

# Organic controls in Germany – is there a need to harmonize?

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## 1 Introduction

In Germany, organic farming is monitored by 20 approved private control bodies (CBs). Pooling data from five important German CBs, we complement earlier studies by Gambelli et al. (2014), Zorn et al. (2013) and Lippert et al. (2014). These studies have shown for single CBs in different European countries that non-compliance can partly be explained by farm characteristics. Here, we extend the analysis to the influence of CBs and national or regional competent authorities on control results.

## 2 Hypotheses

We assume that opportunistic farmers, making a decision on whether to comply with an organic standard or not, implicitly balance the expected net benefits  $B$  of non-compliance.  $B$  depends on (i) compliance costs, (ii) probabilities of detection and (iii) farmers' future sanction related income losses in case of detected non-compliance. Factors (i) through (iii) are likely to be influenced by farm characteristics; factors (ii) and (iii) are also affected by the behaviour of the control body and the regional authority.

## 3 Method and data

A latent, unobservable variable  $y^*$  (e.g., the expected net benefit of not complying with the organic standard) is considered to depend on some observed variables  $x_i$  like farm size or control body (CB) (see first column of the Table):

$$y^* = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n + \varepsilon.$$

The larger  $y^*$ , the higher is the probability  $P(y = 1)$  of non-compliance. The occurrence of a severe sanction issued by the CB is our proxy variable for  $y$ . Binary logit models are used to test the effects of  $x_i$  on the probability  $P(y = 1)$ :

$$P(y = 1 | x_1, \dots, x_n) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)}}.$$

The data originates from five important German organic CBs that provided their complete 2009 and 2010 control data base on organic farms. The sample represents more than two-thirds of the German organic farms. On average, a farm in the dataset is controlled 1.22 times a year. The mean control frequency however differs between the CBs in a range from 1.14 up to 1.29. These differences could result from different control implementations but also from different risk classifications of the farmers by the CB.

For a pooled dataset covering both years and for each year separately we estimate models, firstly, as unrestricted models with all potential explanatory variables and, secondly, as restricted models by stepwise excluding non-significant variables.

Starting point of the analysis is a model based on farm characteristics only. This model then is extended by adding dummy variables for former sanctions, for the CB, and, for large federal states. Finally, models for combinations of these extensions are estimated.

## 4 Results and discussion

Among the significant effects the sanction probability reduction due to contract processing and grape production and the increasing effect of an adherence to a stricter private standard are surprising; the positive effect of the agricultural area may be explained by higher farm complexity. The low *Pseudo-R*<sup>2</sup> values suggest to consider further variables that better represent farmers' personal characteristics, all the more as we partly attribute the high relevance of former sanctions to such characteristics.

As we tried to control for regionally different natural conditions by including farm characteristics into our analysis, the significant federal state effects (see dummies BW and NI) and the CB effects hint at differences in the control implementation. Hence, our results support the need for a more harmonized implementation of organic control systems.

### References:

Bundesanstalt für Landwirtschaft und Ernährung (2011). Strukturdaten zum Ökologischen Landbau für das Jahr 2010. Bonn: BLE. – Gambelli, D., Solfanelli, F. and Zanoli, R. (2014). Feasibility of risk-based inspections in organic farming: results from a probabilistic model. *Agricultural Economics* 45: 267-277. – Lippert, C., Zorn, A. and Dabbert, S. (2014). Econometric Analysis of Non-compliance with Organic Farming Standards in Switzerland. *Agricultural Economics* 45: 313-325. – Zorn, A., Lippert, C. and Dabbert, S. (2013). An analysis of the risks of non-compliance with the European organic standard: a categorical analysis of farm data from a German control body. *Food Control* 30: 692-699.

