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**EFFECTS OF 2013 CAP REFORM ON LAND
MARKET: REGIONALIZED FARM PAYMENTS AND
CHANGES IN FARMERS' INTENDED BEHAVIOUR**

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Abstract

This work provides an ex-ante analysis of the potential impact of the introduction of the Common Agricultural Policy (CAP) regionalized payments, within the 2013-CAP reform, on the land market. The connection between the changes in the CAP and the land market is a subject widely investigated in literature (Floyd, 1965; Parsch et al. 1998; Latruffe et al., 2006; Ciaian and Swinnen, 2006). The CAP reform process has been a central issue for agricultural economics research in recent years, and is gaining further attention in view of the post-2013 perspectives (Viaggi et al., 2010; Bartolini et al., 2011). Today the CAP is in the middle of a new reform process. Through the debate generated by the official proposals, published in October 2011 (COM(2011)625/3), the European Union (EU) engaged in a revision of the CAP ended on 26 June 2013 when a political agreement has been reached (IP/13/613, MEMO-13-621 and IP/13/864). In particular, in Italy the switch of the payment regime from historical to regional bases will take place. The underlying assumption is that the shift to regionalized payments changes the remuneration of inputs and has an impact on farmers' allocation of fixed resources. In the present work, land is the only resource specifically considered. In this context, farmers are expected to adjust their plans to the new policy environment as the regionalization of support is meant to create a change in incentives faced by farmers. The objective of this thesis is to provide an ex-ante analysis of the potential impact of the introduction of regionalized payments, within the post-2013 CAP reform, on the land market.

A theoretical analysis of the effect of the reform application on farmer land demand has been implemented graphically and mathematically. In order to give explanation of changes in land demand, the literature emphasises the effects of the marginal productivity of land and other factors which catch individual characteristics (like risk attitude and different life cycle). These factors lead to diversified preferences with respect increase or decrease of the farmed area, captured by the values of the Willingness To Pay (WTP) or Willingness To Accept (WTA). The economic model is structured on the assumption that the choice (expansion/reduction/no change) is done following the aim of achieving the maximum utility of the decision maker. In this case

the farmer is faced with a limited number of alternatives and each alternative choice receives a different level of utility. Based on this theory and the background literature the research hypotheses tested in the empirical part of the work were formulated. Farmers strategies on how to adjust farm size to regionalised were collected through an intentions survey. The survey was realized within the Factor Markets project, on a sample of 350 farmers (CAP beneficiaries) in the Bologna province (NUTS 3). The data collected through the questionnaire are treated in two steps. In the first step we analyse the answers to questions about the land market through descriptive statistics mainly based on frequency distribution of answers. In a second step, two Multinomial Logit models have been implemented in order to express and explain the probability of farmers' choices with respect to the farmed area being in a specific category. The determinants of farmland changes were estimated under two scenarios. The first one is the current CAP scenario, which concern the hypothesis of maintenance of the present political strategy in the coming years and includes both the intention of changing land size in ownership and in rent. The second one is the regionalized scenario, which assumes the implementation of the regionalized payments over the coming years; also in this case, ownership and rent were both included in the model. Survey information shows a reaction of the land demand to the shift from the historical to the regionalized payments. This analysis underlines that regionalized payments increase the intentions to change in all directions, i.e. increasing the intention to reduce the farmland size of those farmers who want to reduce it, and raising the intention to increase the farmed area of those farmers who want to increase it. The variables influencing differences in farmers' reaction to the regionalization introduction (regionalized scenario) are mainly connected with specialization, location, rental market participation, age of the farmer and of other component of the household.

Regionalized payments seem to produce differentiated effects and contribute to a general (slight) increase of land exchanges. The individual reaction to the new payments introduction would be different depending on location and specialization. These effects seem to be also strongly influenced by the difference in historical payments endowment and value, i.e. by the previous historical system of distribution of payments.

In the light of these considerations, the decisions that will be taken at national level during 2014, on the territorial level at which payments will be uniformed, national or regional, and if regional the definition of it (based on institutional or administrative structure, agronomic and economic characteristics, regional agricultural potential), as well as, on the assignation of coupled payments among sectors, seems to be decisive. More information is needed to better specify the models and new instruments could be included in the analysis, such as the greening or the capping, as well as, more variables would be incorporated (transaction cost, credit access constraints, distance of the city, payments import and entitlements owned) to better explain the farmers behaviour and reaction to the policy change.

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Dedicated to my mum.

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1. Introduction and objectives

The Common Agricultural Policy (CAP) in the course of its evolution has been characterized by continuous reform processes which have significantly renewed it in comparison to its origin. Accordingly, nowadays it is extremely different than when it was born by the Treaty of Rome (1957). Particularly, during the past decades, the CAP evolution has been characterized by moving off from a production-oriented policy to arrive, with the 2003 reform, to the introduction of the Single Farm Payment (SFP), which is a payment decoupled from production. This payments scheme has been later extended incorporating almost all agricultural sectors and the majority of previous payments. In 2008, through the Health Check, it has been realized an evaluation of the state of health of the CAP, in order to examine the implementation status of the previous reform (2003). As a result of this check, some adjustments have been introduced, like the revision of the milk quota system, the abolition of the set aside and the full decoupling of payments, to help farmers to better respond to markets changes.

Today the CAP is in the middle of a new reform process. Through the debate generated by the official proposals, published in October 2011 (COM(2011)625/3), the European Union (EU) engaged in a revision of its Common Agricultural Policy (CAP) ended on 26 June 2013 when a political agreement has been reached (IP/13/613, MEMO-13-621 and IP/13/864). The main changes will concern the direct payments and some of the main new features include: harmonization of payments between member states and between farms (by reducing the gap between the values of payments per hectare), the introduction of a new reference period for the allocation of entitlements, the stronger linkage to agricultural practices beneficial to the climate and environment, and additional payment for young farmers, small farms and for farmers located in less-favoured areas. Particularly in Italy, the switch of the payment regime from historical to regional bases will take place. The regionalized 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. Particularly, new rules concerning the loss of connection with the reference three-year period (2000-2002) and the possibility to obtain payments on all the area on which an agricultural activity

is carried out, (rather than on selected eligible crops connected to the activation of entitlements), will be introduced. In this context, farmers are expected to adjust to the new policy environment as the regionalization of support; in particular, the reform is expected to create a change in incentives faced by farm operators because the support they receive is not linked to the reference period and gives the eligibility of any crops farmed. The underlying assumption is that the shift to regionalized payments changes the remuneration of inputs and has an impact on farmers' allocation of fixed resources.

The land is a strategic factor to take in consideration in this context; in fact, regionalized payments are homogeneous payments between farms decoupled from the choice of what to produce, but they are not decoupled from land use as all rights to receive payment (entitlements) must be associated with a corresponding surface. This mechanism put the relationship between entitlements and land in the spotlight as a key factor to understand the impact of the Direct Payments on land market. The land market is an imperfect market, because of the low substitutability of land, poor transparency and high transaction costs. It is characterised by a low number of transactions and a local dimension, and is also influenced by economic, policy and institutional frameworks. During the last years the land exchange activity in Italy was gradually reduced, it has followed the credit restrictions, even if it has raised the interest in the land considered as a safe-haven asset. In addition, the uncertain general economic situation, the difficulties of access to credit and the crisis of some agricultural sectors have resulted in a lower willingness to invest by the farmers and the consequent reduction in the volume of exchanges. Finally, the high land values and the reduced financial availability have encouraged an increased use of the rent by the farmers. In fact, in the Italian agricultural sector the rental contract is an instrument that becomes more and more significant (Inea, 2013).

The connection between the changes in the CAP and the land market consequent reactions is a subject widely investigated in the literature. Especially, the CAP reform process has been a central issue for agricultural economics research in recent years, and is gaining further attention in view of the post-2013 perspectives (Bartolini et al., 2011). Factor markets are a central issue in analyses of farm development and of agricultural sector vitality. Particularly, land is one of the most studied productive

factors and one that most often limits farm development (Bartolini et al., 2011). Therefore, several authors have emphasised the effect of agricultural policy as a driver of structural change (Floyd, 1965; Harrington and Reinsel, 1995) and particularly the effects of the CAP on factor markets (Persch et al., 1998; Latruffe et al., 2006; Ciaian and Swinnen, 2006).

The general objective of this thesis is to provide an ex-ante analysis of the potential impact of the introduction of regionalized payments, within the post-2013 CAP reform, on the land market.

In order to achieve this general objective, the following specific sub-objectives are addressed:

- To develop a conceptual framework of analysis based on the neo-classical theory, to understand the potential impact of regionalization on land allocation.
- To use the understanding of operators' reactions to regionalization derived from i to formulate hypothesis and to analyse operators' intentions to alter the size of their farm.
- To test empirically the hypotheses raised from the theoretical analysis.
- To identify intended reactions to the policy reform through survey response analysis.
- To find the determinants of this intended changes in farm size using the data collected through the survey.
- To compare the determinants previously found between different scenarios.

These specific questions are crucial to the evolution of the farming sector and can be appropriately captured through an intentions survey. Farmers' plans to change their farm area are critical to the understanding of the future structure of the agricultural sector and are highly connected to the land value. The 2013 reform package represents a significant change in EU policy, mainly in its movement to regionalised support. Particularly, the change in the form of payments and in the entitlements distribution will affect the way support is capitalized into land value and therefore farmers' economic incentives. Additionally, the responsiveness of land prices to the policy change is also likely to be amplified as land is an input in fixed supply due to its

finite availability. As a consequence, adjustments might be expected in the farming sector. Therefore, measuring the impact of Direct Payments on land markets is often difficult because land prices are influenced by a variety of other factors, such as agricultural prices/farm profits, location, economic growth, other types of farm subsidies, various regulations (such as zoning, rental and sales market restrictions).

This thesis is an innovative work on CAP reform on two grounds: on one hand, because of the unique dataset of operators' intentions to adjust to regionalization that was collected (within the Factor Markets Project). On the other hand, because of the current relevance of the post-2013 CAP reform, actually still in the implementation phase at national level.

The remainder of the thesis is structured as follows. Chapter 2 presents a review of the relevant literature on policy changes and a review of the analytic tools used to study its impact on land market. Chapter 3 describes the CAP evolution over the years and the post-2013 CAP reform. Chapter 4 identifies the characteristics of the land market in Italy and its current trends; chapter 5 presents the theoretical model and the graphical analysis from which the research hypotheses for land allocation are derived. The methodologies proposed and the data collection is presented in chapter 6. The results of the model are presented and interpreted in chapter 7. Chapter 8 presents a discussion of the results and chapter 9 illustrates the conclusions.

2. Literature review

2.1 Effects of policy on land market

Factor markets are a central issue in analyses of farm development and their well-functioning is an essential condition for the competitiveness and sustainable development of agriculture and rural areas (Swinnen and Knops, 2013). The factor markets are influenced by several factors including changes in agriculture, in the rural economy and in the institutional and policy settings. Focusing on the latter, the agricultural economic literature has highlighted the effects of the Common Agricultural Policy (CAP) on factor markets (Floyd, 1965; Parsch et al. 1998; Latruffe and Le Mouel, 2006; Ciaian and Swinnen, 2006; Bartolini et al., 2011). Among the different production factors, land is one of the most studied, and the connection between policy and land markets, including the present reform of the CAP, is at the core of the policy debate. The large literature on this topic may be sort by different research lines in which very diversified subjects are treated. There are articles that seek to identify:

- the effect of agricultural price supports on the factor returns and on income distribution (Floyd, 1965; Ciaian and Ratering, 2009).
- the impact of policy changes on the supply/elasticity of, or substitution across, production factors (Goodwin et al. 2003; Latruffe et al., 2006).
- the capitalisation of the policy payments into the land value or land rental prices (Ciaian et al. 2006; Latruffe and Le Mouel, 2009).
- the different policy change impacts on the reallocation of productive factors (Bartolini et al., 2011).

The first works that analyze the direct effect of policy on land demand and, in particular, the effect of farm price supports on the factor returns and on the personal distribution of income, is the paper of Floyd (1965). This work considers three price-support programs of U.S. farm policy where output is alternatively: not controlled; controlled by acreage restrictions; or controlled by restrictions on how much products farmers can market. The authors found that these price-support policies gave benefits to a large number of people involved in American agriculture; and most of these benefits take the form of both an increase in the value of land or the receipt of

marketing certificates issued by the government and having a commercial value. Results show that while a little advantage for the landless or for the young individuals in relation to entering the business, emerges under these policies, under a policy of price support with marketing controls, these groups may be adversely affected. Many authors, in later papers, show a close relationship between effects of policy on supply of factors and their elasticity, as well as the related factor substitution possibilities (Parsch et al. 1998; Goodwin et al. 2003; Latruffe and Le Mouel, 2006). Latruffe and Le Mouel, 2006 provide a literature review which suggests that agricultural support policy instruments contribute to increase the rental price of farmland. The level of this increase strongly depends on the degree of the price elasticity of farmland supply in relations with the other factors/inputs on the one hand, and the range of the possibilities of factor/input substitution in agricultural production on the other hand. It is commonly admitted that the elasticity of land supply to the agricultural sector is very low, and lower than the supply price elasticity of non-land factors/inputs.

Several works aim to estimate the effect of policy payments on the capitalization into land value or land rental prices and to calculate a share of capitalization depending on type of policy support (Ciaian et al. 2006; Dziemianowicz et al. 2008; Courleux et al., 2008). These studies agree that government payments and other types of policy support are significant in explaining land prices and account for a large part of them. Studies estimate that a share up to the 70% of the land price is determined by government payments, though there are big differences in capitalization rate depending on specific study regions and time periods (Latruffe and Mouel, 2009). Feichtinger and Salhofer (2011) investigated the influence of different measures of government support on land prices, particularly searching the determinants of the farmland prices. Results reveal a higher rate of capitalisation for decoupled direct payments and a lower rate for agri-environmental payments, as compared to the rest of government support. Also they found a significant influence of the land type, the data type and estimation techniques on the capitalisation rate. Latruffe et al. (2013) attempted to identify the determinants of agricultural land price in several regions in France; the results show a positive but relatively small capitalisation effect of the total subsidies per hectare; the magnitude of such a capitalisation depends on the region considered, on the type of subsidy considered and on the location of the plot. Others

papers focused on New Member States found that capitalisation of direct payments is higher in more credit constrained markets, while it is lower in countries where more land is used by corporate farms (Van Herck and Vranken, 2013).

The literature also underlines the effect of policy changes on the reallocation of productive factors over time, e.g. Bartolini et al. (2011). This paper is based on the use of farm household dynamic programming models maximising the net present value with a time horizon until 2030. Changes in marginal values of land, labour and capital are used to assess the potential effect of different policy scenarios on farm-household demand of production factors. Results have showed that both policy and market conditions may change strongly the demand of productive factors, and the latter is quite differentiated depending on the productive factor targeted and the particular farm-household circumstances.

Bartolini and Viaggi (2013) have identified the determinants of intended changes in farm size under two different CAP scenarios: Health Check and the complete abolition of CAP payments. Results have highlighted difference in the determinants of changes in farmed area among scenarios, while the CAP abolishment results in a reduction of the intention to expand the farmland size. Through this work has been confirmed that the different single payments scheme models affect the changes in demand of land. Among the main factors relevant to explain farmland expansion, the paper identified the geographic variables and farm characteristics, such as farm organisation and the number of on-farm employees.

Other work combine mathematical programming models, from a farm household investment model, with a survey of farmer intentions (Viaggi et al., 2013). Results from mathematical programming model largely corroborate the results from the survey and both hint at a relevant reaction of the land demand and supply to the shift from the historical to the regionalised payments, which leads to increased rental prices and in a tendency to the re-allocation of land.

Several papers analyze the effects of decoupling, introduced in 2003 by the Fischler reform of the CAP, on the dynamics of exchange of land. In these works, the determinants of the distribution of payments between possible beneficiaries, considering the possibility of entitlements exchange and taking into account the relationship between eligible area and number of entitlements owned, are identified

(Kilian and Salhofer, 2008; Courleux et al., 2008; Zier et al., 2010; Viaggi et al., 2010). In the analyses of the income distributional effects of decoupled payments in the European Union, the focus was placed on how income distributional effects and farm restructuring are impacted by the SPS under alternative entitlement tradability, different SPS implementation models, entitlement stock and with market imperfections (Ciaian et al., 2012). Gocht et al. (2013) found that the introduction of flat-rate payments (such as regionalised payments) determines a reduction of land use of about 0.6% in EU-15. Authors observed also a decrease of rental prices in the old MS and small changes in the new MS due to the introduction of a more harmonised SPS scheme. Rainey et al. (2005) suggested that credit constraint factors influence lease-type selection and both land and crop characteristics are significant determinants of contract terms. The results from the econometric model implemented by Patton et al. in 2008 demonstrate that the impact of CAP direct payments on rental values depends on the type of payment and on the nature of the production characteristics of the associated agricultural commodity. Zier and Petrick in 2010 found that two groups of farms with different size classes get different advantage from the direct payments scheme suggesting that large farms benefit most from CAP direct payments at the cost of smaller farms. The results of a work produced by Vranken and Swinnen in 2006 showed that the land rental markets reallocate land to households with better farm management ability and that farmers combine buying and renting of land to expand their farms. Mishra et al. in 2010 found that larger, more structured farms and younger farmers are generally less inclined to exit. Comparison and differences in the determinants of farm exits in the EU and the US show a different behaviour in the farm dynamics and possible different implications for future agricultural policies.

A subject of a large branch of recent literature is the analysis of policy effects in Central and Eastern European Countries (CEECs). In those country there was, during the procedure of entrance in the European Union, a land reform process which has important consequences on efficiency and distributional effects of payments. Transaction cost in land exchange and imperfection of the land markets, such as imperfect competition, can be very significant. This proved to be particularly relevant in developing land markets, such as those of CEECs, in which the combination of

imperfect competition and transaction costs has a strong impact on land prices (Swinnen, 1999; Ciaian, 2007; Ciaian and Swinnen, 2009).

2.2 Overview of methodologies used

From the methodological point of view the literature provides studies related to stakeholders and expert knowledge, model simulations, and surveys of operators' Intentions. Regarding the agricultural stakeholders interviews a large consultation was carried out by the GENEDEC consortium (Wooldridge *et al.*, 2005). This consultation revealed that stakeholders interviewed were expecting the implementation of the 2003 CAP reform to increase the overall competitiveness of the sector and to push operators to make more market oriented decisions, while the output of all commodities was expected to fall. Consultations of stakeholders are useful to weigh how the change of policy may impact on the sector and the expectations of key actors. They can allow the understanding of the general direction of the impact to be investigated, but they only offer a partial view of the problem as complex impacts or conflicting effects are hard to be seen as a whole.

From the analysis of the literature some important differences between ex-ante and ex-post analysis emerge. The ex-ante approach is found on the identification and evaluation of the policy effects through the simulation of different hypothetical scenarios. Studies, mainly ex-ante analyses, focus on the effect of different policy scenarios on the changes of the land demand or land rented/sold often derived or expressed by changes in marginal land values (Viaggi 2009, Bartolini *et al.*, 2011). The ex-post approach focus on the evaluation of observed policy effects and is based on information obtained through surveys or secondary data.

Mathematical programming models have found extensive use in agricultural economics applications. Different papers analyzed are based on applications of mathematical programming models built on data coming from individual farms or from surveys , to test the impact of different policy scenario on factor markets. In several papers, with the purpose of valuing the ex-ante impacts of policy reforms, the authors developed models founded on mathematical programming methods and very often the implementation of this approach is done in order to carry out a simulation of farm size changes under different price, policy, and cost scenarios (see Zimmerman *et al.*,

2009 for a review of relevant models applied to structural change). This typology of models has also an important use to analyze competition for land allocation between different farms, basically identifying the marginal value of land as the driver of changes (Galko and Jayet, 2011). Finally, some studies using this instruments aim to investigate farmers' investment behaviour (including land), and evaluate the impact of different CAP scenarios, with special focus on the Single Payment Scheme, in order to contributing to the understanding of the relation between policy design and farmers' investments (Gallerani et al., 2008; Viaggi et al., 2011).

Several papers also show the use of econometric models to analyze economical data coming from surveys in order to test statistically hypothesis arising from economic theory (Parsch et al. 1998; Latruffe et al. 2006; Gallerani et al. 2007; Ciaian et al. 2008; Jin et al. 2011). Others address the effects of changes in policy mechanisms or property rights system on the amount of land markets transactions (Le Mouel, 2006; Gallerani et al. 2008). Responses from a survey of landlords leasing crop land in Arkansas are analyzed to understand those factors motivating landlords in the type of lease they select and the terms of those leases (Rainey, et al., 2005). In this work, econometric models are implemented to determine the relative importance of variables representing credit constraint, agency problem, and risk aversion factors, as well as, the impact of site, landlord, and tenant characteristics on contract terms. In another paper, Patton et al. (2008) investigated the impact of both coupled and decoupled EU CAP direct payments on rental values in Northern Ireland, using panel data taken from a farm business survey. Zier and Petrick in 2010, to test the hypothesis that recent reforms of the CAP direct payment regime affect farms of different size differently, have run an econometric exercise based on a regional panel dataset of three East German regions. The paper of Vranken and Swinnen (2006) analyzes the determinants of household farms' participation in land rental markets in transition countries using data from a survey of Hungarian household farms. Mishra et al. (2010), in order to empirically estimate the determinants of exit decisions in the US and the EU, have implemented a comparative econometric analysis. The influence of structural, operator, family, and farm characteristics has been tested on the decision to exit farming. When no data on revealed farmers' behaviour is available the analysis may rests on surveys of intentions. Douarin (2008) analyzes the potential impact of

decoupling on structural change focusing the work on operators' potential changes in land allocation and in labour allocation on and off the farm. In others studies surveys of intention have been used to investigate farmers' decisions on land idling in a 2003 CAP reform scenario (Bougherara and 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 and Viaggi, 2013). In the latter work the stated intentions have been collected through survey information to identify determinants of intended changes in farm size under two different CAP scenarios. The scenarios considered are the Baseline, characterised by the Health Check, and a No-CAP scenario, assuming the elimination of all CAP payments. Results have highlighted difference in the determinants of changes in farmed area among scenarios, while the CAP abolishment results in a reduction of the intention to expand the farmland size. The results confirm that the different single payments scheme models affect the changes in demand of land. Among the main factors relevant to explain farmland expansion, the paper identified the geographic variables and farm characteristics, such as farm organisation and the number of on-farm employees.

