6. THE IMPACT OF THE 2013 CAP REFORM ON LAND MARKETS IN ITALY

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*T*he connection between policy and other context variables and land markets is at the core of the policy debate, including the present reform of the Common Agricultural Policy (CAP). The current proposals for the post-2013 CAP will include the switch of the payment regime from an historical to a regional basis. This component, as well as the greening and other 'micro-provisions' can have an effect on the land markets. The objective of this chapter is to assess the potential impact of the proposed policy reform (in particular concerning the regionalisation of payments) on the land market. Attention will focus on changes in propensity to rent-in and out and in transactions due to the proposed provisions for the post-2013 CAP. To achieve this goal, the authors jointly use: a) a survey of farmers stated intention, and b) a mathematical programming model simulating the land markets in different policy scenarios. Both are applied to a case study at the scale of the province of Bologna, Italy (NUTS 3). The results of the model corroborate the results from the survey, though the model is much more reactive to policy changes, while the survey has a larger share of "no changes". Both hint at a relevant reaction of the land demand and supply to the shift from the historical to the regionalised payments, due to the differentiated and opposite effects that the reform would have on different farm types and sub-regions. The payment would be more capitalised into the land value, at the margin, as long as it is less constrained by the ownership of entitlements. As an effect, the regionalisation would potentially result in increased rental prices and in a tendency to re-allocate land.

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1.   Introduction

The agricultural economics literature has highlighted the effects of the Common Agricultural Policy (CAP) on factor markets (Ciaian & Swinnen 2006; Bartolini et al., 2011) and, specifically, it has studied the way in which the CAP reforms have changed these effects over time. Many papers show a close relationship between the effects of policy on the production factors prices, which are consequences of supply elasticity as well as of factor substitution possibilities (Floyd, 1965; Bierlen et al., 2000; Goodwin et al., 2003; Ahearn et al., 2005; Latruffe & Le Mouël, 2009). Several works aim to estimate the effect of policy payments in terms of their capitalisation into land value or land rental prices, and to calculate a share of capitalisation depending on type of policy support (Ciaian & Swinnen, 2006; Courleux et al., 2008; Latruffe & Le Mouël, 2009).

The literature also underlines the effect of policy changes on the reallocation of productive factors over time (Bartolini et al., 2011). Several papers in particular analyse the effects of decoupling, introduced in 2003 by the Fischler reform, on the dynamics of the exchange of land. They aim to identify the determinants of capitalisation of payments into land prices, including the distribution of payments between beneficiaries, in connection with the possibility of exchange of entitlements and in relation to the ratio between eligible area and number of entitlements owned (Le Mouël, 2006; Balkhausen et al., 2008; Courleux et al., 2008; Kilian & Salhofer, 2008; Viaggi et al., 2010).

Studies focusing on the effect of different policy scenarios on the changes in land demand or land rented/sold are often derived from or are expressed through changes in the marginal value of land (Viaggi, 2009; Bartolini et al., 2011). Mathematical programming models have been used to simulate the impact of policy reforms considering also changes in farm size under different price, policy, and cost scenarios.[16] This typology of models also has an important use in analysing competition for land allocation between different farms, measuring the effects of drivers of changes through the marginal value of land (Galko & Jayet, 2011). Finally, some studies using these instruments aim to investigate farmers' investment (including land) behaviour and to evaluate the impact of different CAP scenarios, with a special focus on the Single Payment

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[16] See Zimmerman et al. (2009) for a review of relevant models applied to structural change

Scheme, to contribute to the understanding of the relation between policy design and farmers' behaviour (Gallerani et al., 2008b; Viaggi et al., 2011b).

Several papers also use econometric models to address the effects of changes in policy mechanisms or property rights systems on the number of land markets transactions (Bierlen et al., 2000; Le Mouël, 2006; Ciaian et al., 2008; Gallerani et al., 2008a; Jin & Jayne, 2011). In some cases, the analysis rests on surveys of intentions, for example to investigate farmers' decisions on land idling in a 2003 CAP reform scenario (Bougherara & Latruffe, 2010), or to identify the determinants of intended changes in farm size under two different CAP scenarios – Health Check and the complete abolition of CAP payments) (Bartolini & Viaggi, 2013). Transaction costs in land exchange and imperfections of the land markets, such as imperfect competition, can be very significant. This has proved to be particularly relevant in developing land markets, such as those of central and eastern European countries (CEECs), where the combination of imperfect competition and transaction costs has a strong impact on land prices (Swinnen, 1999; Ciaian, 2007).

