IMPACT OF THE CAP POST 2013 ON LAND MARKET. THE CASE OF THE PISA PROVINCE

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F. Bartolini, G. Brunori, O. Gava

Abstract. *TOver the last twenty years, the role of agricultural policy in changing the demand for productive factors had been widely studied, emphasising the role of Agricultural Policy reforms' impacts on land demand and land market. The CAP has been recently restyled. In October 2011, the European Commission first released the CAP reform proposal (COM(2011)625/3). The CAP 2014-2020 encompasses a revision of the first pillar policy and some novelties within the second pillar policy. In Italy, the reform also includes the introduction of uniform payments (regionalisation) with partial converge mechanism (so-called "Irish model"). The objective of the present paper is to provide an ex-ante analysis the main instruments of the CAP 2014-2020. The paper focuses on two novelties under Pillar I, i.e. the shift to regionalised payments and the introduction of the greening. The paper evaluates the extent to which the new CAP could affect land demand by estimating farm households' willingness to pay for additional land. A case study in Pisa Province is developed. The results point-out that the new instruments under the reformed CAP would not uniformly affect farms types and could lead to changes in the demand. Alternative policy designs can significantly affect the willingness to pay and hence shows capitalisation effects.*

Keywords: *land market; Common Agricultural Policy; Mathematical Programming Model; Capitalization; Willingness to Pay.*

1. Introduction

Over the last twenty years, the role of agricultural policy in changing the demand for productive factors had been widely studied (see, e.g., Harrington and Reinsel, 1995; Ahearn et al., 2005; Happe et al., 2008). More specifically, several Authors highlighted Common Agricultural Policy (CAP) reforms' impacts on land demand and land market, each being a key variable and a constraint on farm household models (Piorr et al., 2009).

The CAP has been recently restyled. In October 2011, the European Commission first released the CAP reform proposal (COM(2011)625/3). The proposal had been debated for roughly two years before the European Parliament and the Commission came to the agreement in June 2013. In August 2014, the new CAP was officially approved by the member states. The CAP 2014-2020 encompasses a revision of the first pillar policy and some novelties within the second pillar policy. In Italy, the main innovations are as follows: a) the introduction of "active farmers"; b) the introduction of the basic payment scheme, encompassing the shift from a historical to regional allocation system, with payments becoming proportional to the operated farmland, and the partial converge mechanism (so-called "Irish model"); and c) the disentanglement of the direct payment into four components, each contributing to the reward, i.e. (i) active farmers, (ii) green direct payment ("greening"), (iii) disadvantaged areas, and (iv) young farmers and small farms.

Recent scientific evidence has suggested that shifting the entitlement allocation system from a historical to a (partially) regional model would deeply affects land demand in Italy (see Bartolini and Viaggi, 2013; Puddu et al., 2012; Puddu et al., 2014), due to the abolishment of the eligibility constraints, which in practice forces farmers to cultivate eligible crops to activate the entitlements. Other authors shows very high capitalisation effects of the payment on the rental value (Latruffe and Le Mouël, 2009; Povellato; 2013)Moreover, the ratio between eligible and operated land may significantly differ among farmers, due to the divergence between historical endowments over the reference period and current uses.

The objective of the present paper is to provide an ex-ante analysis of some instruments of the CAP 2014-2020. We focus on two novelties under Pillar I, i.e. the shift to regionalised payments and the introduction of the greening. Specifically, we estimate the impact on land demand and simulate the effects on land market. Additionally, we provide a mathematical programming model by which we attempt to show the potential effects of the new direct payment system. We evaluated the extent to which the new CAP could affect land demand by estimating farm households' willingness to pay for land. We calculated the change in shadow prices that result from renting-in one additional unit of land. This allowed assess the willingness to pay. The shadow prices are associated with observed land use constraints.

The model is tested to a subset of farming systems in the Pisa Province (i.e., arable, horticulture and permanent), selected for their diffusion within the province and for their likelihood to be affected by new policy regimes (Viaggi et al., 2013).

As a whole, our work show that the new instruments under the reformed CAP would not uniformly affect the different types of farms and could lead to changes in the demand for land. Alternative policy designs can significantly affect land demand and, hence, rental prices.

The rest of the paper is organised in four sections. The first section provide details on the theoretical model behind the paper. The second section is dedicated to the methodological approach. The third section is for presenting and discussing the results of our work. The fourth and final section includes concluding remarks, reflections on the limits of the paper, as well as suggestions for policy makers and insights for further research.

