

Determinants of land sales prices in Bavaria: In general and government payments in particular

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Abstract - A hedonic price model on cropland sales prices for Bavaria (Germany) in 2007 reveals a significant influence of natural and economic conditions, government payments and non-agricultural demand. We find a high capitalization of 1st pillar payments of the Common Agriculture Policy (CAP) into the asset land.

INTRODUCTION

The analysis of factors determining the price of agricultural land has been a subject of scientific research since a long time (e.g. Tweeten and Martin, 1966). The majority of studies examined land markets in North America (e.g. Goodwin and Ortalo-Magné, 1992, Weersink et al., 1999). Only very few studies exist for Europe (Drescher and McNamara, 2000; Giuliani, 2002; Duvivier, 2005). A major motivation in estimating determinants of land price has been the evaluation of the impact of government payments. OECD (2008) and Bhaskar and Beghin (2007) give extensive literature reviews of empirical studies examining the capitalization of agricultural payments in the asset land. Recent studies evaluated the impact of decoupled government payments. So far, empirical results are available mainly for the FAIR Act of the U.S. (e.g. Goodwin et al., 2003, Roberts et al., 2003, Lence and Mishra, 2003). Kilian et al. (2008) provide first regression results analyzing the influence of the decoupled payments after the CAP-Fischler Reform on land rental prices.

The focus of this study is the analysis of factors determining land sales prices in Bavaria, and in particular the influence of government payments.

DATA AND METHODS

Our theoretical point of departure is the augmented net present value model of Goodwin et al. (2003), which, under some assumptions, can be presented as follows.

$$L_t = \beta_1 E_t P_{t+1} + \sum_{j=1}^{n_G} \beta_{2j} E_t G_{j,t+1} + \sum_{j=1}^{n_H} \beta_{3j} H_{j,t}$$

Land value L at time t depends on three different sources: i.) future revenues from the market P_{t+1} expected at time t (E_t); ii.) n_G different types of

expected public payments ($E_t G_{j,t+1}$); and iii.) n_H different indicators of urban pressure on agricultural land ($H_{j,t}$). All components are discounted by their relevant discount factors β_1 , β_2 and β_3 . Based on this theoretical model we empirically try to explain observed land values by a hedonic price model.

Our regression includes i.) natural and economic conditions influencing the market revenues of farms (e.g. soil quality index); ii.) government payments related to agriculture (e.g. single farm payments); and iii.) variables outside agricultural such as pressure of non agricultural demand on agricultural land (e.g. price of land for building). Further, we also include the legal form of purchaser and seller.

Our data set covers all transactions on the cropland market of Bavaria in 2007. Adjusted for outliers our sample contains 1941 observations. The variables of the soil quality index, the size of transacted area, as well as the legal form of purchaser and seller are available per individual case. All other variables are only available at municipality level.

RESULTS

Table 1 depict the results of a cross-section regression for 2007.

Table 1. Regression results

Variables	coeff.	s.d. ^a
Intercept	-3,054	3,392
Direct payments 1 st pillar (€/ha)	29.77	5.03***
Agri-environmental payments (€/ha)	-26.41	7.62***
Payments less favoured areas (€/ha)	3.43	9.03
Soil quality index (1-100)	212.4	17.68***
Farms per 100 ha of UAA	284.5	144.5**
Plot size (ha)	3,585	718.6***
Share of rental area (%)	-9,694	3,046***
Size of transaction area (ha)	194.5	98.99**
Legal form purchaser (dummy)	6,217	697.8***
Legal form seller (dummy)	3,158	1,217***
Settlement area : agricultural area	13,728	2,159***
Price for building land (€/qm)	24.57	5.32***
City distance (km)	-43.37	14.8***
Agricultural regions (1-12)		
N		1941
R ²		43.9

^athe statistical significance is shown:

*=90%; **=95%; ***=99%

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As expected, 1st pillar CAP payments are strongly capitalized into land sales prices. This result gives evidence that the decoupling of payments of the Fischler Reform 2003 does not reduce the capitalization of 1st pillar payments. The large coefficient may show the expectation of farmers of long-lasting payments. A higher participation rate in agri-environmental programs decreases land sales prices. This can be explained by the fact that these payments are often linked to cultivation restrictions and that participation is more likely in less productive areas. This is in line with results of Goodwin et al. (2003) determining a negative coefficient for the participation in the Conservation Reserve Program in the US Fair Act. Payments for less favoured areas do not show a significant coefficient.

Variables describing natural and economic conditions (soil quality index, farms per ha, the average plot size in a region, the share of rental area) are all significant and show the expected sign. The positive sign of the size of the traded parcel may refer to economies of scale since the cultivation of large-scaled areas is more efficient.

The dummy for the legal form of purchaser and seller (1, if it is a public institution) is positive and highly significant. This may either give evidence that trade among farmers is connected to covenants or, in the case of a public institution as a buyer, that land is bought in the expectation to become building land at least in the medium run².

Our variables for the non-agricultural demand are also all significant and show the expected sign: land sales prices increase with a higher share of settlement area, higher prices for building land and the proximity to large cities.

Finally, a Wald test confirms the significance of dummies for the twelve agricultural regions of Bavaria.

CONCLUSION

This study provides a detailed regression analysis of factors influencing cropland sales in Bavaria. We reveal a high capitalization of 1st pillar payments. This may be a result of payments becoming less coupled to plant and animal production, but being still strongly linked to land.

It has to be noted that the estimation of land prices is accompanied by severe econometric shortcomings like errors-in-variables problems and strong correlations between variables (OECD, 2008; Goodwin, 2003). Besides, explanatory variables like the marginal costs of cultivation are missing but may be important. Some of these problems may be met by panel regressions which are the next objective of our research.

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² Every transacted parcel of our sample is declared as agricultural area also after the transaction. Direct land sales for building areas are not included.