Given the complexity of factors affecting land markets and the impact of policy, ex-ante estimation of the impacts of policy changes always remains difficult. In this respect, survey-based stated intentions and modelling-based simulations may yield different but complementary results (Viaggi et al., 2011a).

The objective of this chapter is to evaluate the impact of the post-2013 CAP policy instruments on the land market in the province of Bologna, Italy. Attention is particularly focused on the regionalisation of the single farm payment regime. To pursue this objective, this chapter combines insights from a survey carried out in Bologna to understand the effect of the reform through stated intentions of the farmers (Raggi et al., 2013) with a modelling simulation exercise carried out in the same province. The modelling component builds on a previous paper (Puddu et al., 2012), and the farm household investment model of the paper has been revised and extended in order to simulate the demand curve for land by individual farms in different policy scenarios.

On the practical side, the chapter aims to contribute an ex-ante understanding of the potential effects of the reform on land values and propensity for transaction. From the methodological point of view, the chapter aims to explore different ways to integrate very detailed farm-level investment model output and survey information in more simplified farm

models suitable for providing regional simulations concerning land markets.

In the next section, we first recall the main features of the post-2013 CAP reform. In the subsequent section, we describe the methodology, followed by the main results. After that, we provide a discussion, followed by conclusions and final remarks.

2. The direct payment in the post-2013 CAP reform

At the time this work was carried out, the most up-to-date information about the post-2013 CAP was available from the official proposal published in October 2011 (COM(2011)625/3). In Italy, it will include the switch of the payment regime from an historical to a regional basis. The regionalised payment is a homogenous payment per hectare for farms in the same region, and will be distributed on the basis of the farm area on which some agricultural activity is carried out. This payment will then lose the connection with the per hectare payment in the three-year reference period (2000-02) and the entitlements owned by the farmers. In addition, the farmers can obtain payments on all of their operated land area. The mechanism of payment will be based on disentangling the single farm payment into four separate components: basic payments, a greening component, payments to less-favoured areas, and payments to young and small farms. The basic payments will be assigned to active farmers. These limitations do not apply to farmers that receive less than €5,000 in direct payment. The greening component of the payment is assigned to farmers entitled to a payment under the basic payment scheme and that comply with some ecological prescriptions. The application of greening and the relationship between provision of environmental good in the first and second pillars of the CAP are central to the ongoing scientific debates about greening payments (e.g. Matthews, 2012).

3. Methodology

The methodology follows a framework that represents a combination of two exercises conducted in parallel. We performed a survey of farmers' stated intentions concerning future reforms, in order to provide empirical information on the reaction to the reform. A selection of survey information, together with demand curves for land obtained from an extended farm household investment model developed in previous works, is then used to feed a mathematical programming model for simulation. In

the remaining of this section, we first describe the survey and then the modelling framework.

The survey was conducted in the early summer of 2012 on a random sample of 350 farm households out of 7379 beneficiaries of CAP payments located in Bologna province. The questionnaire was been completed through a telephone interview which focused on farmers' intentions about land expansion/reduction conditional on the introduction of some specific measures of the post-2013 CAP reform proposal. More specifically, they were asked to state intentions about renting in/out more/less land and buying/selling more/less land assuming the introduction of the regionalised payments, the greening and the capping measures in comparison to what their would have done under a baseline scenario (the current CAP system). The sample has been proportionally stratified by altimetry location (mountain, hill, Bologna hill, plain) and by the amount of CAP payments received in 2011 (below and above the mean). The questionnaire was divided into different sections: first, information about farm characteristics, labour features and market strategy was requested; then, CAP payments and generic planned future activities were requested; next, questions concerning expansion/reduction intentions under the current CAP and under the post-2013 CAP proposal were asked; and finally, personal and household characteristics were requested.

