Nana Zarnekow[1]
Christian H.C.A. Henning[2]
Department of Agricultural Economics
Christian-Albrechts University of Kiel
Kiel, Germany

LOCAL GOVERNMENT PERFORMANCE AND SPATIAL DEPENDENCIES: DRIVERS OF STRUCTURAL SUPPORT ALLOCATION?[3]

Abstract. A central aim of the Regional Policy of the European Union is a regional cohesion. Major instruments are regional policy programs financed via various European funds. The allocation of regional policy funds varies dramatically across regions even when one controls for regional development indicators. Thus, what political economy factors determine the access to financial support of regional policy funds? With this regard, the paper highlights the role of local government performance. Beyond, it is tested for spatial dependencies, e.g. if knowledge spillovers determine the ability to capture regional funds. Pars pro toto empirical analyses focus on the allocation of SAPARD funds in Slovakia using cross-section as well as panel data. The government performance is measured as a technical efficiency of local public good provision and derived within a non-parametric DEA approach. Results show that the government efficiency has a positive significant impact on the structural funding allocation. Furthermore, spatial dependencies occur. With respect to the program duration, it is concluded that knowledge spillovers take place, supporting a successfully program participation.

Key words: regional policy, government performance, spatial econometrics, SAPARD.

Introduction

The European Union is characterized by a coexistence of intra- as well as international disparities. By enlargements of the EU from 6 member-states in 1957 to the current 27, this situation got worse, whereas especially the eastern expansion of the EU led to an intensification of differences. Therefore the Regional Policy of the EU aims to strengthen the economic, social and territorial cohesion by reducing disparities in the level of development among regions and member states. To achieve the objectives of convergence, regional competitiveness and employment, the European territorial cooperation structural programs and funds have been established. However, allocation of regional policy funds vary dramatically across regions even when one controls for regional development indicators. Thus, a question arises, what other political economy factors beyond regional development levels determine the access to the financial support of regional policy funds?

[1] MSc, Department of Agricultural Economics, Christian Albrechts University Kiel, Olshausenstr. 40, 24118 Kiel, Germany. Phone: +49-4318804406, fax: +49-4318801397, e-mail: nana.zarnekow@ae.uni-kiel.de.
[2] Professor, PhD, Department of Agricultural Economics, Christian Albrechts University Kiel, Olshausenstr. 40, 24118 Kiel, Germany. Phone: +49-4318804406, fax: +49-4318801397, e-mail: chenning@ae.uni-kiel.de.

Which components describe the amount of money regions receive? And in respect to the strengthened decentralisation of program implementation: how important is the performance of local governments to participate successfully in regional development programs? In other words: how important is good governance at the regional level to support local agents and what impact does the institutional setting have for the development and performance of the agri-food sector? Furthermore, beyond the capacity of local governments to coordinate, a collective action within their community's knowledge spillovers from other communities might determine local government's ability to capture regional funds. So, do spatial dependencies occur in respect to a successfully project participation? Moreover, the co-financing character of some structural programs supports the importance of localisation in respect to finding a contact with qualified partners. This paper aims therefore to examine to what extend the received structural funds are determined by the government performance as well as by spatial dependencies, in particular by knowledge spillovers among districts. The subject of investigation is a special accession programme for agriculture and rural development SAPARD, which was one of the pre-accession instruments for the Central and Eastern European member-states.

The paper is structured as follows. The SAPARD programme is introduced first with its objectives, measures and funding rules before possible determinants of accessibility to structural spending are deduced. The methodologies of receiving the technical efficiency measures as well as for taking care of spatial dependencies are explained before the estimation settings are described. Next, the estimation results are presented and discussed before a conclusion finishes the paper.