Few works try to combine mathematical programming models with a survey of farmer intentions. As an example, Viaggi et al. (2013) have developed an analysis of the post-2013 CAP reform proposal in order to test the impact of this on land market. This work combines insights and data from a farm household investment model revised and extended in order to simulate the demand curve for land in different policy scenarios and a survey of farmers stated intention. Results from mathematical programming model largely corroborate the results from the survey and both hint at a relevant reaction of the land demand and supply to the shift from the historical to the regionalised payments, which leads to increased rental prices and in a tendency to the re-allocation of land. Given the complexity of factors affecting land markets and the impact of policy, ex-ante estimation of the impacts of policy changes remains always difficult. In this respect, survey-based stated intentions and modelling-based simulation may yield different but complementary results (Viaggi et al., 2011).

2.3 *The determinants of farmers' behaviour*

For the purposes of this work, the main factors influencing farmer decisions about land exchanges have been identified from the analysis of the literature. The main drivers can be identified in the characteristics of the farmer and of the household (socio-demographic variables), in the characteristics of the farms, as well as, in other economic or policy factors (Douarin, 2008; Bartolini and Viaggi, 2013).

Among farmer's characteristics the *age* is frequently considered as a crucial variable in each farm's decision; indeed it is one of the main determinants of farm exit and farm growth in the agricultural sector (Weiss, 1999; Kimhi and Bollman, 1999; Adesina et al., 2000; Vranken and Swinnen, 2006; Bartolini and Viaggi, 2013). In order to analyse the evolution of the size distribution of a sample of Austrian farms households in the 1990s, Weiss (1999) studied the impact of some factors on farm growth and exit. Between these the farmer age was found to be determinant. In addition, the squared term of the age was considered to test for non-linear effects identifying “*two age peaks*” or two points along the age curve in which the probability to exit (51 years old) or to grow (34 years old) is higher. A study conducted on Israel and Canada by Kimhi and Bollman (1999) has proven that the probability to exit from farming was decreasing with age for young operators and increasing for older ones. In any case, the age of the household head is expected to affect the marginal productivity of the land and consequently the land market (Vranken and Swinnen, 2006). Further studies underline that age may have a positive impact on the rental market, as younger farmers are expected to be innovative and to have a lower risk aversion, as well as a long-term planning horizon (Adesina et al., 2000). However age would also be an index of farmer experience and of possession of detailed information on the sector. Such conditions would lead to higher marginal productivity of land by older farmers and this would influence the role of age in the decision to change farmland size in an opposite direction (Hassan, 1998). In general, it seems reasonable to believe that older operators will be more likely to exit and less likely to begin new activities or increase the farm size.

Another farmer characteristic playing an important role influencing farmer decisions about changes of farmed area is the farmer *education* level. The higher is this

parameter, the higher is the farmer knowledge and management capacity, as well as higher will be the marginal productivity of the land; as a consequence a higher education level is expected to have an impact on land market, by increasing the farmers' willingness to pay for land. Nevertheless, the literature also points out that above a certain level of instruction the farmers may get access to better off-farm opportunities and this suggests that improved education can lead to an improvement of labour mobility from agriculture to other sectors (Vranken and Swinnen, 2006; Bizimana, 2011). Failure to provide enough off-farm labour opportunities is argued to be a factor explaining low levels of participation in land markets and land market segmentation (Feng, 2006). Another work, realized by Weiss in 1999, takes into considerations two different forms of instruction, agricultural and not agricultural education, to evaluate the impact of the education level of the farmers. The results underline a positive impact of the latter on farms survival and growth. Nevertheless, the general education had different impact on farms' behaviour depending on the nature of the labour contract or the degree of involvement in farming activities; in particular, for part time farmers it had a negative impact on the willingness to pay for land, while it had a positive one for full time farmers. Economic growth may result in an increase of off-farm labour returns and the latter as well as the technological developments of an area can lead to a decrease of the employment in the agricultural sector (Barkley, 1990). A better development of off-farm labour markets is likely to reduce rental prices. On the one hand, development and improvement of off-farm labour markets would lead a larger share of households to exit agriculture, thus increasing the supply of land to the rental market (Deininger and Jin 2008).

Among *household characteristics* factors such as the size of the family and the presence of old relatives or children, as well as the availability of labour force within the household, affect the farmer decisions on land markets, particularly concerning land rental (Thomson, 1996; Bizimana, 2011). The literature highlights the positive effect of the presence of unemployed household members on the intention to expand the farmed area. The presences of young or old members in the family can determine the probability to change in farm dimensions. Young members of the household have lower probability to state the intentions to reduce land size, which would be

connected to the likelihood to become a successor within the household (Bartolini and Viaggi, 2013).

Between the *farm characteristics* the initial farm size is in many cases connected with the farm growth rates. If, on the one hand, in some studies the smallest farms are found to grow faster than the others (Weiss, 1999), on the other hand, other works have highlighted a positive influence of the economies of scale obtained by large farms on the intentions to increase the farmed area (Bartolini and Viaggi, 2013). A spatial analysis of agricultural land price in Bavaria has been implemented by Feichtinger and Salhofer (2013). They performed an empirically analysis of a dataset of agricultural land sales transactions in order to identify the factors influencing agricultural land prices. Results from a general spatial model confirm the strong influence of land quality, urban pressure and land market structure, and that the involvement of public authorities as seller or buyer increases sales prices.

Also factors like the diffusion of renewable energy crops can have a significant impact on the evolution of the land market. The need to obtain raw materials for biogas systems, in fact, has increased the demand for land to be used for the production of silage with distorting effects on the land use dynamic (Rathmann et al., 2010).

Vranken and Swinnen (2006) argue that *credit constraints* reduce the demand for land and, at the same time, can make more likely the use of the rental agreement to adapt the farmland size to the needs. Rent-in land, compared to buy it, requires less liquidity or access to credit. In cases of highly segmented credit markets and poor agricultural labour markets, the land rental market therefore plays an important role in enhancing overall productivity via transferring land to more productive producers (Deininger et al., 2008).

Available studies on transitions countries further emphasize the role of *transaction costs* in land rental market development (Swinnen, 1999; Ciaian, 2007). High transaction costs in land rental markets usually originate from insecure land rights and low level of trust among landlords and tenants. Insecure land rights from formal laws and regulations may be an important factor, because under such conditions renting out by migrating households may be seen by the village leader as a signal to take land away by the village leader. Moreover, tenants may not return the land upon expiry of the contract (Deininger and Jin 2008).

3. The CAP and the post-2013 CAP reform proposal

3.1 CAP brief history

The Common Agriculture Policy down the years has followed an evolution characterized by constant changes and dynamism. Continuous reform processes have led to several changes in order to satisfy different needs arose in the agricultural sector. These reforms have changed the face of CAP with respect to how it was born.

In the 1957, the Treaty of Rome creates the European Economic Community, between six European countries (France, Italy, Germany, Belgium, Luxemburg and the Nederland). In 1962 the Common Agricultural Policy (CAP) was born and the first objective has been to provide affordable food for EU citizens and an adequate standard of living for farmers. Over the 70s and 80s, the attempt to achieve this goal, has resulted in strong incentives for EU farmers to increase agricultural productions. More food than what was needed was produced and the EU had to deal with almost permanent surpluses of the major farm commodities, some of which were exported, while others had to be stored or disposed of within the EU (European Commission, 1980). To overcome this problem by getting production level nearer to the market requests, a number of measures were introduced. During 1992 the CAP shifted from market support to producer support. The direct payments to farmers have replaced the previous price support and farmers were encouraged to be more environmental-friendly. This has been also a consequence of the 1992 Rio Earth Summit which launches the principle of sustainable development.

In the mid 1990s the CAP focused more on food quality, introducing new measures to support farm investment, training, improved processing and marketing. Steps were taken to protect traditional and regional foods and to make farmers more market-oriented. In 2000 a new round of the CAP reforms moved further attention to rural development, putting more focus on the economic, social and cultural development of rural Europe. During the 2003 reform, the CAP completed its shift from a production-oriented policy to producers' income support. Farmers now receive an income support payment, on condition that they maintain the farmland in good conditions and fulfill environmental, animal welfare and food safety standards. In the mid 2000s EU

becomes the world's largest importer from developing countries and a open market for all least developed countries. Between 2004 and 2007 the EU with 12 new countries reaches the numbers of 27 member states with over 500 million citizens. Policy reforms from 2003 to the present day are described in the next paragraphs.

3.2 The 2003 Fischler reform

The Fischler reform of 2003 (European Commission, 2003 Reg. EC 1782/2003) has strongly changed the conditions and the modality of support given from the European Union to the agricultural sector. The main objectives of this reform were to improve the competitiveness, to make production more market-oriented and to create an agriculture more sustainable and more socially fair. The reform consists of five basic points: the full decoupling (except for few crops), the mandatory cross-compliance, the modulation and the strengthening of monetary commitment directed to rural areas, the reform of some OCM (i.e. milk), and the financial discipline. Also greater importance to individual Member States has been given, asking to operate a set of choices to adapt the CAP to specific territorial realities. However, the main change brought by the reform was about the introduction of the Single Payments Scheme (SPS) which is a payments decoupled from the choice of what to produce. The areas covered by the decoupled payment may be allocated to any agricultural use except permanent crops and vegetables, on condition that they maintain the farmland in good conditions and fulfil environmental, animal welfare and food safety standards. Under the SPS, an entitlements system has been introduced, which guarantees the farmers to receive a payment as a fixed set of "payment rights" per farm. The activation of the entitlements owned by each farm is constrained to the presence of a corresponding number of eligible hectares of land. Member States could choose between three different SPS implementation models. In the historical model, the Single Payment is farm-specific and equals the support the farm has received in the "reference" period (2000-2002). Under the regional model, an equal per hectare payment is granted to all farms in a given region based on the total payments historically granted in that region and the number of entitlements established in the first year of operation. Finally, the hybrid model is a combination of historical and regional models, and has two versions: one static and one dynamic. Under the

historical and hybrid models the value of entitlements varies, sometimes considerably, between farms. This is particularly relevant under historic allocations. On the contrary, under the regional SPS model, all farms in a region have entitlements with the same unit value. The table below identifies the different SPS implementation models.

Table 1 SPS/SAPS models in EU Member States.

Model SPS/SAPS	Member States
SPS historical	Austria, Belgium, France, Greece, Ireland, Italy, Netherlands, Portugal, Spain, UK (Wales and Scotland)
SPS regional	Malta, Slovenia
SPS static hybrid	Luxemburg, Sweden, UK
SPS dynamic hybrid	Denmark, Finland, Germany, UK (England)
SAPS	Bulgaria, Czech R., Estonia, Cyprus, Latvia, Lithuania, Hungary, Poland, Romania, Slovakia

(Source: European Commission, 2007).

In the historical model, like in Italy, entitlements are linked to the number of hectares that generated subsidies in the reference period (2000-2002). The entitlements to pay are exercised by the holder, but, if unused for three years, except in cases of force majeure, they will be withdrawn and stored in the national reserve.

Farm eligibility to the SPS is subject to cross compliance, under which each farm must comply with the Statutory Management Requirements (SMR), and maintain the agricultural land in Good Agricultural and Environmental Condition (GAEC). Although the standards of the GAEC are defined at the national level they have to follow some general objectives such as (i) limit soil erosion, (ii) maintain soil organic matter, (iii) maintain soil structure and (iv) ensure a minimum level of maintenance and avoid the deterioration of habitats (Council of the European Union, 2003). Hence, the payment is conditioned to the use of suitable practices by the farmer concerning the preservation of the soil fertility, the good management of the water resource, the protection of the

environment and the preservation of the animal welfare standards. Another instrument implemented through the reform was the modulation. The latter consists of a gradual reduction of direct payments paid to larger farms to obtain additional resources to be used for rural development. This shifting of resources from the first to second pillar of the CAP has been realized in order to promote the improvement of the quality of products, to help producers to adapt to new environmental standards, plant health, animal welfare, and to support the agricultural advisory systems. In addition to the SPS, additional payments or aids for specific products of national strategic importance (economic and environmental) in traditional areas of production remained in force. These payments then maintained the conditions of aid coupled to production. Finally, the principle of financial discipline has committed member states not to exceed the budget set by the Europe for the agricultural sector balance until 2013.

With the introduction of decoupled payments, the definitions of farmers and agricultural activities have been changed, as the maintenance of land in GAEC is now considered as an agricultural activity. As a result, following the reform, “*Farmer*” means a natural or legal person, or a group of natural or legal persons whose holding is situated within Community territory, and who exercises an agricultural activity. “*Agricultural activity*” means the production, rearing or growing of agricultural products including harvesting, milking, breeding animals and keeping animals for farming purposes, or maintaining the land in good agricultural and environmental condition (Council of the European Union, 2003).

3.3 The Health Check

In 2009 it was made an evaluation of the health status of the CAP with the objective to verify the status and the level of implementation of the Fischler reform. This evaluation step has been followed by additional simplifications and modifications in order to link in the best way farming and market opportunities. The main changes of the Health Check (Council Regulation, 73/2009) have been related to budget revisions, updating the single payment scheme, the progressive modulation, the decoupling of payments, the revision of the milk quota system, the abolition of set-aside, the strengthening of cross-compliance. In addition, new challenges on the future of rural

development regarding key issues such as climate change, water management, biodiversity and the bio-energy have been introduced. The health check required the full decoupling or the abolition of all coupled payments in the period between 2010 and 2012. In 2010, the following coupled payments have been changed: the quality premium for durum wheat, which is decoupled; aid for energy crops, which is abolished; additional payments (Article 69, Reg. CE 1782/2003) which are decoupled. Direct payments were not paid to a farm if their total amount for that farm in a given calendar year was less than 100 €. Since 2009, with the approval of the health check, the modulation has been strengthened, reaching 10% in 2012. The amounts in excess of € 300,000 suffer, since 2009, an additional reduction of 4%. The Health Check has determined the abolition of the article 69 which has been substantially modified and replaced by a new formulation: the article 68. It includes the coupled premiums, comprising those for beef, olive oil, milk quality, tobacco, sugar beet and payments that help to get insurance access. Also the set-aside (setting aside of portions of arable land), born with the Mac Sharry reform to reduce surplus production of those years, has been abolished within the Health Check. The support for rural development undertaken by the European Union for the period 2000-2006 has been confirmed for the period 2007-2013 following the CAP objective to make more effective intervention strategies in rural areas.

3.4 The post 2013 CAP reform

The EU Commission, based on the outcome of approximately one year of public debate on the CAP's future and taking into account the exchanges with the Council and the European Parliament, in October 2011, has published the new policy proposal for the CAP towards the period 2013-2020 (COM(2011)625/3). After almost others two years of negotiations between the Commission, Parliament and the Council, a political agreement on the reform of the CAP has been reached on 26 June 2013 (European Commission (2013)13/613). On December of the same year the four Basic Regulations for the reformed CAP, as well as the Transition Rules for 2014, have been formally adopted and approved by the Council and the European Parliament, to be subsequently published in the Official Journal (EU regulation, 1305/2013, 1306/2013, 1307/2013, 1308/2013, 1310/2013). These regulations deal respectively the new rules

for the Rural Development, those for the financing, management and monitoring of the CAP, those relative to Direct Payments, those for market measures establishing a common organization of the markets in agricultural products, and finally, those providing transitional provisions for the year 2014. In line with the objective of the present work, the following will treat in depth the regulation concerning Direct Payments of the CAP and will identify only some general guidelines of others regulations.

The new rules for Direct Payments (EU regulation, 1307/2013) represents one of the main changes introduced through the post 2013-CAP reform. New measures have been introduced in order to reduce differences in national ceiling of Direct Payments between Member States and between entitlements value among farms within the same state.

The budget for DP for specific Member States will change because of two budgetary effects. First of all, the overall CAP budget will be reduced as a result of the new Multiannual Financial Framework; secondly, in order to reduce differences between Member States the national envelopes for direct payments for each Member State will be progressively adjusted in order to reach a harmonization; such that, those Member States where the average payment is below 90% of the EU average, will see a gradual increase in their envelope. Particularly, in Italy the annual national ceiling for the basic payment scheme in the period between 2015 and 2019 will be progressively reduced.

In order to achieve the objective of harmonization of payments among farms within the same Member State the regulation requires an alignment of direct payments imports received by farmers located in the same country or in the same region. Particularly, in Italy where the historical payment system is still in place the entitlements value are different among farms. To overcome this problem the regulation includes the provisions to switch the direct payment regime from historical to regional or national bases. Particularly, Member States shall decide, before 1 August 2014, to apply the new payment scheme at national or regional level. Member States will define the regions in accordance with objective and non-discriminatory criteria such as their agronomic and economic characteristics and their regional agricultural potential, or their institutional or administrative structure. The regional ceiling will be divided by the number of entitlements fixed at regional level. This new payments will

replace the old SFP from 2015 and it is composed by six different components: basic payments; greening or ecological payments; payments to the less favoured areas; coupled payments; redistributive payments and payments to young farmers, as well as, for small farms. Particularly, some of these are mandatory, like basic payments, greening, capping and payments for young farmers, and others are applied voluntarily by the Member State, like coupled payments, payments for small farms for less favoured areas (LFA) and for redistributive payments. The first two components are expected to be the most relevant because they cover almost the total of the payment that the farmers can receive. The basic payments can reach a maximum of 70% of the amount of payment assigned to the farm and the greening to the 30% of it.

The basic payment shall be granted to farmers upon activation of a payment entitlement per eligible hectare in the Member State where it has been allocated. The eligible hectare has been defined as any agricultural area of the farm used by agricultural activity or predominantly used for agricultural activities. 2015 will be the new reference year in order to determine the eligible area on basis of which claim the entitlement and obtain payments. Therefore, in order to avoid speculation a link to beneficiaries of the direct payments system in 2013 there will be. Member States which might see a large increase in declared eligible area are allowed to limit the number of payment entitlements to be allocated in 2015 to either 135% or 145% of the number of hectares declared in 2009. Only farmers currently active, which carry out a minimum activity defined by MS, may benefit from regionalized payments schemes (list of excluded activities: airports, railway services, water works, permanent sports and recreation grounds). Farmers who do not fit this minimal activity shall, however, be regarded as an active farmer if demonstrates that the annual amount of payments is at least the 5% of the total obtained from non-agricultural activity, or if its agricultural activities are not insignificant, or if the main object of production of the company consist in an agricultural activity. In addition, Member States shall decide not to grant direct payments to a farmer if the total amount of direct payments claimed or due to be granted in a given calendar year is less than 100 euro or if the eligible area of the farm is less than one hectare.

The greening component of the payment is assigned to farmers entitled to a payment under the basic payment scheme and that comply, on their eligible hectares, with

some ecological prescriptions. These are a) to have at least three different crops on their arable land where the arable land of the farm covers more than three hectares; b) to maintain existing permanent grassland on their holding; c) to have ecological focused areas (5% of the total farm area) on their agricultural area, such as land left fallow, terraces, landscape features, buffer strips and woodlands. About crop diversification the greening measure requires to have at least two different crops within the arable land when it covers between 10 and 30 hectares. When the arable land covers more than 30 hectares the crops have to be at least three. In both these cases the principal culture has not to cover more than the 75% of the arable land. Ecological focus areas are required only when the arable land covers more than 15 hectares. The greening payment is consistent with biological farming. Member States will use 30% of the national envelope to pay for the greening component. Member States can assign the 2% of the annual national ceiling to young farmers in order to encourage generational renewal. This measure provides payments to farmers setting up for the first time an agricultural holding and which are no more than 40 years of age. Member states may grant payments to farmers entitled to compensation under a basic payment scheme whose holdings are fully or partly situated in less favoured areas (5% of national envelope). Member States have the option of providing limited amounts of "coupled" payments (8% of the national envelope) to specific products or specific agricultural sectors that are particularly important for economic, social and environmental reasons in order to maintain determinate levels of production. A reduction by at least 5% the amount of Direct Payments to farmers exceeding 150000 euro will be adopted by Member States. Therefore, this reduction does not need to apply to Member States which apply the "redistributive payment", under which part of the national envelope is held back for redistribution on the first hectares of all farms. Particularly, MS may use up to 30% of own budget to increase payments on the first 30 hectares of farms. Member state can grant a simplified lump sum payment for small farms in order to simplify administrative procedures of payment and it would reach a maximum value of 1250 euro for each beneficiary.

Summarizing, in Italy the DP budget will decrease due to the overall CAP budget reduction as a result of the new Multiannual Financial Framework and of the harmonization of payments across Member States. As well, on one hand, the reforms

require a shift towards the regional SPS model, which implies a harmonization of SPS across farms (i.e. towards a flat-rate SPS value) at MS or regional level; on the other hand, the reform includes many other changes in the DP, like the greening, the payments for young farmers, small farms and LFA. In addition, during 2014 important decisions will be taken at national level concerning the Direct Payment schemes before implementation in January 2015. Particularly, Member States will decide about transfers between pillars, national or regional implementation of the Basic Payment Scheme, internal convergence, greening equivalence, young farmers and so on. Another important aspect to consider at national level is that the internal convergence, which aims to bring the payments per hectare to an average national or regional level, may have different effects depending on the productive sector and the production specialization. Particularly, within the fruit and horticultural sector there are certain producers which have benefited in the past from high payments per hectare (citrus production, tomato and fruit for processing), others have values per hectare lower than in other sectors and others just do not get any payment. Specifically, horticultural, fruit and vine surfaces, with the exception of tomatoes, processed fruit and citrus, have not received direct payments under the previous policy scheme (Reg. 73/2009). So, with the inclusion of all this crops between those eligible to receive direct payments under the regionalized payments different effects depending on the specialization are expected.

Concerning rural development (EU regulation, 1305/2013), Member States will have the possibility of transferring up to 15% of their national envelope for Direct Payments (1st Pillar) to their Rural Development envelope.

