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The role of policy priorities and targeting in the spatial location of participation in Agri-Environmental Schemes in Emilia-Romagna (Italy)

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ABSTRACT

The objective of the paper is to understand the determinants of the spatial location of participation in Agri-Environmental Schemes and, in particular, to understand the interplay between structural determinants, priority criteria and spillover effects in guiding participation. As a first step, the paper seeks to conceptualise the issue based on the existing literature. Thereafter, an econometric model is used to provide an empirical application on data regarding participation in measure 214 of the Rural Development Programme 2007–2013 in an Italian region (Emilia-Romagna). The results show that both priority scores and the spatial dimension are significant in affecting participation.

Background and objectives

Determinants of participation in Agri-Environmental Schemes (AES) have been analysed from several angles, mainly by applying econometric models, using cross sectional data or panel data, usually collected at the farm level. The results of early papers on this issue highlight that profitability, risk reductions, and attitudes towards sustainable methods of production, are determinants of adoption. The literature has also pointed out the positive effects of motivations and incentives in promoting AES (Morris and Potter, 1995). Several papers have provided further evidence in recent decades and various papers also provide extensive reviews of the determinants of participation (e.g. Defrancesco et al., 2008; Uthes and Matzdorf, 2013). The determinants have been organised in different ways depending on the scientific approach of the researchers. It can be recognised, however, that the macro areas of interest can be ascribed to the socio-economic characteristics of the farmer and his/her household (e.g. age, composition, presence or lack of a successor), the attitudes and beliefs of the farmers (e.g. opinions about the environment), farming conditions (e.g. site conditions, yield expectation due to geophysical and climatic settings, designation status), structural characteristics of the farm (e.g. size, specialisation, stocking density, financial constraints) and context variables (e.g. information received, neighbours' participation, market opportunities) (Vanslembrouck et al., 2002; Knowler and Bradshaw, 2007; Defrancesco et al., 2008; Jongeneel et al., 2008; Peerlings and Polman, 2009; Barreiro-Hurlé et al., 2010; Wauters et al., 2010; Baumgart-Getz et al., 2012; Uthes and Matzdorf, 2013). Studies based on secondary information tend to put less emphasis on individual variables and more on the structural or environmental characteristics of each farm/area, which is largely driven by information availability (Borsotto et al., 2008; Hynes and Garvey, 2009; Capitanio et al., 2011; Lapple and Kelley, 2013). For example, the Farm Accountancy Data Network (FADN) information tends to record only if the farm is funded and the relevant Rural Development Program (RDP) axis, without providing specific information about the measure or sub-measure (Pascucci et al., 2013). In addition, FADN offers a meaningful aggregation only at the NUTS 2 level and is biased towards professional farms, available for bookkeeping, at least compared to Integrated Administration and Control System (IACS) data.

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The literature also highlights the limitations and inconsistencies of the variables used to explain participation, emphasising how different data collection approaches affect the results and, in particular, the inconsistent use of environmental awareness and farmers' attitudes across studies (Baumgart-Getz et al., 2012). Knowler and Bradshaw (2007) even conclude that there are very few, if any, variables that consistently explain adoption of conservation practices.

In spite of this, over time, determinants have been increasingly investigated, including by enlarging the scope of attention. The recent literature recognises that participation in AES is affected by agglomeration effects due to the spatial dependence of explanatory variables, as in Schmidtner et al. (2012). The authors pointed out that, for the case of organic farming in Germany, vectors of prices and costs are heterogeneously spatially distributed due to spatial differences in distance to markets or the positive values of transportation costs. Furthermore, the authors argue that production functions and transaction costs required to participate in AES are heterogeneously distributed across the space due to different natural conditions, which implies changes in input-output relations, and heterogeneity in the quality of institutions and social capital elements. In addition, a growing body of literature on spatial phenomena points to the relevance of proper spill over effects due to, for example, imitation or economic signals outside the involved farms (e.g. through effects on prices) (Anselin, 2010; Bell and Dalton, 2007; Brady and Irwin, 2011).

