UZEI, and the Ministry of Agriculture. The development of market prices in the period of 2004-2011 shows that the support



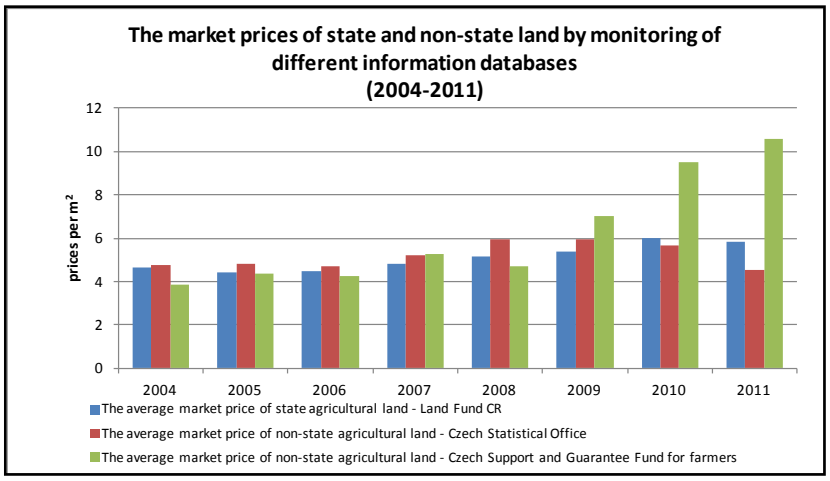
Source: Authors by Němec at al. (2008), MoA (2012)

Graph 2: Transfers of agricultural land - % of the total land in Czech Republic (1993-2011).



Source: Authors by Němec at al. (2008), MoA (2012), LF CR (2012)

Graph 3: The quantity sold state land relative to the total quantity of traded agricultural land (2000-2011).



Source: Authors by MoA (2012), LF CR (2012)

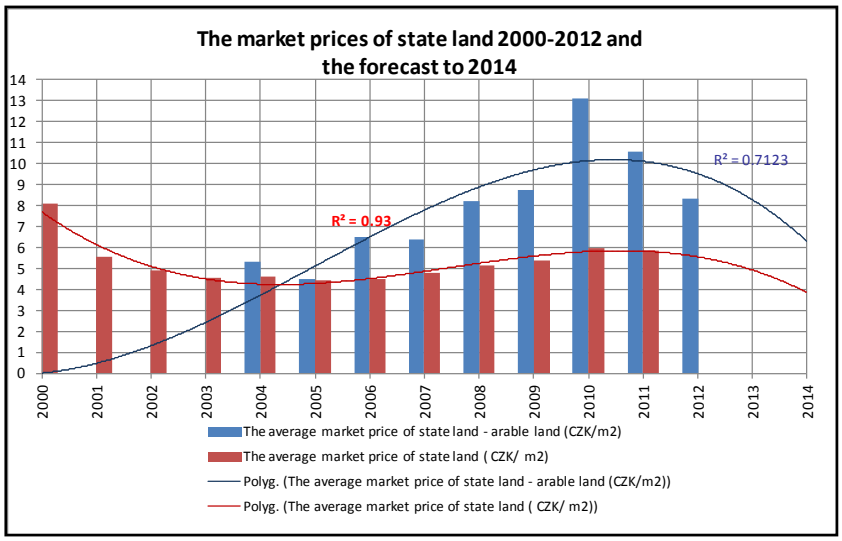
Graph 4: The market prices of state and non-state land by monitoring of different information databases (2004-2011).

of the purchase of land in the private sector by way of the Supporting and Guarantee Agricultural and Forestry Fund (SGAFF) affected the demand for agricultural land for business in agriculture and, overall, through the effect of subsidies, lowered the market price for the buyer and provided better availability of loans for the purchase of land.

There is little access to quality sources of information on prices of agricultural land in the Czech Republic. There is no database containing complete information on business relationships (price of land, size, purpose of use, type of business person, etc. …). Price development is monitored by the Czech Statistical Office, UZEI and the Ministry of Agriculture with different results (graph no. 4).