The new support scheme provided for by this Regulation replaces the support scheme set up by Regulation (EC) No 1698/2005. This Regulation lays down general rules governing Union support for rural development, financed by the European Agricultural Fund for Rural Development ("the EAFRD"). Some of the main objectives of this new support scheme are: to foster the competitiveness of agriculture; to ensure the sustainable management of natural resources, and climate action; to achieve a balanced territorial development of rural economies and communities including the creation and maintenance of employment, etc. The achievement of the objectives of rural development shall be pursued through new rules providing a more flexible

approach with respect to the present. These measures are no longer classified into “axes” with associated minimum spending but each Member State decides which measures use to reach the commons “priorities”. The latter are summarized in 6 points:

- fostering knowledge transfer and innovation in agriculture, forestry, and rural areas with a focus on the following areas,
- enhancing farm viability and competitiveness of all types of agriculture in all regions and promoting innovative farm technologies and the sustainable management of forests,
- promoting food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture,
- restoring, preserving and enhancing ecosystems related to agriculture and forestry,
- promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors,
- promoting social inclusion, poverty reduction and economic development in rural areas.

A Member State may submit either a single programme for its entire territory or a set of regional programmes. Member States with regional programmes may also submit, for approval, a national framework containing common elements. Member States may include within their rural development programmes thematic sub-programmes that address specific needs: young farmers; small farms; mountain areas; short supply chains; women in rural areas; climate change mitigation and adaptation and biodiversity. Each rural development measure shall be programmed to contribute specifically to the achievement of one or more Union priorities for rural development and shall be approved by the Commission by means of an implementing act.

The “Horizontal” Regulation (EU regulation, 1306/2013) lays down the rules on: the financing of expenditure under the Common Agricultural Policy (CAP), including expenditure on rural development; the farm advisory system; the management and control systems to be put in place by the Member States; the cross-compliance system; clearance of accounts. The financing of the various measures falling under that

policy, including rural development shall be made by both the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). The EAGF shall finance the following expenditure: measures regulating or supporting agricultural markets; direct payments to farmers under the CAP; the Union's financial contribution to information and promotion measures for agricultural products on the internal market of the Union and in third countries; the Union's financial contribution to the Union School Fruit and Vegetables Scheme and to the measures related to animal diseases and loss of consumer confidence; promotion of agricultural products, undertaken either directly by the Commission or through international organisations; etc. The EAFRD shall finance the Union's financial contribution to rural development programmes implemented in accordance with the Union law on support for rural development.

Concerning the market measures (EU regulation, 1308/2013), the regulation establish a common organisation of the markets in agricultural products provides for the eligibility to the Union aid of accompanying measures necessary to ensure the successful implementation of the School Fruit and Vegetables Scheme. This regulation repealed and replaced Council Regulation (EC) No 1234/2007 as from 1 January 2014. It provides that the Union aid under the School Fruit and Vegetables Scheme may cover also the accompanying measures necessary to make the scheme effective; provides the rules for the application of the School Fruit and Vegetables Scheme and in particular the obligation for the Member States to describe in their strategies the accompanying measures which they intend to adopt in order to ensure the successful implementation of the scheme. The accompanying measures shall support the distribution of fruit and vegetable products and shall be directly linked to the objectives of the School Fruit and Vegetables Scheme of increasing short and long-term fruit and vegetable consumption and contributing to shaping healthy eating habits.

Regarding the common organisation of the markets, the milk and sugar quota regime, respectively in 2015 and in 2017, will expire, allowing for additional time for the sector to adjust. As regards the wine sector, the right to plant have not been liberalized but a new right system will be introduced from 2016. In the fruit and vegetable sector has been introduced the requirement to indicate the origin of products. Particularly, this request has been promote by Italy. Also new safeguard clauses are introduced for all

sectors to enable the Commission to take emergency measures to respond to general market disturbances.

Transitional provisions (EU regulation, 1310/2013) to bridge the gap between the existing legal framework and the elements of the reform for which it was decided that they will apply only from 2015 (particularly as regards direct payments and rural development), in order to give Member States sufficient time to roll out the new policy on the ground.

4. The land market

4.1 General concepts

Land market is an imperfect market, due to the low substitutability, the reduced transparency and the high transactions costs. It is characterized by a reduced number of exchanges and a local dimension. In Italy the amount of sales in a year hardly reaches 2% of the total area. The exchange activity is relatively dynamic only in the most fertile areas with greater profitability (INEA, 2012). Demand of land assets generates a continuous market differentiation on the basis of two main issues. The demand for agricultural land assets, for farming is highly selective as a function of fertility and some accessory characteristics, such as irrigation and the prevailing production systems. This demand comes mainly from farmers, whose behaviour reflects the expectations of investors interested primarily in the land capacity to generate income.

Another type of demand, sometimes overlapping the first, is dependent on the potential alternative uses of the land (like for urban, industrial and transport uses). Therefore, the demand characteristics are more fragmented and the land values are no longer consistent with the parameters of farming profitability. In many areas, the two markets tend to interact and this causes land prices that are not always related to the performance of the agricultural activity.

The segmentation of agricultural land market is very strong in relationship to the heterogeneity of the territory and of the agricultural structures. The components of market segmentation usually recognised as key elements are: location, crop specialisation/suitability, plot size. In addition, there are many others factors that can affect the values of the land, the mechanism of formation of these values and the relative market. Among them we can mention economics, demographic and technology development of the area, the inflation rate, the regulation of the right of property of land, the territorial planning, the agricultural policy (CAP, regional and national policy), the fiscal policies, the institutional framework, as well as, the natural conditions and the characteristics of the soil, and so on (Swinnen and Vranken, 2007). The natural characteristics of the land and the human enhancement performed on the same results in a differentiation between types of land based on aspects linked to the

physical nature of the land (sloping, exposure), the chemical-structural composition of the soil (composition and soil type), the hydrological condition (availability of surface and underground water resources), the climate characteristics (influence of weather conditions on soil type and agricultural activity), the farm specific features (farm size and characteristics of rural buildings, irrigation and drainage conditions, accessibility to the markets for output allocation and factors provisions, and so on), the land use, or different crops specialization (arable land, orchards and vineyards, permanent grassland, and so on). Another important determinant of the price of land is the price of agricultural products. The latter can influence investment decisions in the purchase of land by farmers, making farming more or less profitable. The situation of course varies depending on the type of product obtained from the soil, for example in the case of crops or livestock. The productivity of the land therefore depends on intensity of agricultural activity, whether it is represented by crop or livestock, but also on the degree of development of the technology. Despite major changes in land uses, there seems to always be a strong link between land use and soil type. Therefore the profitability/productivity of some crops/livestock influences the demand for specific types of land. The performance of financial markets and the urban market (return on financial investments and stock) can also affect the demand for land by investors, especially non-agricultural ones. An important role is assumed also by the inflation that encourages or discourages the sale of land and the economic development of the agricultural sector (Viaggi, 2009).

The common agricultural policy and in particular its first pillar, has affected the value of the land in the Member States in different forms and intensity. The different policy effects depend on the typology of payments implemented and, as a consequence, on the changes due to the CAP reform process. For example with the Single Payments Scheme, presently in force, we can have a double effect. On the one hand, the income effect which can increase the purchasing power and thus the propensity to offer more for the land, which push the farmer to buy more land. On the other hand, the introduction of the single payment scheme can push farmers to give land for rent with seasonal contracts or to sell more land as consequence of the minimum requirement for the maintenance of good soil conditions. Besides the above, due to the entitlements and eligibility system, the main effect that arises from the introduction of

the single payment is a segmentation of the land market between eligible and ineligible land (which may change annually based on the crops cultivated), and between land with and without entitlements (Swinnen et al, 2008).

4.2 Land market in Italy

From the 6th census of agriculture, developed by ISTAT in 2010, in Italy, there were 1,620,844 active farms with an average size of 7.9 hectares of Utilised Agricultural Area (UAA). The UAA is equal to total 12.9 million hectares (42.8% of the national territory), while the Total Agricultural Area (TAA) amounted to 17.1 million hectares. Among total Italian farms, around 217000 are livestock farms and between them 4,838 are exclusively livestock as the land is not at the same time cultivated. The Italian agricultural and livestock structure is based on individual or family farms (96.1%), in which the farmer directly manages the farm (95.4%) and in which the land is owned by the farmer or his family (61.9% of UAA). The land tenure is presently much more flexible than ever before, thanks to the increased use of forms of possession of land diversified and increasingly oriented to the use of rental contracts. Regarding the use of agricultural land, more than half of the UAA is cultivated with arable crops (54.5%), followed by permanent grassland (26.7%), orchards (18.5%) and horticultural crops (0.2%). More specifically, arable crops are cultivated in more than half of Italian farms (about 800000) and cover more than 7 million UAA. The orchards are practiced by 1.2 million farms covering an area of 2.4 million hectares, while the permanent grassland is present in less than 300 thousand farms and occupy an area of 3.4 million hectares. The 6th General Census of Agriculture also highlights trends by comparison with the previous census carried out in 2000. In particular, in Italy important structural transformations took place, which resulted in a multi-year process of concentration of agricultural farmland in a substantially smaller number of companies who increasingly often use rental contracts to adjust the farm dimension to the needs. The decrease in farms and UAA happened in different degrees at the regional level. The average farm size has grown considerably over the last decade, from 5.5 hectares of UAA per farm of 7.9 hectares in 2010 (+44.4%). This is a consequence of a sharp decline in the number of agricultural and livestock activity (32.2%), which was accompanied by a much lower decrease in cultivated surface (-2.3%). The managerial and structural changes

previously described have necessarily impacted on the composition and intensity of agricultural labour. The labour force decreases (-50.9%), moves to the wage earners (whose share rose from 14.3% to 24.2% between 2000 and 2010), while the man/days worked per year increase for all types of labour on average. The presence of family members in the farm tends to decrease (-56.6%), but the agricultural production structure, is still organized around the household and about 99% of the farms use family labour force.

During the last years the land exchange activity in Italy was gradually reduced, following the credit restrictions and the decrease in supply, even if the crisis has raised the interest in the land considered as a haven asset (Inea, 2013). The national average land value has decreased by 0.1% on an annual basis, reaching approximately 20,000 Euros per hectare, and the fall has also affected regions where land values are higher and the demand is more sustained. The main factors that have contributed to this decrease are related to the general economic crisis and the new scenarios that have characterized agriculture in the last decade. In particular, the difficulty of access to credit limits the demand by professional farmers, while the uncertainty on the profitability of the sector affects the activity of non-agricultural operators (Inea, 2013). In Italy there is always large heterogeneity between the values of the land depending on the region and altimetry zones. Particularly, the northern districts have land values more than twice those of the South, while the soils of the plains reach prices about three times higher than those of the mountain.

The high land values and the reduced financial availability have encouraged an increased use of the rent by the farmers. In fact, in the Italian agricultural sector the rental contract is a tool that becomes more and more significant. Recent censuses testify that in the past decade the UAA rented has increased by 10.5 percentage points, in fact if in 2000 it covered about 23% of the total farmed area in 2010 it has exceeded 33% (Istat, 2010). The high cost of land, the land reduced mobility and the uncertainty about the future of the agricultural sector both in economic and political terms, gave to the rent the role of the most effective instrument to adjust the size of the farm. Therefore farmers interested in developing their own businesses increasingly seek solutions that are less risky, as the rental agreement compared to the purchase of land at prices no compatible with the financial stability of the company. The supply is

driven mainly by the small landed property in difficulty both in dealing with the complex economic period and a simultaneous reduction of EU payments for smaller size farms. They are, in fact, more and more frequent cases of owners of small farms that go out of business and considering the general economic situation and the lack of alternative safe investment opportunities to land, rather than selling decides to grant in rent their surfaces. From the institutional point of view, the increase in rents contracts has been determined largely by the use of appropriate contracts “in derogation” (*in deroga*), regulated by Law 203/82. In particular the Article 45 allows entering into lease contracts with flexible rental amount and duration, allowing an independent contractual determination among parties. The other forms of transfer are becoming less common: usually verbal agreements relate to the mountain pastures (even with payment of the rent in kind).

4.3 Land market in Emilia-Romagna region

The General Census of Agriculture in 2010 has detected 73466 farms in Emilia-Romagna. The average size of these farms is about 14 hectares of UAA while the TAA corresponds to an average of 18.5 hectares. Among total farms, around 12600 are livestock farms and between them about 500 have exclusively livestock productions. The 42% of the UAA of the region is managed by approximately 4,000 farms (5.5% of the total) with at least 50 hectares of UAA. Farm’s legal form prevalent in the region is the individual holdings (87%) and the corporations (12%). Regarding the use of agricultural land, the majority of the UAA is cultivated with arable crops (78%), followed by the orchards (12%) and permanent grassland (10%). This predominance of arable crops varies in intensity depending on the altimetry, in fact the diffusion changes between 85% and 50% respectively moving from the plains to the mountains. The overall amount of funding for the support and the development of regional agriculture between 2007 and 2012 is approximately 3.388 million of Euros. Of this amount, 1.678 million of Euros were addressed for the “first” pillar. The average amount of direct payment is estimated around the 350 Euros per hectare.

In recent years the land market in Emilia-Romagna region has been characterized by a substantial stability in the exchanges: deviations from this trend occur only in some areas where transactions have increased slightly, and the province of Ravenna, which

showed a decrease of exchanges. The demand is growing in the province of Ferrara, in some areas of Forlì and for irrigated arable plains of the provinces of Piacenza and Bologna. In 2011, it was also noted the growing demand of marginal land aimed to access agri-environmental measures of the RDP. A significant increase in prices has affected arable land in the provinces of Forlì and Rimini (+6 / +10%) and the orchards of areas dedicated of Romagna (+5 / +11%). The rental market remained stationary apart from some sporadic increase in rents recorded in the provinces of Parma and Reggio Emilia (Inea, Annuario 2011).

4.4 Land market in the Bologna province

Based on the General Census of Agriculture of 2010, the Bologna Province holds 10.790 farms covering 173.224,46 ha of UAA which represents 46% of the total province extension (370.000 ha). It is registered that out of 10.790 farms, 47% of farms have a land class ranging between 2 and 10 ha, corresponding to 11% of the UAA, 24% between 10 and 30 ha corresponding to 23% of the UAA, 16% with less than 2 ha covering 0,5% of the UAA and 11% have more than 30 ha covering 64% of the UAA. Arable crops covered 81% of the UAA, of which 53% is specialized in cereal and 27% in forage crops. The remaining area is covered by orchards and pasture. The territory of Bologna province holds very heterogeneous agro-food chain systems such as the fresh fruit chain located in the area of Imola and the Parmigiano Reggiano cheese, located in the area at the left side of the Reno river. The fresh fruit-chain is mostly outlined by crops such as peach trees, apricot trees and kiwi with the existence of important fruit processing centres and storages. In the plain of Bologna the potato represents an important crop, while, among the fresh horticultural crops the most cultivated are represented by onion, asparagus, lettuce and squash. Cereal production is the cultivation type that has most characterized the rural area of Bologna Province. Consequently, several important storage centres and seed factories have been developed and expanded in the province. The livestock production most important activity in the area is related to the existence of large medium size processing factories of milk products. Vineyards represent another significant agricultural activity within the province which is predominantly located in the hill close to the town of Bologna and Imola.

The comparison with the data coming from the 2000 census shows an increase of farms larger than 30 ha and a decrease of all other land classes. The average farm size observed in 2010 is 16.05 ha, which shows an increase of 5 ha compared to previous census. The average farm size increase is mainly consequence of higher amount of farmers who exit the agricultural sector in the province (35% of farmers) and a lower reduction of UAA compared to other area of the region. The agricultural land value between 2010 and 2012 registered just a slight increase of 2.2 % for orchard and vineyards in the hill areas.

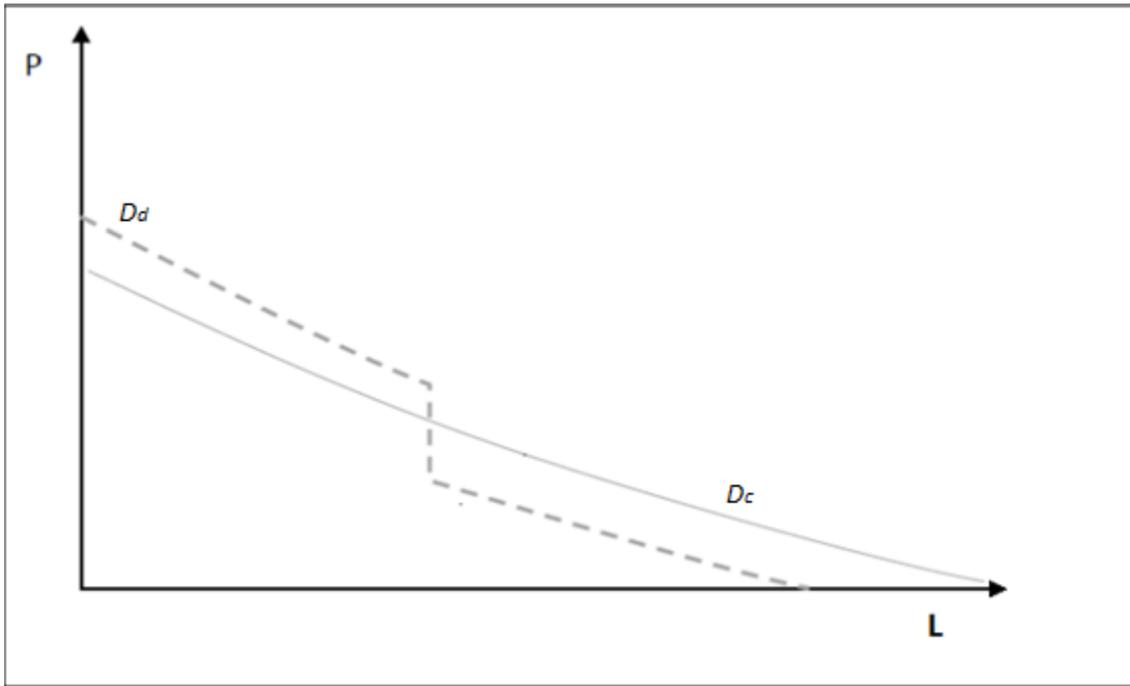
5. The theoretical model

5.1 A graphical analysis of regionalized payments implementation

Several studies concerning policy effects on land markets suggest a graphical analysis of the effect of decoupling, introduced in 2003 with the Fischler reforms, on individual farmland demand function. Following this literature the objective of this chapter is to develop a graphical analysis of the possible effects of the regionalization of the Direct Payment, introduced by the CAP reform, on the farmland demand. In particular our theoretical work starts from figure 1, based on a previous paper by Gallerani et al. (2008), that built their analysis on a previous work of Swinnen et al. (2007). The figure shows two demand curves: the first one, with dotted line, represents the decoupled scenario through a discontinuous farmland demand function (Dd), and the second one, with solid line (Dc), the scenario before the introduction of decoupling, in which the payment was coupled with the area of selected crops (Agenda 2000). In the decoupled scenario, assuming historical payments, this figure may be used to illustrate the mechanism of capitalization of direct payment in the selling or rental price of land.

The proportion between entitlements owned and eligible area is at the basis of the capitalisation mechanism. In practice, this mechanism leads to the formation of two categories of farmland price, those of the land with entitlements, associated with a higher value that encompass the direct payment value, and those of the land without entitlements corresponding with a lower value. The decoupled payment, under the assumption of non-tradability of entitlements, is represented by the part of the curve on the left side of the step of the curve which represents the drop of land marginal value when the entitlements owned from the farmer end. Additional availability of land has a lower marginal value as it cannot be used to activate entitlements.

Figure 1. Effect of decoupling on farmland individual demand function.



(Source: Modified by Gallerani, 2008; Swinnen, 2007).

To follow the evolution of the CAP as envisaged by the 2013 CAP reform we develop the above analysis further, assuming the introduction of the regionalised payment scheme in the framework above.

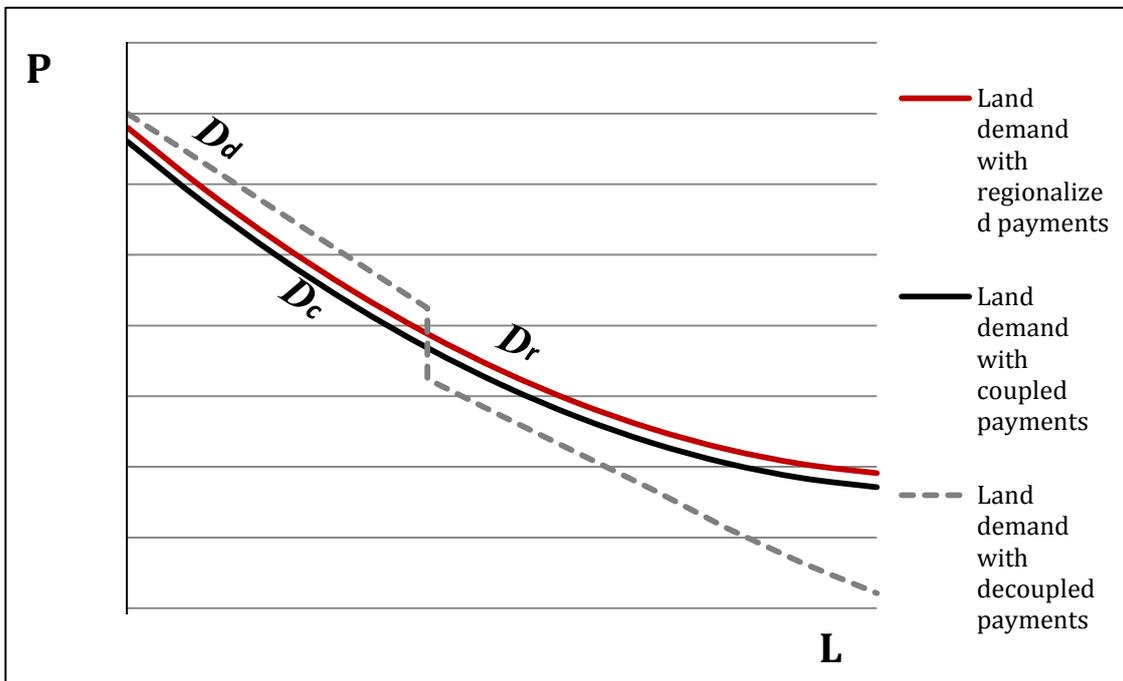
Figure 2 shows three farmland demand curves: the black one represents the land demand curve (D_c) under coupled payment scheme (Agenda 2000 scenario), the grey dotted line represents the land demand (D_d) with decoupled payments (Fischler 2003 CAP scenario), and the red one is the land demand (D_r) under the regionalized payments scheme (Post-2013 CAP reform). Compared to the decoupled scenario, the (D_r) curve changes mainly in two aspects. First, it is lower than the (D_d) in the left side and greater than the (D_d) in the right side; second, the (D_r) curve do not present any steps inside it. Concerning the first aspect, the (D_r) left side of the curve has been placed under the grey dotted curve in order to represent the lower unit value of direct payments received with the regionalised scheme. In fact, the whole Italian budget (national ceiling) will be reduced because a more equal redistribution between states is prerogative of the post-2013 reform. As consequence states with high national ceiling value will suffer a reduction (Italy, Nederland, Belgium, Malta, Denmark, etc) while states with lower budget will see an increase (Eastern European countries). In addition, for those farms that have historically benefited from higher payments than

the national average, this reduction will be stronger due to the redistribution connected to regionalisation of payment within each country.

