



# Capitalisation of the government support in agricultural land prices in the Czech Republic

Laure Latruffe, Tomas Doucha, Chantal Le Mouël, Tomas Medonos, Vaclav Voltr

## ► To cite this version:

Laure Latruffe, Tomas Doucha, Chantal Le Mouël, Tomas Medonos, Vaclav Voltr. Capitalisation of the government support in agricultural land prices in the Czech Republic. *Agricultural Economics (Zemedelská Ekonomika)*, 2008, 54 (10), pp.451-460. hal-01462332

**HAL Id: hal-01462332**

**<https://hal.science/hal-01462332>**

Submitted on 31 May 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Capitalisation of the government support in agricultural land prices in the Czech Republic

## *Kapitalizace dotací do cen zemědělské půdy v České republice*

L. LATRUFFE<sup>1,2</sup>, T. DOUCHA<sup>3</sup>, CH. LE MOUËL<sup>1,2</sup>, T. MEDONOS<sup>3</sup>, V. VOLTR<sup>3</sup>

<sup>1</sup> INRA, Rennes, France

<sup>2</sup> Agrocampus, Rennes, France

<sup>3</sup> Institute of Agricultural Economics and Information, Prague, Czech Republic

**Abstract:** The recent implementation of the CAP Single Area Payments in the EU New Member States raises the question of whether a quick capitalisation of these payments is expected. Capitalisation of public support to agriculture into land prices indicates that the benefits are partly transferred toward landowners rather than toward producers. This distributional aspect is of particular importance in countries where a large proportion of land is farmed by producers who do not own this land. This study investigates the influence of several types of support on Czech agricultural land prices from private transactions between 1995–2001. The past period direct payments have been capitalised at the strongest rate, despite their low level and imperfections on the land market, suggesting that such support is most easily transferred to land values. A continuing capitalisation might threaten the farming activity, as farms are almost only tenanted. And because most of the landowners live in towns, there is a risk of an extreme leakage of support not only outside the farming sector, but also outside the rural sector.

**Keywords:** land prices, agriculture, capitalisation, public support, direct payments

**Abstrakt:** Nedávná implementace jednotných plateb na plochu (SAP), realizovaných v rámci SZP v nových členských státech EU, vyvolává otázku, zda je možné očekávat rychlou míru kapitalizace těchto plateb. Kapitalizace podpor do cen půdy představuje jev, kdy jsou tyto podpory částečně přenášeny vlastníkům půdy spíše než zemědělským výrobcům. Uvedený distribuční aspekt je předmětem pozornosti zejména v zemích, kde je velká část půdy obhospodařována zemědělskými výrobci, kteří tuto půdu nevlastní. Příspěvek se zabývá vlivem vybraných typů podpor na ceny zemědělské půdy v ČR v případě transakcí s půdou od soukromých osob v období 1995–2001. Přímé platby ve sledovaném období byly kapitalizovány ve vysoké míře i přes jejich nízkou úroveň a přítomnost nedokonalostí na trhu s půdou. Toto zjištění vede k tvrzení, že tento typ podpor je docela snadno převáděn do hodnoty půdy. Pokračující kapitalizace by mohla ohrozit zemědělské činnosti, protože zemědělské podniky si půdu především najímají. Navíc je zde velké riziko prosakování podpor nejen mimo zemědělský sektor, ale také mimo venkovský prostor, protože většina vlastníků zemědělské půdy žije ve městech.

**Klíčová slova:** ceny půdy, zemědělství, kapitalizace, dotace, přímé platby

The large fluctuations in farmland prices that have been observed in some developed countries have stimulated research on the factors influencing land prices. Among these factors, government agricultural support programs have received special attention because their potential impact on farmland prices raises the sensitive questions of the leakage of support out of the agricultural sphere, and of the distribution of

the benefits of support programs. While supporting farmers' income is a major objective of agricultural policies, if the implemented programs make agricultural land prices to drive up, they raise production costs, hence transferring benefits toward landowners rather than toward the targeted population (the producers). This distributional aspect is of particular importance in countries where a large proportion

of land is farmed by producers who do not own this land, such as in the Czech Republic where corporate farms and large individual farms cultivate most of the agricultural area of the country, but rent more than 85 percent of it from private landowners.

Most of the existing studies dealing with farmland price formation have been undertaken in North America. For example Barnard et al. (1997) in the United States (US) and Clark et al. (1993) in Canada found some evidence of capitalisation of subsidies in land values. By contrast, very few studies are concerned with farmland price formation in the European Union (EU), although the topic is gaining an increasing attention following the last two Common Agricultural Policy (CAP) reforms attempting to decouple the support, and none of them are in the Central and Eastern European Countries (CEECs) (for a review of existing studies, see Latruffe, Le Mouél 2006b).