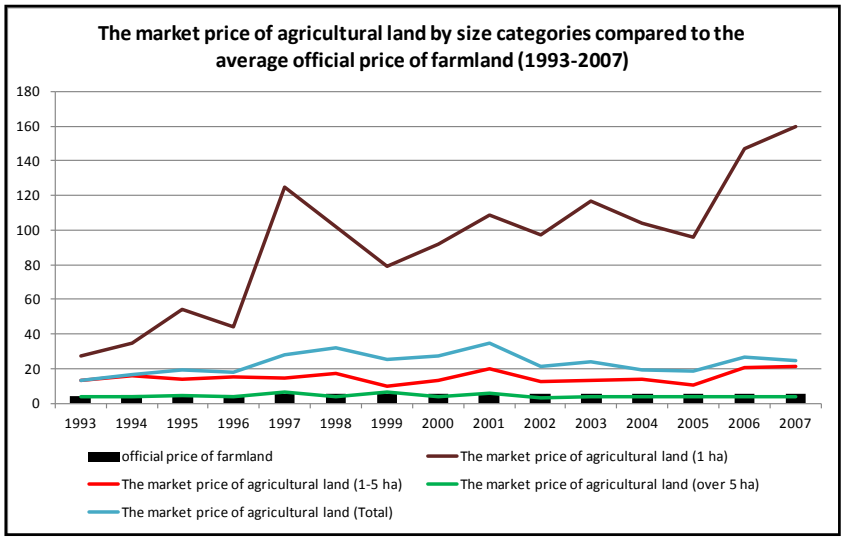
From the year 2000 until 2012, approximately 90% (out of 600 thousand ha.) of state agricultural land (MoA, 2011a), intended for agricultural use, was sold. Currently, prices of privatized land are stagnating, as the remaining portion of the land being offered is of worse quality and thus less appropriate for agricultural use. The price of state land, they will be falling by approximately 30% within the period of the next 3 years (to 2014) (graph no. 5), while the prices of agricultural land for non-agricultural use will grow (graph no. 6).

When evaluating the development of the agricultural land market is necessary to take into account the effect of Act No. 503/2012 Coll. The State Land Office, Section 15th *„To ensure the unpaid purchase price*



Source: Authors by LF CR (2012), Vilhelm at al. (2012)

Graph 5: The market prices of state land 2000-2012 and the forecast to 2014.



Source: Authors by MoA (2009b)

Graph 6: The market price of agricultural land by size categories compared to the average official price of farmland (1993-2007).

of agricultural land or part of the state will have a lien on the transferred agricultural land at the time of transfer of land,, (§ 15, article 1). „The pre-emption right of the State ceases payment of the purchase price of the land, but not before the expiry of 5 years from the date of deposit of title to land in the real estate in favor of the acquirer (§ 15, article 2).“ At this legislation expected many purchasers of state land to live out their land for favorable pricing terms to sell at current market prices . Another important factor is the attitude of the Church and the question of what to do having been restored to agricultural land acquired under the restitution of church property pursuant to Act No. 428/2012 Coll .

It is likely that in the period of economic crisis as well as in view of the situation on global stock markets, investors will be seeking a commodity that will ensure a stable and long-term return. A proposal of how to support the development of the agricultural land market primarily for agricultural use in the Czech Republic in terms of tax savings is published by the authors in their work (Gebeltová, Pletichová, 2012).

Bonita of Land

In the period of 1993-2007, the market price of agricultural land with an area of over 5 ha. ranged within the interval of values of CZK 3.4/m2 (2002) to CZK 6.57/m2 (1999). As prices in this size specification represent land for agricultural use, they are compared with the average official price of the same period (an interval of CZK 4.49/m2, 1993 to CZK 5.33/m2, 2007). The value of the average official price is, for the past eleven years of monitoring (1997-2007), in the same amount CZK 5.33/m2. The price decree in the Czech Republic is updated every year, but, nevertheless, the BPEJ appendix with assigned official prices remained in an unchanged form.