The right hand side of the regionalized demand curve (D_r) is located over the decoupled one (D_d) because land beyond the area covered by entitlements can now benefit of payments under the regionalised scenario.

About the second aspect, the new curve is not a discontinuous farmland demand function because we lose the step due to the drop of land value consequent to the end of entitlements owned by the farmer. It is due to two different reasons. On one hand, the end of the link between historical reference period and entitlement endowment allows to obtain entitlements, and so claim payments, on all the eligible area of the farm and not just in the part where historically have been received. In fact, the allocation of the entitlements will be on the basis of the eligible area declared, and for which will be claimed the payments, in 2014. On the other hand, with the inclusion of vegetable and permanent crops between those eligible the farmer can get payments on almost all farmed area.

Figure 2. Effect of post-2013 reform on farmland individual demand function.

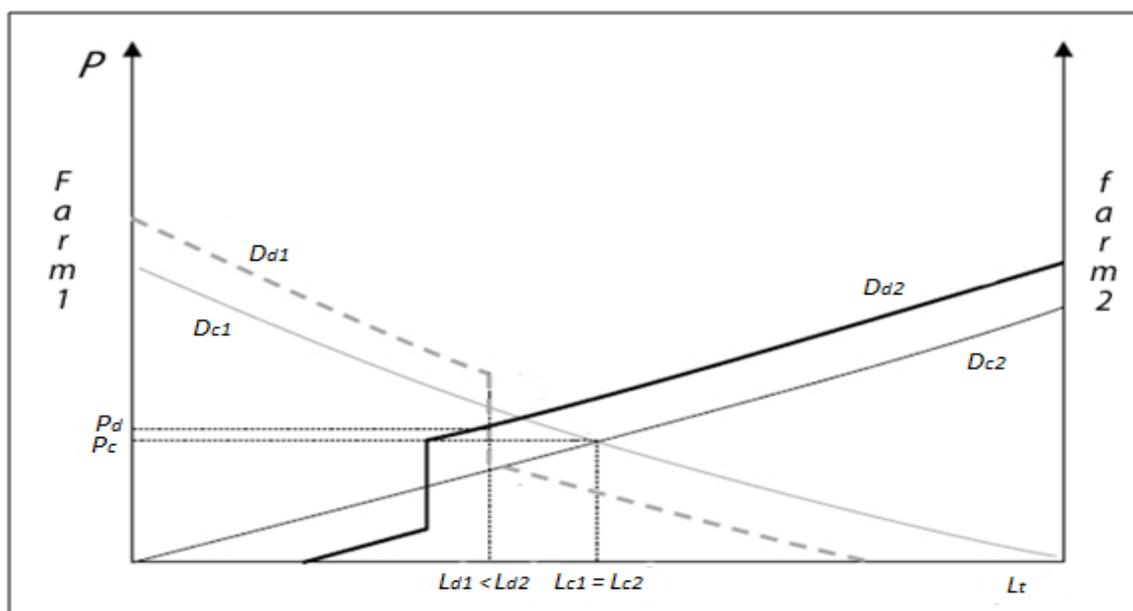


(Source: Own production).

To better understand the reaction of the farms to the reform and to test differences between farms in the land competition the analysis move from the previous approach, only one farm, to a simplified land market constituted by two farms. The starting point

of the analysis comes from the work carried out by Swinnen et al. in 2007 and modified by Gallerani et al. in 2008. In Figure 3 the horizontal axis represents the sum of the arable land of the farms as the total land available, which means that the two farms compete for the same area (L_t). The vertical axis correspond to the price of the land (P). On the left side of the figure, the curves of land demand of the farm number one are shown, one for each policy scenario considered. On the other side of the figure the land demand curves of the second farm are shown. The land demand curves of the farm 1 under coupled and decoupled payments scenarios are represented by the curve $Dc1$ and $Dd1$ respectively. While $Dc2$ and $Dd2$ curves represent the land demand curve of farm 2 in both coupled and decoupled scenarios. The two farms have different endowments of entitlements and particularly the farm1 have a deficit of entitlements while the opposite situation occurred for the farm 2 which is in a position of surplus. The amount and the distribution of entitlements determine the equilibrium price and land division between the two farms. In this case the new equilibrium price (P_d), with decoupled payments, is higher than that one under coupled payments (P_c). The amount of land farmed by the farm 2 increase with the shift to the decoupled scheme, and vice versa happened for farm 1 ($L_{d1} < L_{d2}$). So, under decoupled scenario the farmland demand decrease compared to the coupled one for the farm with less amounts of entitlements and vice versa for the other.

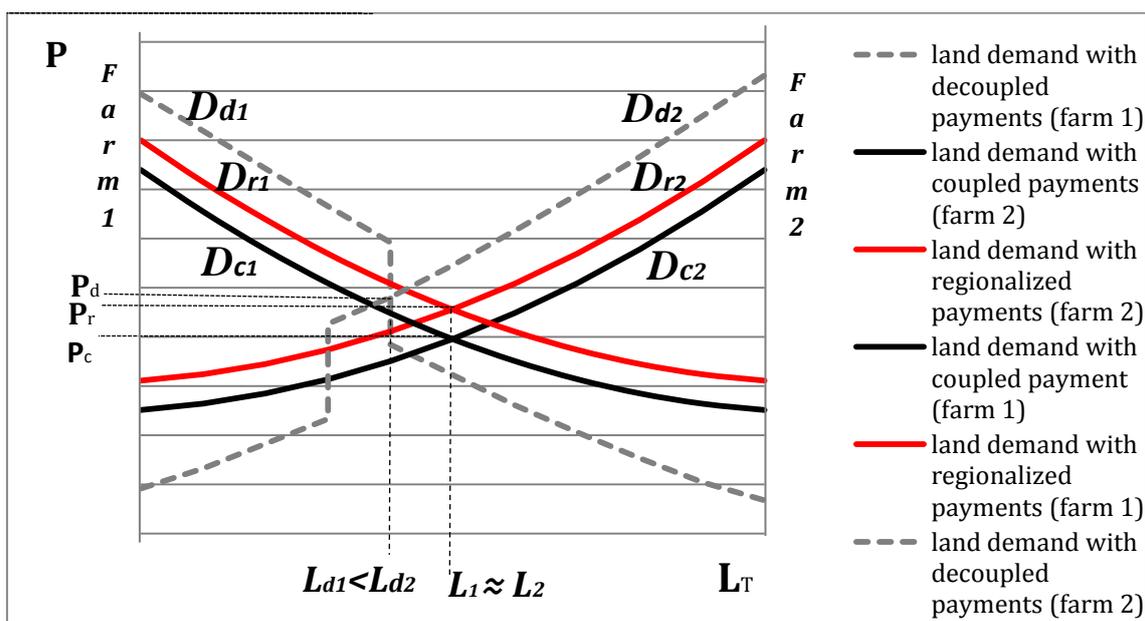
Figure 3. Effect of decoupling on land market: A two farms hypothesis.



(Source: modified by Gallerani, 2008; Swinnen, 2007).

Following the previous approach the effect of the introduction of the regionalized payments on a general two farm case is shown in Figure 4. It is the same situation than the figure before with a simplified market constituted by two farms, farm 1 with a deficit of entitlements and farm 2 with a surplus. The difference with the previous figure concern the inclusion of two red curves in order to represent the land demand curves under regionalized scenario of farm 1 and 2 ($Dr1$ and $Dr2$). With the shift to regionalized payments in terms of price of equilibrium (Pr) there is a decrease compared to the price (Pd) in decoupled scenario. In terms of land allocation the equilibrium point go back to the same coupled situation level with the same amount allocated to each farm ($L1 \approx L2$). But the effect on the demand side differs depending on the entitlements endowment with respect to the farmland owned before the reform i.e. under decoupled scheme. In fact, the farmland demand decrease compared to decoupled payments for the farm with a previous situation of surplus of entitlements and vice versa for the other. So, under the new payments the amount and the distribution of rights in the previous policy scenario determine the changes caused by moving to the new equilibrium. It means that the farm position of deficit or surplus of entitlement before the reform will determine “losers” and “winner” from the implementation of the new payments.

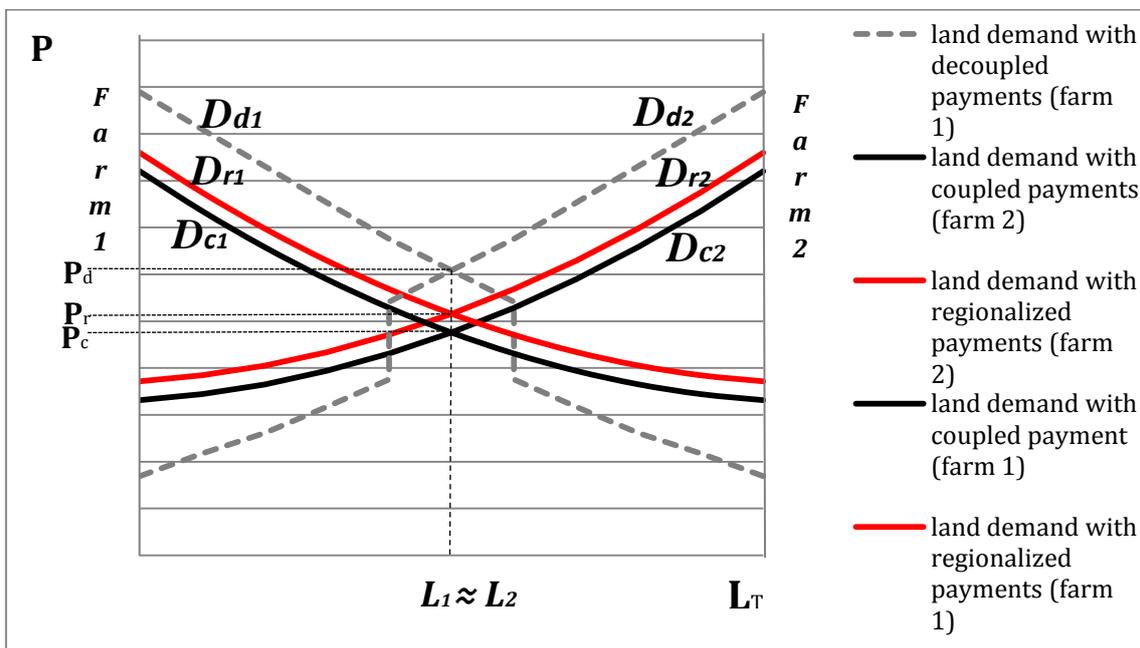
Figure 4. Effect of regionalized payments on farmland individual demand function. A two different farms hypothesis.



(Source: Own production)

Figure 5 shows a situation where the intersection between the two decoupled land demand curve, dotted line, occur before the step that characterizes the end of entitlements owned by the farm. This situation represents farms with entitlements in a high share of the land operated. Between scenarios the land rental price changes. In particular, with the regional payment, the price (P_r) is lower than the decoupled one (P_d) of the decoupled scenario. So, for farms with high number of titles owned respect to the land operated, the shift to the regionalized payments brings at prices of land lower than the decoupled one. This happens because the intersection between the two decoupled curves happened in the part of the curve that represent the land with entitlements associated for both farms, so this value of land includes the value of the titles that is higher in the decoupled scenario than in the regionalized one. In terms of demand of land the results shows a decrease with the shift to the regionalized payment scheme for farm with high amount of entitlements as compared to the land operated.

Figure 5. Effect of regionalized payments on farmland individual demand function. A two equal farms hypothesis.

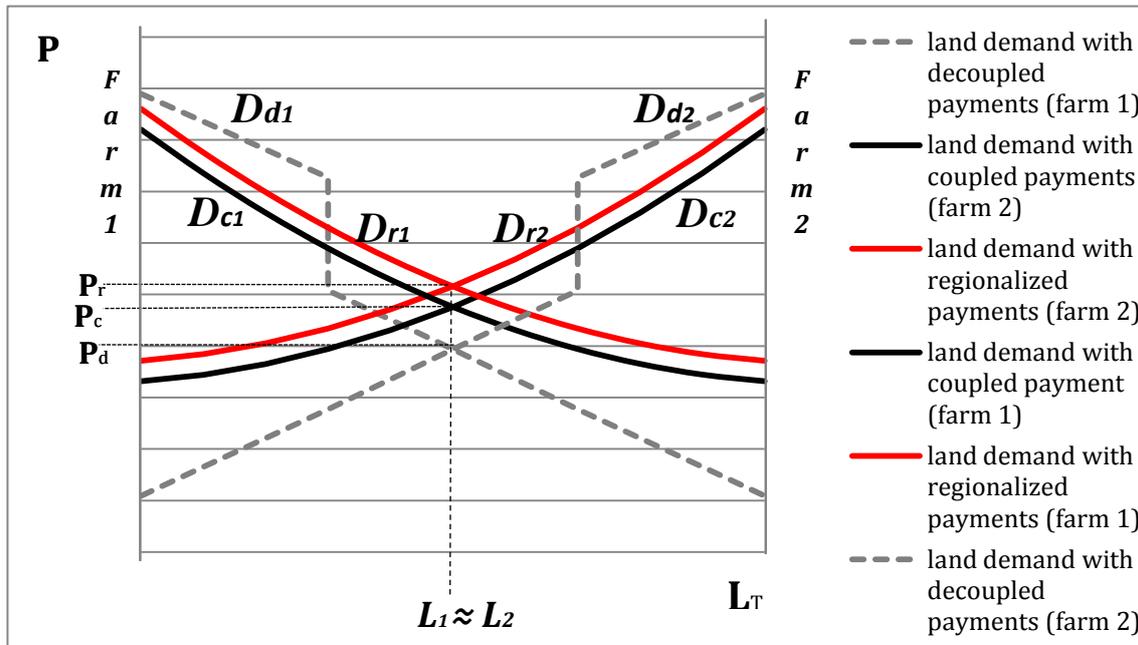


(Source: Own production)

Figure 6 shows a situation with low proportion of entitlements owned as compared to the land operated for both farms. These farms have entitlements on a limited part of the land operated. In this cases, the shift to regionalized payments results in an increase of the land price (P_r), with respect to the historical one (P_d). This happens

because the intersection between the two curves in the historical scenario happened in the part of the curve that represents the land without associated entitlements. In terms of land demand the results shows an increase with the shift to the regionalized payment scheme for farm with low amount of entitlements respect the land operated.

Figure 6. Effect of regionalized payments on farmland individual demand function. A two equal farms hypothesis.



(Source: Own production)

Concluding, the land demand analysis shows that the effect of the implementation of the regionalized payments will depend on the previous CAP payment scheme, the entitlement endowment by the farms involved, and the availability of land cultivated with crops that under the previous payments scheme did not receive support because not eligible. Particularly, the ratio between entitlements endowment and eligible land in the pre-reform period will determine the farm position of deficit or surplus of entitlements with respect to the eligible area. This position will determine who “gains” and who “loses” in terms of willingness to pay between actors in the land market. So, on the one hand, the implementation of the regionalized payments should have a harmonization effect on direct payments among farms, removing inequality between farms due to the historical reference period on base of which amount of payments were previously given. On the other hand, a diversification effect should take place as the ratio between entitlements endowment and the farmed area in past payment scheme would determine differences between effects of the new scheme on farms. In

addition, the possibility to get payments on areas previously not supported by direct payments, as vegetable and permanent crops, gives the possibility to claim payments on almost the whole farmed area. As consequence farms involved in this specialization would get more benefit from this new payment scheme with respect to farms not involved in it, leading to a further differentiation of the effects across farms. So, the implementation of the regionalized payments scheme leads to an increase in terms of land demand for farms which before the reform were in a position of deficit of entitlements with respect the eligible area and for farmers with areas cultivated with crops previously not supported. While in farms previously in surplus position the implementation of the new payments scheme will bring to opposite results, reduction in terms of land demand.

In terms of aggregated effects, if the area under investigation is characterized by general low rate of entitlements with respect to the farmed area, i.e. the common situation is the farm deficit of entitlements, the general expected effect of the reform would be characterised by a mostly higher willingness to pay for land and higher expected equilibrium price on the land market.

5.2 The economic model

In order to give explanation of changes in land demand, the literature emphasises the effects of the marginal productivity of land and other factors which catch individual characteristics (like risk attitude and different timing in the life cycle, see chapter 2). These factors allow us to differentiate preferences with respect to farmed area changes, captured by the values of the Willingness To Pay (WTP) or Willingness To Accept (WTA). The WTP quantifies the actual value of the good for a particular buyer. Since this value depends on the benefits that the purchaser expects to obtain from that asset, it is a monetary measure of the indirect benefits or utility of the buyer.

Indeed, based on economic theory (Bartolini F. and Viaggi D.,2013), it can be assumed that:

i) if the WTP for an additional hectare of land is higher than the cost to rent the land plus transaction costs (TC), the farmer will choose to increase the farmed area;

ii) if the WTA is lower than the land rental prices received minus TC, the farmer will decide to decrease the farmed area;

iii) if the WTA is higher than the land rental prices received and the WTP is lower than the land rental price paid, the farmer will choose to preserve the same farmed area.

The WTP or WTA for a farm household, assuming a fixed policy, depends on several variables. Some of these can be classified into the following categories: geographical, household, farm, and farmer characteristics:

$$WTP \text{ or } WTA = f(\text{geographical, household, farm, farmer, . . .} | CAP) \quad (1)$$

Through an exercise of maximization of a simplified version of the farm profit functions, following similar models in the literature (Deininger et al., 2008; Deininger and Jin, 2008; Bartolini and Viaggi, 2013), the hypothetical optimal farmed area with historical and regionalized payments can be obtained. Under the historical payments scenario, this can be formulate as:

$$\max_A \pi = pf(\alpha, L, A) + eA_e - I^{in}[(A - \bar{A})(r + tc^{in})] + I^{out}[(\bar{A} - A)(r - tc^{out})]$$

(2)

$$s. t. A_e \leq ent \quad (3)$$

$$A \geq 0 \quad (4)$$

Where:

π is the farm profit

p is the output price (assumed fixed)

$f(\alpha, L, A)$ with $f_A > 0$ and $f_{AA} < 0$ represents the production function based on the technology (α) and the quantity of labour (L) used on farm (household and external labour) and the farmed area (A).

e is the entitlement value (historical SPS) and A_e is the amount of eligible land, with

$$A_e = A - A_{ne} \text{ (} A_{ne} \text{=non-eligible land).}$$

I^{in} and I^{out} are two indicators for the rent-in or the rent-out activity. These elements can have a value of zero when they are not activated or a value of one if the farm household is rented-in or out. A represents the optimal farmed area, while \bar{A} is the land endowment and r the rental price (assumed exogenous).

tc^{in} and tc^{out} are the TC associated with the rent-in and out.

Assuming that entitlement are not tradable among farmers, to activate the full set of entitlements, it is necessary for each farmer to allocate a portion of the farm to eligible crops at least equal to the amount of entitlement endowment. Let γ be the Lagrangian multipliers associated to the constraints (3) which constraints the amount of eligible land to the entitlements endowments. The optimal farmed area in a condition of historical payments is obtained by solving the maximization problem above. When constraint (3) holds, the first order conditions (FOC) lead to:

(Assuming for simplicity that there is no capitalization effect from the payment on r)

$$pf_A(\alpha, L, A) + e^{-\gamma} = r + tc^{in}$$

When the household rents-in ($A > \bar{A}$);

$$pf_A(\alpha, L, A) + e^{-\gamma} = r - tc^{out}$$

When the household rents-out a portion of land ($A < \bar{A}$);

$$r - tc^{out} < pf_A(\alpha, L, A) + e^{-\gamma} < r + tc^{in}$$

When the household uses the entire land endowment without activating any rent ($A = \bar{A}$).

Contrary to the above, the regionalized payment is assumed as 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. The optimal farmed area with the introduction of the regionalized payments is obtained by maximizing the following farm profit functions:

$$\max_A \pi = pf(\alpha, L, A) + eA - I^{in}[(A - \bar{A})(r + tc^{in})] + I^{out}[(\bar{A} - A)(r - tc^{out})] \quad (5)$$

$$\text{s. t. } A \geq 0 \quad (6)$$

Where e is the entitlement value (regionalized) and A is the optimal farmed area.

Solving the following maximization problem the FOC leads to:

$$pf_A(\alpha, L, A) + e = r + tc^{in}$$

When the household rents-in ($A > \bar{A}$);

$$pf_A(\alpha, L, A) + e = r - tc^{out}$$

When the household rents-out a portion of land ($A < \bar{A}$);

$$r - tc^{out} < pf_A(\alpha, L, A) + e < r + tc^{in}$$

When the household uses the entire land endowment.

Comparing the two situations, historical and regionalized scenarios, in the second one there is a increase in the WTP due to the fact that the factor γ has been not subtracted in the FOC when the constraint (3) holds. In the opposite situations, where constraint (3) does not hold, the two optimization problems have the same results with respect to the optimal farmland size. This last case represents the situation in which the entitlements endowment is greater than the eligible area available. On the one hand, parts of the results are in line with the graphical analysis previous performed. In fact, in a situation of deficit of entitlement with respect to the farmed area the policy change brings to a higher WTP and therefore also a higher land demands (Figure 6). On the other hand, when there is a situation of entitlements surplus, the outcome of the policy change will bring to the same results in both scenarios, historical and regionalized. This is not in line with the graphical analysis which show a decrease of land demand as a consequence of new payments introduction when entitlements are in surplus with respect to farmed area (Figure 5). This happens because this model

does not include the reduced of the unit value of the payments, which is instead considered in the graphic analysis.