The above-mentioned literature, largely based on *ex-post* studies on participation, only marginally addresses policy design variables, targeting and participant selection processes. This may be justified by the fact that the case studies from which the participation data were obtained involved little targeting or poor selection priorities. Furthermore, when selection criteria are in place, the existing budget may or not be sufficient to allow for participation from all of the applicants. Regardless, farmers' decisions may be influenced by their expectations of the priority mechanisms. When the analysis is performed with secondary data (e.g. FADN), taking into account the participant selection process may be even more difficult, due to the fact that information about the full process (i.e. if the farmer applied and was not accepted or did not apply) is rarely available for researchers.

Policy design is more directly dealt with in the literature addressing farmer preferences for different contract alternatives based on hypothetical questions (e.g. Ruto and Garrod, 2009; Christensen et al., 2011; Broch et al., 2013). However, given the particular focus of this type of study on individual behaviour, the authors deal more with "hard" variables of direct interest to the farmer (such as payment levels, contract length, transaction costs etc.), rather than variables that matter mainly on the aggregate, such as those related to how the policy includes targeting and selection mechanisms for farmers.

On the other hand, the literature on AES design points out the relevance of targeting as a key issue (and a major gap) for the improvement of AES effectiveness and efficiency (Coisnon et al., 2014). In particular, the literature contrasts spatial targeting, aimed at promoting the concentration of AES in selected areas, and group targeting, more related to other farmer characteristics (Uthes et al., 2010). The former may be based on the combination of different policy components (e.g. zoning, eligibility criteria, scoring systems, differentiated payments) and is a cornerstone of environment-related measures as it allows, in principle, to concentrate measures in areas where the added value of environmental improvement is higher; at the same time, a more focused targeting approach could lead to higher administration/transaction costs and result in the perception of an unequal distribution of funding (Vatn, 2010).

Targeting, eligibility and selection criteria can interact: Bartolini et al. (2013) found that selection criteria and priority mechanisms increase the spatial targeting of agri-environmental measures. However, the authors found that sub-measures react heterogeneously to economic incentives due to the relevance of motivation and social capital in explaining spatial concentration (e.g. organic farming). Moreover, given their relationship with space, these mechanisms can interact with the occurrence of the spillover effects highlighted above. For example, on the one hand one could expect that targeting may stimulate concentration above that justified by spontaneous decisions. Yet eligibility constraints may hamper spillovers by hindering willingness to participate. However, these issues are not generally addressed in the empirical literature.

The objective of this paper is to understand the determinants of the spatial location of participation in AES and, in particular, to understand the interplay between structural determinants, priority criteria and spillover effects in guiding the spatial distribution of participation in AES.

The objective is addressed through the application of spatial econometrics on participation in measure 214 (agri-environmental measure) in Emilia-Romagna, Northern Italy, including priority variables to reflect the selection process mechanisms. Emilia-Romagna offers a very interesting case with respect to the objectives of the measure. This region is very heterogeneous in terms of territorial and agricultural conditions and the local administration has put in place a complex system of scoring, based on several criteria, which is aimed at guiding the selection of applications in each area, taking into account the specific environmental context.

Spatial econometrics is the chosen methodology due to its ability to account specifically for spatial dependency due to spillover effects that can be traced through the spatial association of participation. Spatial econometrics is largely applied in the regional studies literature and has recently been applied to better understand participation in AES (Schmidtner et al., 2012; Yang et al., 2014). The main originality of this paper, compared with the recent literature, is the use of (ex-post) priority setting in the context of spatial econometrics models, allowing for discussions of the interplay between spatial effects, priority targeting and other explanatory variables of participation. It also provides insights into how this interplay concerns different sub-measures (interpretable as different types of measures). In addition, in order to fit these purposes, and in particular to account for the share of participating land as the dependent variable, a fractional logit model is used. Due to the novelty of the approach and the data limitations (see the Discussion and conclusions section), this is to be considered mainly as an explorative exercise.

The Problem setting and methodology section provides a formalisation of the problem addressed and the description of the methodology. The case study: Regional features, AES implementation and uptake distribution section describes the case study area. The results are illustrated in the Results section, followed by a discussion and concluding remarks in the Discussion and conclusions section.

Problem setting and methodology

A framework for analysing funding priority effects

The connection between participant (self-)selection, targeting and policy design is addressed from different perspectives in the literature. Babcock et al. (1997) analyse the problem of targeting conservation payments and the role of different targeting instruments, comparing situations in which targeting is based either on cost or benefits, with a situation in which targeting is based on an ideal cost-benefit ratio. They consider three practical targeting options: acreage maximisation; enrolling land based only