According to IAEI (MoA, 2012), the main factor that affects the average market price of agricultural land, regardless of size differences, is the quality of the land (yield rent). Qualitative evaluation of land is expressed by way of the BPEJ code. If the BPEJ has not changed in eleven years and nevertheless the average market price of agricultural land is increasing (graph 6), it means that:

a) If the IAEI statement applies, that the average price of agricultural land is determined primarily by quality, then the official price does not plausibly reflect the production capability of agricultural land (the authors) or:

b) The correlation between the market price and the official price is insignificant and there are still other, more significant factors that affect prices. For example, the size of the land plot, the location of the land plot in regard to an urban agglomeration, subsidies, etc. (Vilhelm et al. 2012, the authors).

The results of regression (the correlation of the average official price of agricultural land and the average market price of agricultural land):

The required significance $p < 0.05$ (methodology 2 par. 2) was not achieved for any one of the elements of the regression function (p-value of the absolute element: 0.9168, p-value of the regression coefficient: 0.4517). A zero correlation (effect) between the analyzed variables was confirmed.

Because of identical values of the official price of land in the course of eleven years, it was not possible to conduct even the statistical correlation between average official prices and the average market price of state land.

In view of the fact that privatized land is intended for business in agriculture, the prices of land plots in the size category of over 5 ha. were used for the analysis, which represent the purchase of land plots for agricultural use. Land plots in this size category mirror the development of the average official price (graph no. 6). Through analysis, it was confirmed that the official price affects the market price of state land.

Conclusion

It took 20 years for the agricultural land market in the Czech Republic to get to the level that is normal within the EU. In 2011, approximately 2.72% of agricultural land was transacted in the Czech Republic out of the total agricultural land fund. (MoA, 2011a). The average market prices of agricultural land regardless of its utilization increased from **CZK 13.90/m²** in 1993 (MoA, 1999) to **CZK 24.58/m²** in 2007 (MoA, 2009b).

The effect of quality on the market price of agricultural land was proven only in the case of the sale of state land, which is significant in terms of the purpose of its use. For the average market price of agricultural land, a correlation to the quality of the land for agricultural use was not established, which may show that the official price does not objectively express the production capability of land because of the absence of the gradual objective reflection of the effect of economic factors in the official price.

The analysis shows that the development of the market and the market price of agricultural land were significantly affected by the privatization of agricultural land (graph 2,3).

Despite the fact that market prices of agricultural land in the Czech Republic were deformed by state intervention and subsidies provided for agricultural land from EU funds and the PGRLF more than in the 1990's, the decision regarding the privatization of land in 1999 was correct. The proportion of transacted agricultural land in 1993 was 0.17%, and in 2003 3.74% of the total land fund (Němec at al., 2008, MoA, 2009b). An important fact is that the demand increased primarily for land for agricultural use, which is a priority in terms of the protection of the agricultural land fund and the efficiency of agriculture.

In the Czech Republic, market prices of agricultural land for agricultural use fluctuate within

the interval of CZK 7-15/m^2 (RSA, 2012).

A negative factor for the analysis of market prices of agricultural land in the Czech Republic is an absent information system regarding the agricultural land market. There is little access to quality sources of information on prices of agricultural land in the Czech Republic. There is no database containing complete information on business relationships (price of land, size, purpose of use, type of business person, etc.…) Price development is monitored by the Czech Statistical Office, UZEI and the Ministry of Agriculture with different results. The authors of the article suggest the creation of a central database of market prices, the size of land being sold, quality and anticipated manner of use of land plots. Such information could be monitored by cadastral offices along with registration of land plots in the real estate register for individual cadastral areas. It is useful for the above information to be publicly available for potential owners of agricultural land, leaseholders, researchers, the banking sector and government administration.

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References

[1] Alterová, L. Volání po potravinové bezpečnosti, Zemědělec: special and professional weekly, 2009, 17, No. 5, p. 4, ISSN: 1211-3816.