6. Methodology

6.1. Research hypothesis

As show in the graphical analysis, depending on the pre-reform implementation model, the change in policy may have different effects. Particularly, the ratio between the amount of the allocated entitlements and the eligible area held before the reform will determine who, among farmers, gains and who loses from the policy change. Basically, this mechanism is based on the entitlements deficit or surplus with respect to the eligible area endowment in the pre-reform period. As confirmed in the mathematical analysis, the introduction of the regionalized payments leads to changes in farmers' intentions with respect to the farmed area, particularly; it leads to changes of farmers WTP depending on the ratio between payments endowment and eligible area previous to the reform. The biggest increase of the WTP, consequent of the regionalization, happened in case of farms with entitlements deficit. From the previously theoretical analysis, graphical and mathematical, as well as from the previous literature, the following hypotheses have been identified:

H1: The decision to change farmland area will be affected by the change in policy

H2: Under the regionalized payments compared to the historical one, farm willingness to expand the farmed area is likely to be higher on farms producing previously no supported crops (fruit, and vegetables)

H3: Under the regionalized payments, compared to the historical ones, willingness to expand the farmed area is likely to be higher in farms located in zones previously benefiting of a low payment (mountain and hill)

H4: The ratio between amount of entitlements in possession and the eligible area before the reform is expected to affect the farmers' reaction to the reform

H5: Differences in the determinants of intended changes in farmland size among different policy scenarios are expected, in connection to the different (policy/non policy) issues determining the relevant marginal segment of the demand curve.

6.2. Estimation strategy

This work uses data from a survey of farmers that collects their characteristics and explores their future intentions to change the allocation of land in response to the introduction of the regionalized payments. The data collected through the questionnaire are treated in two steps. In the first step we analyse the answers to questions about the land market through descriptive statistics mainly based on frequency distribution of answers (paragraph 7.1). In a second step, we use econometric models in order to identify determinants of stated intention about changes in land operated under alternative policy scenarios (chapter 7.2).

Within this outline, the hypothesis stated will be validated (or at least corroborated) by comparing the determinants of changes in land endowments across scenarios. The objective is to check if the observed change in determinants is in line with the expected impact of the policy. For example, Hypothesis H3 will be validated if the farms located in mountain areas are significantly more likely to grow under the regionalization scenarios.

The analysis of operators' decisions carried out in this research is based on an intentions survey realized at the very beginning of the policy reform implementation. Due to the newness of this reform, the survey collects one of the first databases investigating farmers' response to this change. In fact, the survey was conducted in the early summer 2012 when, even if the official proposal (COM(2011)625/3) was already approved, the reform process was still in phase of negotiations. Still today, and of course much more at the time of the survey, there is a high uncertainty about the new Cap Direct Payments. In fact, it is already approved at Community level but still under negotiations at the national level. Particularly, the reform gives to Member States room for several decisions regarding direct payments of the CAP. As an example, each Member State will decide internally the modality of implementation of the new payments, defining the dimensions of the area on the basis of which payments will be homogenized and choosing about the inclusions of vegetables and permanent crops

among those eligible to receive payments. Therefore, we would expect farmers' intentions at this early stage to reflect to a large extent their expectations and perceptions of reform and their global situation, rather than actual ongoing decisions facing regulations in place. However, even if not yet well defined, we expect that farmers had an idea in mind about the future possible changes of payments scheme and have stated the intention on the basis of this idea. In addition, to give a basic level of information to all interviewed a description of the measures within the questionnaire, before the relative questions formulation, has been provided. Regionalized payments have been described in the questionnaire as a new form of direct payment which changes from the determination of the entitlements on historical bases to a uniform entitlements value per region, distributed according to the farmed land. Also the greening measure has been explained before the relative questions. It has been described as an additional payment for those who are organic farmers or farming at least 3 different crops in arable land or maintaining the surfaces already present in permanent grasslands or creating ecological focused areas (such as terraces, buffer strips, hedges, landscape features and forestation) on at least 7% of the surface. Also the capping measure has been explained before the questions, and it has been described as an upper limit of 150,000 euro of direct payments per farm.

Important features of this exercise concern the use of stated intention rather than observed behaviour. This instruments has been broadly used in literature to test policy impact on structural changes (Goodwin and Mishra, 2003; Bartolini et al., 2010; Viaggi et al., 2011). Even if stated intentions are not as sure as observed behaviour, the literature highlights as in most of the cases it reveals realistic ex post (Gallerani et al., 2008; Gorton et al., 2008; Douarin, 2008).

6.3. Empirical model

In order to verify the hypothesis arising from the theoretical analysis and to find the determinants of changes in farmland size two multinomial logit (MNL) models have been implemented. The first one represents the baseline scenario which corresponds to the hypothesis of continuity of the current policy in the coming years, i.e. Direct Payments allocated on historical bases. The second one concerns the changes

associated with the hypothesis of introduction of regionalized payments in the coming years.

The choice of the model typology has been driven by the characteristics of the variable used as dependent in this work. The MNL model is the most frequently used with this typology of variables, which correspond to a categorical variable that cannot be ordered. The model expresses and explains the probability of farm household choices to be in a specific category. As stated in the theoretical model the decisions on farmed area can be interpreted as being driven by the farmers WTP and WTA and by the expected rent or sale land value. Following this conceptual framework, each operator, index (i) , faces a choice among three alternatives:

Alternative 1: intention to increase the farmland size

As discussed above, the farmer is expected to choose this option when his WTP is higher than the cost to buy or to rent the land plus the related TC.

Alternative 2: intention to decrease the farmland size

The farmer chooses this option when his WTA is lower than the received land sales or rental price minus the related TC.

Alternative 3: intention to not change the farmland size.

The farmer chooses this option when his WTP is lower than the cost to buy or to rent the land plus related TC and the WTA is lower than the received land sales or rental price minus related TC.

The WTP and WTA values depend on the benefits that the farmer expects to obtain from a choice and can be interpreted as a monetary measure of the utility of the farmer.

The modelling rationale can also be based on a direct interpretation in terms of utility. The farmer is assumed to have a limited number of alternatives and each alternative choice has a different level of utility. In the utility models, decisions are assumed to be based on the utility maximization by the decision maker. Therefore, for the (i) farmer

faced with the (j) option of choice, the utility of the choice (j) will be equal to:

$$U_{ij} = \mu_{ij} + \varepsilon_{ij}$$

Where (μ_{ij}) is the observable part of the utility function and (ε_{ij}) the not observable one; the latter being not known it is then treated as a random component (Cameron and Trivedi, 2005). When the utility function is divided in this way, the observable part of the function is treated as linear in the parameters and with a constant:

$$\mu_{ij} = x_{ij} \beta + K_j$$

Where (x_{ij}) is a vector of variables related to the alternative (j) facing the decision maker (i) , β are the coefficients of these variables and (K_j) is the constant specific for different options of choice (j) . The probability that a (i) farmer chooses the alternative (j) between a numbers of alternatives (M) is a function of the independent variables X_{ij} and of the β coefficients (Greene, 2003). If the decision maker (i) made the particular choice (j) , we assume that U_{ij} is the maximum utility between the utility associated with each alternative (j) . In our case, using MNL model, the unobservable term, (ε_{ij}) , is assumed to be independent and with a Gumble distribution, and the probability that the (i) th farmer chooses the farmland size change alternative (j) is:

$$P_{ij} = \frac{\exp\{\mu_{ij}\}}{\sum_j^M \exp\{\mu_{ij}\}} \text{with } (j)=1,2,\dots,M \text{ alternatives.}$$

$$\text{s.t } 0 \leq P_{ij} \leq 1$$

$$\sum_j^M P_{ij} = 1$$

Assuming (μ_{ij}) as a linear function, it is possible to write: $X_{ij} \beta = \mu_{ij}$, in which the vector (X_{ij}) contains the set of the explanatory variables. Therefore, we can rewrite a normalised form of probability calculation under the previous assumptions as:

$$P_{ij} = \frac{\exp\{x_{ij}\beta\}}{\sum_j^M \exp\{x_{ij}\beta\}} \text{ for each } (j) = 1, 2, \dots, M \text{ alternatives.}$$

From the practical side, as academically well known, the interpretation and the evaluations of the model output is mainly centred on the significance of coefficients: when we have a not significant coefficient, it means that the variable does not affect the probability of being in a certain category; on the other hand, when the coefficient of a variable is significant it may be interpreted as the increase/decrease of the probability to make a given choice (Cameron and Trivedi, 2009).

6.4. Data collection

The survey has been carried out within the Factor Markets project which is a collaborative project founded by the European Commission under the 7th EU Framework Programme (FP7).

The survey has been conducted on a sample of 350 farm households out of 7379 beneficiaries of Cap payments located in Bologna province (NUTS 3). The questionnaire has been filled through a telephone interview which focused on farmers' intentions about land size expansion/reduction conditional on the introduction of some specific measures of the post 2013-CAP reform. The sample has been proportionally stratified by altimetry zone (63% of farms located in the plain area, 16% in hill, 10% in the hills of Bologna and the last 10% in the mountains). Particularly, the strata hill of Bologna has been created in order to take in account possible differences connected with the proximity of the city of Bologna. The sample has been also stratified by the amount of CAP payments received in 2011 (below and above the mean). Inside each of these strata, subsamples have been randomly chosen. The questionnaire (full questionnaire available as annex) was divided in different sections: a) information about farm characteristics, labour features and market strategy; b) CAP payments and planned future activities; c) expansion/reduction intentions under current CAP and under post-2013 CAP proposals; d) finally personal and household characteristics. Firstly we overview briefly the whole questionnaire and then we focus on only the variables included in the models.

In the questionnaire the farm characteristics are related to farm size, location, legal form, farm specialization, typology of crops and animals breeding, intensity of livestock production, surface under agro-environmental or ecological measure, hectares involved in photovoltaic or biogas systems. In the same section, information on land rent-in and rent-out has been asked, as well as on the increase/decrease of land in ownership or rented in the previous years (from 2002), and on the presence of relatives between owners or tenants of the farm. About labour characteristic, the number of household members working full-time or part-time in the farm and the number of external workers full and part-time working in the farm have been collected. In order to investigate market strategies, questions about sales channels contract endowment and typology, as well as about internet use to buy or sell inputs/output have been included. Regarding CAP payments, information on the amount of payments, number of entitlements owned and the amount of others payments received in 2011, as well as, the influence of payments on revenue, was collected. Generic intentions about adoption of new technology and on intention to stay in activity in the next years were asked. Within this section the percentage of total gross family income coming from farming was also investigated. The expansion/reduction intentions under current CAP has been collected for the land in property, rented out and rented; for each of these categories of land the respondent could choose between the following categories: increase, no change, decrease. The questions about farmers' intentions to change the farmed area have been realized also for the hypothesis of introduction of the regionalized payments, measure included into the proposal of post-2013 CAP reform, specifically asking about changes under this scenarios with respect to the baseline. In addition to the differentiation present in the previous scenario, between property, rent-in and rent-out questions, here each questions has been split in two. The intentions to change the land amount in property is represented by two question, one collecting intentions to sell more and another intentions to buy more. The intentions to change the land amount in rent-in correspond to two questions, one collecting intentions to rent-in more and another those to rent-in less. The intentions to change the land amount in rent-out correspond to two questions, one collecting intentions to rent-out more and another those to rent-out less. Also the categories of answer of these questions are more and different

with respect to the previous scenario. Particularly, the farmers can state their intention to make a change or not expressing also the degree of certainty of choice. The structure of these questions will be better understood through the section (paragraph 6.6) concerning the structure of the variables included in the econometric models or the full questionnaire in appendix.

Household information's has been collected through questions concerning gender of family components, number of minors, of over 65 years old and number of unemployed. Personal characteristics related to farmer age and education level, the latter divided in 8 categories ranging from no title or primary school to PHD, have been collected.

Before concluding this overview of data collected through survey it is important to underline that the questions relative to the regionalized scenario concerns the expected changes with respect to stated behaviour under current CAP scenario, i.e. forcing the respondent to consider only the difference with the baseline. In others words, the comparison between the two scenarios is implicit in the questions about the regionalized one, so the values resulted from the descriptive statistics (table 6) are relative to the amount of farmers stating the intention to take/give more land under this scenario compared with what they would make in the baseline scenario.

Table 2. Summary of questions contained in the questionnaire.

OUTLINE QUESTIONNAIRE	
<i>Subdivisions sectors</i>	<i>Specific questions</i>
1 Farm characteristics	Localization farm and farmland Corporate form Specialization Crops and livestock composition Total agricultural area Fragmentation of farmland Land rent-in/rent-out Changing in farmland dimension since 2002 Areas used for agro-environmental measures Solar energy and biogas production Subcontracting activity
2 Labour characteristics	Internal full-time/part-time External full-time/part-time
3 Market strategy	Sales channels/contracts Internet use (buy inputs/sell products)
4 Cap payments	SFP received in 2011 Number of titles Others payments received in 2011 SFP change since 2005 Ratio payments/Household income
5 Generic intentions	Adoption of innovations or new technologies (next 5 years) Exit from the market (next 5 years)
6 Expansion/reduction intentions under current CAP	Buy/sell and rent-in/rent-out under current CAP
7 Cap reform knowledge	CAP reform proposal knowledge
8 Expansion/reduction intentions under post-2013 CAP proposal	Buy/sell rent-in/rent-out under CAP reform (specific proposals about direct payments: Regionalization, greening and capping application)
9 Personal and household characteristics	Sex, age, education Number of female, male, young , over 65, unemployed

6.5. Descriptive statistics

Before starting the statistical description of the sample, it is important to underline that from the whole sample has been excluded one farm which corresponds to an outlier. It is a very big cooperative with a farmed area of 1870 hectares specialized in cereals production used as energy crops in the production of biogas. Accordingly, the sample used for this work consists of 349 farms and the related descriptive statistics are showed next. The greater part of surveyed farms are specialised in cereals (47% of the sample), 27% are specialised in mixed crops, 14% in livestock (which includes the categories livestock, mixed livestock/arable, milk/meat cattle farms), while 8% are fruits farms. Moreover, the main specialisations differ across altitudes: cereals in plains and hills of Bologna and mixed crops in the mountains and hills. The legal form of the majority of farms is individual firm (82%), while the rest are prevalently run as companies (14%). The 18% of the whole sample declares the presence of relatives

between farm's owners. The average farm dimension of the whole sample, excluded the outlier, is about 25 hectares per farm. Differences are marked by altimetry, with a average ranging from around 21 hectares per farm for mountain to around 43 hectares per farm in case of hill region (table 3). It is worthy to note, that average farm size of the sample is larger than the average farm size in the province which is around 16 hectares (ISTAT Census, 2010). This can be explained by the selection criteria of farms from the universe of SFP beneficiaries, from which very small farms and farms without land are excluded.

Table 3. Descriptive statistics land operated by altitude.

Altitude	Land operated (ha)			rent-out (ha)	rent-in (ha)
	mean	sd	median	mean	mean
plain	36.18	132.82	10	0.64	6.99
hill	37.84	40.68	23	0.54	7.16
hill (BO)	43.67	90.60	8.50	0.75	4.39
mountain	20.78	21.92	13.50	-	2.28
all	35.63	111.05	12	0.56	6.26

The rental market shows a low level of activity: only 5% of the farms rented-out land to other farms with an average dimension of plots rented out of 11 hectares. On the contrary, a quite high number of farms rented-in land. They are about 34% of the total and the average land rented-in is 19 hectares per farm. The 26% of the whole sample claimed to have changed the size of the farm since 2002. The majority of those farmers have stated an enlargement of the land operated, through increasing land owned (10% of the surveyed farmers) or through increasing rented-in land (9.5% of the survey sample). However, 8% of farmers stated to have sold a portion of farmland and 5% have reduced land rented-in. It is also important to underline that for all those questions related to changes since 2002 in farmland size the number of respondents was very low, less than a quarter of the sample. The 5% of whole area under investigation is invested to agro-environmental measures. The presence of areas used for energy production by biogas or photovoltaic was investigated and the answers reveal an almost null presence of photovoltaic installed on the ground and only one

farm involved in the production of biogas with 200 hectares planted with energy crops. Activities of subcontracting are carried out by 7% of the sample.

About labour characteristics, 90% of farmers have household members working full time on farm, of which the 60% have only one worker and the 30% have two, while 18% of the sample have family members working part time on farm, of which the 80% have just one worker. As regards the off-farm labour used on farm only 5% of the farms has external full time workers and the 9% has part time workers. The majority of farmers sell the main part of products through cooperative (63%) or to wholesaler or retailer (32%), and 19% directly to consumers. More than 30% of the sample has contracts for the sale of agricultural products and 7% of the farmers use internet to buy inputs, while 3% use internet for selling products.

Very heterogeneous answers were collected on SFP payments by altitude (table 4). In fact, in the mountain area the average SFP per farm (received during year 2011) is about 1,500 euro, in the hill of Bologna is approximately 12,500 euro, in the hill about 3,050 euro and in plain about 9,150 euro per farm.

Table 4. Descriptive statistics SFP by altimetry.

Altitude	SFP (€ per farm)			SFP (€/ha)
	mean	median	sum	mean
plain	9152.03	2200	1.436.869	241.62
hill	3058.74	1400	143.761	100.03
hill (BO)	12582.2	2000	314.556	168.25
mountain	1515.96	500	42.447	57.88
all	7539.43	1800	1.937.633	188.75

Information about the amount of entitlements and amount of SFP received are largely missing. In fact, regarding the number of entitlements, only 43 farmers stated this information, while, regarding the SFP, around 150 farmers. In the large majority of cases in which the entitlements number is available the farm UAA (largely) exceeds this number. Only 2 cases report a number of entitlements higher than the UAA and 5 report a number of entitlements equal to that of the UAA. We ask also about the trend of payments received since 2005. 30% of the sample stated a decrease and 10% an increase of payments. It's important to note that, besides SFP, 10 % of the sample receives others typology of payments, which have a range between 200 and 150,000

euro per year with an average of about 15,500 euro per year per farm. These payments are usually represented by RDP payments, mostly related to the implementation of specific agro-environmental measures or to organic. More than 50% of the sample stated that, in percentage terms, the influence of SFP on farm revenue is less than 30%, while the 10% stated that it is between 30 and 50%.

About intentions to adopt innovations or new technologies in the next 5 years, 2% of farmers intend to adopt energy crops, 3% robot and precision agriculture, 5% new irrigation systems and 6% system for the production of energy.

The stated intentions regarding changes in farmland owned or rented in response to CAP change, were collected only for those who stated intention not to exit from farming activity in the next 5 years (about 85% of the whole sample). Also information related to motivations (causes) of leaving the sector and future intentions regarding owned land use was collected. The main motivation because some farmers leave the activity is the absence of successors within the family (45% of farmers leaving the sector); others think that the activity is not profitable enough (20%), while 25% have their unspecified reason. The 20% of those farmers who intend to leave the agricultural sector stated intention to sell the property, while 20% would like to maintain the property and give the land for rent; the remaining 50% do not know what to do. The percentage of the total gross income of the family coming from farming is less than 10% for 22% of the sample, between 10 and 29% for 14% of farmers, more than 30% for 18% of the sample; 6% of the farmers have their activity in loss. The 76% of the sample declares to live at the farm with the family, 9% to live alone at the farm, and 13% stated that neither the farmer nor the family are living at the farm.

The descriptive statistics of the stated intentions on farmland size changes under both current CAP and regionalized scenario have not been discussed here but included in the results chapter.

The average age of the Italian farmers is very high compared to other countries and in our survey the mean age is 63 years old. About education level, 40% of the sample has no education or primary school; 23% have middle school education level, 20% high school level, 6% professional qualification, and 8% have a master degree. The 16% of the sample have at least one minor living with the family, and 53% of households have

in at least one over 65 years old member. The 5% of the sample have at least one unemployed in the family.

6.6. Variables used

From the initial sample of 350 observations the analysis is carried out by considering only the sub-set of usable stated intentions. In fact, farmers whose answers were not identified, because they have not replied or because they had expressed uncertainty responding that they did not know are removed from the sample. Also farmers stating the intention to exit farming in the coming years were excluded from the analysis because beyond the scope of this work. This decision is justified by the fact that the decision to exit from farming undertaken would undermine any statement about future intentions related to the farm. As the scope of this work is to test responses to policy changes, it can be tested only between farms in activity during the policy change, which are those who will be affected by the change. In addition, in the questionnaire, the question about the decision to exit has been asked independently from the policy and the policy change. For these reason, the issue of exists will not be further discussed here. The final number of observations available in each model is different. It correspond to 284 in the first model, concerning the baseline scenario in which the current CAP remains unchanged over the coming years, and 233 in the second one, regarding the reform scenario in which the regionalized payments are implemented. Valid econometrical analyses were only possible using discrete variables based on operators' plans to expand or reduce the farmed area with three categories: intend to increase, to decrease or not to change the farmland endowment. The categorical dependent variable in both models has a value of "1" if the respondent would change his behaviour turning to an increase in farmland size, and "2" in the case of a reduction in farm area. The "0" value was set as the reference or base category representing farmers whose stated intention to not change the amount of land owned. The majority of the answers to the questions of interest in the survey, from which derives the final models structure, have been not directly usable as they are codified. These answers needed to be recoded to meet the purpose of this work.

Under the current CAP scenario the categories of the answers are the same as the dependent variables in the model, increase, no-change and decrease, but the questions are divided between those related to changes in property and those concerning changes in rent-in and rent-out, in contrast with the model structure which does not take into account this differentiation. The combination of those questions into only one variable enclosing the intentions to change using all strategies (increase, no-change, decrease) was needed because the number of observations was not sufficient to deal with more "fragmented" categories of the dependent variable. To better understand the structure of the questions, as an example, one of these is shown below:

Question 4.01.1: Assuming a scenario in which the current CAP remains unchanged, what are your intentions regarding the land in property?