Structural funding: the example of SAPARD

SAPARD was established in 1999 on the basis of proposals within the Agenda 2000 for the period 2000-2006 and was characterized by three priorities and by 15 eligibility measures. The general aim was to assist accessing countries in the structural adjustment of their agricultural sectors and rural areas, as well as in the implementation of the acquis communautaire concerning the Common Agricultural Policy and related legislation. For an improvement and guidance of program implementation, a multi-annual programming approach with priority setting and continuous monitoring and evaluation was introduced. The basis of an financial allocation were the farming population, the agricultural area, the gross domestic product and the specific territorial situation.

In comparison with other pre-accession instruments, SAPARD was conspicuous because of its decentralized management by implementing agencies in the beneficiary countries. So, institutions were allowed to acquire the responsibility for program management and to build an internal expertise and capacity to implement, monitor and evaluate programs. This decentralisation allowed for a support of small projects which guaranteed that the share of local contracts exceeded the share of international public invitations. A dualism of measures and investments in a region took place with the aim to enforce induced positive regional effects. Furthermore, the decentralization implicated that the European Commission was not involved in the management of SAPARD in the beneficiary countries, apart from project ex-post controls. Ex-ante and mid-term evaluations were in responsibility of the programme managing and payment authority [Regional… 2010]. All in all, the sole responsibility for selecting and managing projects, arranging finance and carrying out controls reflects the importance of local institutions in respect to a successful SAPARD implementation. Especially, since a partnership principle was pursued increasingly, meaning to include and involve regional and local authorities as well as economic and social partners at all stages, the local authorities gained in importance. Apart from coordination, they could assist in the development plan formulation, which was a pre-condition of participation in a regional development program. The SAPARD was co-financed, meaning that a minimum requirement for participation of the accessing states accounted for 25%, and bilaterally organized, i.e. a Multi Annual Financial Agreement (MAFA) and Annual Financial Agreements (AFA) had to be arranged, whereas the MAFA laid down the framework for co-operation and included the provisions for delegating the management of the programs to the applicant countries. Also financial control rules, monitoring and evaluation requirements and rules for the coordination with other instruments were recognized; this additionally strengthened the importance of the local agencies in respect of successful project participation.

Determinants of structural funding: the example of SAPARD in Slovakia

In this study Slovakia, as one of the new member-states, has been chosen as an object of investigation, regarding LAU 1 (rural community) level regions. The database originates from the Slovak Statistical Office and was set up for a project 'Advanced Eval' which was one of the sixth framework programmes of the EU. During the period 2000-2006, SAPARD had a usable financial support from the Community budget amounting to over half a million euro (€) per year. In case of Slovakia 947 programs were accredited, of which 905 have been realized. Around 4.617 million Slovakian korunas (SKK) (112 million €) have been allocated, whereas the distribution of SAPARD funding between the Slovakian regions differs clearly. The highest amount was allocated in the case of Nitra region, with 6.2 million €, whereas the lowest spending received the Poltar region, with 2600 €. The distribution per population differed, from 0.11 € per capita in Poltar to 65.46 € per capita in Detva region.

The allocation of the SAPARD payments clearly varied across regions (Figure 1). The farming population, the agricultural area, the gross domestic product and the specific territorial situation were in general a basis of the financial allocations from SAPARD. In case of Slovakia the measures M1 (investment in agricultural holdings), M2 (improving the processing and marketing of agricultural and fishery products), M4 (development and diversification of economic activities) and M7 (land improvement and re-parcelling) received the highest funding amounts. But regional development indicators such as the agricultural area or the farming population cannot explain the variances in SAPARD funding in total. Moreover, beyond a clearly differing regional distribution of the agriculturally used area (Figure 2), low correlations of 0.04 and 0.02 between the SAPARD payments per head of population and the farming population or the agricultural area indicate a lack of explanation. Thus, other political economy factors might have determined the access to financial support from SAPARD.