The objective of the paper is to assess to what extent the government support in the Czech Republic has been capitalised in the price of agricultural land over the past period 1995–2001. Not only will this paper contribute to the research about the issue of support capitalisation in the EU and in particular in the CEECs, but such analysis is even more legitimate in the New Member States (NMS) such as the Czech Republic, where the level of support post-accession is much higher than pre-accession.

The paper is structured as follows. The next section reviews the concept of capitalisation of public support in agricultural land prices, and describes the evolution of agricultural support and the characteristics of the agricultural land market in the Czech Republic. The third section presents the methodology and the data, while the fourth section discusses the results. The last section concludes.

## BACKGROUND

### Capitalisation of public support in agricultural land prices

Capitalisation formulae, derived by the present value model (PVM), underlie most of the studies concerned with the farmland price formation. The PVM stipulates that the price of an income-earning asset at the beginning of a time period  $t$  ( $L_t$ ) is equal to the discounted expected value of the stream of future net returns or rents to this asset (Weersink et al. 1999):

$$L_t = \sum_{i=0}^{\infty} \frac{E(R_{t+i})}{(1+r_{t+1})(1+r_{t+2})\dots(1+r_{t+i})} \quad (1)$$

where  $R_{t+i}$  is the net real return at the end of time period  $t+i$ , generated from owning the asset,  $r_t$  is the time varying discount rate, and  $E$  is the expectation on returns, conditional on information in period  $t$ .

Several studies investigating farmland price formation based on the PVM have used the capitalisation formula given in (1) in the simplest form, that is to say assuming a constant discount rate and risk neutral individuals, and ignoring the differential tax treatments of capital gains and rental income (e.g. ERS USDA 2001; Shaik et al. 2005). In this case, the model reduces to the basic capitalisation formula as follows:

$$L_t = \frac{R_t}{r} \quad (2)$$

where:  $r$  is the time-constant discount rate.

However, many refinements of the formula can also be found in the literature, whether it is assumed a time-varying discount rate, various expectation schemes, differentiated taxes, or that the agricultural land prices may result from alternative uses of land (e.g. Alston 1986; Lloyd et al. 1991; Chavas, Jones 1993; Just, Miranowski 1993; Goodwin et al. 2003). As for the investigation of the capitalisation of public support in agricultural land prices, it can be done by separating the returns to farming into the returns from production and the subsidies received (e.g. Weersink et al. 1999; Lamb, Henderson 2000; Duvivier et al. 2005).

An alternative framework to the PVM, for investigating the effect of public support on farmland prices is the hedonic price approach (e.g. Barnard et al. 1997; Taylor, Brester 2005). This approach relies on the idea that the land price is determined by the meeting of sellers' and buyers' bids, based on their respective maximised profit. However, in this framework the determinants of land price are often chosen in an *ad hoc* way.

Despite the difference in approaches, most of the empirical studies gave evidence of the significant impact of government payments and other types of support (price support, quotas) on agricultural land prices. In general, studies agree that the support accounts for around 15–30 percent of the land prices (e.g. Just and Miranowski, 1993; ERS USDA 2001; Shaik et al. 2005), and that land prices are more responsive to the government-based returns than to the market-based returns (e.g. Goodwin, Ortalo-Magné 1992; Weersink et al. 1999; Duvivier et al. 2005). Most of the studies were applied to the US or Canada, and more rarely to Europe (the United Kingdom, France or Belgium, never in the CEECs).

## Development of the agricultural policy in the Czech Republic

Based on policy priorities, it is possible to identify five phases in the agricultural policy development in the Czech Republic during the period 1989–2004. The beginning of transition was marked by the introduction of market liberalisation and basic legislation for property transformation in agriculture, but the support to farm income was similar to the pre-reform period. Such phase of “initial policy” (1989–1992) triggered the process of farm restructuring. The process of restitution and transformation graduated in the second phase of further liberalisation, “liberal policy” (1993–1994). However, this phase was characterised by the almost total reduction of all income support to farms. By contrast, investment support (in the form of interest free loans), for establishing and strengthening new farms, was introduced. The next policy phase of “development and stabilisation” (1995–1998) consisted in the gradually re-introducing direct support in a view of easing farms’ financial problems, and in launching new forms of investment support such as the interest-subsidised and guaranteed loans. The policy phase in the next year (1999–2000), “revitalisation”, started off the adjustment of the Czech policy to a CAP-like policy. The policy emphasised the re-orientation of farms on non-market activities and the multifunctional roles of agriculture. A relatively large share of supports was given in the form of various disaster payments. In the “pre-accession-adaptation” phase (2001–2004), the stress was put on the alignment with the CAP, with policy measures including the

legislative and institutional harmonisation with the EU. The policy was assisted by the EU pre-accession structural programmes (SAPARD).