2. Theoretical model

In agricultural economics, land use and its connections with policy are studied under three different perspectives, i.e. i) the change in land tenure preferences, ii) the capitalization of payments into farmland selling or rental prices, and iii) the effects of the policies on land demand, land markets, and land reallocations (Viaggi et al., 2013). Here, we focus on policy impacts on land market. Econometric and statistical methods and mathematical programming modelling are major approaches to this issue (Zimmermann et al., 2009). Mathematical programming is rather used to simulate the ex-ante impacts on land demand and the changes in land prices (i.e. purchase and rent agreements), as well as to test different hypothesis about relevant parameters, such as price level change, payment amount, and cost of labour or other inputs (see, for example, Galko and Jayet, 2011).

Given a fixed policy scenario and an initial land endowment, marginal changes in land demand result from the WTA (willingness to accept) or the WTP (willingness to pay) for land, both being functions of household's geographical location, as well as of farmers' and farm's characteristics (Bartolini and Viaggi, 2013). A generic farmer would claim for additional land when his WTP for land exceeds the sum of rental prices (*r*) plus transaction costs (tc_{in}) (Deininger et al., 2008; Bartolini and Viaggi, 2013): $WTP > r + tc_{in}$. Conversely, the farmer would shrink the surface of operated UAA (utilised agricultural area) when its WTA land is inferior to the *r* (received) minus the *tc* for renting out land (tc_{out}): $WTA < r - tc_{out}$. However, no single farmer's demand for land would change when the sum of *r* plus *tc* exceeds the WTP, while the WTA exceeds the *r* (received) minus the related *tc*: $WTP < r + tc_{out}$ and $WTA > r - tc_{in}$, respectively. Agricultural economists had widely studied the impact of transaction costs (*tc*) both on the demand for land and on the market of land. Total *tc* depend on transactions' frequency and asset, farmers' characteristics, quality of social relationships, reciprocal trust among people, and institutional factors (Williamson, 1996; Allen and Lueck, 2003; Ciaian et al., 2012). When considered together, *tc* and land demand changes account for the sum of total time spent for collecting information about the availability of rentable land rent plus contract registration cost. Time spent for searching farmers interested in renting-in land is an additional *tc*. As *tc* grow, the number of transactions decrease, thus pushing up rental prices.

3. Methodology

We propose a methodology divided into three sequential steps, i.e. i) identification of representative farm households, ii) development of policy scenarios, and iii) simulation farmers' behaviour. The following paragraphs provide details on each step.

3.1 Identification of representative farm households

This study refers to farms located within Pisa province of the Italian region of Tuscany. Following a common procedure of agricultural economics analyses (see, e.g., Bartolini and Viaggi, 2012), we preferred to perform the simulation by using representative (built) farms identified *via* cluster analysis, rather than real farms. Cluster analysis helps clearly discriminate among groups of homogeneous farms. In addition, median values for single group characteristics can be used to create farm profiles representative for each group of farms (see, e.g., Galko and Jayet, 2010). The cluster analysis returned 33 groups of homogeneous farms[1]. Policy impacts were quantified via scenario analysis.

3.2 Development of policy scenarios

We simulated CAP post-2013 impacts on changes in land demand by developing four alternative policy scenarios, each relying on a specific assumed combination of payment scheme and greening requirements. We built an additional scenario encompassing the complete abolishment of the CAP to capture the full effect of the payment scheme. Table 1 provides an outline of the main assumptions under which alternative scenarios were built.

[1] Cluster analysis is conducted on a subset of farms from the Italian 2010 agricultural census. The subset was made of all farms located within the boundaries of Pisa province (4868 farms), but for very small farms, i.e. farms operating less than 1 ha were excluded from the subset. The groups were highlighted using the k-means non-hierarchical clustering method. The group with the higher Calinski/Harabasz pseudo-F value was used to identify the other groups. Distinctive variables of cluster groups are farm size, amount of basic payments received and amount of household labor allocated to on-farm activities. Collinearity among selected variables was pointed out through a pairwise correlation test. The test returned low correlation coefficients among variables; specifically, the correlation coefficients are as follows: 0.4243 for pair farm size and amount of basic payments; 0.2843 for pair farm size and household labor allocated to on-farm activities, and 0.1135 for household labor allocated to on-farm activities and amount of basic payment received.

Tab. 1 - Main features of policy scenarios.