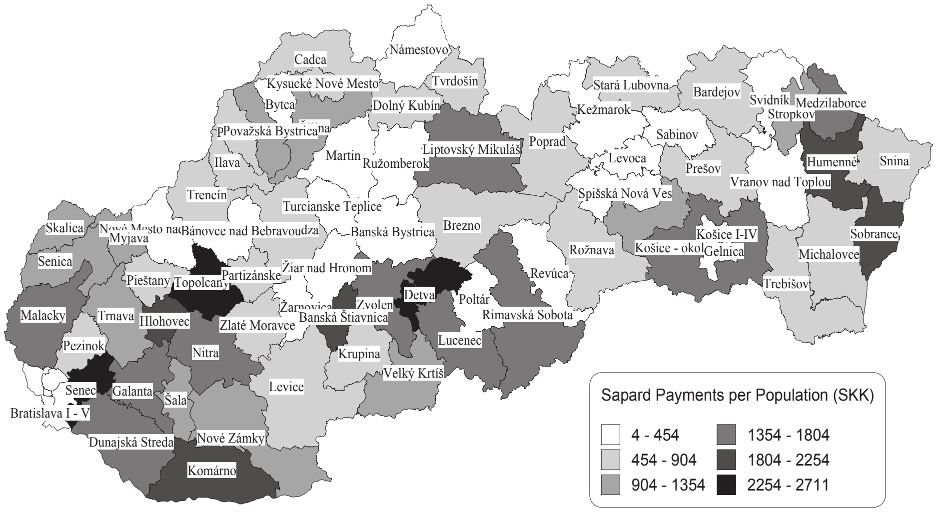

Fig. 1. SAPARD payments in total per head of population, SKK

Source: own research, Slovakian census data.

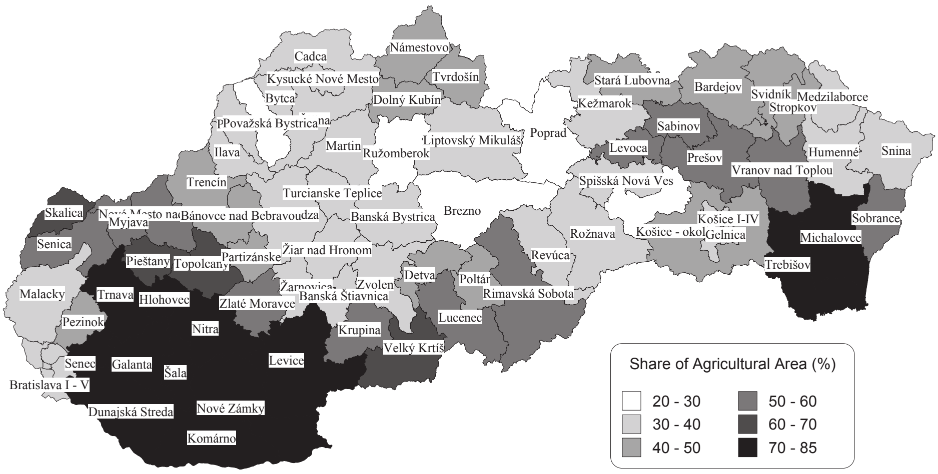

Fig. 2. Share of area used for agriculture, %

Source: own research, Slovakian census data.

Therefore, different determinants of the SAPARD funding were taken into consideration. In respect to the payment shares attributable to individual measures and the general focus of the program, agricultural and local governmental structures as well as different socioeconomic measures should be recognized. The agricultural structure was included into the investigations, represented by the employment share of the agricultural sector (Empagr) and by the share of area used for agriculture (Agrarea). The local governmental structures are captured differently. On the one hand, by the number of agencies per population (Adm), whereas a high density is perceived as helpful for the formulation of development plans, on the other hand by the technical efficiency of local governments (TechEff) in respect to the success of submitted development plans. As socioeconomic measures, the average-income (Avinceur), the net-migration (Netmig), the degree of privatization (Privatization), the spare-time facilities (Spattime) and the average age (Mage) of inhabitants were chosen. In this way, the average income is recognized in respect to the co-financing principle; so it is assumed as a proxy for the easier management of co-financing. The spare-time facilities are seen as a form of social capital. Their supporting character for plan formulation as well as for gaining partnerships and co-financing management is assumed. The net migration is recognized as an indicator of a favourable regional amenity structure or a regional quality of life. However, although this might be a very vague measure life quality, it is included in the investigations in respect to the purpose of regional policy. The degree of privatisation is measured by the share of privatized enterprises. This serves as a test if the share of enterprises in private ownership has an influence on a successful program participation. Respectively the formulation of partnerships might be positively linked with a higher degree of privatization. In the next section methods for receiving a local government performance and to test for spatial dependencies are introduced before the estimation results are given and discussed.

