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Factors affecting farmland prices in the Czech Republic

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ABSTRACT

The spatial variability of farmland prices is determined by factors reflecting agricultural use, and also by location-specific characteristics, which are crucial to the conversion of farmland to non-farming uses. In co-operation with experienced real-estate brokers, we collected data from 286 transactions carried out in 2008. We identified factors to be analyzed at the parcel scale and tested their effect on the variability of farmland prices in the Czech Republic using general linear modeling. Our results indicate that the most powerful factor in explaining the sale price per square metre was proximity to a settlement, and significantly higher prices were found close to existing built-up areas. The next most powerful factors were: municipality population, travel time to the capital city, accessibility of the parcel, and natural soil fertility. The results have been interpreted to determine the threshold values for significant factors that support future non-agricultural use of farmland and significantly raise current farmland prices. The values supporting non-agricultural use of farmland are proximity to a settlement (up to 100 m), proximity to a larger municipality (above 5000 inhabitants), short travel time to the capital city (up to 1 h) and accessibility to the parcel via the transportation network.

Introduction

The price of farmland is determined by many agronomical, economic, demographic and geographic factors (Drescher et al., 2001; Huang et al., 2006; Skaloš et al., 2011). The determinants of farmland price volatility vary according to future land development (Plantinga and Miller, 2001). From the standpoint of agricultural use, the factors most frequently quoted as significant determinants of farmland price are soil quality, water supply, land rents, farm returns, farm size, location in relation to markets, various land lease arrangements, and agricultural subsidies (Palmquist and Danielson, 1989; Lloyd et al., 1991; Sogaard, 1993; Bastian et al., 2002; Awasthi, 2009).

The value of non-agricultural characteristics of farmland has been noted in many previous studies that describe the frequently speculative character of business transactions where the buyer intends to develop the land, usually for residential, commercial or recreational purposes. Buyers with a special motivation often pay a premium to obtain agricultural land (Drozd and Johnson, 2004). In comparison with these forms of motivation, non-agricultural use of farmland for habitats or for open spaces is usually a less significant driver of increases in farmland prices (Skaloš and Engstová, 2010). However, these forms of use also increase the competition for farmland (Bastian et al., 2002). Barnard (2000) estimates that non-agricultural influences account for about one-quarter of the average market value of US farm real estate. In such cases, location-specific characteristics, which do not reflect the agricultural characteristics of the land, are capitalized into land prices (Cho and Newman, 2005; Tan et al., 2009; Spinney et al., 2011).

The conversion of farmland to non-agricultural use is, according to many authors, supported especially by proximity to a settlement, i.e. the distance to the edge or the centre of the nearest municipality (e.g. Cheshire, 1995; Guiling et al., 2009). Naydenov (2009) confirmed a significant negative relationship between distance to the capital city and land prices in one part of Bulgaria, whereas in another part of the country the effect of the distance of the parcels from the seaside was prevalent. Besides proximity to a metropolitan area, Stewart and Libby (1998) emphasize the role of the quality of the infrastructure and of accessibility, especially proximity to a highway or to a state road. Drescher et al. (2001) and Lisec and Drobne (2009) also describe the influence of the natural amenities of an area on the farmland market, noting that the presence of natural amenities increases recreational activities and retirement activities, which are further capitalized into land prices. Palmquist and Danielson (1989) and Guiling et al. (2009) found a positive influence of the size of the adjacent settlement, or of the local population, on land prices. Forster (2006) reports a higher level of conversion of farmland to residential and commercial use in areas where population growth is occurring.

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Similarly as in other post-socialist countries (Deininger and Jin, 2003; Drobne et al., 2009), the real estate market of the Czech Republic and the methods for its evaluation are still in the development phase. To date, no comprehensive studies focusing on the sales of agricultural land have been published. However, partial results (e.g. Sklenicka and Salek, 2008) show that since the transition to democracy in 1989 and the restitution of agricultural land in the following years, there has been a clear prevalence of the rental market over the sales market. The results further show that factors affecting landowners' decisions to sell or rent their land include low current prices of agricultural land and lack of credit policies enabling potential farmers to buy land. This situation leads to renting subjects farming large blocs of land, a phenomenon which many studies have shown to be potentially disadvantageous both from the environmental standpoint (Petit and Usher, 1998; Lovett-Doust et al., 2003) and from the standpoint of the efficiency of agricultural production (Deininger and Jin, 2003). Where agricultural land is sold, the transactions usually involve individual parcels or groups of parcels, rather than the whole farm.