The farm characteristics relate to farm size, location, legal status, main farm specialisation, typology of crops and animal breeding, intensity of livestock production, surface allocated to agro-environmental or ecological measures, and area invested in photovoltaic or biogas systems. In the same section, information on land rent in and out, on the increase/decrease of land owned or rented in the previous years (from 2002), and on the presence of relatives among owners or tenants of the farm was collected. Concerning labour characteristics, information about the number of household members working full-time or part-time on the farm and the number of full and part-time external workers on the farm was collected. Farm characteristics were investigated through questions about marketing strategies for selling farm production, farm specialisation, production contracts implemented, and use of the internet to buy inputs or sell outputs. Regarding the CAP payments, information on the amount of payments, number of entitlements owned and the amount of other payments received in 2011 was collected. Moreover, the respondents were asked to quantify how the farm revenue is affected by those payments. Generic questions on intentions were also asked about the adoption of new technology and on intentions to remain in activity in the next years. The

percentage of total gross family income coming from farming was also investigated in this section. Household information was collected through questions concerning the gender of family members, the number of minors, the number of family members over 65 years old and the number of unemployed. Personal characteristics requested related to farmer age and education level, with the latter divided into eight categories ranging from no title or primary school to PhD. An outlier was excluded from the analysis. The main descriptive statistics about the sampled farms are reported in Table 6.1. More information is available in Viaggi et al. (2013b).

Table 6.1 Descriptive statistics

Category	Variable (code)	Variable (description)	Obs	Mean	Std. Dev.	Min	Max
Geographical characteristics	d_hillBo	1 if farm located in Bologna area	350	0.102857	0.304207	0	1
	d_hill	1 if farm located in hill area	350	0.16	0.367131	0	1
	d_mountain	1 if farm located in mountain area	350	0.102857	0.304207	0	1
	d_plain	1 if farm located in plain area	350	0.634286	0.482319	0	1
	d_disadv	1 if the farm is in a disadvantaged area	350	0.331429	0.471401	0	1
Farm characteristics	d_rentOut	1 if the farmer have land rent out	348	0.051724	0.221788	0	1
	d_rentIn	1 if the farmer have land rent in	349	0.335244	0.472753	0	1
	d_saleCon	1 if have contracts to sell products	348	0.33046	0.471056	0	1
	d_livestock	1 if carries out livestock farming activities	349	0.106017	0.308302	0	1
	d_fruits	1 if main specialization is fruits	349	0.083095	0.276421	0	1
	d_mixedcrop	1 if main specialization is mixedcrop	349	0.272206	0.445735	0	1
	d_cereals	1 if main specialization is cereals	349	0.469914	0.499811	0	1
	HectLanProp	Farm total area in property	349	29.73066	107.5369	0	1870
	d_AATs	1 if is a small farm (AAT <=10 hectares)	349	0.492837	0.500667	0	1
	d_AATms	1 if is a medium small farm (AAT >10 <=50 hectares)	349	0.383954	0.487045	0	1
	d_AATml	1 if is a medium large farm (AAT >50 <=100 hectares)	349	0.083095	0.276421	0	1
	d_AATl	1 if is a large farm (AAT >100 hectares)	349	0.040115	0.19651	0	1
Household characteristics	d_ExPartT	1 if have external worker part time	349	0.091691	0.289003	0	1
	d_ExFullT	1 if have external worker full time	349	0.057307	0.232761	0	1
	d_HPartT	1 if have Household worker part time	349	0.183381	0.387534	0	1
	d_HFullt	1 if haveHousehold worker full time	350	0.871429	0.335204	0	1
	d_Unemployed	1 if presence of unemployed in the household	346	0.054913	0.228141	0	1
	d_Over65	1 if presence of over 65 on household	350	0.537143	0.499332	0	1
Farmer characteristics	d_higheduc	farmer with high school, degree or PHD title	350	0.294286	0.456373	0	1
	d_LowEduc	farmer with no title, primary or middle school title	350	0.705714	0.456373	0	1
	Age	Age of respondent	347	63.29683	13.96263	25	92
	d_livOnFarm	1 if live on farm (alone or with family or only the family)	347	0.85879	0.348741	0	1
	d_Exit	1 if farmer intend to leave farm activity	350	0.145714	0.353325	0	1
	d_Sellpro	1 if sell products to processing firms	350	0.071429	0.257908	0	1
	d_selldea	1 if sell products to wholesale dealer	348	0.321839	0.467854	0	1
	d_sellcoo	1 if sell products to cooperative	347	0.636888	0.481591	0	1
	d_sellcon	1 if sell products to consumers	347	0.198847	0.399709	0	1
	d_sellotfa	1 if sell products to another farm	347	0.083574	0.277147	0	1
CAP payments	importSFP	Amount of Single Farm Payment received	257	7539.428	26404.53	36	350000
	ImpOthPaym	Amount of other CAP payments received	25	27418.4	66675.45	200	310000
	NEntitlem2011	Number of entitlements owned	44	55.29545	188.2768	1	1200
	ImpPayOnRevenue	Average influence of CAP payments on revenue	253	2.217391	1.437927	1	6