Local government performance

When understanding local politics basically as the provision of public services, the governmental performance can be interpreted as a technical efficiency of local production of public goods. Following this idea, a non-parametric data envelopment analysis (DEA) was applied to estimate the local government performance in rural communities in Slovakia. DEA models have been used differently in the literature; among other purposes also for analysing the efficiency terms of economic development of cities [Charnes et al. 1989; Data… 1994]. The advantage of deploying DEA methodology is that it measures multidimensional relationships among several inputs and outputs without an a priori functional form assumption [Zhu 2001]. In this study inputs are the factors that the local governments are able to influence as well as the given local conditions; outputs are thereby produced public goods and related amenities. The number of inputs and outputs is chosen according to Dyson et al. [2001] and in respect to the given database. It has been taken care for non-negativity as well as for changing the direction of undesirable outcomes. The relative efficiency measure is scaled so that it ranges between [0, 1]. Each Decision Making Unit (DMU) j has multiple inputs $x_{i,j}$ and multiple outputs $y_{k,j}$; u and v are weights (Equation 1).

$$Efficiency = \frac{\sum_k u_k y_{k,j}}{\sum_i v_i x_{i,j}} \tag{1}$$

By this each DMU j_0 is allowed to set its own weights. The optimization problem (Equation 2) is given as the efficiency of DMU j_0 is maximized subject to the condition that all efficiencies of other DMU's remain less than or equal to 1. By this the denominator is fixed to a constant value, e.g. 1.0, which can be interpreted as setting a constraint on the weights v_i [Kalvelagen 2002]:

$$
\begin{aligned}
&\max u, v \sum\nolimits_k u_k y_{k,j0} \\
&s.t. \sum\nolimits_i v_i x_{i,j0} = 1 \\
&\sum\nolimits_k u_k y_{k,j} \le \sum\nolimits_i v_i x_{i,j} \forall j \\
&u_k, v_i \ge 0
\end{aligned}
\tag{2}
$$

In this study the DMUs are 72 rural communities (LAU1) in Slovakia, called 'okres'. The estimations are conducted for the years 2002-2004, whereas the time-period is related to the phase the majority of SAPARD payments took place. As DEA inputs, the sizes of income, employment, agricultural area as well as the share of forest and water area in total area, the share of built-up area and the unemployment payments per person unemployed were recognized as a proxy for the regional budget conditions. In order to receive a more complex description of the production outcomes, the factor analyses were applied to reduce the number of outcome variables and to classify them by detecting the structure in their relationships. Thus, as outputs the basic and daily technical infrastructure, the social infrastructure, the city life amenities, the economic structure and the environmental quality were used.

Spatial dependencies in structural funds allocation

Beside the importance of the local government performance, the spatial location of a region might be also an important factor for the structural funds allocation. It is thinkable that the amount of received SAPARD payments depends on the region itself as well as (in part) on the neighbouring regions. The existence of spatial hierarchical relationships, spatial spillovers and other types of spatial interactivity are an intuitive motivation for this. In a more general way, a spatial dependence was assumed between observations which were set in spatial or in spatial and temporal order. The spatial dependence exists as a functional relationship between occurrences in one region and occurrences elsewhere, whereas two forms of dependencies can exist. One obvious cause for them is a spatial spillover in measurement errors. The second factor follows from the importance of space as an element in structuring explanations of human behaviour, i.e. from that the location and distance matter and result in a variety of interdependencies in space and time [Anselin 1988].