[2] Angus, A., Burgess, P. J., Morris, J., Lingard, J. Agriculture and land use: Demand for and supply of agricultural commodities, characteristics of the farming and food industries, and implications for land use in the UK, Land Use Policy, Supplement 1, December 2009, Vol. 26, pp. 230 - 242, ISSN: 0264-8377.

[3] Bringerzu, S., Schütz, H., Arnold, K., Merten, F., Kabasci, S., Borelbach, P., Michels, C., Reinhardt, G.A., Rettenmaier, N. Global implications of biomass and biofuel use in Germany – Recent trends and future scenarios for domestic and foreign agricultural land use and resulting GHG emissions, Journal of Cleaner Production, Supplement 1, November 2009, Vol. 17, pp. 57- 68, ISSN: 0959-6526.

[4] Buday Š., Bradáčová K. Faktory vplývajúce na rozvoj trhu s pôdou na Slovensku. Collection of papers from seminar Vliv zemědělské politiky EU na využívání půdního fondu a rozvoj venkova. Špindlerův Mlýn, CR. VUZE Prague, 2007, p. 57-63. ISBN 978-80-86671-73-7.

[5] Buday, Š., Krausová,G., Rybár,V. Tendencia rozvoja trhu s pôdou a hospodárenie na pôde v podmienkach EÚ, in Land in 21st century: evaluation and appraisal of agricultural land in the context of natural ressource conservation, Collection of papers of international seminar, 1. -2. 11. 2011, IAEI, Prague, 2011, pp. 13 - 23, ISBN 978-80-86671-85-7.

[6] Ciaian, P., Kancs, D., Swinnen, J. F. M. EU land markets and the Common agricultural policy. Centre for European policy studies. Brussels. 2010. p. 343. ISBN 978-92-9079-963-4.

[7] Deininger, K., Sarris A., Savastano, S., Rural land markets in transition: evidence from six Eastern European Countries, Quarterly Journal of International Agriculture, 2004, 43 (4), Pages 361–390, ISSN: 00498599.

[8] Duke, J., M., Marisová, E., Bandlerová, A., Slovinska, J. Price repression in the Slovak agricultural land market, Land Use Policy, January 2004, 21, 1, pp. 59 - 69, ISSN: 0264-8377.

[9] FAO (2013), FAOSTAT – Agriculture, available: http://faostat.fao.org/site/291/default.aspx, online: April 2013.

[10] Government CZ (2012), available: https://www.euroskop.cz/8961/21269/clanek/komisari-potvrdili-budouci-omezeni-spotreby-biopaliv/, online: February 2012.

[11] Gebeltová, Z, Pletichová, D: Proposal of the Creation of Resources for the Maintenance of the Production Capability of the Agricultural Land Fund by Way of Tax Savings. Agris on-line, 2012, No 4 - special, p. 37-48, ISSN 1804-1930.

[12] Hurrelmann, A., Analysing agricultural land markets as organisations: An empirical study in Poland, Journal of Economic Behavior & Organization, July 2008, Vol. 67, 1, pp. 338-349, ISSN: 0167-2681.

[13] Lerman, Z., Shagaida, N., Land policies and agricultural land markets in Russia, Land Use Policy, January 2007, Vol. 24, 1, pp. 14-23, ISSN: 0264-8377.

[14] LF CR. The Land Fund of the Czech Republic, available: www.eagri.cz, online: December 2012.

[15] Lloyd, T. A. , Rayner, A. J., Orme, C. D. Present value model of land prices in England and Wales, European Review of Agricultural Economics, 1991, Vol. 18, 2, pp. 141-166, ISSN: 01651587

[16] Medonos, T., Vilhelm V., Hruška, M., Jelínek, L. Faktory ovlivňující vývoj cen zemědělské půdy v České republice – regionální pohled, in Land in 21st century: evaluation and appraisal of agricultural land in the context of natural ressource conservation, Collection of papers of international seminar, 1. -2. 11. 2011, IAEI, Prague, 2011, pp. 78 - 87, ISBN 978-80-86671-85-7.