Figure 1 shows the evolution, during the period studied in this paper (1995–2001), of the deflated value of four types of support to agriculture in the Czech Republic: market price support, payments based on input use, payments based on area planted/animal numbers, and other payments. Following the OECD definition, the latter include payments based on output, payments based on historical entitlements, payments based on input constraints, payments based on the overall farm income, miscellaneous payments, and general services. The absolute value of the total support experienced a peak in 1998, just before the start of the alignment of the Czech policy on the CAP measures. Market price support accounted for the major part of the total support, except in 1997 where payments based on input use were the bulk. Direct payments (i.e. payments based on planted area or on animal numbers) were almost non-existent at the beginning of the period considered (2 percent of the total support), but increased considerably to almost one quarter of the total support in 2001.

After the EU accession on 1<sup>st</sup> May 2004, the structure and orientation of support have not been altered in principle. However, the amount of support changed markedly. In comparison with the period of 2001–2003, subsidies for farms have doubled from 15 000 million CZK to almost 30 000 million CZK. According to Doucha (2006), the support after the EU accession is from one half distributed in the form of direct payments per hectare, the Single Area Payments

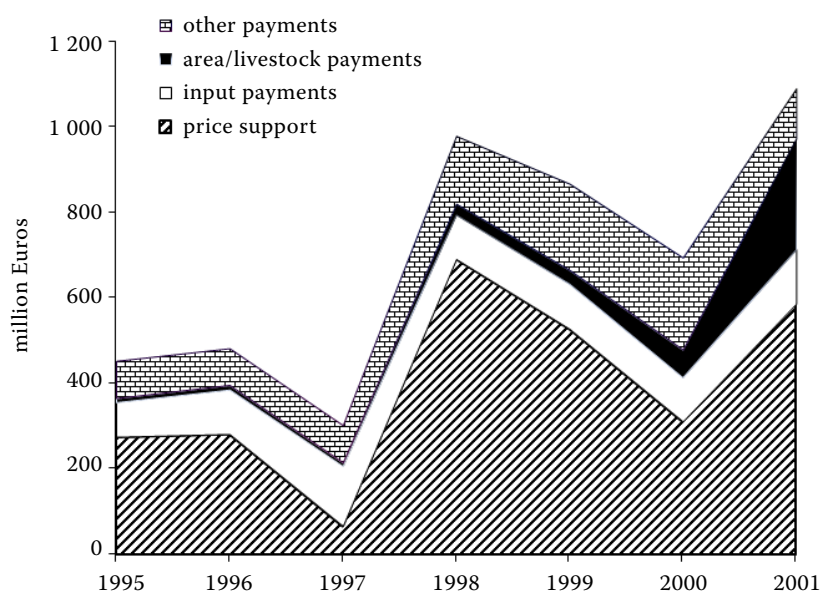


Figure 1. Evolution of the deflated public support to agriculture in the Czech Republic between 1995 and 2001

(SAP), supported by the EU budget. Farms can also receive the coupled top-ups and other direct commodity payments from the national resources. The Less Favoured Area (LFA) payments and the agro-environmental support in the framework of the Horizontal Rural Development Program have increased nearly three times compared with the pre-accession period and are playing a substantial role in farm income. A substantial part of the former investment support provided by the Support and Guarantee Farm and Forestry Fund (SGFFF) was re-allocated in the form of operational support, with a bigger focus on food security, animal welfare and environment. Finally, market price support (from the EU budget) and other national subsidies (including disaster compensations) have been reduced, while the nominal value of support in the frame of the general services (research, education, extension services, etc.) is on a similar level as the pre-accession one.

### **The Czech agricultural land market**

The Czech agricultural land market was utterly insignificant in the pre-reform period. Although private ownership of land, resulting from several land reforms that started in 1918, was not abolished under the Communist regime, land use rights totally prevailed to land ownership rights. The changes in land property and use after 1989 have been directly influenced by several policy measures, including the legislation for restitution of the ownership titles (The Land Law, The Restitution Law), the legislation for privatisation of the state-owned land (since 1999), the delimitation of the level of rents (to 1 percent of the administrative price of land in case both parties do not reach an agreement<sup>1</sup>), the legislation for land consolidation (re-parcelling), the introduction of administrative limits to land purchases by foreigners (The Foreign-Exchange Law), the establishment of rules for the market of private land (The Civil Code, The Business Code), and the launch of supports for the purchase of private land through the SGFFF<sup>2</sup> and for land consolidation.