01. Increase it

02. no-change

03. Decrease it

88. Does not know

99. Does not answer

The other two questions with the same structure collecting information on land rented-in and rented-out are shown in the full questionnaire in the appendix. The category increase of the dependent variables is obtained combining more than one question (in the present case the questions have been three).

As an example, we can consider a specific case. The farmer choice falls in the category *increase* of the dependent variable in the baseline model if:

- gives positive answer to the question regarding the increase in property, or
- gives positive answer to the question regarding the increase in rent-in, or
- gives positive answer to the question regarding the decrease in rent-out, and
- gives no positive answer to the question concerning the decrease in property, and
- gives no positive answer to the question concerning the decrease in rent-in, and
- gives no positive answer to the question concerning the increase in rent-out

These last three restrictions have been included in order to exclude from "increase" answers farmers stating opposite intentions, which would offset each other actually leading to an ambiguous behaviour.

Also answers coming from the regionalized CAP scenario needed coding before use. Therefore, the categories of the categorical dependent variable used in the second model come out from combinations of more than one answer to the related questions. As an example, one of these is shown below:

Question 4.71.1: Assuming the introduction of regionalised payments, your intention is to rent-in more land than you would make with the current payment system?

01. Certainly

02. Probably

03. Probably not

04. Certainly not

88. Does not know

99. Does not answer

We consider the first two categories (certainly and probably) as positive answers to the question, so farmers stating one of these two fall in the "increase" category of the dependent variable. All other categories (probably not, certainly not, does not know and does not answer) are considered in the no-change category.

The category "increase" of the dependent variables is obtained combining more than one question. In this case the questions are six, three more than the first model. In fact, in addition to the differentiation presented in the previous model, between property, rent-in and rent-out questions, here there are diversified questions respectively on intentions to sell more and buy more, and rent-in more and rent-in less, as well as between rent-out more and rent-out less.

For example, the farmer choice falls in the category *increase* of the dependent variable in the regionalized model if:

- gives positive answer to the question concerning the increase in property (buy more), or
- gives positive answer to the question concerning the increase in rent-in (rent-in more), or

- gives positive answer to the question concerning the decrease in rent-out (rent-out less), and
- gives no positive answer to the question concerning the decrease in property (sell more), and
- gives no positive answer to the question concerning the decrease in rent-in (rent-in less), and
- gives no positive answer to the question concerning the increase in rent-out (rent-out more)

These last three restrictions have been included in order to exclude farmers stating opposite intentions as before.

To sum up, in this example the choice to increase includes affirmative answers to the questions: *..your intentions is to buy more land?...your intentions is to rent-in more land?* and *..your intentions is to rent-out less land?* It has been made because in both cases, increasing the amount of land in property or rented in or decreasing the land rented out, the effect is the same: to increase the farmed area. Another example representing the combination of two answers is represented by the intentions to decrease the farm size. In this case were taken together the questions: : *..your intentions is to sell more land? ..your intentions is to rent-in less land?* and *..your intentions is to rent-out more land?* As in the previous case, for the purposes of this research the two questions bring me the same information.

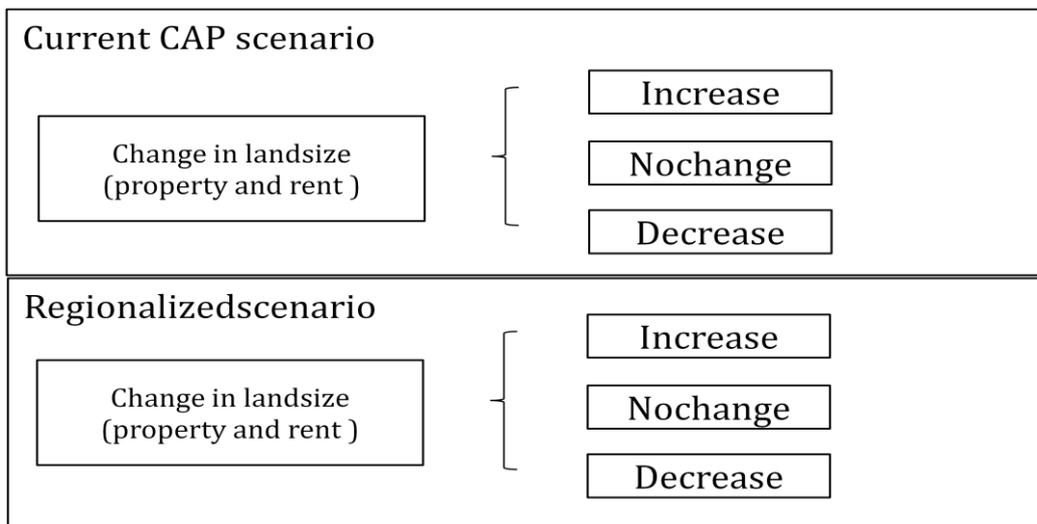
Table 5 clarifies the recombination of the questions to obtain the dependent variable used in the second model. Questions which relative answers express intention to expand the farmed area have been placed in the increase category and symbolized by the “+” sign while those which answers express intention to reduce the farmed area has been placed in the decrease category and symbolized by the “-” sign.

Table 5. The dependent variable structure.

CAP measures	Land	Intentions	Increase	Decrease
Regionalized payments	rented	Rent-in more land	X	
		Rent-in less land		X
		Rent-out more land		X
		Rent-out less land	X	
	owned	Buy more land	X	
		Sell more land		X

The dependent variables structure relative to the two models implemented is summarized below (Figure 7).

Figure 7. The two models dependent variables structure.



The choice of the *independent variables* to be included in the model was made according to those identified from the literature review as determinants of changes in farm size, in line with those available from the survey, on the basis of log-likelihood comparisons between diverse models and taking into account multicollinearity problems.

The explanatory variables created are briefly described in table 6. Farm specializations include cereals, mixed crops, livestock, fruit and horticulture, each of which corresponds to a dummy variable with a value of one if the farm specialization matches to the relative category. The farmland dimension has been taken in consideration as a continuous variable. A dummy variable represents the farms which express intention to adopt some new technology in the coming years. Two dummy variables have been created to take into account internet use to sell the products or to buy the inputs. Two dummy variables have been designed to explore the effect of the rate among Direct Payments and farm revenue on farm decisions: one related to a ratio between payments and revenue lower than 50%, and the other concerning farms with this ratio higher than 50%. Two dummy variables consider the positions of the farms below or above the average SFP payments of the whole sample. Concerning

labour availability, in our exercise four variables have been created to take into account respectively the quantity of household and external, part time and full time worker. These are continuous variables taking the value corresponding to the numbers of each workers typology. Dummy variables for the same typologies (household and external, part time and full time) were also used to account for the presence/absence of workers of each typology. A specific variable representing the presence of active sales contract for selling agricultural products has been created. A specific variable has been included to take in consideration the influence of living in the same location of the farm or in a different one. A variable accounting for involvement in rental market activity has also been considered. The age and education level variables were included in the models, the first as a continuous variable and the second one as a dummy variable. The number of minors living in the family, the presence of males, members over 65 years old and the number of unemployed in the household were included in the models as household characteristics. In order to verify the influence of the presence of females as farm owner a dummy variable has been included. Four dummy variables representing the location of the farm and particularly the altitude zone (Mountain, Hill, Hill-Bo, Plain) have been considered.

Table 6. Independent variables created and relative descriptive statistics. Table

Category	Variable (code)	Variable (description)	Obs	Mean	Std. Dev.	Min	Max
Geographical characteristics	d_moun	1 if farm located in mountain area	349	0,103152	0,304594	0	1
	d_hill	1 if farm located in hill area	349	0,160459	0,367558	0	1
	d_hillBo	1 if farm located in Bologna area	349	0,103152	0,304594	0	1
	d_plain	1 if farm located in plain area	349	0,633238	0,482613	0	1
	d_disadv	1 if the farm is in a disadvantaged area	349	0,332378	0,471742	0	1
Farm characteristics	d_livestock	1 if farm carries out livestock activity	349	0,031519	0,174966	0	1
	d_cere	1 if main specialization is cereals	349	0,469914	0,499811	0	1
	d_fru	1 if main specialization is permanent crops (fruit)	349	0,083095	0,276421	0	1
	d_mixedcrop	1 if main specialization is mixedcrop	349	0,272206	0,445735	0	1
	HectLanProp	Farm total area in property	348	24,44253	42,54213	0	380
	d_saleCon	1 if have contracts to sell products	347	0,32853	0,470357	0	1
	d_rentIn	1 if the farmer have land rent in	348	0,336207	0,473091	0	1
	Int_buy	Internet use to buy inputs	349	0,071633	0,25825	0	1
	Int_sell	Internet use to sell products	349	0,028653	0,16707	0	1
	ImpPayOnRevenue	Average influence of CAP payments on revenue	252	2,218254	1,440723	1	6
	PayOnRevL50	SFP on revenue lower than 50%	349	0,616046	0,487045	0	1
	PayRevM50	SFP on revenue higher than 50%	349	0,106017	0,308302	0	1
	d_aboveAvPay	SFP above the sample average	349	0,684814	0,465257	0	1
	d_belowAvPay	SFP below the sample average	349	0,315186	0,465257	0	1
	importSFP	Amount of Single Farm Payment received	256	6201,691	15434,32	36	188000
	NEntitle2011	Number of entitlements owned	43	28,67442	66,08967	1	360
	Household characteristics	NFamiMemFullT	N° household worker full time	349	1,35530	0,946777	0
NFamiMemParT		N° household worker part time	348	0,224138	0,510741	0	3
NExternalFullT		N° external worker full time	348	0,183908	1,052279	0	13
NExternalPartT		N° external worker part time	348	0,298851	1,250844	0	10
MinorsInFam		N° minors in family	349	0,292264	0,784529	0	5
d_MaleInFarm		1 if absence of males in family	347	0,060519	0,23879	0	1
d_Over65		1 if presence of over 65 on household	349	0,538682	0,499217	0	1
d_Unemployed		1 if presence of unemployed in the household	346	0,054913	0,228141	0	1
Farmer characteristics	Age	Age of respondent	346	63,31503	13,97873	25	92
	d_higheduc	1 if farmer with high school, degree or PHD title	349	0,292264	0,455456	0	1
	d_LowEduc	1 if farmer with no title, primary or middle school title	349	0,707736	0,455456	0	1
	d_livOnFarm	1 if live on farm	348	0,864943	0,342277	0	1
	d_female	1 if female farm owner	349	0,243553	0,429842	0	1

Unfortunately, not for all the questions the number of answers is big enough to give the possibility to use all the variables available from the survey in our analysis. In addition, correlations problems between variables have been reason of the exclusion of some of them. For these reasons, some important factors are excluded, such as the

CAP payments, the entitlements number, as well as, the presence of energy crops, the biogas or photovoltaic energy production and the percentage of gross income coming from farming activity. The variables included in the models are showed in table 7 and 8.

Table 7. Independent variables included in the first model, baseline scenario, and relative descriptive statistics.

<i>Category</i>	<i>Variable code</i>	<i>Var. description</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>max</i>
<u>Dependent variable</u>	CurCapUNICO	Land size: 0= No-Change 1= Increase 2= Decrease	284 (222) (29) (33)	.334507	.6757324	0	2
<u>Farm characteristics:</u>	d_livest	Livestock specialization	284	.0985915	.2986391	0	1
	d_cere	Fruit specialization	284	.4964789	.5008702	0	1
	d_fru	Cereals specialization	284	.0809859	.2732951	0	1
	HectLanProp	Farm dimension	284	24.63028	41.73762	0	380
	d_saleCon	Sales contract in act	284	.3591549	.4805996	0	1
	innovation	Willingness to innovate	284	.1725352	.3785119	0	1
	d_rentIn	Land rented in	284	.3626761	.4816211	0	1
	Int_buy	Internet use to buy input	284	.0739437	.2621411	0	1
	Int_sell	Internet use to sell products	284	.0316901	.1754831	0	1
	PayRevMore50%	SFP on revenue more than 50%	284	.0985915	.2986391	0	1
	d_belowAvPay	SFP below the sample average	284	.3098592	.4632517	0	1
<u>Household characteristics:</u>	NFamiMemFullT	N° worker full time	284	1.369718	.9770866	0	7
	NFamiMemParT	N° worker part time	284	.2429577	.5324652	0	3
	NExternalFullT	N° ext. worker full time	284	.1971831	1.129367	0	13
	NExternalPartT	N° ext. worker part time	284	.3239437	1.329467	0	10
	MinorsInFam	N° minors in family	284	.3415493	.8445831	0	5
	d_MaleInFarm	Absence of males in family	284	.0598592	.2376445	0	1
	d_Over65	Over 65 in family	284	.4929577	.5008329	0	1
	d_Unemployed	Unemployed In family	284	.0492958	.216867	0	1
<u>Farmer characteristics:</u>	Age	Age of the farm owner	284	62.00352	13.66187	25	92
	d_higheduc	High education level	284	.306338	.4617856	0	1
	d_livOnFarm	Live at the farm	284	.8626761	.3447966	0	1
	d_female	Female farm owner	284	.2288732	.420849	0	1
<u>Geographical characteristics:</u>	d_moun	Located in mountain	284	.0880282	.283836	0	1
	d_plain	Located in plain	284	.6443662	.4795499	0	1

Table 8. Independent variables included in the second model, regionalized scenario, and relative descriptive statistics.

<i>Category</i>	<i>Variable code</i>	<i>Var. description</i>	<i>Obs.</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>max</i>
<u>Dependent variable</u>	RegCapUNICO	Land size: 0= No-Change 1= Increase 2= Decrease	233 (167) (41) (25)	.3905579	.6742148	0	2
<u>Farm characteristics:</u>	d_livest	Livestock specialization	233	.0901288	.2869826	0	1
	d_cere	Fruit specialization	233	.4935622	.5010349	0	1
	d_fru	Cereals specialization	233	.0729614	.260633	0	1
	HectLanProp	Farm dimension	233	27.24034	48.46411	1	380
	d_saleCon	Land rented in	233	.3562232	.4799132	0	1
	innovation	Sales contract in act	233	.1888412	.392225	0	1
	d_rentIn	Willingness to innovate	233	.3776824	.4858513	0	1
	Int_buy	Internet use to buy input	233	.0901288	.2869826	0	1
	Int_sell	Internet use to sell products	233	.0257511	.1587328	0	1
	PayRevMore50%	SFP on revenue more than 50%	233	.0901288	.2869826	0	1
	d_belowAvPay	SFP below the sample average	233	.3133047	.4648357	0	1
	<u>Household characteristics:</u>	NFamiMemFullT	N° worker full time	233	1.317597	.9525326	0
NFamiMemParT		N° worker part time	233	.2660944	.5551566	0	3
NExternalFullT		N° ext. worker full time	233	.2360515	1.235288	0	13
NExternalPartT		N° ext. worker part time	233	.3648069	1.386498	0	10
MinorsInFam		N° minors in family	233	.3776824	.8972274	0	5
d_MaleInFam		Absence male in family	233	.0600858	.2381574	0	1
d_Over65		Over 65 in family	233	.4978541	.5010718	0	1
d_Unemployed		Unemployed In family	233	.0515021	.2214954	0	1
<u>Farmer characteristics:</u>	Age	Age of the farm owner	233	61.44206	13.95428	25	92
	d_higheduc	High education level	233	.3433476	.4758486	0	1
	d_livOnFarm	Live at the farm	233	.8626609	.344946	0	1
	d_female	Female farm owner	233	.2188841	.41438	0	1
<u>Geographical characteristics:</u>	d_moun	Located in mountain	233	.0901288	.2869826	0	1
	d_plain	Located in plain	233	.5879828	.4932578	0	1

7. Results

7.1 Survey's results: farmer's stated intentions on farmland size change

The most common intention stated by the sample in the baseline scenario has been to not change the farmland dimension. In fact, in this scenario around 78% of farmers do not stated the intention to make changes in the next years (table 9). In the second scenario, concerning the differences in farmers' behaviour as consequence of regionalization introduction, the 76% of farmers do not stated the intention to make changes in the next years (Table 10). A small portion of the sample, in both scenarios, stated the intentions to change (increase or decrease) the amount of land operated. The intention to increase the farmed area, assuming the baseline scenario (table 10), in which the current CAP remains unchanged over the coming years, has been stated by 10.40% of the farmers. On the opposite, in this scenario, also 11.74% stated the intention to decrease the dimension of the farm in the next years. These results underline a very small disparity among intentions to increase and to reduce the farmed area.

Table 9. Intentions on farmland size changes under baseline scenario.

Land size	Freq.	Percent
no change	232	77.85
increase	31	10.40
decrease	35	11.74
Total	298	100.00

Assuming the introduction of regionalised payments (table 10), 14.43% of farmers stated the intention to increase more the farmed land than they would make under the maintenance of the previous scenario, i.e. the baseline. On the opposite, 9.06% of the farmers stated the intention to decrease farmed land with respect to what they would make under the baseline. Hence, in this scenario results have highlighted a larger gap between numbers of farmers stating intention to increase and those who want to decrease land with respect to the previous scenario. The baseline is characterized by a number of farmers intentioned to increase the farm size lower than those with the intention to decrease. In the regionalized scenario the number of

farmers that stated intentions to increase the farmed area is higher than those with intention to decrease it.

Table 10. Intentions on farmland size changes under regionalized scenario respect the baseline.

Land size	Freq.	Percent
no change	228	76.51
Increase	43	14.43
Decrease	27	9.06
Total	298	100.00

Survey’s results indicate a reaction of the land demand to the shift from the historical to the regionalized payments. Farmers’ intentions to change the farmed area were found to be different among the scenarios considered. Therefore, the form of the payments and particularly the entitlements allocations rules, as well as the level of the payments, as implied by the shift to the regionalised model, seems to affect operators’ plans significantly enough to be detected by the survey.

In order to better understand the impact of the policy change on the amount of operated land the farmers intentions have been put together in the next tables to identify as farmers’ intention stated in one scenario change in the new one and in which group of farms (with respect to the answer to the baseline scenario) this occurs (Table 11).

Table 11. Intentions on farmland size changes under scenarios comparison.

		<i>Regionalized scenario vs Baseline scenario</i>		
		Decrease	No change	Increase
<i>Baseline</i>	Decrease	13	18	4
<i>scenario</i>	No change	12	192	28
	Increase	2	18	11

Particularly, out of 35 farmers’ stating the intention to decrease the farmed area under the baseline scenario, 18 would not change their intentions (respect what stated in the baseline) as consequence of the regionalised payments introductions; 13 farmers have reinforced their position by stating the intention to decrease the farmland size

assuming the regionalized scenario; while 4 farmers stated the intention to increase the land endowment.

Out of 31 farmers' stating the intention to increase the farmed area under the baseline scenario, 18 would not change their intentions (respect what stated in the baseline) as consequence of the introduction of the regionalised payments; 11 farmers have reinforced their position by stating the intention to further increase the farmland size assuming the regionalized scenario; while 2 farmers have stated the intention to decrease the land endowment.

Out of 232 farmers' stating the intention to not change the farmed area under the baseline scenario 192 reinforced their position by stating the intention to not change the farmland size as a consequence of the introduction of the regionalised payments; 12 farmers have stated the intention to decrease the farmland size assuming the regionalized scenario; while 28 farmers have stated the intention to increase the land endowment.

This analysis underlines that regionalized payments increase the intentions to change in all directions, i.e. increasing the intention to reduce the farmland size of those farmers who want to reduce it, and raising the intention to increase the farmed area of those farmers who want to increase it.

7.2 Model's results: Estimation of the determinants of changes

Among the variables used, all of correlation coefficients are below 0.5 and it means that collinearity problems are not expected (Gujarati, 1995). The Wald test is highly significant and the values of the log-likelihood are lower than others tested in other models building upon a different set of variables (Cameron and Trivedi, 2009). This test confirms the validity of the models. In the next paragraph, the results of the Multinomial Logit implemented for each scenario under investigation will be showed.

7.2.1. Model under current CAP continuity assumption

The first model has been implemented under the hypothesis of maintenance in the coming years of the current CAP scenario and it is inclusive of both intentions to change using sales and rental market. Table 12 shows the results of this model.

Table 12. Results from the first model: Current CAP (baseline) scenario.