Scenario	Code	Entitlement allocation mechanism	BPS level	Rights	Cross compliance	Greening conditionality
Baseline HC 2008	ba	Historical	–	Current entitlements	Existing	–
Irish model	rp	Regionalised	Partial convergence	No entitlements; payment per ha UAA; all crops eligible	Existing	30% BPS
Full convergence 2015	rp1	Regionalised	Full convergence by 2015	No entitlements; payment per ha UAA; all crops eligible	Existing	30% BPS
Full convergence 2020	rp2	Regionalised	Full convergence by 2020	No entitlements; payment per ha UAA; all crops eligible	Existing	30% BPS

BPS: basic payment scheme; UAA: utilised agricultural area; Greening requirements: (i) crop diversification; (ii) ecological focus areas; (iii) measures to maintain permanent grassland

"Baseline HC 2008" scenario (*ba*) frames farms' state in 2013, under the 2008 CAP "Health Check". Under *ba*, firms receive the single farm payment (SFP), with entitlements being assigned on the basis of historical data. "Irish model" scenario (*rp*) differs from *ba* for the introduction of both historical payments based on partial convergence (Irish model) and the greening measures. As alternative scenarios to *rp*, we propose "full convergence 2015" (*rp1*) and "2020" (*rp2*), which encompass the implementation of uniform payments per hectare UAA (flat rates) by 2015 and by 2020, respectively[2]. As a result, the reference level for the basic payment under *rp* (nearly €173.35/right)[3] corresponds to the flat rate payment under both *rp1* and *rp2*.

3.3 Simulation of farmers' behaviour

We simulated farmers' demand for agricultural land in response to policy changes by mathematical programming modelling. As a rational behaviour, farmers aim at maximising the net present value (NPV) of their firm's profits. Equation 1 depicts NPV maximization (max *NPV*).

$$\max \text{NPV} = \sum_{n=1}^{N=2020} \pi^n (1+i)^{-.n} \qquad (1)$$

Where, π^n is the farm household profit in a generic year *n*, given the rate of return (*i*) over the entire period (*N*), i.e. 2014-2020. The profit equation is as follows (Eq. 2):

$$\pi^n = x_i (I_i - c_i) - x_i^d k_i + BP_c * ent - x1_{in} * P_{in} + x1_{out} * P_{out} - x_j * p_j \qquad (2)$$

s.t.

[2] Collectively, we refer to *rp*, *rp1*, and rp2 as "regionalised" scenarios.

[3] The reference level is given by the overall amount of basic payment received divided by the surface area of eligible land (Frascarelli, 2014).

$$\sum_i x_i = x1_{ow} + x1_{in} - x1_{out} \quad (3)$$

Where the subscript *i* indicate a generic crop; *I* is farm income; *c* stands for variable and fixed farming costs; BP_e is the basic payment per entitlement and *ent* is the highest possible number of farmer's entitlements; l_{in}, l_{out} and j respectively stand for renting-in, renting-out and labour activities, with p_{in}, p_{out} and p_j being the relative costs. Equation 3 is land demand equation. Land and crop variables involved in NVP calculation are subject to the below technical and non-negativity constraints:

$$\sum_i x_i * a \leq A$$

$$e \leq ent$$

$$x1_{in} \geq 0$$

$$x1_{out} \geq 0$$

$$\sum_i x_i > 0$$

Where *a* is a unit of UAA and *A* is the optimal farmed area (see Severini and Valle 2011; Bartolini and Viaggi, 2013).

Due to the short time period, we assume that the rental market is the only active market of land; thus, farmers can either rent or rent-out some land, respectively to increase or shrink their farmed UAA. Modelling a short time span allow also consider the fixed factors as constants, so that variable factors only need adjustment.

Given their tight relationship with land value, rental prices are a major research topic within the field the assessment of CAP's impacts on land market (see, for example, Bartolini and Viaggi, 2013). Apart from the profitability of agricultural activities tied to land demand, rental prices can dependent on other factors, e.g. geographical location and topography, life cycle hypothesis, and credit markets, to cite some (see Swinnen and Knops, 2013 for a review). It is worth noting that the selected time span is too short to allow a coherent simulation of farmers' behaviour with respect to investments; hence, neither the purchase nor the rental of land can be robustly investigated (see Puddu et al., 2012 for an analysis of policy impact on land demand covering both rental and purchase markets).

Data used for the simulation result from the merge of Italian Agricultural Census 2010 *micro-data* with ARTEA (regional payment agency of Tuscany) database. ARTEA data covers all payments received by farmers from 2005 to present. We supplemented ARTEA data with primary data from expert interview about the dynamics of land market and land prices.