However, functioning of the land market is still hindered by several barriers, which are mostly the heritage from the past. Owners' identification in the

regions from where Germans were expelled after World War II and where the special allotment system was applied for newcomers is still problematic. Regarding the parcels themselves, the main problems are the inaccessibility to them, and the impossibility to physically identify their boundaries. Particularly after 1970, during the creation of the socialistic large-scale farming, parcels were merged into extremely large fields, accompanied with the almost total destruction of the natural physical boundaries. The restitution additionally resulted in a severe fragmentation of ownership (there are nowadays approximately 3.5 millions of very small landowners), sharply contrasting with the extreme land use concentration (about 5 percent of the farms use about 75 percent of the land)(Doucha, Divila 2005; Voltr 2000; Lošťák et al. 1999). Another consequence is the inconsistency between the land ownership registration and the land use registration. According to the Czech Cartography Authority, the sum of the (owned) parcels amounts to about 4.3 million ha of agricultural land. This area is defined as the Czech Agricultural Land Fund (ALF). However, according to the Czech Integrated Administrative and Control System (IACS), the sum of (used) land blocks of the Czech agricultural land, eligible for direct payments, amounts only to about 3.5–3.6 million ha. This area is defined as the Czech Utilised Agricultural Area (UAA).

Most of the abovementioned problems can be alleviated by the realisation of land consolidation (re-parcelling) in the individual cadastres. However, in spite of the policy declarations, the financial sources for these purposes were relatively low for a long time until 2006, and the processes have been very slow. After 17 years of reform, the finished complex land consolidations cover only 328 134 ha of agricultural land (i.e. about 8 percent of the Czech ALF), representing only 788 cadastres out of 13,000. This echoes in Dale and Baldwin's (2000) conclusions. The authors argued that three pillars are necessary for the effective functioning of the land market: (1) land registration (to ensure ownership titles and rights), (2) land valuation (to provide a basis for pricing), and (3) financial services (to ensure access to capital and credit). Dale and Baldwin then carried out a comparative study of some CEECs, in terms of the achievement in each pillar over the transition

<sup>1</sup> All agricultural land for individual cadastres (as the elementary area units) is given an administrative price, used in particular for tax purposes. The prices reflect soil quality or the so-called rent effects.

<sup>2</sup> The programme "Land" in the frame of the SGFFF has been functioning since 2004. When purchasing private land, farmers can benefit from the interest-subsidised loans extended by commercial banks but subsidised by the government. Banks also provide credit amounting to maximum 90 percent of the collateral value of land for a repayment period of 10–20 years.

period. According to them, the reform in the Czech Republic has mainly developed the first pillar, but the latter is still insufficient (rated 3.5 on a scale from 1 to 5). As a consequence, the land sale (and even lease) market is still undeveloped, burdened with high transaction costs and accompanied with a weak bargaining power of the landowners (or with a monopsony position of land users, respectively). This results in relatively low prices of land or low rents for the leased land (Vrbová and Němec 2005; Němec 2005; Němec, Kučera 2007).

Nowadays, the Czech land market consists of four main segments, depending on whether the land is leased or sold, and whether there is a state interference or not. The lease market, whether it is for the state-owned or private land, still utterly prevails as a consequence of the abovementioned barriers and problems: about 85 percent of the farms' UAA is leased. The sale market, although it is influenced by the possibility to use the land for non-agricultural purposes, is therefore relatively insignificant. The sub-segment of sold land with the state interference comprises the land sold through the privatisation of the state land (1.0–1.5 percent of the Czech ALF after 2002), the land sold after the restitution by the state of parcels that had been confiscated under the communist regime for housing or other purposes, and purchases of private land by the state in the defined public interests (for industrial zones, highways, etc.) The fourth sub-segment, which is the one of interest for this paper, is the sale market for private land without any state interference. This sub-segment covers yearly only about 0.1–0.2 percent of the Czech ALF.

## METHODOLOGY AND DATA

### The model

#### Theoretical model

The present study is based on the PVM as given by the equation (1), assuming that the agents are risk neutral and that the tax rates are similar. The discount rate is not assumed to be time-constant, but the model is extended in two ways. Firstly, by separating the returns to land from two sources, market-based returns ( $M$ ) and government-based returns ( $G$ ), as in Weersink et al. (1999). Secondly, by including the value of the option to convert the land to non-agricultural use such as development ( $CONV$ ), as in Goodwin et al. (2005). The PVM used here is therefore:

$$L_t = \sum_{i=0}^{\infty} \frac{M_{t+i} + G_{t+i}}{(1+r_{t+1})(1+r_{t+2})\dots(1+r_{t+i})} + CONV_t \quad (3)$$

#### Empirical specification

The above model suggest that the factors affecting land prices are fourfold,  $M$ ,  $G$ ,  $CONV$  and  $r$ . This implies land prices to be regressed on proxies for market-based returns, government-based returns, non-agricultural land use, and discount rate.