The modelling component of the paper is based on mathematical programming applied to the set of individual farms of the sample. Ciaian et al. (2012) and Puddu et al. (2012) developed a theoretical analysis of the

impact of regionalisation on land prices in a two-farm setting and a simulation of farm-level demand curves. Puddu et al. also developed a model to simulate the effects of regionalisation (intended as the move from historical payment to fully regionalised) in the province of Bologna. Starting from the regionalised model developed by Ciaian et al., we first apply a simple profit maximisation model to simulate changes in land operated, in which profit is a function of available land, without specifying the way of accessing the land (ownership or rent). An alternative modelling framework is also used, explicitly considering ownership versus renting and including transaction costs, following the model developed by Deininger et al. (2008) and Bartolini & Viaggi (2013).

Using the simulation model, the effect of the post-2013 CAP reform on the land market in the area is calculated as the difference between the current situation and the new situation, assuming a redistribution of the total amount of payments in the area based on a regionalised payment.

In order to calibrate the model using data from the survey, we base the land demand function on information about the demand slope (function) and the amount of land available. In the model, we use the individual farms in the Bologna province assuming that altogether they are representative of the dynamics of the area. We assume that land can only be traded within each sub area of the study area (there are four sub areas: mountain, hill, Bologna hill and plain).

A major issue concerns the reference area for the calculation of the regionalised payment. First, we assume that the regionalised payment will be uniform across the whole area and calculated based on the total SFP/UAA of the area; an alternative hypothesis simulated is that the regionalised payment is uniform within each sub area.

Based on the rationale of the policy instrument, it would be reasonable to assume that entitlements (on the historical basis) do not affect the marginal value of land for most the farmers in the area (see also Bartolini & Viaggi, 2013).

A detailed description of the model and of the calibration procedure is described in Viaggi et al. (2013b).

4. Results

Stated intentions, from the survey, on changes in farmland size as a consequence of the introduction of specific measures of regionalised direct payments, compared to the situation with the present CAP, show a similar

trend across the different options tested, with value of change below 13%. The option of "no change" covers the majority of the sample (Table 6.2).

Table 6.2 Pattern of responses to regionalised payments

CAP Measure	Change	Mode	Frequency	Percent
Regionalisation	Expansion	buy	36	12.04
		rent	38	12.71
	Reduction	sell	10	3.34
		rent	23	7.69

The results of the model are illustrated in Table 6.3. The regionalisation of payments causes an increase in total income from €5.119 million to €5.698 million as a result of the fact that with the regionalised payments, land allocation is not driven by entitlements and hence land is allocated reflecting the private optimum without any policy-driven distortion.

Table 6.3 Main results of the model

	Baseline (historical SFP)	Regionalised payment	Regionalised payment per zone
Total gross margin (€ million)	5.991	6.509	6.892
Marginal land value			
Mountain	200	372	251
Hill	350	509	542
Bologna hill	350	506	404
Plain	600	744	789
N. farms	349	160	160
N. farm transaction costs model			
TC=0		122	117
TC=0.1		223	152
TC=0.2		292	211
TC=0.3		320	265

The total income does not differ between the two regionalisation options, due to the fact that land allocation and also the total amount of payments distributed are the same.