To deal with spatial dependencies, different possibilities exist. In what follows, a spatial lag, respectively a spatial autoregressive model and a spatial error model will be introduced as well as a combination of both a spatial lag model and a spatial regressive error term. A common idea is that in a cross-sectional setting with N observations, there is insufficient information to estimate a N by N covariance matrix directly from the data, so in general it will be necessary to impose a structure on the covariance. This can be done by using a positive N by N spatial weights matrix W, whereas the elements of the weights matrix are based on the geographic arrangement of the observations, or the contiguity. By this, different specifications of the spatial weights are possible, e.g. weights are non-zero in case two locations share a common boundary, or in case they are within a given distance of each other. In this study, a first order contiguity matrix is used, containing zeros on the main diagonal, rows that contain zeros in positions associated with non-contiguous regions and ones in positions reflecting neighboring units that are (first-order) contiguous, defining contiguous here as sharing a common okres-boundary. The spatial autoregressive model (Equation 3) combines the standard regression model with a spatially lagged dependent variable, whereas y is the dependent variable vector, X represents the data matrix containing the explanatory variables and W is the spatial weight matrix. The estimated parameters ρ and β represent the coefficients of the spatially lagged dependent variable and the influence of the explanatory variables.

$$\begin{aligned} y &= \rho W y + X\beta + \varepsilon \\ \varepsilon &\sim N(0, \sigma^2 I_n) \end{aligned} \tag{3}$$

A number of statistical tests is given in the literature, usable to detect the presence of spatial autocorrelation in the residuals from a least-squares model; the Lagrange Multiplier test and the Moran's I-statistic will exemplarily be used in this study. In case the last one shows that spatial correlation in the least-square residuals is given, the spatial error model (Equation 4) can be used in which the spatial dependencies are exhibited by the disturbances. The parameter λ represents the coefficient of spatially correlated errors.

$$\begin{aligned} y &= X\beta + u \\ u &= \lambda W u + \varepsilon \\ \varepsilon &\sim N(0, \sigma^2 I_n) \end{aligned} \tag{4}$$

In case there is evidence that a spatial dependence exists in the error structure from a spatial autoregressive model a general version of the spatial model, including spatial lagged term and spatially correlated error structures, is an appropriate approach to model this type of dependency (Equation 5). By this W_1 can equal W_2 but also different formulations can be found. In respect to LeSage and Kelley Pace [2009] we construct W_2 as $W_2=W'W$.

$$\begin{aligned} y &= \rho W_1 y + X\beta + u \\ u &= \lambda W_2 u + \varepsilon \\ \varepsilon &\sim N(0, \sigma^2 I_n) \end{aligned} \tag{5}$$

Regarding panel data the spatial autoregressive (Equation 6) as well as the spatial error model (Equation 7) can also be applied [Elhorst 2003].

$$\begin{aligned} y_t &= \rho W y_t + X_t\beta + \varepsilon \\ \varepsilon &\sim N(0, \sigma^2 I_n) \end{aligned} \tag{6}$$

$$\begin{aligned} y_t &= X_t\beta + u \\ u &= \lambda W u + \varepsilon \\ \varepsilon &\sim N(0, \sigma^2 I_n) \end{aligned} \tag{7}$$

Estimation results

Table 1. Estimation results from spatial models: average regional endowment 2002-2004