The land prices used were the deflated prices per hectare of land, as averages per district and per year (*price*). The average yearly interest rates for credit in the country were used as a proxy for the discount rate (*interest*). The market-based returns were proxied by the average crop yields at the district level and per year (*yield*). Data about support to agriculture were unfortunately not available at the district level. One option was to use the support received by farms registered in the Farm Accountancy Data Network (FADN). However, the availability was constraining the estimation too much (data available from 1998 only), and besides, such data would not capture the support received by all farmers, as the FADN system is under-representative of small farms. Therefore, the national (deflated) data were used instead (*support*). This specification implicitly assumes that the effect of support is similar across districts. Several models were estimated. The first one includes the yearly total support to agriculture in value, while the others include separately one type of support in value, such as market price support, payments based on the planted area or animal numbers (called direct payments in what follows), etc (the separation of the total support into different types of support for this research was made according to the OECD classification, as explained in Section 2.2). As for the other use of land, the yearly average population density in the district was used (*density*). Additionally, the average plot size of the transactions was included in the model, in order to account for the size effects not captured by the price per ha (*plot*).

Panel techniques accounting for district effects (*effects*) were applied. A double-log model was used, giving as estimated coefficients the elasticity of the price with respect to each determinant. The equation estimated was therefore the following:

$$\ln(\text{price}_{i,t}) = \beta_0 + \beta_1 \ln(\text{plot}_{i,t}) + \beta_2 \ln(\text{interest}_{i,t}) + \beta_3 \ln(\text{yield}_{i,t}) + \beta_4 \ln(\text{support}_t) + \beta_5 \ln(\text{density}_{i,t}) + \beta_d \text{effects} + u_{i,t} \quad (4)$$

where  $i$  represents the district and  $t$  the period.<sup>3</sup>

<sup>3</sup> Yearly dummies did not show any significant influence, and were therefore removed from the final specification.

## Description of the data

In the Czech Republic, the agricultural land market activity is followed since 1993 by the Czech Agricultural Research Institute (VUZE) for 25 districts, representing 37 percent of the agricultural area (ALF) of the whole country. In this paper, only private transactions were considered, between physical or private legal persons. All transactions, whatever the plot size, are registered in cadastres.

Figure 2 displays the evolution of the deflated land prices as averages of the surveyed districts between 1995 and 2001. The average price for all plots exchanged shows an increasing trend, except for a drop in 1999. This fall in prices can be explained by the law introduced at this date about the sale of state land. The law implied that during the following years more than 750 000 ha of state-owned agricultural land were for sale. Although such land is not considered in the statistics represented on Figure 2, the sale of state land reflected on the private market.

Figure 2 also shows that the average price for all plots over the whole period is about 6 600 euros per ha, which is very high when compared to the other CEECs or to the Western European countries (for a comparison of some EU-25 countries, see Latruffe, Le Mouél 2006a). This average price is in fact driven up by the high prices of plots less than 1 ha, the averages of which are also represented on Figure 2. Over the period studied, the average price of such plot is about 14 000 Euros per ha. This is explained by the fact that very small plots of agricultural land, although they are registered as agricultural land type at the time of the transactions, are mainly sold for

building purposes. On the contrary, plots larger than 5 ha, which are used only for agricultural purposes, are much less expensive as shown by Figure 2 (about 1 500 Euros per ha) and closer to the other CEECs' averages. But such plots account for the minority of the agricultural land exchanged on the Czech market: almost 90 percent of the sales of agricultural land are below 1 ha, according to Vrbová and Němec (2005). This is confirmed in the sample used in this paper, where the average size of the plots sold over the period studied is 0.6 ha.

Regarding the other determinants, the support values have been discussed in Section 2.2 and Figure 1. As for crop yields, they have remained fairly stable during the period considered (around 4 t/ha for the whole country), while the population density has increased (reaching 117 inhabitants/km<sup>2</sup> in average for the country in 2001) and the interest rate has decreased (from around 13 percent in the first years to 7 percent in 2001).

## RESULTS

Results indicate that the total support to agriculture has no significant effect on the price of agricultural land during the period studied. A similar conclusion is reached for all types of support (based on the OECD classification). However, the finding is different when using the first lagged value of support as the explanatory variable ( $support_{t-1}$  for explaining  $price_t$ ). Two types of past support have an influence on agricultural land prices: payments based on output and payments based on the overall farm income.

