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The common agricultural policy and the determinants of changes in EU farm size

Fabio Bartolini*, Davide Viaggi

Department of Agricultural Economics and Engineering, Alma Mater Studiorum - University of Bologna, Italy

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ABSTRACT

Structural change provides the possibility of increasing the competitiveness and efficiency of the entire agricultural sector through a better allocation of productive factors. Amongst the productive factors, land is the one that most often limits farm development. This paper seeks to identify determinants of intended changes in farm size (represented by farmed area and measured as a reduction, expansion or no change) identified as stated intentions expressed through survey information, under two different Common Agricultural Policy (CAP) scenarios: (1) the Baseline, characterised by the Health Check policy as of 2009; and (2) a No-CAP scenario, assuming the elimination of all CAP payments and regulatory measures. Results highlight that CAP abolishment strongly reduces the intention to increase the amount of farmed area; the determinants of change in farmed area also change sharply amongst the two scenarios. Geographic variables, and farm characteristics such as farm organisation and the number of on-farm employees are relevant to explain the farmed area expansion. On the contrary, without the CAP, the relation between household and farm has strong effects on the different directions of change of farmed area. The results confirm that the different single payments scheme models affect the changes in demand of land.

Introduction

Agricultural economics literature has addressed the effect of the Common Agricultural Policy (CAP) on changes in the use of productive factors. Several authors have emphasised the effect of agricultural policy components, such as the decoupled payments and the various Single Farm Payment (SFP) models, as drivers of structural change (e.g. Harrington and Reinsel, 1995; Ahearn et al., 2005; Heckelei, 2010). Amongst the productive factors, land is the one which most often limits farm development and which is most directly applicable as an indicator of farm size. As a result, change in farmland size and land markets are the structural factors most studied in the literature (Ciaian et al., 2010). The analysis of land use in agriculture and its connections with policy is undertaken from several perspectives. The literature that directly addresses policy effects on land use has focused on three different aspects: (a) the formulation of land prices, or farmland rental prices; (b) the changes in preferences regarding land tenure; and (c) the effects of policies on the demand for land and on land markets.

The subject of the first branch of literature is the formulation of farmland prices or farmland rental prices with the emphasis on their evolution and on the determinants of such prices, including elasticity or capitalisation due to different types of government intervention (Ciaian and Swinnen, 2006; Latruffe and Le Mouël, 2009). The second branch of the literature analyses the preferences for different forms of land tenure or different production contracts, mainly from the point of view of neo-institutional economics. Attention is focused on differentiated levels of transaction costs related to differing property right structures (Feder and Feeny, 1991; Pretorius and Kirsten, 1994; Allen and Lueck, 2002; Jacoby et al., 2002; Home, 2009). In the third branch of literature, the effects of governmental instruments on land markets are simulated or measured. The results are represented as changes in the amount of demand for land or as differences in the Willingness to Pay (WTP) for land (or in the marginal value of land), considering heterogeneous farmers (Ciaian and Swinnen, 2006; Kilian and Salhofer, 2008; Happe et al., 2008; Bartolini et al., 2011; Galko and Jayet, 2011).

This paper seeks to identify the determinants of future change in farmed area (reduction, expansion or no change) and how the CAP affects such changes. We test the micro-level effects of farm-household variables and the macro-level effects of the location variables (interpreted as a combination of area and policy characteristics) on these changes.

This objective is pursued through the study of stated intentions regarding changes in the amount of farmed area identified *via* survey information, under two different policy scenarios, which consider: (a) the current (in 2009) CAP Health Check (referred to as

* Corresponding author at: Department of Agricultural Economics and Engineering, Viale Fanin, 50, 40127 Bologna, Italy. Tel.: +39 051 2096116; fax: +39 051 2096105.
E-mail address: fabio.bartolini@unibo.it (F. Bartolini).

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the Baseline scenario); and (b) a scenario involving the elimination of all CAP policy instruments (referred to as the No-CAP scenario). Two separate models have been implemented, each containing, as a dependent variable, the stated intention with regard to change in farm size respectively under the Baseline and the No-CAP scenario. In both models the stated choice regarding the farmed area was one of several farm strategy options, all of which would necessarily result in a change in the amount of farmed area. The data used were obtained from a survey of over 2000 farm households in 11 Case Study Areas (CSA) in 9 different European Countries. The survey was conducted in the context of the FP7 project CAP-IRE (Assessing the Multiple Impacts of the Common Agricultural Policies (CAP) on Rural Economies).

The paper is structured as follows: in 'Policy effects on land size change' section we review the literature on the impacts of policy on farm size, in 'Methodology' section we describe the methodology adopted; and in 'Data and descriptive statistics' section we describe data sources and sample descriptive statistics. This is followed by the presentation of the results and a discussion.