<i>Category</i>	<i>Variable code</i>	<i>Var. description</i>	<i>Increase</i>	<i>Decrease</i>
<u>Farm characteristics:</u>	d_livest	Livestock specialization	1.634*	-1.020
	d_fru	Fruit specialization	0.051	0.914
	d_cere	Cereals specialization	0.463	0.481
	HectLanProp	Farm dimension	-0.021*	0.009
	d_rentIn	Land rented in	2.139***	1.962***
	d_saleCon	Sales contract ownership	0.888	-1.083**
	Innovation	Willingness to innovate	2.311***	-2.497**
	Int_sell	Internet use to sell products	2.250**	0.409
	PayRevMore50%	SFP on revenue more than 50%	-0.123	0.369
	d_belowAvPay	SFP below the sample average	0.725	0.570
<u>Household characteristics:</u>	NfamiMemFullT	N° worker full time	0.124	0.496*
	NfamiMemPartT	N° worker part time	-1.031	0.666*
	NExternalFullT	N° external worker full t.	-0.124	-13.554
	NExternalPartT	N° external worker part t.	0.067	-0.158
	d_Over65	Over 65 in family	-1.695**	0.606
	d_Malein Fam	Presence male in family	-16.041	1.315
	d_Unemployed	Unemployed In family	-1.099	-0.538
	MinorsInFam	Minors in family	0.136	1.315
<u>Farmer characteristics:</u>	Age	Age of the farm owner	0.012	0.013
	d_highedu	High education level	1.203**	0.539
	d_livonFarm	Live at the farm	-	-0.152
			2.456***	
	d_Female	Female farm owner	-0.845	-0.769
<u>Geographical characteristics:</u>	d_moun	Farm located in mountain	-1.335	-16.614
	d_plain	Farm located in plain	1.257	0.062
<u>Constant:</u>			-3.861*	-4.894**

(No-change is the base outcome of the model). *significant at 10%, **significant at 5%, ***significant at 1%

The results highlight the farm characteristics as the main determinants of changes in farmland dimension. Among these, carrying out a livestock activity ($d_livestock$) has a positive effect on the intention to increase the farm size. That could be due to the high profitability of the productions consequent to good market price of milk and milk products at the time of the survey. In addition, the increase would be driven also by the necessity to have always more land per animal in order to respect the thresholds of nitrate pollution and others environmental measures. Moreover, also the amount of the direct payments received from livestock farmers can influence this result. In fact, under the baseline scenario livestock farmers would receives higher amount of payments compared with those obtained by others specializations. On the one hand, it is because the amount of the payments in the historical reference period was high for this typology of farms. On the other hand, it is because livestock farmers receive an additional payment coupled to the production (article 68 of regulation No 73/2009). This would lead to high amount of payments which as a consequence may result in higher marginal productivity of the land of the farms involved in this specialization. The farm dimension ($HectLanProp$) has a negative effect on the probability to increase the farmed area. This result, in contrast with the literature, can be justified by the fact that larger farms already benefit of economies of scale and can be less willing to increase size with respect to small and medium farms which want to achieve this type of economies. Farmers that have land rented-in (d_rentIn) have a higher probability to increase, and at the same time, to decrease the farm area; this could be due to different reason. On the one hand, the rental market gives the possibility to modify and fit the size of the farm as needed in an easy and quick way than sales market. On the other hand, past experience in the rental market gives farmers information and knowledge required to undertake negotiations with others farmers in order to change size (basically it could be claimed that they can adapt with lower transaction costs). Altogether this supports the idea that farms with land rent-in appear to have greater ability to adapt farm size, than those with only land in property, whatever the preferred direction of change, while they have not a precise intention in terms of increase/decrease. The intention to decrease the farmland is negatively affected by

the engagement in contracts (*d_SaleCon*) to commercialize the main products of the farm. The allocation of products guaranteed by contract commits the farmers to produce a given product in a certain quantity. Consequently it would determine a rise of the propensity to maintain the land endowment in order to meet the commitments of the contract. It could also be that the existence of ongoing contracts better guarantees farm profitability. The intention to adopt one or more new technologies in the coming years is positive correlated with the probability to increase and negatively correlated with the probability to decrease the farmed area (innovation). The internet use to sell farm product result significant as determinant for the farm to be in the increase category (*Int_sell*). This is in line with the increasing use of internet in all sectors and with the possible higher gains from the use of this tool. Particularly, it can increase the number of potential customers and markets as it improves the connections between people, particularly between economical actors, and provide the possibility to reach the world market. These factors can improve the production and lead to farm growth. Among household characteristics, the number of household members working full time and part time on farm (*NFamiMemFullT*, *NFamiMemPartT*) seem to be significant and this affects positively the intentions to decrease the land size. Households with high number of members employed in farm can be pushed by the economic crisis to diversify the job among members looking for off farm work. The presence in the household of relatives older than 65 years (*d_Over65*) is negatively correlated to the propensity to increase the farming area. The presence of over 65 components in the household would constrain farmer decisions in order to fit the farmed area with the availability labour force and the presence of successors inside the household. Farmer education level influences the intention to change the farmland size. Particularly, a high education level (*d_higheduc*) affects positively the intention to increase the farmed area. This would be due to the high management capacity and by the increase of the marginal productivity of the land operated by these farmers. The fact that the farmer lives on the farm (*d_livOnFarm*) have a negative effect on the probability to increase the farming area.

7.2.2. Model under the regionalized scenario

The second model has been implemented under the hypothesis of implementation of the regionalized scenario in the coming years. In analogy with the first model it is inclusive of both intentions to change using sales and rental market. Differently from the first model, this one only explains deviations of the regionalised scenario with respect to the baseline scenarios. Table 13 shows the results of this model.

Table 13. Results from the second model: Regionalized vs. Baseline scenario.

<i>Category</i>	<i>Variable code</i>	<i>Var. description</i>	<i>Increase</i>	<i>Decrease</i>
<u>Farm characteristics:</u>	d_livest	Livestock specialization	0.261	1.409
	d_fru	Fruit specialization	1.476 *	0.471
	d_cere	Cereals specialization	0.785	3.008 ***
	HectLanProp	Farm dimension	0.002	0.005
	d_rentIn	Land rented in	1.915 ***	1.808 ***
	d_saleCon	Sales contract ownership	0.333	-0.783
	Innovation	Willingness to innovate	0.304	0.605
	Int_buy	Internet use to buy input	0.275	16.809
	PayRevMore50%	SFP on revenue more than 50%	0.694	-0.936
	d_belowAvPay	SFP below the sample average	0.798	0.167
	<u>Household characteristics:</u>	NfamiMemFullT	N° worker full time	0.112
NfamiMemPartT		N° worker part time	0.487	0.788 *
NExternalFullT		N° external worker full t.	-0.214	-14.210
NExternalPartT		N° external worker part t.	0.132	-0.202
d_Over65		Over 65 in family	0.304	1.209 **
d_Malein Fam		Presence male in family	1.034	0.680
d_Unemployed		Unemployed In family	0.417	0.909
MinorsInFam		Minors in family	-0.108	0.514*
<u>Farmer characteristics:</u>	Age	Age of the farm owner	-0.037 *	-0.009
	d_highedu	High education level	0.073	0.433
	d_livonFarm	Live at the farm	-0.464	-0.622
	d_Female	Female farm owner	-0.421	-0.475
	<u>Geographical characteristics:</u>	d_moun	Farm located in mountain	2.716 ***
d_plain		Farm located in plain	-0.487	0.016
<u>Constant:</u>			-0.884	-5.290***

(No-change is the base outcome of the model). *significant at 10%, **significant at 5%, ***significant at 1%

Farm characteristics are the principal determinants of the different behaviour of farmers in the regionalized scenarios with respect to the baseline. Among these, carrying out fruit activities have a positive effect on the probability to being in the increase category. It can be due to the fact that the implementation of the regionalized scheme also includes fruit and vegetables among the crops eligible to receive payments. Accordingly, the marginal productivity of the land farmed with these crops could have an increase compared to the present situation in which farmers do not receive any direct payments for these crops. Instead, being involved in cereals production affect positively the intention to decrease the farmed area. This is consistent with a negative farmers' expectation about the effects of regionalization on the amount of payments for this specialization. In addition, it can be also linked to the altimetry locations of the majority of cereal farms (plain) which would be the one main affected by the homogenizations of payments between altimetry zones that will occur with the regionalization. In fact, the mechanism of harmonization of payments amount would result in a decrease for plain areas. Farms with land rented-in (d_rentIn) have a higher probability to increase and also to decrease the farm area. Similarly to the baseline scenario, also for the explanation of reactions to the shift to the regionalised payment, the possibility to modify and fit the size of the farm as needed in an easy and quick way and the perception of lowers transaction costs given by the experience with past participation in the rental market seems to be determinant. Among household characteristics the number of part time workers at farm ($NFamiMemPartT$), the presence of household members older than 65 years (d_Over65) and the number of minors inside the household ($MinorsInFam$) affect positively the intentions to decrease the land size. An explanation may be found behind the influence of these variables on the differences in farmers' behaviour consequent to the regionalization. Accordingly with the baseline scenario, a motivation in the linkage among farmers' intentions and available labour force and the presence of successors inside the household was be found. This seems to be important also explaining different farmers' behaviour among scenarios. The farmers' age variable (Age) has a negative effect on farm expansion intentions respect the baseline scenario. Aging implies an approach to the end of life cycle which, by shortening the time horizon in which the gains from growth can be realized, may explain the negative effect of age on growth and survival for older farm

operators. Following this reasoning older farmer would have low attitude and quickness to react to policy changes, poor information about the policy change and difficulty to understand the complexity of the reform. In addition, a reasonable explanation of it could be found in the fact that under the historical payments younger farmers, because the historical reference period, would received less amount of payments than old farmers and with the introduction of the regionalization this difference would be overcome. Unfortunately, the high share of missing values related to SFP import does not allow to test it. Farms located in mountain area (*d_moun*) have a positive probability to being in the increase category. This can be connected with the fact that the introduction of the regionalized CAP measure provides a “harmonization” of the payment between zones and farms with a consequent likely increase of the amount received in favour of farms located in hill-mountain.

7.3 Models comparison

Before starting the description of similarity and differences among models it is important to consider that the two models implemented want to explain different things: one model explains farmers’ behaviour under the baseline scenario with the aim of explaining the future intentions under the current Cap payments scheme; the other explains farmers’ behaviour under the regionalized scenario in comparison with the baseline focusing only in differences between baseline and regionalized scenarios. In order to have a clearer view of results and to quickly indentify differences, Table 17 compares the outcomes of the two models, showing only significant variables. Already be involved in the rental market result highly significant explaining expansion/reduction intentions, in the baseline scenario, and also explaining the effect of the introduction of the regionalized payments scheme, in the regionalized one. This can be interpreted as a general propensity to exchange and it is in line with the growing importance of the rental market to adjust farm dimension in the short time. Farms characteristics like the dimension, the willingness to innovate and the sales contract, as well as the internet use to sell products, have resulted significant to explain the intentions to change the farmland size (baseline scenario). Almost all of these are positively correlated with the increase category except for the ownership of

sales contracts which have a negative correlation with the decrease category, and for the dimension of the farm which affects negatively the probability to stay in the increase category. These variables are not significant explaining the effect of the introduction of the regionalized payments scheme.

Farm specializations influences characterize differently the scenarios. Particularly, carrying out a livestock activity influence significantly the intentions to change the farmland size under the baseline scenario while it is not significant explaining differences between baseline and regionalized scenarios. In this latter scenario, carrying out a fruit or cereals activity have resulted significant in explaining differences between baseline and regionalized scenarios. These are respectively positively correlated with the increase category and positively correlated with the decrease one. These results point out that different effects are expected at farm level depending on the farm specialization as consequence of the introduction of regionalization; this is consistent with the expected effects of the harmonization of payments combined with the inclusion among eligible crops of those not currently remunerated by payments, which seems to play a very important role defining which farms will benefit from a payments increase and which will suffer a reduction depending on specialization and location. As a confirmation of this, the geographical characteristics result significant only in the regionalized scenario; particularly, only the mountain location result significant explaining differences between baseline and regionalized scenarios. Within household characteristics the number of family members working part time or the presence of relative in farm older than 65 years old have resulted significant explaining expansion/reduction intentions in the baseline scenario, and also explaining the effect of the introduction of the regionalized payments scheme, in the regionalized one. The number of full time family workers has resulted significant only in influencing intentions to change the farm size but it is not significant in explaining differences among policy scenarios. Among farmer characteristics the education level and the place where the farmer lives have been significant to explain the intentions to change the farmland size (baseline scenario) but not to explain differences between baseline and regionalized scenarios. The age has resulted significant explaining the effect of the introduction of the regionalized payments scheme but it is not significant in the baseline scenario.

Summing up, the variables influencing differences in farmers' reaction to the introduction of the regionalization are mainly connected with specialization, location, rental market participation, age of the farmer and of other components of the household. Almost all of these factors could be interpreted as a consistent response to specific design features of the post-2013 reform of the CAP. Particularly, the harmonization of payments between farms and consequently among altimetry zone and the eligibility of all crops farmed seems to play an important role in this analysis. Differently, variables resulted significant influencing farmers' intentions to change the farmland size (baseline scenario) seems to be linked mainly to factors like dimension, innovation, internet use, farmer and household characteristics. Concluding it is important to underline as the significance of the variables founded in the baseline scenario corroborate the literature on the issues, while those variables influencing differences in farmers' behaviour in response to regionalization introduction corroborate partially the literature.

Table 14. Comparison among scenarios (only significant variables).

<i>Category</i>	<i>Var. description</i>	<i>Current Cap scenario</i>		<i>Regionalized scenario</i>	
		<i>Increase</i>	<i>Decrease</i>	<i>Increase</i>	<i>Decrease</i>
<u>Farm characteristics:</u>					
	Livestock specialization	1.634*	-1.020	0.261	1.409
	Fruit specialization	0.051	0.914	1.476 *	0.471
	Cereals specialization	0.463	0.481	0.785	3.008 ***
	Farm dimension	-0.021*	0.009	0.002	0.005
	Land rented in	2.139***	1.962***	1.915 ***	1.808 ***
	Sales contract ownership	0.888	-1.083**	0.333	-0.783
	Willingness to innovate	2.311***	-2.497**	0.304	0.605
	Internet use to sell products	2.250**	0.409	-	-
<u>Household</u>	N° worker full time	0.124	0.496*	0.112	0.249
<u>characteristics:</u>	N° worker part time	-1.031	0.666*	0.487	0.788 *
	Over 65 in family	-1.695**	0.606	0.304	1.209 **
<u>Farmer characteristics:</u>					
	Age of the farm owner	0.012	0.013	-0.037 *	-0.009
	High education level	1.203**	0.539	0.073	0.433
	Live at the farm	-2.456***	-0.152	-0.464	-0.622
<u>Geographical</u>	Farm located in mountain	-1.335	-16.614	2.716 ***	-16.469
<u>Constant:</u>		-3.861*	-4.894**	-0.884	-5.290***
<u>Observation</u>			284		233
<u>Pseudo R2</u>			0.3570		0.2829

(No-change is the base outcome of the model). *significant at 10%, **significant at 5%, ***significant at 1%.

8. Discussion

8.1 Summary and consistency with previous literature

This work analysed intentions of change in farmed area under current CAP and regionalized scenarios. Particularly, the first one concerned farmers' intentions under the assumption of continuance of the current policy scenarios, i.e. in a scenarios which may be considered of reference or "baseline"; the second one, called regionalized, investigate farmers' intentions as response or reaction to the regionalization introduction, i.e. in order to isolate the policy changes effect. The most common intention stated by the sample, in both scenarios, has been to not change the farmland dimension. This result seems to be in line with the high level of uncertainty that characterizes this implementation phase of the reform. This survey results point out two important matters. On the one hand, regionalized payments increase the intentions to change in all directions, i.e. increasing the intention to reduce the farmland size of those farmers who want to reduce it, and raising the intention to increase the farmed area of those farmers who want to increase it. On the other hand, farmers have a positive perceptions and expectations towards the implementation of the new measure, testified by the higher number of farmer stating the intention to increase farmland size compared to those who want to decrease more the farmed area. This could reveal higher farmers' WTP for the land due to a higher marginal value associated. It could be seen as a general increase of land exchange which would lead to better allocation of the resource, i.e. to more efficient land market.

Most of the variables found as determinants of farmers' intentions to change farmland endowment through MNL implementation reinforce the existing literature on the topic. Socio-economic characteristics of the farmer, such as age, education and living at the farm seem to play an important role in influencing the intentions to change the farm size. The age of the farmer has been considered in literature as a critical variable for structural decisions taken in the farm. In fact, older operators are more likely to decrease the farmland size or exit from farming while younger are more likely to increase the size or start off new activities (Stiglbauer and Weiss, 2000; Kimhi and Bollman, 1999; Weiss, 1999). Results of the present work, confirming literature, shows

as older is the farmer and less is the likely to increase the farmed area as consequence of the regionalized payments scheme introduction. The education level of the farmer has resulted significant to increase the farmed area. On the one hand this result confirms some literature which considers this variable as a factor that may increase the farm efficiency and profitability, particularly when the farmer received an agriculture-specific schooling education (Weiss, 1999); on the other hand, in other works it has resulted in a increase of the probability to decrease the farm size and this has been interpreted as driven by the potential for a better labour opportunity outside farming due to higher education level (Goddard et al., 1993; Stiglbauer and Weiss, 2000). In our case results are coherent with the increase of efficiency and profitability of farms run by farmers with higher education level. It can be also consequence of the general economic crisis which have contracted the off farm job opportunity during recently years.

Farm dimension and the intentions to adopt new technologies have resulted to be important factors associated with the farm size changes; particularly, the literature highlights that larger farms are supported by economies of scale and better suited to expand the farmland size (Bartolini and Viaggi, 2013). In the present work, larger farms are less likely to expand the farmed area. Several justifications of this result, in contrast with the previous argumentation, can be found. On the one hand, the new Cap reform introduces payments reductions targeted to large-scale farms because considered already efficient. So, it can be interpret as a response to the policy reform which reduces payments to big farmer to assist better small ones. On the other hand, other explanation of this result may be found in the fact that farms already big enough to benefit from economies of scale have less incentives to expand more the farm dimension than small and medium farms which would benefit from economies of scale from a larger size. In contrast, the intention to adopt new technologies, hence to innovate is positively correlated with the intention to increase the farm size, confirming the existent literature. The same results are shown for the variables corresponding to the internet use for selling products, highlighting the importance to adopt this new channel in order to increase the dimension of the market in which to sell production output. In addition, it can be seen as proxy of better farm endowment in terms of technology. The presence of outstanding contracts to sell products have a

negative effect on the intentions to decrease the farmland size and is in line with what found in others works (Bartolini and Viaggi, 2013).

Farm changes can be also affected by the type of output produced. The profitability of crops and their market prices are very important factors explaining farm size changes (Stiglbauer and Weiss, 2000). In this work results have highlight that carrying out a livestock activity is significant to be willing to increase the farm dimension in the baseline scenarios and this may be due to the higher profitability of this specialization and to the coupled payments received for this specialization under the historical payment scheme. On the contrary, under the regionalized scenario, carrying out a fruit production have a positive effect on the intention to increase farmland; this could be due to the fact that permanent crops will be included among eligible crops. Others choices regarding payments coupled to specific specializations will be taken at national level during 2014. The cereals specialization variable is positively correlated with the intention to decrease the farmed area under the hypothesis of introduction of regionalized payments and this can be seen as in line with the reductions which could take place for these crops as a result of homogenization of payments. This result is also in line with the decrease of the direct payments expected for cereals specialization and consequently of the profitability of this specialization as a consequence of the regionalization of payments.

The location of the farm reflects operators` opportunities both inside and outside farming, influenced by the proximity of city and the natural conditions (Pietola et al., 2003; Kimhi and Bollman, 1999). In our case, farmers which exercise their activity in mountain area have higher probability to increase the farmed area. This is in contrast with the literature which allocates to this disadvantaged region less probability to increase the farm size. The results of this study can be explaining by the harmonization of the unit entitlements value between farms and zones potentially expected by the reform. In fact, farmers located in mountain areas equalling the payments level of the plain will reach a important increase with respect to the payments previously received. Size and composition of the household, such as the number of the family workers, the presence of children or male rather than old members or females may result in a higher propensity to increase the farm size (Kimhi and Bollman, 1999). On the one hand, the age of the family members, particularly the presence of members older than

65, results negatively correlated with the intention to expand the farm size, corroborating the literature. On the other hand, the number of household members working full time and part time affect positively the intentions to decrease the farmed area not confirming the literature. Farms characterized by a predominant presence of family labour force, employed full or part time would want to diversify it. In line with this, the literature confirms that technological developments of an area can lead to a decrease of the employment into the agricultural sector (Barkley, 1990).

Farmers with land rented-in can change quickly dimensions, in both directions, respect those with only property. In addition, the rental activity follows the economic convenience of the land use while the property may be driven by other reasons. The literature confirms the importance of the rental agreement to adapt farmed area to the needs (Vranken and Swinnen, 2006).

8.2 Limitations and weaknesses

Results of this work can be interpreted as ex ante farmers' intentions based on expectations concerning the reform. Particularly, this work was conducted at a very early stage of the post-2013 CAP reform, when the political agreement reached in 2013 was still in phase of negotiation between the Commission, the European Parliament and the Council. In fact, the data were collected in 2012 and the questionnaire was based on the 2011 legal proposals. Consequently, there is a farmers' lack of knowledge about the implementation of regionalized payments and it has been investigated through the survey (question 4.02.2 in the questionnaire) which show as 60% of the sample did not know the official proposals for reform of the CAP. To provide enough information to farmers in order to answer the questions, a brief explanation of each measure of the reform proposal has been included in the questionnaire. However, due to the fact that policy change investigated is new and still unclear, the farmers need time to react to the new situation. In addition, farmers' decisions would be influenced by uncertainty on policy and may be driven by interpretations and subjective expectations that we cannot know. So, results may be biased depending on how this new approach for PAC payment was understood by farmers.

In addition, stated intentions may not necessarily reflect the real respondents' adjustments to a change of economic incentives but rather their perception of the likely future change of incentives. Therefore, a discrepancy may exist between intentions and expected adjustments. Responses may be biased in two major ways: on the one hand, answers will strongly depend on the respondents' potentially partial knowledge and expectations with regard to the Cap evolution, the general economic situation and their own condition. On the other hand, respondents may modify their answers to influence the outcome of the analysis in order to provide indications to the competent institutions (Thomson and Tansey, 1982).

More scenarios, and consequently models, could be implemented within this work in order to separate the intentions regarding sales and rental market. In the present work the combination of the two has been driven by the low number of observations when divided among sales and rental market. Others scenarios could have been produced in order to include new policy instruments introduced by the reform like the additional payments for young farmers and for small farms. Information on others instruments have been collected through the survey, like greening and capping, for which the low number of observations regarding the dependent variable decrease category does not permit the use of the same typology of model implemented in the others scenarios; consequently the analysis would results not comparable and was not carried out. It remain a point to develop in further works in the fields, perhaps performing the analysis centred only in farmers intentions to grow in different scenarios.

Within this work, it was chosen to take into account changes in land demand and supply from the point of view of individual farmers; as a consequence the work does not account for their matching, i.e. if the expansion/reduction intentions will result in changes in market equilibrium. This implies that this analysis is appropriate to depict the determinants of different farm strategies with regard to land use intentions but cannot be used to simulate the effects of the Cap on the land market in the next years.

The models could be better specified introducing new variables in order to take into account others factors such as payments information and macroeconomics indicator. Among these, these transaction cost, credit access constraints, market imperfections

have not be included because not available within the survey. Therefore, literature has highlighted as CAP subsidies compensate the credit tightening associated the financial crisis and, in a time of growing global market volatility, they stabilise agricultural production by correcting credit market imperfections (Pokrivcak et al., 2013). Instead, distance of the city, payments value and entitlements endowment have not be used because the number of the observations collected through the survey for these variables was not enough to be included in the model. Also, the inclusion of variables counting for payments coming from rural development measures has been not possible due to the lack of observations regarding these variables. In addition, others variables catching differences between farmers involved in agricultural activities as a main activity and farmers involved also in others activity has been not included in the model. This work does not include also variables that take into account the attitudes of farmers and psychological factors which can affect decisions. The literature has highlighted that when the objectives of the farm decision-makers' and those of the policy reform differ, farmers' adjustments to the reform is likely to take longer.