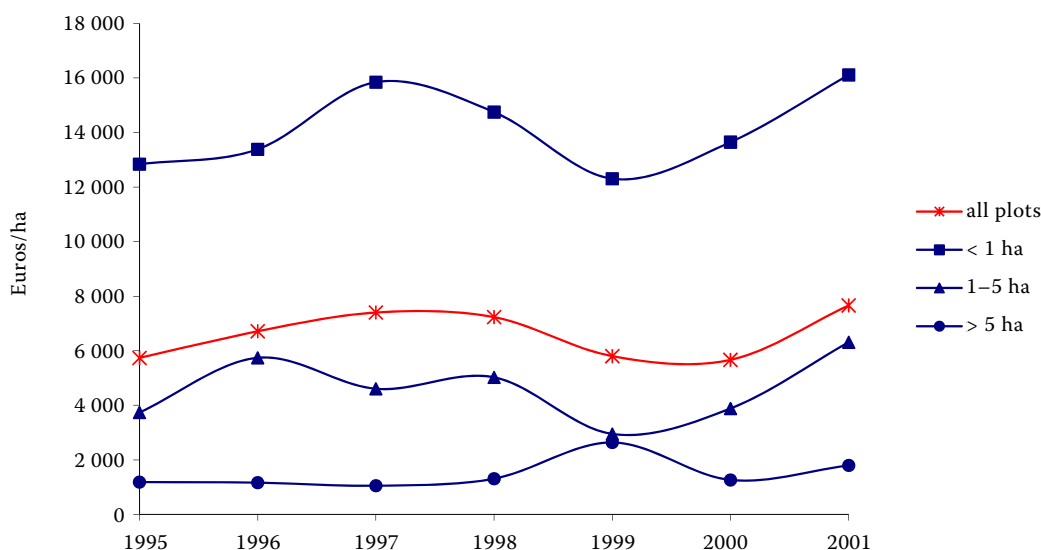


Figure 2. Evolution of the deflated agricultural land prices in the Czech Republic between 1995 and 2001

Table 1. Determinants of the logarithm of land prices for all plots – Model results

Determinant	Parameter	<i>t</i> -value	Significance
Constant	8.94	6.57	***
Log of Plot size ( <i>t</i> )	−0.49	−3.68	***
Log of Interest rate ( <i>t</i> )	0.36	1.95	**
Log of Crop yield ( <i>t</i> )	−0.62	−1.41	
Log of Payments on output ( <i>t</i> − 1)	0.04	1.98	**
Log of Density ( <i>t</i> )	−2.92	−0.45	
Number of observations		122	
<i>R</i> <sup>2</sup>		0.36	

The dependent variable is the logarithm of the average price for all plots at time *t*  
significance: \*\*\*, \*\*, \* is at the 1-, 5-, 10-percent level

Table 1 reports the results for the model including the payments based on output.

The population density and the average crop yield had no significant influence on the prices, while the interest rate and the support payments had a positive effect and the average plot had a negative impact. The negative impact of the average plot size confirms what was shown by Figure 2, namely that smaller plots are more expensive than larger plots. Plot size is the strongest determinant of the land prices in terms of statistical significance; this is confirmed by the Spearman correlation coefficients: −0.57 for plot size; −0.03 for interest rate; 0.22 for crop yield; 0.05 for payments based on output; 0.37 for population density. Although the regression coefficient for the latter is not significant, the rather high correlation coefficient suggests the existence of opportunity cost of alternative uses of land such as housing.

The elasticity of land price with respect to payments based on output is 0.04. Due to the logarithmic specification of the econometric model, this is an

elasticity calculated at the sample's mean. The value indicates that, on average, land prices were increased by 0.04 euro per ha for every additional euro per ha of past period support in the form of output payments delivered to agriculture. As shown by Table 2, the elasticity of the other significant support, namely the payments based on farm income, is of similar extent: 0.06. As for direct payments (although such payments in the context of the CAP did not exist in the Czech Republic before 2004, we use the name for payments based on the planted area or on animal numbers based on the OECD classification), they had no effect on land prices, suggesting an absence of capitalisation of such support. However, additional estimations were performed using prices of various types of land (arable land, pasture and gardens). The results presented in Table 3 indicate that, while direct payments have no significant influence on the prices of arable land, they were capitalised in pasture and garden land. The elasticity is much higher than the one for payments based on output or on income: 0.89 for pasture plots, 0.61 for garden plots. This figure is in line with studies in the US in the 90es, such as Lence and Mishra (2003) and Roberts et al. (2003), who found an increase of land prices by 0.13 to 0.85 dollars for one more dollar of public support. The fact that one additional unit of payment results in an increase of less than one land price unit was also given evidence by Rutherford et al. (1990) using a general equilibrium model. The authors explained this dilution effect by the conditionality of the support, such as set-aside requirements which imply additional costs for the participants and offset the benefit of the support. Similar costs can be considered for the direct payments to arable land in the Czech Republic during the last pre-accession years. The discrepancy in elasticity value between direct payments on the one hand, and payments based on output and income on the other hand, may be due to the fact that the latter have been launched in 2000 only. Payments based on output were similarly capitalised in the three land types (Table 3), while