Variable or parameter	Spatial autoregressive model coefficient	z-prob	Spatial error model coefficient	z-prob	General spatial model coefficient	z-prob
Constant	-2301.795***	0.000	-1853.566***	0.000	-1548.649***	0.000
Privatization	-24.227***	0.005	-28.593***	0.002	-18.809***	0.003
Empagr	-26.085	0.713	-9.442	0.879	-31.256	0.568
Adm	126.312*	0.080	135.314**	0.013	162.383***	0.004
Mage	39.238**	0.021	26.329**	0.014	23.850**	0.037
Spattime	98.146	0.282	44.655	0.598	114.397	0.145
Avinceur	2.796***	0.001	2.684***	0.001	2.014***	0.007
Netmig	11.195	0.257	9.541	0.312	21.036**	0.013
Agrarea	441.313**	0.023	434.938***	0.001	362.829**	0.012
TechEff	105.060*	0.062	161.275***	0.003	108.632**	0.024
ρ	-0.007	0.476	-	-	0.001	0.905
λ	-	-	-0.085***	0.000	-2.119***	0.000
R-squared	0.192		0.177		0.2440	
Rbar-squared	0.157		0.141		0.2110	
log-likelihood	-1239.907		141230.119		-1455.8521	

Abbreviations: Privatization: degree of privatization, Empagr: employment share of the agricultural sector, Adm: number of agencies per population, Mage: mean age, Spattime: spare-time facilities, Avinceur: average income, Netmig: net migration, Agrarea: share of area used for agriculture, TechEff: technical efficiency of local governments.

Source: own research.

First, we estimated the spatial models using the average regional endowment for the years 2002-2004 as explanatory variables (Table 1). The total received SAPARD payment per head of population is the dependent variable. All three models give similar results for the significances as well as for the directions of estimated coefficients. The idea of administrative units having a supporting character to receive SAPARD payments is approved as well as that a higher average income, agricultural area share and a technical efficiency of local authorities lead to a higher payment allocation. Regarding the positive influences of the mean age and net migration, whereas the last one is only significant in case of the general model, it is thinkable that a clearly positive correlation with the average income could be an explanation; but this is not the case. Rather, a higher age might represent a higher identification with the region and a better endowment with social relations; so the development plan formulation can easier be managed and a higher incentive occurs and forms a more clear and settled individual planning. Explanation for the negative impact of privatization might be on the one hand that public enterprises as well as cooperatives are more able to co-finance their project plans. On the other hand it is thinkable that private units are finally not familiar with or unaccustomed to the combination of private sector and public grant money and therefore they use this possibility less than public institutions do. The insignificant parameter of the spatial autocorrelation model implies that no spatial dependence is given. So, the SAPARD funding of the neighboring regions in a year does not influence the amount of SAPARD funding a region receives in the same year.

When using a Lagrange Multiplier test for spatial correlation in the residuals of the spatial autoregressive model, any spatial dependence in the residuals of this model can be rejected. In contrast with that, the Moran's *I*-statistic indicates that there is a spatial correlation in the residuals of the spatial error model. The significant parameter λ gives evidence that a spatial dependence occurs as the residuals are spatially correlated. Although the test for spatial autocorrelation in the residuals of the spatial autoregressive model shows no evidence for residual spatial autocorrelation, and so the general model might not be appropriate, for the sake of completeness the results are also listed. The insignificance of the spatial lag and the significant value of the spatial error parameter are consistent with the explanations given before. As the majority of SAPARD payments took place during the years 2002 to 2004, it seems adequate to use a panel data approach in comparison to the average regional endowment discussed before. From applying the Hausman's specification test it can be deduced that a random-effects model is better suited than a fixed-effects model. A comparison of a pooled regression model with a random effects model shows hardly any differences. Therefore, the results of a simple random effects model without spatial effects are given (Table 2). In relation to the covariance matrix which shows unequal zero, spatial dependencies are included, too (Table 2).