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**Table. Results of selected logit models explaining the occurrence of at least one severe sanction.**

Model type	Unrestricted models		Restricted models			
	Basic farm model (2009-2010)	Basic farm model (year 2010) with lagged severe sanctions	Basic farm model (2009-2010)	Basic farm model (year 2010) with lagged severe sanctions	Basic farm model & dummy variables for CB B & federal state BW	Basic farm model & dummy variables for CB C & federal state NI
<b>Observations</b>	29,157	13,821	29,157	13,821	29,157	29,157
<b>Bayesian Information Criterion (BIC)</b>	-587.6	-327.4	-676.1	-418.3	-702.5	-757.2
<b>McFadden's R<sup>2</sup> (Pseudo-R<sup>2</sup>)</b>	0.061	0.081	0.061	0.080	0.064	0.060
Agricultural area (ha)	0.001 ***	0.001 *	0.001 ***	0.001 *	0.001 **	0.001 ***
Organic control experience (years)	0.003	-0.019 **		-0.019 **		
Processor (yes=1) <sup>a</sup>	-0.017	0.019				
Contract processor (yes=1)	-0.115 *	-0.029	-0.112 *		-0.127 *	-0.091 *
Farm is controlled for private organic standards (yes=1)	0.495 ***	0.364 ***	0.503 ***	0.368 ***	0.526 ***	0.298 ***
Farm is controlled for international organic standards (yes=1)	0.449 *	0.543 *	0.448 *	0.536 *	0.428 *	0.378 *
Conversion area (yes=1)	0.337 ***	0.223 **	0.330 ***	0.230 **	0.328 ***	0.305 ***
Conventional area (yes=1)	0.328 ***	0.439 ***	0.323 ***	0.439 ***	0.263 ***	0.166 **
Cereals (yes=1)	0.004	0.102				
Root crops (yes=1)	0.028	-0.036				
Industrial crops (yes=1)	-0.064	-0.021				
Fresh vegetables (yes=1)	0.178 **	0.167 *	0.187 **	0.180 *	0.157 *	0.141 *
Fodder crop production (yes=1)	0.160 *	0.109	0.171 **	0.161 *	0.178 **	0.202 ***
Other arable crops (yes=1)	0.203	0.315				
Permanent grassland (yes=1)	-0.332 ***	-0.407 **	-0.323 ***	-0.403 **	-0.308 ***	-0.289 **
Fruits and berries (yes=1)	0.218 *	0.107	0.222 *		0.226 *	0.224 *
Grapes (yes=1)	-0.723 ***	-0.751 **	-0.727 ***	-0.744 **	-0.749 ***	-0.541 **
Other permanent crops (yes=1)	0.327 ***	0.262 *	0.342 ***	0.280 *	0.309 ***	0.376 ***
Bovine animals (yes=1)	0.579 ***	0.519 ***	0.576 ***	0.500 ***	0.553 ***	0.607 ***
Pigs (yes=1)	0.241 ***	0.250 *	0.244 ***	0.261 **	0.237 ***	0.248 ***
Sheep (yes=1)	0.062	0.024				
Goats (yes=1)	-0.073	0.051				
Poultry (yes=1)	0.451 ***	0.393 ***	0.453 ***	0.400 ***	0.410 **	0.404 **
Bees (yes=1)	-0.160	-0.253				
Dummy var. for the year 2010 (yes=1)	0.143 **	X	0.143 **		0.142 **	0.146 **
Mixed orchards ("Streuobst", yes=1)	-0.290 ***	-0.393 ***	-0.285 ***	-0.395 ***	-0.186 **	-0.280 **
Dummy variable for severe sanction in previous year (yes=1)	X	1.172 ***	X	1.175 ***	X	X
Dummy variable for control body (CB) B	X	X	X	X	-0.398 ***	X
Dummy variable for CB C	X	X	X	X	X	0.530 ***
Dummy v. for Baden-Württemberg (BW)	X	X	X	X	-0.320 ***	X
Dummy v. for Niedersachsen (NI)	X	X	X	X	X	0.293 ***
Constant	-3.546 ***	-3.0652 ***	-3.537 ***	-3.0515 ***	-3.401 ***	-3.742 ***

Own calculations based on CB data provided by Bundesanstalt für Landwirtschaft und Ernährung (2011). X – variable was not used. Variables with empty cells, were excluded from the restricted models. Significance levels: \* < 0.1, \*\* < 0.01, \*\*\* < 0.001.