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The design of agri-environmental schemes: Farmers' preferences in southern Spain

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ABSTRACT

Agri-environmental schemes (AES) play a key role in promoting the production of environmental public goods by European Union agriculture. Although extensive literature has analyzed AES, some important issues remain understudied. This paper performs an ex-ante assessment of AES in permanent cropping, analyzing several issues that have received little attention from researchers, such as ecological focus areas (EFA) and collective participation. For this purpose, a choice experiment was used to assess farmers' preferences toward AES in a case study of olive groves in southern Spain. Results show high heterogeneity among farmers, with different classes being identified, from potential participants to non-participants. As regards EFA, almost half of the farmers would be willing to accept it up to 2% for low monetary incentives (€8–9/ha per additional 1% of the farmland devoted to EFA) while the rest would do it for moderate-to-high monetary incentives (€41–151/ha per additional 1% of EFA). However, for a high share of EFA (e.g., 5–7%) higher incentives would presumably be required due to the intrinsic spatial restrictions of olive groves. With regard to collective participation, we find that it is unlikely that farmers would participate collectively with the incentive of the up to 30% EU-wide bonus. These results are relevant for policy-making now when new AES are being designed for the next programming period 2014–2020.

Introduction

The provision of public goods by agriculture is a relevant objective shared by most of the agricultural policies of developed countries (OECD, 2008). This objective has gained relevance throughout time because of society's increasing demands for such goods. However, the design of efficient tools oriented to achieve this objective represents a daunting challenge for policy-making. In particular, policy-makers have to take account of the type of joint production (of private and public goods) and farmers' preferences and circumstances to design tools that effectively promote agricultural public goods production without distorting commodity markets (OECD, 2001; Cooper et al., 2009). Yet, analyses are still required to support public decision-making regarding the design of such tools (Hart et al., 2011; OECD, 2013).

Among tools to promote the provision of public goods by agriculture, voluntary incentive-based payments aimed at compensating the farmer for the rent forgone derived from the use of related non-productive agricultural practices are a suitable option (OECD, 2001; Hart et al., 2011; Hodge, 2013). These are no (or little) distorting tools (i.e., part of the Green Box of World Trade Organization Agreement on Agriculture) specifically targeted to the production of agricultural public goods. A paradigmatic case of this type of tools are the agri-environmental schemes (AES) of the European Union's (EU) Common Agricultural Policy (CAP). AES are multiannual and voluntary incentive-based payments to farmers for preserving and enhancing environmental public goods. They usually consist of a per-hectare payment implemented regionally and co-financed by the EU and each of its Member States (Espinosa-Goded et al., 2010; Uthes and Matzdorf, 2013). AES stand out as one of the most significant CAP tools as they have assigned an aggregated expenditure of 22.2 billion euro (i.e., 22% of the budget of the European Rural Development Policy 2007–2013, according to ECA, 2011). Thus, the implementation of AES is a good proof of how the

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objective of encouraging public goods provision has become a key concept for the design of the CAP (EC, 2010a).

Not surprisingly, AES have been the subject of much attention by researchers (Uthes and Matzdorf, 2013). Their work has focused mainly on the barriers to participation in such schemes (Falconer, 2000; Christensen et al., 2011; Broch and Vedel, 2012), and on improving their design (Ruto and Garrod, 2009; Espinosa-Goded et al., 2010). However, more in-depth knowledge is still needed regarding some important issues such as farmers' willingness to accept (WTA) for AES participation in agricultural systems made up of permanent crops, the inclusion of ecological focus areas (EFA) and collective participation in such schemes.

With regard to the first issue, it is worth pointing out that ex-ante analyses of farmers' WTA for AES enrolment in permanent cropping systems are lacking in the literature. While AES in these agricultural systems have been previously studied (Calatrava-Leyva et al., 2007; Duarte et al., 2008; Fleskens and de Graaff, 2010; Franco, 2011), to the authors' knowledge none of these works have focused on the ex-ante assessments of farmers' WTA for AES participation, though this is not the case for herbaceous cropping systems (Christensen et al., 2011; Broch and Vedel, 2012). Ex-ante analyses of farmers' WTA for AES participation in permanent crops are opportune now since new AES are being designed for the next programming period, 2014–2020. This is particularly true for the case of olive groves in southern Spain, considering not only their high socioeconomic relevance, but also the numerous environmental problems that have emerged as a consequence of the expansion and intensification process that olive growing has undergone over the last two decades (Gómez-Limón and Arriaza, 2011). Specifically, these negative environmental impacts are soil erosion, biodiversity loss, overexploitation of water resources, non-point water pollution and deterioration of traditional landscapes (Beaufoy and Pienkowski, 2000; Gómez, 2009). Recent studies highlight that there is great scope for improvement in the production of environmental public goods by olive growing (Carmona-Torres et al., 2014; Villanueva et al., 2014). These studies identify soil conservation practices as one of the most important environmental-friendly practices to be adopted by olive growers, especially the use of cover crops (CC). CC are spontaneous or cultivated plants that grow between tree lines with the main objective of soil protection (Gómez, 2009). Apart from soil conservation, the use of CC has additional positive environmental impacts on soil carbon sequestration (González-Sánchez et al., 2012), biodiversity (Rey, 2011), visual quality of landscapes (Arriaza et al., 2004) and water pollution (Castro et al., 2008). Although there are studies that analyze the adoption of CC (Franco, 2011; Rodríguez-Entrena and Arriaza, 2013), to our best knowledge there are no other studies estimating farmers' WTA for CC within AES.