4. Results and discussion

the two tables below (Table 2 and 3) provide model's results. Farm clusters (CL1 to CL33) are classified according to their specialization into arable, vegetable and permanent clusters.

The outcomes of "Baseline HC 2008" scenario are presented in Table 2.

Tab. 2 - Model results under baseline scenario							
Cluster	**Specialization**	**Topography**	**NPV (*1000 €)**	**Operated UAA (ha)**	**Rented-in UAA (ha)**	**SFP (€/year)**	**SFP per ha (€/year)**
CL1	Arable	Plain	48,749	5.20	0.68	713	137
CL2	Arable	Plain	1,068,879	143.99	53.88	25,433	177
CL3	Arable	Plain	372,149	50.00	16.00	8,297	166
CL4	Arable	Plain	2,874,602	316.27	104.18	72,570	229
CL5	Arable	Hilly	749,075	75.99	7.84	15,715	207
CL6	Arable	Hilly	115,464	18.50	2.50	3,365	182
CL7	Arable	Hilly	394,233	62.79	15.39	10,610	169
CL8	Arable	Hilly	1,379,133	249.54	92.86	34,069	137
CL9	Arable	Hilly	2,510,397	460.00	180.00	71,485	155
CL10	Arable	Hilly	246,904	37.62	6.62	6,630	176
CL11	Arable	Hilly	21,054	9.67	2.34	-	-
CL12	Arable	Hilly	1,099,071	135.66	40.44	22,821	168
CL13	Arable	Hilly	4,753,901	870.12	270.33	-	-
CL14	Vegetable	Plain	190,811	3.31	0.64	-	-
CL15	Vegetable	Plain	177,456	7.05	0.05	804	114
CL16	Vegetable	Plain	251,209	40.90	2.34	10,296	252
CL17	Vegetable	Plain	414,675	21.94	8.36	3,396	155
CL18	Vegetable	Plain	543,498	25.63	5.68	1,603	63
CL19	Vegetable	Hilly	1,312,442	76.78	38.39	7,992	104
CL20	Vegetable	Hilly	583,790	21.00	-	3,597	171
CL21	Vegetable	Hilly	8,472	4.67	1.45	-	-
CL22	Vegetable	Hilly	50,360	5.30	1.03	-	-
CL23	Vegetable	Hilly	120,130	23.50	7.50	-	-
CL24	Permanent	Plain	30,878	2.56	0.06	-	-
CL25	Permanent	Plain	204,014	36.94	-	13,192	357
CL26	Permanent	Plain	1,258,246	150.00	-	135,299	902
CL27	Permanent	Hilly	1,471,623	58.36	8.14	12,314	211
CL28	Permanent	Hilly	430,467	44.20	8.70	6,632	150
CL29	Permanent	Hilly	391,062	16.42	1.46	3,133	191
CL30	Permanent	Hilly	179,704	9.12	1.12	1,553	170
CL31	Permanent	Hilly	19,596	2.24	0.12	-	-
CL32	Permanent	Hilly	1,330,428	158.88	8.88	37,541	236
CL33	Permanent	Hilly	44,085	3.70	0.35	547	148

NPV: net present value; SFP: single farm payment; UAA: utilized agricultural area

According to our analysis, under *ba* most clusters behave similarly with respect to land demand, looking for land to rent to increase the operated UAA. Received SFPs are highly heterogeneous both within and across the three specialization categories. When entitlements are allocated on a historical basis, the share of arable clusters granted with direct payments (85%) exceeds that of other specialization clusters (80% vegetable and 60% permanent clusters). Overall, arable cluster SFP are also more homogeneous that those of other specialization clusters, with the highest figure being 1.7, 2.3, and 6.1 times the lowest for arable, vegetable, and permanent clusters, respectively.

Changes in first pillar payment schemes have a negligible impact on small farms (Viaggi et al., 2013), thus we excluded farms operating less than 1 ha from the sample. This approximation lead to overall higher SFPs than the expected ones.

Across the sample, SFPs are heterogeneous, ranging from €63/ha/year (CL18) to €902/ha/year (CL26), with an average value of €205/ha/year. This variety is mainly due to existing differences in both the amount of collected rights and the unitary payment level per farm.

Additionally, SFPs differ across farm clusters with unlike topographic features, with 42% clusters located in plain areas and 29% clusters located in hilly areas receiving unitary payments above the reference level, i.e. nearly €173/right (Frascarelli, 2014).