There is an increase in marginal land values as revealed by the land constraints in the model (which could hint at an increase in land prices). This may be due to two main effects:

- The regionalised payment directly affects the marginal value, differently from the historical payments, constrained by the mechanism of entitlements.

- There is an increase in the marginal productivity of land due to better re-allocation of land.

The marginal value of land (and supposedly the income) per zone changes between the two regionalised options, as they imply a different re-distribution of payments across areas. In particular, the uniform regionalised payments would yield relevant increases in the marginal value of land in mountain areas.

The results also indicate a major tendency to re-allocate land, which is concentrated in only 160 farms (less than half). This does not differ between the two regionalisation options, due to the fact that land is constrained to being re-allocated within the same zone and the optimal allocation does not change with the level of regionalised payments.

The model including transaction costs corroborates the same ideas, but also emphasises that the actual land re-allocation would depend on the actual transaction costs. The effects of assumptions about transaction costs are twofold. First, there is an effect of model calibration, and second, assuming transaction costs, the differential of marginal value of land across farms is greater and this yields different results (more intense re-allocation) in the option with zero transaction cost (less farms remaining). Increasing transaction costs causes a reduction in land exchanges and hence a higher number of farms remaining. It is expected that there is no difference between the two regionalisation hypotheses.

5.   Discussion

This work uses survey and modelling information to assess the impact of post-2013 CAP reforms. Altogether, the results of the model are consistent with the results from the survey. In particular, both hint at the fact that there are farms in the area interested in selling/buying land in opposite directions in the case of regionalisation. However, the high level of "no changes" in the survey (also the consequence of uncertainty in future value of payments under the regionalised regime), which is normal when comparing modelling results with actual intentions, reveal that any change would occur much more gradually than indicated by the model. Both

survey and modelling results are generally consistent with the previous literature in terms of stated reactivity to policy reforms and direction of changes. This is also due to the fact that the model design is largely theoretically driven.

This work is affected by several limitations. A key limit is the current uncertainty about the CAP reform (still in a phase of negotiation). This does not allow for realistic hypotheses about the actual details of the allocation mechanisms in each area.

Another set of limitations derives from the characteristics of the model, which uses a very simplified approach not including specific technical constraints, land uses and technologies. In addition, in spite of the use of transaction costs, the model cannot be deemed to fully incorporate obstacles to land transaction, including distance effects, life cycle of the farms and so on, as well as other factors affecting land values and transactions. As a result, the changes due to the reform and the related economic effects are certainly overestimated.

6.   Conclusions, policy implications and further research

Modelling and survey information show a reaction in land demand to the shift from historical to regionalised payments. Regionalised payments seem to be capitalised more into the land value, at the margin, as long as they are less connected to entitlements. As a result, regionalisation would cause increased rental prices in the study area. From an economic point of view, however, overall agricultural income would benefit from regionalisation due to a more efficient allocation of land.

The reaction is strongly influenced by the previous historical system of distribution of payments. In fact, the quantity of entitlements owned before the reform and their link with farm area is the key factor affecting the change in land demand resulting from the upcoming reform and how each farm would interact with the market. The difference in historical payments and the hypotheses about how the regionalised payments will be calculated also strongly affect the outcome of the modelling exercise. Hence, the choice of the distribution of the national ceiling, which affects the budget available to the basic payment, and the territorial level at which payments will be uniformly applied will be particularly decisive.

In terms of policy implications, two main messages arise. First, regionalisation is desirable if the objective is efficiency. Second, if there is also a concern over destabilisation of land markets and distribution of income, a cautious (evidence-based) choice of the areas for uniform

payments and a gradual move from the historical to the regional system would be advisable.

A straightforward development of this work would be the revision of the model once the reform is approved and the implementation process better clarified. In addition, new instruments could be included and/or better developed in the analysis, such as greening or capping. Another line of investigation is the use of a dynamic model, which could better account for the process of adaptation, or a more realistic specification of spatial interactions, allowing for distance and neighbouring effects.

This work does not necessarily reflect the view of the European Union and in no way anticipates the Commission's future policy in this area.

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