Table 2. Comparison of the effect of various payments

Payment type	Parameter for Log of Payments	<i>t</i> -value	Significance
Direct payments ( <i>t</i> − 1)	0.06	0.89	
Payments based on output ( <i>t</i> − 1)	0.04	1.98	**
Payments based on farm income ( <i>t</i> − 1)	0.06	1.75	*

The dependent variable is the logarithm of the average price for all plots at time *t*  
significance: \*\*\*, \*\*, \* is at the 1-, 5-, 10-percent level



Table 3. Comparison of the effect of various payments on different plot types

Plot type	Parameter for Log of payments ( $t - 1$ )	$t$ -value	Significance	Number of observations	$R^2$
<b>Direct payments</b>					
Arable land	0.22	0.77		121	0.19
Pasture	0.89	2.36	**	121	0.22
Gardens	0.61	2.86	***	121	0.17
<b>Payments based on output</b>					
Arable land	0.07	2.16	**	121	0.20
Pasture	0.10	2.40	**	121	0.22
Gardens	0.06	2.64	***	121	0.17
<b>Payments based on farm income</b>					
Arable land	0.08	1.58		121	0.19
Pasture	0.11	1.64	*	121	0.22
Gardens	0.07	1.98	**	121	0.16

The dependent variable is the logarithm of the average price for all plots at time  $t$   
significance: \*\*\*, \*\*, \* is at the 1-, 5-, 10-percent level

payments based on farm income were not capitalised in arable land. Market price support was, however, not capitalised although it was the highest support during the period.

## CONCLUSION

The continuous attempts by the European Commission to decouple support to farmers, and the recent implementation of the CAP single area payments in the Czech Republic, raise the question of the past capitalisation of support in this country, and in particular of direct payments. This study has investigated the influence of several types of support on Czech agricultural land prices between 1995–2001. Although the estimation would benefit from a longer time period and vdistric-level support data, this first study in a NMS gives valuable insights about the issue.

The positive and significant influence of three types of the past period payments on prices of several types of agricultural land shown by the regression indicates that the public support to agriculture has been capitalised into these prices in the Czech Republic over the period 1995–2001, but with a delay effect. This capitalisation occurred despite an imperfectly functioning land market. Besides, in spite of their low level, direct payments were given evidence of stronger capitalisation compared to the other types of payments. All this might suggest that such type

of support is most easily transferred to land values, compared to market price support for example. However, the results have indicated that it has been transferred less in prices of arable land than other type of land such as pasture.

This is a first stone in the debate of whether a quick capitalisation of the CAP support to Czech farmers could be expected after the accession. The Czech Republic opted for the CAP implementation in the form of the SAP scheme, that is to say direct payments per hectare without a production obligation. Although the SAP are low in comparison to what the EU-15 farmers are currently receiving, they are relatively high compared with what Czech farmers used to receive before the accession. If the rate of capitalisation continues or even increases in the future, this might threaten the farming activity in this country, as farms are almost only tenanted. And because most of the landowners live in towns, there is a risk of an extreme leakage of support not only outside the farming sector, but also outside the rural sector.

## Acknowledgement

Financial support from the European FP6 project IDEMA (Impact of Decoupling and Modulation in the Enlarged Union) is acknowledged. The authors also wish to thank Dr. Pavel Fronek from the VÚZE for his valuable advice.