Table 3 displays the results from "regionalised" scenarios (*rp*, *rp1*, *rp2*) modelling. The figures refer to changes of both the operated UAA and its relative marginal rental value with respect to *ba*.

Tab. 3 - Policy impact on land demand (% change UAA and % change WTP[4]).

Cluster	Farm type	Topography	rp		rp1		rp2	
			t1	t2	t1	t2	t1	t2
CL1	Arable	Plain	-	-	-	-	-	-
CL2	Arable	Plain	33.56	36.12	61.52	57.45	-	48.16
CL3	Arable	Plain	1.39	-	-	-	-	-
CL4	Arable	Hilly	-	-	-	-	-	-
CL5	Arable	Hilly	-	-	-	-	-	-
CL6	Arable	Hilly	4.73	-	3.52	-	-	-
CL7	Arable	Hilly	-	-	-	-	-	-
CL8	Arable	Hilly	-	-	-	-	-	-
CL9	Arable	Hilly	59.91	-63.88	45.27	-41.72	1.39	- 9.09
CL10	Arable	Hilly	-	-	-	-	-	-
CL11	Arable	Hilly	3.56	-	1.15	-	-	-
CL12	Arable	Hilly	-	-	-	-	-	-
CL13	Arable	Hilly	-	-	-	-		-11.75
CL14	Vegetable	Plain	-	-	-	-	-	-
CL15	Vegetable	Plain	-	-	-	-	-	9.65
CL16	Vegetable	Plain	-	-	-	-	-	-
CL17	Vegetable	Plain	-	-	-	-	-	-
CL18	Vegetable	Plain	-	-	-	-	-	-
CL19	Vegetable	Hilly	-	-	-	-	-	-
CL20	Vegetable	Hilly	5.43	5.61	9.35	9.35	-	9.35
CL21	Vegetable	Hilly	3.23	4.10	3.33	5.35	-	5.11
CL22	Vegetable	Hilly	2.24	8.06	8.06	8.06	-	8.06
CL23	Vegetable	Hilly	-	-	-	-	-	-
CL24	Permanent	Plain	-	-	-	-	-	-
CL25	Permanent	Plain	-4.64	-2.20	-4.64	-1.09		-3.23
CL26	Permanent	Plain	-	-29.57	-	-29.19	-	-89.40
CL27	Permanent	Hilly	-	-	-	-	-	-
CL28	Permanent	Hilly	-	-	-	-	-	-
CL29	Permanent	Hilly	-	-	-	-	-	-
CL30	Permanent	Hilly	-	-	12.15	12.15	-	-
CL31	Permanent	Hilly	7.84	-	7.84	-	-	-
CL32	Permanent	Hilly	87.90	-16.32	16.17	16.17		68.71
CL33	Permanent	Hilly	-	-	-	-	-	-

rp: "Irish model" scenario; rp1: "Full convergence 2015" scenario; rp2: "Full convergence 2020" scenario; t1: treatment 1; t2: treatment 2

[4] Accurate WTP estimation should include a broad range of data, e.g. market value, not market value and option value. In this paper, the shadow price for a unitary increase of the surface area of the operated UAA is considered a proxy for the WTP. The approximation is allowed by private agent involvement and strict limitation to the rental market.

Changes in the marginal rental value measure the extent to which renting one additional ha UAA would push farmers' objective function (NPV) up. In agricultural economics, changes in farmers' marginal value and WTP are generally referred to as benchmarks to quantify rental price changes (Galko and Jayet, 2010). In fact, the model returns changes in the objective function, when one additional unit of land is added. As a result, the marginal value can capture changes in the WTP for one additional ha of land.

The shift from a historical to a regional system for entitlement allocation lead to changes in marginal rental value for most simulated clusters. The introduction of the regionalized determines a reduction in WTP for the majority of clusters (*rp*). Among them, the larger part of clusters show a relatively low increase (about 5%) which was consequence of the slights increases of payments. This result is expected due the introduction of both the gradual convergence to a flat rate and with the introducing of ceiling at convergence. This is not surprising considering that the clusters have both entitlement endowments above the average and the highest share of eligible ha UAA of all clusters. The contemporaneity of basic payment reduction with greening commitments lead shadow price to decrease in two clusters, i.e. those with the highest level of payment per ha and the highest overall grant. The ecological focus area requirement of the greening also contributed to both shadow price and direct payment reductions.