9. Conclusions

This thesis has investigated the potential impact of the implementation of the post-2013 CAP reform and, more specifically, the introduction of regionalized direct payments on the land market. The reform is expected to create a change in incentives faced by farm operators because the support they receive is not linked to the reference period, but rather redistributed more uniformly across farms, and gives the eligibility of any crops farmed. Accordingly, the shift to regionalized payments would change the remuneration of inputs and would have an impact on farmers' allocation of fixed resources.

Literature emphasizes the effect of agricultural policy as a driver of structural change (Floyd, 1965; Harrington and Reinsel, 1995) and particularly the effects of the CAP on factor markets (Persch et al., 1998; Latruffe et al., 2006; Ciaian et al., 2006).

Theoretical and graphical analyses show a land demand reaction to the introduction of regionalization. Differences have been found depending on the rate among entitlements endowment and eligible area in the pre-reform period. Accordingly, the analyses show that the implementation of the regionalized payments scheme leads to an increase in terms of land demand for farms that, before the reform, were in a position of deficit of entitlements with respect to the eligible area.

Survey information confirms a reaction of the land demand to the shift from the historical to the regionalized payments. This analysis underlines that regionalized payments increase the intentions to change in all directions, i.e. increasing the intention to reduce the farmland size of those farmers who want to reduce it, and raising the intention to increase the farmed area of those farmers who want to increase it. However, a higher number of farmers state the intention to increase more the farmland size with respect to those who want to decrease more it under the regionalized payments with respect to the baseline.

The determinants of changes in farmed area have been investigated and estimated using two different Multinomial logit models (MNL). Variables significantly influencing farmers' intentions to change the farmland size under the baseline scenario seem to be linked mainly to factors like dimension, innovation, internet use, farmer and

household characteristics. Differently, variables influencing differences in farmers' reaction to the regionalization introduction (regionalized scenario) are mainly connected with specialization, location, and rental market participation, as well as, age of the farmer and of other component of the household. So, differences in the determinants of intended changes in farmland size among different policy scenario are detected as hypothesized. Almost all of these factors would be interpreted as responses to specific measures provided by the post 2013-reform of the Cap. Particularly, the harmonization of payments between farms and consequently among altimetry zones, the eligibility of all crops farmed and the incentive to young farmers seems to play an important role in this analysis.

The hypotheses arising from the theoretical investigation and from the literature review have been almost all confirmed by empirical results. However, the effect of the ratio between the amount of entitlements owned and the eligible area in the pre-reform period was not tested, as most of the farmers have not revealed their entitlement endowment. The hypotheses concerning heterogeneity on results depending on specialization and location have been confirmed within the empirical exercise. Particularly, under the regionalized scenario, farm growth result positively correlated with fruit specialization, i.e. types of crops previously not supported by payments. Farm growth intention is likely to be higher also on farms located in mountain zone, previously supported with a lower payment. So, specialization and location reveal the expected farmers' behaviour as a response to the introduction of the new CAP payments.

Concluding, the redistribution of payments consequent to the regionalization would depend at individual farm level on the balance of different effects. Firstly, it depends on the ratio between entitlements endowment and farmed land before the reform, under the historical payment scheme. Particularly for farms with historically less entitlements than area, the reform can be expected to translate in a higher marginal value of land and hence in an increase in land demand. Secondly, it depends on how much a farmer will lose from the reduction of the entitlements unitary value, if his unitary value was above the mean of the region, or how much the farmer will gain from the increase of the unitary value, if his value was below the mean. So, the redistribution of payments among farmers, from those with higher value toward those

with lower ones, will determine “winners” and “losers” from this policy change. Finally, the redistribution of payments consequent to the introduction of the regionalization depends also on the endowment of land cultivated with crops actually not eligible to claim payments but eligible through the introduction of the regionalized payments. Particularly, with the inclusion of horticulture and fruit crops among those eligible to receive direct payments different effects depending on the specialization are expected. In addition, within the fruit and horticultural sector there are certain producers which have benefited in the past from high payments per hectare (citrus production, tomato and fruit for processing), others having values per hectare lower than in other sectors and others just did not get any payment. Specifically, horticultural, fruit and vine surfaces, with the exception of tomatoes, processed fruit and citrus, have not received direct payments under the previous policy scheme (Reg. 73/2009). So, heterogeneous effects among singular farms in the first years of implementation of the new policy scheme is to be expected.

Regionalized payments seem to produce differentiated effects and contribute to a general (slight) increase of land exchanges. The individual reaction to the new payments introduction would be different depending on location and specialization. These effects seem to be also strongly influenced by the difference in historical payments endowment and value, i.e. by the previous historical system of distribution of payments.

There is still a high degree of uncertainty about the actual implementation of the CAP post-2013 at national level. Several decisions will be taken during 2014 and Member States have a responsibility to decide which strategy adopt in order to take every opportunities offered by the reform looking at the same time to farmers needs. Results of this work suggest of paying attention, especially at national level, to the effects on the value of farm assets, seeking to protect certain categories of farmers more negatively affected by the new distribution of direct payments. Particularly, a careful selection of the areas for uniform payments (administrative regions, agrarian regions, homogeneous production areas, altitude, etc.) and a gradual process of adaptation to move from the historical to the regional scheme would be advisable.

Future opportunity to develop this work could be to repeat the survey once the reform will be implemented and the specific decisions at national level will be determined. This would allow exploring in more detail the reform, as more information is available, while an increased knowledge of the reform on the part of farmers would improve the reliability of the responses. In addition, this enable us to verify if the farmers stated intentions, collected within the survey used in this work, will be confirmed by the farmers real behaviour after the reform implementation. Another chance to develop this work could be found in the integration of this analysis at spatial and market level. Particularly, the intention to increase and reduce the farmed area can be used as proxies for land demand and supply, and complemented with the allocation of land from farmers stating the intention to exit. These information could be matched at the local level in order to identify more directly the potential effects on land markets. Further research is needed to improve the explanation of the farm size determinants including more independent variables, particularly related to CAP payments, or integrating secondary data with those collected through the survey.

10. References

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ANNEX: QUESTIONNAIRE

Farm characteristics

2.00: What's the altimetry zone where his farm is located?

01. Mountain
02. Bologna Hill
03. Hill
04. Plain

2.01: Class of payment for the farm (the average)

01. Below the mean
02. Above the mean

2.05: What's the altimetry zone where are located the lands of your farm?

01. Mountain
02. Bologna hill
03. Hill
04. Plain
99. Does not answer

3.01: What's the legal form of your farm?

01. Individual firm
02. Company simple
03. Limited liability company
04. General partnership company
05. Limited partnership company
06. A cooperative
07. Joint stock company
08. Association/consortium
55. Other form: specify
99. Does not answer

3.02: Between the owners of the farm there are relatives?

01. Yes
02. No
99. Does not answer

3.03: What's the main specialization of the farm?

- 01. Cereals
- 02. Horticulture
- 03. Fruits
- 04. Cattle livestock (milk and meat)
- 05. Granivorous livestock
- 06. Mixed crops
- 07. Mixed livestock
- 08. Mixed arable and livestock
- 77. Not classifiable
- 99. Does not answer

(If 3.03=04 or 05 or 07 or 08)

3.04: In your farm carries out activities of livestock other than for own consumption?

- 01. Yes
- 02. No
- 99. Does not answer

(If 3.03=04 or 05 or 07 or 08 and 3.04=01)

3.05: Can you tell me what and how many animals bred on your farm among the following?

- 00. None
- 20. Text (number) *
- 99. Does not answer

* 3.05.01 Dairy cows

3.05.02 Cattle

3.05.03 Cattle for fattening (calves excluded)

3.05.04 Sows

3.05.05 Fattening pig and boars

3.05.06 Adult goats and sheep

3.05.07 Adult poultry

3.05.08 Horses and other equines

(If 3.03=04 or 05 or 07 or 08 and 3.04=01)

3.05.09: In addition to those listed, breeding other types of animals? If yes can you specify the type?

- 01. Yes, (specify the type)
- 02. No
- 99. Does not answer

(If 3.05.09=01)

3.05.10: what's the consistence of the other type of farming?

- 20. Text (number)
- 99. Does not answer

3.06.1: What's the total number of hectares of land (AAT = Total Agricultural Area) owned the farm?

- 00. no surface properties
- 01. hectare of AAT
- 99. does not answer

(If 3.06.1=01)

3.06.1.1: It's a single piece (or body)?

- 01. Yes
- 02. No
- 99. Does not answer

3.06.2: Of which land rented out by the farm?

- 00. None area of land rented out
- 01. Text (number hectare of AAT)
- 99. Does not answer

(If 3.06.2=01)

3.06.2.1: It's a single piece (or body)?

- 01. Yes
- 02. No
- 99. Does not answer

(If 3.06.2=01)

3.06.2.2: The land is rented out to some relative?

- 01. Yes
- 02. No
- 99. Does not answer

3.06.3: Of which land rented in by the farm?

- 00. None area of land rented in
- 01. Text (number hectare of AAT)
- 99. Does not answer

(If 3.06.3=01)

3.06.3.1: It's a single piece (or body)?

- 01. Yes
- 02. No
- 99. Does not answer

(If 3.06.3=01)

3.06.3.2: The land is rented in to some relative?

- 01. Yes
- 02. No
- 99. Does not answer

3.07: The dimension of your farm is changed from 2002?

- 01. Yes
- 02. No
- 99. Does not answer

(If 3.07=01 and 3.06.1=01)

3.07.1: Can you tell me if, about the land in ownership, since 2002 there has been:

- 01. An increase
- 02. A decrease
- 03. No change
- 99. Does not answer

(If 3.07=01 and 3.06.2=01)

3.07.2: Can you tell me if, about the land rented out, since 2002 there has been:

- 01. An increase
- 02. A decrease
- 03. No change
- 99. Does not answer

(If 3.07=01 and 3.06.3=01)

3.07.3: Can you tell me if, about the land rented in, since 2002 there has been:

- 01. An increase
- 02. A decrease
- 03. No change
- 99. Does not answer

3.09: Can you tell me what the crop allocation, in hectares of UAA, for the agricultural year of 2012?

- 00. None area
- 01. Text (AAU)*
- 99. Does not answer

* 3.09.01: Cereals (wheat, corn, barley, rice)

3.09.02: Protein-oleaginous (rapeseed, soybean)

3.09.03: Sugar beet

3.09.04: vegetable open field (potatoes, tomatoes)

3.09.06: alfalfa and grass

3.09.07: Permanent grass

3.09.08: Uncultivated and set-aside

3.09.09: Greenhouses

3.09.10: Fruit

3.09.11: Vine

3.09.12: Forest

3.09.13: Do you have in your farm permanent or protected crops? if yes, can you specify the type?

- 01. Text, yes; (specify)
- 02. No

99. Does not answer

(If 3.09.13=01)

3.09.13.1: How many hectares of AAU dedicated to these permanent crops do you have?

01. Text (AAU)

99. Does not answer

3.09.14: There are areas in the company you have invested in agro-environment, forestry or ecological measures? If so, can specify the type?

01. Text, yes; (specify)

02. No

99. Does not answer

(If 3.09.14=01)

3.09.14.1: And how many hectares of AAU you have invested in this kind of measures?

01. Text (AAU)

99. Does not answer

3.10.1: Your farm or part of it is involved in the production of photovoltaic energy?

01. Yes

02. No

99. Does not answer

(If 3.10.1=01)

3.10.1.1: And how much area in hectares is intended for the production of photovoltaic energy?

00. Panels installed only on buildings

01. Text (area under photovoltaic)

99. Does not answer

3.10.2: Your farm or part of it is involved in the production of energy from biogas?

01. Yes

02. No

99. Does not answer

(If 3.10.2=01)

3.10.2.1: And how much area in hectares is intended for the production of biogas?

01. Text (area under biogas)

99. Does not answer

3.12: Your farm carries out activities of subcontracting (on behalf of a third party)?

01. Yes

02. No

99. Does not answer

(If 3.12=01)

3.12.1: And which activities among the following:

01. Ploughing

02. Harrowing

03. Fertilizing

04. Cutting

05. Levelling

06. Weeding

07. Planting

08. Watering

09. Cutting

10. Threshing

11. Transport and silage

12. Maintenance

55. Others

77. All of these

99. Does not answer

Labour characteristics

3.13.1: Including you, how many family members are full-time employees of the farm?

00. Nobody

01. Text (number)

99. Does not answer

3.13.2: Including you, how many family members are part-time employees of the farm?

00. Nobody

01. Text (number)

99. Does not answer

3.13.3: Excluding family members, how many full-time employees have your farm?

00. Nobody

01. Text (number)

99. Does not answer

3.13.4: Excluding family members, how many part-time employees have your farm?

00. Nobody

01. Text (number)

99. Does not answer

Market strategy

3.14: Between the following subjects, who sells the product derived from the main specialization of your farm?

01. Yes *

02. No

99. Does not answer

* 3.14.01: Processing firms of agricultural products

3.14.02: Wholesale dealer or retailers

3.14.03: Consortia, cooperative, chains of retail and wholesale

3.14.04: Consumers

3.14.05: Another farm

COMMERCIAL INSTRUMENTS

3.15.1: Have you contracts for the sale of agricultural products?

01. Yes

02. No

99. Does not answer

3.15.2: Do you use the internet to buy means of production?

01. Yes

02. No

99. Does not answer

3.15.3: Do you use the internet to sell your products?

- 01. Yes
- 02. No
- 99. Does not answer

CAP PAYMENTS RECIVED IN 2011

3.17.1: How much is the amount of the Single Payment received by the farm in 2011?

- 00. None
- 01. Text (import)
- 99. Does not answer

3.17.2: How many entitlements you had in 2011?

- 00. No entitlements (if 3.17.1=00)
- 01. Text (number of entitlements)
- 99. Does not answer

3.17.3: Do you received others payments in 2011? If yes, can you specify the typology?

- 01. Text, Yes; (specify)
- 02. No
- 99. Does not answer

(If 3.17.3=01)

3.17.4: How much is the other payments received?

- 01. Text, (import)
- 99. Does not answer

VARIATION AND INCIDENCE

3.18.1: The amount of the single payment compared to that received in 2005 is:

- 01. Increased
- 02. Unchanged
- 03. Decreased
- 99. Does not answer

3.18.2: In percentage terms, how much, on average, single payments affect farm revenue?

- 01. Less than 10%

- 02. 10-29%
- 03. 30-49%
- 04. 50-69%
- 05. 70-89%
- 06. Over 90%
- 88. Does not know
- 99. Does not answer

Generic intentions

3.20: Over the next 5 years intends to take one or more of the following innovations or new technologies as:

- 01. Yes *
- 02. No
- 99. Does not answer

* 3.20.1: robotizing and precision agriculture

3.20.2: new irrigation systems

3.20.3: adoption of energy crops

3.20.4: adoption of systems for the production of energy

3.20.5: Other than those listed above, you have the intention to adopt other innovations or new technologies in the next 5 years? Can you specify the type?

- 01. Text, Yes; (specify)
- 02. No
- 99. Does not answer

3.21: Do you think that your agricultural activities will continue in the next 5 years?

- 01. Yes, conducted by me
- 02. Yes, conducted by a familiar member
- 03. No
- 04. Depend
- 88. Does not know
- 99. Does not answer

CAUSE (MOTIVATION) AND FUTURE

(If 3.21=03)

3.22.1: Why you or a family member doesn't continue in farming in the next 5 years?

01. I think not sufficiently profitable
02. Too many constraints (administrative, bureaucratic, other limitations)
03. High risk in the farm
04. I don't have a successor within the family
05. Other reasons
99. Does not answer

(If 3.21= 03)

3.22.2: Therefore what you going to do with the farm?

01. To sell it
02. Maintain the property and give it for rent
03. Another reason
88. Does not know
99. Does not answer

3.24.1: What percentage of the total gross income of your family comes from farming (on average)?

01. Agricultural activity in loss
02. Less than 10%
03. 10-29%
04. 30-49%
05. 50-69%
06. 70-89%
07. 90% or more
88. Does not know
99. Does not answer

3.24.2: You live at the farm:

01. Alone
02. With family
03. Family live there but not you
04. Neither you nor your family lives at the farm

99. Does not answer

Expansion/reduction intentions under current CAP

(If 3.21=03 now go to question 5.01)

(If 3.06.1=01)

4.01.1: Assuming a scenario in which the current Common Agricultural Policy (CAP) remains unchanged, what are your intentions regarding the land in property?

01. Increase it

02. No change

03. Decrease it

88. Does not know

99. Does not answer

(If 3.06.2=01)

4.01.2: Assuming a scenario in which the current Common Agricultural Policy (CAP) remains unchanged, what are your intentions regarding the land rented out?

01. Increase it

02. No change

03. Decrease it

88. Does not know

99. Does not answer

(If 3.06.3=01)

4.01.3: Assuming a scenario in which the current Common Agricultural Policy (CAP) remains unchanged, what are your intentions regarding the land rented in?

01. Increase it

02. No change

03. Decrease it

88. Does not know

99. Does not answer

THE FUTURE OF LAND PRICES AND THE CAP

4.02.1: In your opinion, what will be the evolution of land prices between now and 2020?

- 01. Decrease between 10 and 20%
- 02. Decrease by less than 10%
- 03. No change
- 04. Increase by less than 10%
- 05. Increase between 10 and 20%
- 88. Does not know
- 99. Does not answer

Cap reform knowledge

4.02.2: Are you informed about the official proposals for reform of the CAP for the period 2014-2020?

- 01. Yes
- 02. No
- 99. Does not answer

4.04: You fall into the category of active farmer?

- 01. Yes *
- 02. No
- 99. Does not answer

* 4.04.1: Receives less than 5000 euro of direct payments

4.04.2: Have a ratio between direct payments and non-agricultural income lower than 5%

4.04.3: Carries out a minimal agricultural activity defined at national level

Expansion/reduction intentions under post-2013 CAP proposal

Regionalised payments: form of financing to farms under which it will pass from the current historic entitlements to those homogeneous in each region, distributed according to land cultivated.

4.70.1: Assuming the introduction of regionalised payments, your intention is to sell more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably

- 03. Probably not
- 04. Certainly not
- 55. No land ownership
- 88. Does not know
- 99. Does not answer

4.70.2: Assuming the introduction of regionalised payments, your intention is to buy more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.71.1: Assuming the introduction of regionalised payments, your intention is to rent in more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.71.2: Assuming the introduction of regionalised payments, your intention is to rent in less land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.72.1: Assuming the introduction of regionalised payments, your intention is to rent out more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land to rent out
- 88. Does not know
- 99. Does not answer

4.72.2: Assuming the introduction of regionalised payments, your intention is to rent out less land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land to rent out
- 88. Does not know
- 99. Does not answer

Greening payments: is assigned to farmers entitled to a payment under the basic payment scheme and that comply respect, on their eligible hectares, with some ecological constraints prescriptions.

4.80.1: Assuming the introduction of greening payments, your intention is to sell more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land ownership
- 88. Does not know
- 99. Does not answer

4.80.2: Assuming the introduction of greening payments, your intention is to buy more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.81.1: Assuming the introduction of greening payments, your intention is to rent in more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.81.2: Assuming the introduction of greening payments, your intention is to rent in less land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know
- 99. Does not answer

4.82.1: Assuming the introduction of greening payments, your intention is to rent out more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land to rent out

- 88. Does not know
- 99. Does not answer

4.82.2: Assuming the introduction of greening payments, your intention is to rent out less land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land to rent out
- 88. Does not know
- 99. Does not answer

The capping: It is a reduction of the amount of payments for farmers that receive more than 150000 euro of direct payments.

4.90.1: Assuming the introduction of capping, your intention is to sell more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land ownership
- 88. Does not know
- 99. Does not answer

4.90.2: Assuming the introduction of capping, your intention is to buy more land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 88. Does not know

99. Does not answer

4.91.1: Assuming the introduction of capping, your intention is to rent in more land than you would make with the current payment system?

01. Certainly

02. Probably

03. Probably not

04. Certainly not

88. Does not know

99. Does not answer

4.91.2: Assuming the introduction of capping, your intention is to rent in less land than you would make with the current payment system?

01. Certainly

02. Probably

03. Probably not

04. Certainly not

88. Does not know

99. Does not answer

4.92.1: Assuming the introduction of capping, your intention is to rent out more land than you would make with the current payment system?

01. Certainly

02. Probably

03. Probably not

04. Certainly not

55. No land to rent out

88. Does not know

99. Does not answer

4.92.2: Assuming the introduction of capping, your intention is to rent out less land than you would make with the current payment system?

- 01. Certainly
- 02. Probably
- 03. Probably not
- 04. Certainly not
- 55. No land to rent out
- 88. Does not know
- 99. Does not answer

5.01: In your opinion, to reduce the cost of land for farms which actions should be taken at the level of the European Union, the Italian Government, or local authorities?

- 55. Text (specify)
- 77. Does not indicate
- 88. Does not know
- 99. Does not answer

Personal and household characteristics

The respondent

6.01.1: Gender?

- 01. Male
- 02. Female

6.01.2: Only for statistical purposes, can you tell me your age in completed years?

- 01. Text (age)
- 02. Does not answer

6.01.3: What is your level of education, the last completed?

- 00. No title or primary school
- 01. Middle school
- 02. Professional qualification
- 03. High school
- 04. Vocational course
- 05. Bachelor's degree
- 06. Master degree
- 07. PHD

99. Does not answer

Family: group of persons living in the same household

(If 6.01.1=01)

6.03.1: You included, how many male members living in your household?

00. None

01. Text (male number)

99. Does not answer

(If 6.01.1=01)

6.03.2: You included, how many female members living in your household?

00. None

01. Text (male number)

99. Does not answer

6.03.3: How many minors live in your household?

00. None

01. Text (minors number)

99. Does not answer

6.03.4: How many with more than 65 years live in your household?

00. None

01. Text (number over 65)

99. Does not answer

6.03.5: how many are unemployed in your household?

00. None

01. Text (number unemployed)

99. Does not answer

7.01: The interview is over, thank you for your cooperation. If you can leave a comment on the topic, otherwise I salute you. Have a good day. Bay.

01. Text (Comments)

99. Does not answer