## REFERENCES

- Alston J.M. (1986): An analysis of growth of US farmland prices, 1963–82. *American Journal of Agricultural Economics*, 68 (1): 1–9.
- Barnard C.H., Whittaker G., Westenbarger D., Ahearn M. (1997): Evidence of capitalization of direct government payments into U.S. cropland values. *American Journal of Agricultural Economics*, 79 (5): 1642–1650.
- Chavas J.P., Jones B. (1993): An analysis of land prices under risk. *Review of Agricultural Economics*, 15 (5) 351–366.
- Clark J.S., Klein K.K., Thompson S.J. (1993): Are subsidies capitalized into land values? Some time series evidence from Saskatchewan. *Canadian Journal of Agricultural Economics*, 41: (2) 155–168.
- Dale P., Baldwin R. (2000): Emerging Land Markets in Central and Eastern Europe. In: Csaki C., Lerman Z. (eds.): *Structural Change in the Farming Sectors in Central and Eastern Europe. Lessons for EU Accession*. Second World Bank/FAO Workshop, June 27–29, 1999. World Bank Technical Paper, 465. Europe and Central Asia Environmentally and Socially Sustainable Development Series.
- Doucha T. (2006): Adaptation of the Czech agriculture to the Common Agricultural Policy of the EU. *Economika poľnohospodárstva*, 4 (1): 15–26.
- Doucha T., Divila E. (2005): Possible impacts of the Czech agricultural policy after the EU accession on the land market and land usage. *Agricultural Economics – Czech*, 51 (5): 185–193.
- Duvivier R., Gaspart F., Henry de Frahan B. (2005): A Panel Data analysis of the Determinants of Farmland Price: An Application to the Effects of the 1992 CAP Reform in Belgium. Paper presented at the XI<sup>th</sup> European Association of Agricultural Economists Congress, Copenhagen, Denmark, 23–27 August.
- ERS USDA (2001): Government Payments to Farmers Contribute to Rising Land Values. *Agricultural Outlook* June–July 2001. Economic Research Service, United States Department of Agriculture, Washington, DC.
- Goodwin B.K., Ortalo-Magné F. (1992): The capitalization of wheat subsidies into agricultural land values. *Canadian Journal of Agricultural Economics*, 40 (1): 37–54.
- Goodwin B.K., Mishra A.K., Ortalo-Magné F. (2003): What's wrong with our models of agricultural land values? *American Journal of Agricultural Economics*, 85 (3): 744–752.
- Goodwin B.K., Mishra A.K., Ortalo-Magné F. (2005): Landowners' Riches: The Distribution of Agricultural Subsidies. April.
- Just R.E., Miranowski J.A. (1993): Understanding farmland price changes. *American Journal of Agricultural Economics*, 75 (1): 156–168.
- Lamb R.L., Henderson J. (2000): FAIR Act implications for land values in the Corn Belt. *Review of Agricultural Economics*, 22 (1): 102–119.
- Latruffe L., Le Mouél C. (2006a): Description of Agricultural Land Market Functioning in Partner Countries. FP6 project IDEMA, Deliverable 09, January 2006. Available at <http://www.sli.lu.se/IDEMA/publications.asp>
- Latruffe L., Le Mouél C. (2006b): How and to what Extent Support to Agriculture Affect Farmland Markets and Prices: A Literature Review. Report for the OECD, Directorate for Food, Agriculture and Fisheries, 27 March.
- Lence S., Mishra A. (2003): The impacts of farm programs on cash rents. *American Journal of Agricultural Economics*, 85 (3): 753–761.
- Lloyd T.A., Rayner A.J., Orme C.D. (1991): Present value model of land prices in England and Wales. *European Review of Agricultural Economics*, 18 (2): 141–166.
- Lošťák M., Hudečková H., Rikkon S. (1999): Land ownership and the challenge of “late modernity” (New institutional settings and behaviour of Czech landowners). *Agricultural Economics – Czech*, 45 (11): 481–490.
- Němec J. (2005): Sale of agricultural land in the Czech Republic after accession to the EU. *Agricultural Economics – Czech*, 51 (5): 202–206.
- Němec J., Kučera J. (2007): Land market development after the accession to the EU. *Agricultural Economics – Czech*, 53 (4): 154–160.
- Roberts M.J., Barrett K., Hopkins J. (2003): The incidence of government program payments on agricultural land rents: The challenges of identification. *American Journal of Agricultural Economics*, 85 (3): 762–769.
- Rutherford T.F., Whalley J., Wigle R.M. (1990): Capitalization, conditionality, and dilution: Land prices and the U.S. wheat program. *Journal of Policy Modeling*, 12 (3): 605–622.
- Shaik S., Helmers G.A., Atwood J.A. (2005): The evolution of farm programs and their contribution to agricultural land values. *American Journal of Agricultural Economics*, 87 (5): 1190–1197.
- Taylor M.R., Brester G.W. (2005): Noncash income transfers and agricultural land values. *Review of Agricultural Economics*, 27 (4): 526–541.

Voltr V. (2000): EU Accession and the Land Market in the Czech Republic. In: Land Ownership, Land Markets and their Influence on the Efficiency of Agricultural Production in Central and Eastern Europe. IAMO Studies, 9: 273–283.

Vrbová E., Němec J. (2005): Land market development in the Czech Republic. Agricultural Economics – Czech, 51 (5): 216–220.

Weersink A., Clark S., Turvey C.G., Sarker R. (1999): The effect of agricultural policy on farmland values. Land Economics, 75 (3): 425–439.

Arrived on 23<sup>th</sup> May 2008

---

*Contact address:*

Laure Latruffe, INRA UMR SMART, 4 Allée Bobierre, CS 61103, 35011 Rennes cedex, France  
e-mail: Laure.Latruffe@rennes.inra.fr

---