For some clusters, adjustment effects occurs over time. In fact some cluster show different changes between the two time period as a consequence of changes in the payments level across periods finally the clusters with the highest payment per ha under *ba* would see shadow prices fall with direct payment converging to a flat rate by the end of 2019.

Both *rp1* and *rp2* encompass a ceiling. Under those scenarios, the changes in clusters' marginal rental value are higher that under the "Irish model", as the ceiling mechanism allow price adaptation and gradual transition towards the regional allocation system. Under both *rp1* and *rp2*, changes occur in a high number of clusters and the magnitude of shadow price change is higher than under *rp*. Those findings are in line with previous literature on the impact of the shift from historical to regionalized payments (Puddu et al., 2014).

Overall, the results of our work confirm previous literature findings pointing out that first pillar payments help farmers maintaining agricultural land operated (Bartolini and Viaggi, 2013) and that the major effects on rental market are due to the introduction of regionalized payments (Povellato 2013).

5. Conclusions

This paper attempts to provide empirical evidence about the impact on land demand of major novelties in first pillar payments under the CAP post-2013. We used mathematical programming modelling to simulate the effects of alternative policy scenarios on a sample of Italian farms from the province of Pisa (Tuscany). Changes in the marginal value of land were used as proxies for farmers' willingness to pay for expanding their actual farmland. Model results highlight that the shift from historical to regional payments would lead to higher changes in land demand than other tested policy instruments. Our findings point out the ability of the new basic payment scheme to determine land demand changes and support previous literature (Povellato, 2013; Puddu et al., 2014). Model outcomes show that the new policy mechanism would have heterogeneous impacts on farm clusters. For some clusters, for example, the new CAP could lead to a significant decrease of the overall land demand, with potentially detrimental effects on land rent values. Foreseeing coupled payments for specific sectors may make the negative impact milder. For example, livestock, cereal and olive farms would significantly benefit from coupled payments. Coupled payments would allow lower changes in land demand or in land rental demand for those three farming sectors.

Taken as a whole, our findings confirm the overall decrease in land demand and land market activity, due to the introduction of rationalised payments, and show that impacts are different on different representative farms. Entitlement endowments, unitary payment level, and share of eligible land over the total UAA are the main drivers of the impact. We found that direct payment convergence to a flat rate (the so-called "Irish model" chosen by Italy) should affect only slightly the change in land demand, due to the gradual adjustment allowed by the convergence mechanism The paper has several limits. For example, we attempted to simulate policy changes before legal amounts of regionalisation payments and level of coupled payments were proposed. Having being conceptualised in an early stage of the process that lead the CAP 2014-2020 to the final approval, the proposed model does not encompass coupled payments; moreover, in that stage the exact amount of the prospective basic payment was unknown. Effects of CAP's Pillar II payments on land prices and milk quota abolishment on land prices were not modelled either. Other Authors had already prospected at least two positive impacts of second pillar payments on land prices. E.g., Floridi et al. (2013) have found that the co-founding investment can help cut cost associated to scale economy strategies, thus promoting operated farmland expansion, with increased land demand, Pufalh and Weiss (2009) and Bartolini and Viaggi (2013) have pinpointed that payments for less favourable areas, or the agri-environmental measures, may raise land demand, especially in marginal areas, by increasing returns for grassland management and arable cropping. Moving to milk quota abolishment, the province under study hosts few large dairy farms, with overall low impact, compared to other regions in Italy (e.g. Emilia Romagna) or other provinces in Tuscany (e.g. Grosseto) where herds are bigger. An additional shortcoming of the paper arises from not having analysed uncertainty and risk in farming activities, both of which can affect farmers' behaviour. That research choice informed Authors' modelling approach. Specifically, having no assumptions on farmers' utility preferences, nonlinear modelling could overestimate farmers' copying strategy, thus returning higher WTP for additional hectares of land. Here, the research focus is on the influences of the new CAP on land demand. Including other variables with relevance for the land market, such as e.g. adverse weather conditions, climate change, and credit constraints, could lead to different results. Finally, the paper does not encompass land market simulation, rather using the marginal value as a proxy for land demand changes. Thus, our model covers neither interactions nor reciprocal strategic influences among farmers, that depend on attitude towards risk of single farmers or farm households. Indeed, including the above mentioned factors may provide a more realistic picture of land market in the case study area. To aim at inclusiveness, further research should entail the modified policy framework under the new CAP as a whole, model farmers' attitude towards risk, consider the investment component of farmers' behaviour and simulate the interactions among different cluster. Nonlinear modelling approaches could improve analysis' outputs.

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