Table 2: Estimation results from panel regression models (2002-2004)

Variable or parameter	Random Effects Regression Model		Pooled model with spatial error autocorrelation, no fixed effects		Pooled model with spatially lagged dependent variable, no fixed effects	
	coefficient	P>|z|	coefficient	P>|z|	coefficient	P>|z|
Priv	-23.951***	0.007	-20.100**	0.020	-22.179***	0.009
Empagr	-26.388	0.717	-22.355	0.756	-29.042	0.678
Adm	133.865*	0.066	102.210	0.174	116.822*	0.095
Mage	35.925**	0.027	38.669**	0.022	29.958*	0.061
Spattime	99.256	0.289	100.874	0.266	86.186	0.339
Avinceur	2.792***	0.001	2.131**	0.012	2.230***	0.007
Netmig	11.892	0.24	14.099	0.154	12.494	0.199
Agrarea	396.146**	0.038	370.207*	0.064	327.379*	0.078
TechEff	105.725*	0.066	77.401	0.165	86.505	0.117
spat.aut.	-	-	0.168*	0.066	-	-
W*dep.var	-	-	-	-	0.199**	0.026
Constant	-2194.631***	0	-2055.022***	0.001	-1807.839***	0.001
R-squared	0.1907		0.2049		0.2185	
Rbar-squared			0.1702		0.1804	
log-likelihood			-1584.043		-1582.4526	

Source: own research.

The directions as well as the significances of the estimated coefficients do not differ clearly in comparison to the first estimation results (Table 1); exceptions are on the one hand for the technical efficiency, which has still a positive but now an insignificant impact, and on the other hand for occurring spatial dependencies. Both spatial models show now significant influences; meaning that in case the panel data are used, a spatial dependency can be deduced from the spatial autoregressive model, too. Therefore, over time spatial influences occur as the funding of one region is positively influenced by the funding amount a neighbouring region receives. When comparing the log-likelihood values, the spatial error model seems to explain the spatial influence better than the spatial autoregressive one does; in relation to the R-squared values, both spatial models fit better than the simple regression model. So, the importance to recognize spatial dependencies in analysing structural spending is additionally reinforced.

Conclusions

This paper deals with determinants of the structural funds allocation using the special accession programme for agriculture and rural development SAPARD as an example. The decentralized program implementation as well as the focused partnership principle attracted our attention and caused investigation of this program. Because the allocation of regional policy funds varies dramatically across regions even when one controls for regional development indicators, we thought of local government performance as well as of spatial dependencies as explanations for a successful program participation. As possible determinants of SAPARD funding, the governmental and administrative structures were recognized as well as the socio-economic components, especially the sectoral structure. The estimations were conducted for 72 Slovakian okres during the years 2002-2004. Two different approaches were followed, recognizing in each case the possibility of spatial dependency. First, the average regional endowment was tested to explain the total amount of SAPARD payments a region received per inhabitant; second, a panel data approach was used, applying random effects models. The estimation results provide mixed results. The efficiency of local governments has a positive and in almost all models a significant impact on payment receipts. Also a higher share of land used by agriculture has a clearly positive influence, which was expectable in accordance to the program objectives and measures. In relation to the co-financing principle, the positive directions and significances of the average income seem also plausible. The insignificances of the employment share of the agricultural sector were unexpected but with respect to the program design explainable as that not the number of potential program submitters is decisive but their ability for plan formulation, partnership and financing management. Spatial dependencies occur in form of a spatial correlation in the residuals in both approaches. A spatial lag can only be found in the panel approach. The influence of neighbouring regions on the SAPARD payments a region receives is therefore a temporal aspect. This seems comprehensible as information or knowledge spillovers take better place regarding the whole program duration.

All in all, local government efficiency as well as spatial dependencies prove to be considerable determinants of structural funds allocation, whereas their impact has to be seen in context to regional socio-economic circumstances. As the structural programs are set out for a duration of six years, this study advocates using panel approaches to detect determinants of structural funding, especially with respect to occurring spatial dependencies in form of spatial spillovers. Regarding the general objectives of structural policies to reduce intra- as well as international disparities, the impact of structural funding on the quality of life level should be focused in a more adequate way as done in this study which indicates therefore the contents of future research.

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