Apart from the agricultural system, the second issue that has received limited attention in the literature about AES is the promotion of EFA in farmland. EFA is defined in CAP regulations as areas with landscape features, terraces, buffer strips, land lying fallow, afforested areas and agro-forestry areas, or areas with a reduced use of inputs on the farm, such as those covered by catch crops and winter green cover. The presence of EFA generally improves biodiversity, as well as other public goods such as visual quality of landscapes, soil conservation, and so on (Stoate et al., 2009; EC, 2011a). This is the main reason that led to the European Commission (EC, 2011b) proposing a new instrument in the CAP 2014–2020, known as *green payment*, for those farms fulfilling some basic environmental requirements, including dedicating 7% of their farmland to EFA. However, this particular requirement was later relaxed as a result of the political debate and in the final regulation (Regulation 1307/2013, Art. 43–47) the share of EFA was set at 5%, compulsory for arable land only (permanent crops are eligible for this payment without any minimum EFA requisite). Therefore, this research aims at exploring in advance the olive growers' behavior regarding the implementation of EFA in their farmland. This is carried out by means of considering the inclusion of EFA in AES as a possible transitional period on the way to a hypothetical future implementation of EFA as a requisite for being eligible for the green payment in permanent crops.

The third issue to receive scarce attention in the literature is collective participation in AES, understood as farmers collectively signing AES contracts. It represents a promising way of reducing public transaction costs (costs of the resources spent by the administration in providing information about the AES, subscribing contracts, monitoring and making payments) while increasing the environmental effectiveness of policy tools. Specifically, spreading out the collective participation in AES reduces the number of applications to be processed as well as the costs of monitoring, consequently reducing transaction costs incurred by the government (Franks, 2011; Emery and Franks, 2012). Moreover, if the collective participation in AES is implemented in such a way that ensures the proximity of the farms that form the collective, a greater environmental effect would also be expected (Sutherland et al., 2012). Focusing on olive growing agricultural systems, it is worth quoting a recent work carried out by Rocamora-Montiel et al. (2014) who have explored the potential of territorial contracts in mountainous olive production systems in southern Spain as a tool to increase the farmers' profitability by adopting organic farming. This work represents a precedent of the current research since it reflects the interest for collective contracts in permanent cropping systems, in particular in olive growing. Despite the relevance of this topic, to the authors' knowledge, there is no paper that quantitatively analyzes farmers' willingness to participate in AES collectively, neither in olive growing nor in any other agricultural system.

In this paper, we use the choice experiment method to analyze southern Spain's olive growers' preferences toward AES including the above-mentioned innovative issues. The main objectives of this analysis are to support the design of new AES aimed at promoting public goods production by olive growing, and to partially bridge the existing knowledge gaps about the inclusion of CC, EFA and collective participation in AES contracts. Therefore, the results of this analysis may be very useful for policy-making, particularly now when new AES are being designed for the next programming period, 2014–2020. For this purpose, the paper is structured as follows. The next section is devoted to the description of the method and the data gathering used for the empirical analysis. The main results are presented in the third section and discussed in the fourth, where the main policy implications are also outlined. Finally, in the fifth section some conclusions are highlighted.

Method

Choice experiment approach

Choice experiment (CE) is a stated preference valuation technique based on Lancasterian Consumer Theory of utility maximization which postulates that consumption decisions are determined by the utility or value derived from the attributes of the good being consumed (Lancaster, 1966). The econometric basis of the approach lies in the Random Utility Theory (McFadden, 1974)[1]. CE is well suited to measuring the marginal value of the attributes of a good or a policy instrument (Ruto and Garrod, 2009), with the underlying assumption being that farmers' choices among voluntary policy schemes depend on the specific characteristics – attributes – of these schemes (Christensen et al., 2011). In fact,

[1] For an extensive explanation of the choice experiment theory and practice, see Hensher et al. (2005).