The two main acts used within the Czech legal system to control the transformation of agricultural land to buildable land are the Act no. 183/2006 on Spatial Planning and Building Rules ("Building Act") and Act No. 334/1992 on Protection of Agricultural Land Resources. While spatial planning, institutionalized by the Building Act, protects agricultural land by zoning, the Act on Protection of Agricultural Land Resources enables the authorities to charge relatively high one-time fees for the transformation of agricultural land to buildable land within this zoning. However, the current system does not utilize some of the measures proposed by recent research (e.g. Deininger and Jin, 2003; Deininger et al., 2003) to promote efficient land utilization and access to the land by farmers by poor but efficient farmers, such as a realistic level of land taxation and efficient credit policies to support farming subjects and prevent distress sales.

Studies of farmland prices can be divided into two broad categories, according to their focus on agricultural or non-agricultural factors. A comprehensive overview of both these categories of studies and of the variables that are used has been presented by Shi et al. (1997). Our study cites some more recently published works. Apart from these two categories, there are models that combine the approaches of the two types of studies. One of the earliest of these models was a study by Scharlach and Schuh (1962). More recent examples include the works of Bernischka and Binkley (1994), and Plantinga and Miller (2001). Some of these studies use time-series data, some use cross-sectional data, and some combine these two types. Both parcel level data and aggregated data from secondary sources are used for model estimation (Shi et al., 1997).

The goal of this study is, in co-operation with experienced real-estate brokers, to identify the factors which can act as determinants of land prices in the Czech Republic. We then test the significance of these factors, related both to agricultural and non-agricultural use of farmland, for the spatial variability of land prices at the parcel scale, and verify the hypothesized relationships between the most significant predictors and the price of agricultural land (Table 1).

Table 1
Factors potentially influencing farmland prices, identified by 17 real estate brokers. The table lists the frequency of repeatedly identified factors and the influence of each factor on farmland prices predicted by the brokers. Only variables identified as potentially significant by more than one respondent are listed. Where the brokers agreed in their predictions, a positive influence of the higher value of a factor on land prices is marked (+), and a negative influence is marked (−). Where the opinion was not uniform, the influence was marked (?). Based on further discussion with the participating brokers, the factor Travel Time to a City was subsequently divided into 3 separate factors: Travel Time to the Capital City (over 1 million inhabitants), Travel Time to the Regional Capital (hundreds of thousands of inhabitants) and Travel Time to a District Town Capital (tens of thousands of inhabitants), to describe the influence of the size of the town combined with the travel time to this town.

Factor potentially influencing the prices of farmland	Number of identifications	Hypothesized influence
Parcel size	17	+
Travel time to a city	16	−
Proximity to a settlement	16	−
Soil fertility	14	+
Parcel accessibility	14	+
Municipality population	12	+
Distance from a recreationally used waterbody	4	−
Risk of soil and crop contamination	4	−
Inundated area	4	−
Highly eroded soil	4	−
Scenic vistas	3	+
Nature conservation	3	?
Steep slope	3	−
Real income	3	+
Land rents	3	+
Systematic drainage	2	?
Irrigation	2	?
Infrastructure	2	+
Angling opportunities	2	+
Shape of the plot	2	?

Methods

Data collection

In this study, the term "farmland" is used as a synonym for the word "agricultural land", meaning "land including arable land, land under permanent crops and land under permanent meadows and pastures" (OECD, 1997).

The data was collected in the course of 2008, and samples were chosen throughout the Czech Republic (Fig. 1) to represent the entire range of the country's natural and socio-geographic heterogeneity. We co-operated with 17 real-estate agencies, whose scope covers all 14 regional administrative units of the Czech Republic. The sample used in this study includes all transactions carried out by these 17 agencies in 2008 in which only one parcel or a group of adjoining parcels was sold. In other transactions, the price reflected the variable characteristics of all the sold parcels, and it would therefore be impossible to determine the influence of individual factors. All transactions included in the sample took place between a willing buyer and a willing seller, there were no distress sales or transactions between co-owners, as all these circumstances could influence the price in manners which would be difficult or impossible to assess. To objectivize the initial choice of potential determining factors, brokers ($n = 17$) with a minimum of 5 years of experience in real estate were asked to list the 10 most significant factors that influence land prices in the Czech Republic. The number of brokers who identified each factor as important determined the importance attached to the factor. Six predictors were chosen on the basis of this simple questionnaire. As shown in Table 1, these 6 factors reached a very high level of correspondence (at least 12 out of 17 brokers identified them as important; i.e. more than 70% of the brokers), whereas the level of correspondence in other factors was relatively low (they were identified as important by 4 or fewer brokers; i.e. fewer than 25%). Based on further discussion with the participating brokers, the factor Travel Time to a Large Town was divided into 3 separate factors: Travel Time to the Capital City (over 1 million inhabitants), Travel Time to the Regional Capital (hundreds of thousands of inhabitants) and Travel Time to the District Town (tens of thousands of inhabitants), to describe the influence of the size of the town combined with the travel time to this town.

The study therefore tested 8 predictors, 3 of which can be described as agricultural and 5 as non-agricultural explanatory