Policy effects on land size change

The policy context and policy changes have been identified as important drivers of structural change (Floyd, 1965; Harrington and Reinsel, 1995). The existing literature highlights the effect of policy change on the re-allocation of productive factors over time. In order to limit attention to recent studies of the CAP, on the one hand, the authors have identified a positive effect of policy decoupling on the land market, generated by an increase in formalised relationships between actors with regard to land possession (Ciaian and Swinnen, 2006; Ciaian et al., 2010). On the other hand, others have noted that income support payments have reduced land re-allocation towards more efficient farms, hence preventing some farmers from exiting agriculture and also helping to keep less efficient farms active (Latruffe and Le Mouël, 2009; Brady et al., 2009; Viaggi et al., 2010). With regard to the assessment of the effects of different policy designs (decoupled vs. coupled CAP) on structural change, studies have been carried out both *ex ante* and *ex post*. Three different approaches have been used to investigate structural change and the impact of policy.

The first field of literature concerns the use of Markov models. The results of Markov Models can be summarised as the prediction of the number of farms in a given farm type/typology and the effect of exogenous variables on transition processes (Stationary or Non-stationary Markov Chain Models). See Piet (2008, 2011) and Zimmermann et al. (2009) for a review of Markov models applied to land and structural change issues.

The bulk of the literature falls within the second field of study and can be described as an econometric analysis. The results of regression or choice models enable the identification of the set of variables which explain a specific farm's behaviour in terms of structural change. The analysis of structural change is carried out using panel data, time series (Ahearn et al., 2005), or cross section data (Goodwin and Mishra, 2005; Douarin et al., 2007). The panel data approach is the one most commonly used (Key and Roberts, 2003; Ahearn et al., 2005). Other authors, for their part, have made use of cross-sectional data. For example, Goodwin and Mishra (2005) use stated reactions in order to assess the impact of direct payments on decisions regarding acreage. Another application of the analysis of structural change based on the stated reactions is presented in Douarin et al. (2007), in which the authors use a probit model to explain stated reactions (exit or farm growth) to decoupling. Lobley and Butler (2010) use stated intentions about future (the next 5 years) strategic plans in South West England. In this paper, the authors analysed intentions concerning: (a) the exit from farming; (b) the change in the use of productive factors (mainly focusing on household labour use on-farm or off-farm); (c) the change (increase or reduction) in farm scale.

Finally, other authors have applied models based on mathematical programming approaches in order to assess the *ex ante* impacts of policy changes (i.e. Viaggi et al., 2011). Mathematical programming aims to simulate farm size changes under different price, policy, and cost conditions. Applications of mathematical programming use linear/non-linear models, static/dynamic models or more sophisticated agent-based models (Happe et al., 2008). Generally, these models allow for the identification of changes in land allocation amongst heterogeneous farm/agents, driven by the change in the marginal value of land (Galko and Jayet, 2011).

Several authors have tried to explain the micro-level effects which determine changes in land demand/or land tenure preferences. Despite the large body of literature available, most existing analyses focus on changes in land demand in Least Developed Countries or in Transition Countries. This literature mainly highlights the effect of the shifting or modifying land property rights (see, for example, Swinnen, 2002; Vranken and Swinnen, 2006; Deininger et al., 2008; Jin and Jayne, 2011). In other countries, the analyses, beginning with the preliminary works of Floyd (1965), tests the direct effect of policy on land demand; the dependent variables of the econometric exercise are the change in rented land or the change in the demand for marginal areas, idle areas or soil conservation contracts (Lichtenberg, 2007; Kilian and Salhofer, 2008; Bougherara and Latruffe, 2010).

There is a general consensus in the literature that explains changes in land demand as the allocation of land from less efficient producers to more efficient producers, where the change in land demand essentially, follows the differing marginal productivity of the land between heterogeneous agents (Galko and Jayet, 2011; Piorr et al., 2009). To perform such an analysis, elements of household characteristics (such as consumption or labour availability), farm specialisations, or typologies of the upstream/downstream relations, are used to proxy farm productivity (Shapiro et al., 1987; Huffman and Evenson, 2001; Balmann et al., 2006). Other authors have highlighted the effects of the issues connected with transactions costs on the change in land demand. In their explanation of transaction costs, the authors have mainly considered farm characteristics connected with social capital or education as key elements explaining different behaviours (Allen and Lueck, 2002; Deininger et al., 2008). Finally, other authors have focused on determinants related to expectations about farm household life cycles, often approximated as the owner's age or the presence/absence of a successor within the household (Allen and Lueck, 2002; Weiss, 1998).

Methodology

In this paper, we develop an analysis of the determinants of the changes in the size of farmed area and the policy effect on such changes. This analysis is conducted using the stated intentions collected through survey information, and comparing the determinants between two different policy scenarios.

We begin by discussing two distinguishing features of our approach. The first concerns the use of stated intentions rather than observed behaviour, whilst the second focuses on the treatment of the choice connected to the change in farmed area as a qualitative non-ordered variable.

The use of stated intentions is common in the literature on the impacts of policy on structural change (i.e. Goodwin and Mishra, 2005; Douarin et al., 2007; Genius et al., 2008; Viaggi et al., 2011). The use of stated reactions to describe the change in farmed area allows for the isolation of the effects of individual policy changes and to relate them to farm, farmer and household characteristics, hence avoiding the need to account for other drivers (e.g. local laws and regulations or land price fluctuations) as would be the case