[17] MoA. Ministry of Agriculture, Prague, 1999, Situation and Outlook report – Land, ISBN 80-7084-800-5.

[18] MoA. Ministry of Agriculture, Prague, 2003, ISBN 978-80-7434-005-5.

[19] MoA (2009a). Ministry of Agriculture, Prague, 2009, ISBN 978-80-7434-005-5.

[20] MoA (2009b). Ministry of Agriculture, Prague 2009, Situation and Outlook report – Land, ISBN 80-7084-800-5.

[21] MoA (2011a), Ministry of Agriculture, Prague, 2011, ISBN 978-80-7434-005-5.

[22] MoA (2011b). Pozemkové úpravy, 2. updated issue, MoA CR, 2011, ISBN 978-80-7084-944-6.

[23] MoA. Ministry of Agriculture, Prague 2012, Situation and Outlook report – Land, ISBN 80-7084-800-5.

[24] Němec, J. Bonitace a oceňování zemědělské půdy ČR, VUZE Prague, 2001, ISBN 80-85898-90-X.

[25] Němec, J. et al. Analýza hodnocení trhu se zemědělskou půdou do roku 2006. Editorially adjusted final report 2007. Project NAZV QF 3081. VUZE, Prague: 2008.

[26] NCREIF, 2012. The National Council of Real Estate Investment Fiduciaries, available: https://www.ncreif.org/farmland-returns.aspx, online: January 2013.

[27] Rejfek, F. et al. Bonitace čs. zemědělských půd a směry jejich využití: Stanovení úředních cen zemědělské půdy – Vol. 5., MoA CR, Prague, 1990.

[28] Skalos J., Engstova B. Methodology for mapping non-forest wood elements using historic cadastral maps and aerial photographs as a basis for management, 2010, Journal of Environmental Management, 91, 4, pp. 831 - 843, ISSN: 0301-4797.

[29] Sklenicka, P., Molnarova, K., Pixova, K., C., Salek, M., E. Factors affecting farmland prices in the Czech Republic, Land Use Policy, January 2013, Vol. 30, 1, pp. 130 - 136, ISSN: 0264-8377.

[30] Standard & Poor`s. available: http://www.standardandpoors.com/indices/sp-500/en/us/?indexId=spusa-500-usduf--p-us-l--, online: May, 2013.

[31] Střeleček, F., Lososová, J., Zdeněk, R. Výše pachtovného v závislosti na struktuře výroby, in Land in 21st century: evaluation and appraisal of agricultural land in the context of natural ressource conservation, Collection of papers of international seminar, 1. -2. 11. 2011, IAEI, Prague, 2011, pp. 67 - 77, ISBN 978-80-86671-85-7.

[32] Ravallion, M., Chen S., Sangraula, P. Dollar a day, The World Bank Economic Review, 2009, pp. 163-184, Online ISSN 1564-698X, Print ISSN 0258-6770.

[33] RSA. Real estate agency, available: www.farmy.cz, online: October 2012.

[34] TP fund (2011). Traxis Partners hedge fund, available: www.HedgeLists.com, online: January 2012

[35] UN. The State of Food Insecurity in the World 2012, Food and Agriculture Organization of the United Nations, 2012, ISBN 978-92-5-107316-2.

[36] Vilhelm V. et al. Vývoj trhu se zemědělskou půdou a identifikace faktorů ovlivňujících vývoj cen zemědělské půdy v podmínkách ČR". Topical task 22 (4233), December 2012, IAEI, Prague.

[37] Vopravil, J. et al. Systém bonitovaných půdně ekologických jednotek – současnost a jejich Budoucnost, in Land in 21st century: evaluation and appraisal of agricultural land in the context of natural ressource conservation, Collection of papers of international seminar, 1.- 2. 11. 2011, IAEI, Prague, 2011, pp. 93 - 100, ISBN 978-80-86671-85-7.

[38] Zákon č. 503/2012 Sb. o Státním pozemkovém úřadu, available: http://www.sbirka.cz/POSL4TYD/NOVE/12-503.htm, online: May 2013