THE EVOLUTION OF ITALIAN FARMS AND THE ROLE OF SUBSIDIES PAID BY THE EUROPEAN UNION FOR RURAL DEVELOPMENT

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ABSTRACT – In Italy, there has been a significant emigration from the countryside towards urban areas with negative downsides on rural communities which have suffered of socio-economic marginalization and negative effects on the environment. The Common Agricultural Policy has been a pivotal tool able to reduce the marginalization in rural territories financing farmers able to promote the multifunctionality and the production of positive externalities. By using a quantitative approach on Farm Accounting Data Network time series on Italian farmers, it has been possible to access the role of subsidies allocated by the European Union on the rural development. The results have pointed out a positive role of financial supports and subsidies allocated by the Common Agricultural Policy to guarantee an adequate level of farm income. In the next period 2014-2020, the national and local authorities should take into account to put into action the Rural Development Programme aimed to implement the socio-economic growth in the Italian countryside specifically towards farms located in less favoured areas.

Keywords: Rural Development Plan, Farm Accountancy Data Network, Italian small farms, multifunctionality, less favoured areas, Common Agricultural Policy

INTRODUCTION

In Italy, since the World War II up to now, there has been a tremendous contraction of farms and in particular, this process has characterized the traditional Italian farms which are typical small agricultural holdings called *diretto coltivatrice* farms. Comparing the statistical data of the National Agricultural Census from 1990 to 2010, more than 1.5 million small farms have ceased their activity with a positive aspect due to an increase of the average agricultural cultivated surface. The average usable surface in Italian farms approximately is equal to 8 hectares (Istat, 2014) and it is rather lower compared to the average amount of 14.2 hectares in the European Union (EU), 50.1 hectares pointed out in the European north-western regions and 12.0 hectares in the south European areas (European Union, 2014). In some new Member States of the European Union (Cyprus, Slovenia, Malta), the average value of usable cultivated surface is only 7.10 hectares which is under the average value observed in Italian farms (European Union, 2014).

Recently, the European Union Parliament has discussed and approved a new proposal to protect small European farms able to produce a level of standard output, that is a standard measure of farmer productions, lower than 8,000 euros; in fact, more than 72% of enterprises with a surface lower than 2 hectares is placed in this class of standard output (European Union, 2014) and this negative aspect is a bottleneck in the management perspectives during the rural development programme in many States of the EU. In Italy, Spain, Romania, and Poland there are more than 70% of farmers with an own utilizable arable surface below 2 hectares. Comparing the total universal statistical dataset of European small farms, it is evident that in Romania 45% of farms are placed in the size class with a surface under 2 hectares with negative consequences on strategies to manage farms as underlined in the level of produced output (Table 1).

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Bearing comparison the size in terms of utilizable agricultural surface between Italian *diretto coltivatrice* farms and farms managed by limited companies, the average size of these former in terms of utilizable agricultural surface is always below the average value in the European Union. In general, farms in Italy with an usable surface greater than 50 hectares are held by a minority of farmers which are less than 5% of the total amount of active enterprises (Vieri, 2012).

Table 1. *Farms in different classes of size and by standard output in all States of the European Union*

	Total farms	Farms less than 2 hectares	Farms less than 5 hectares	Standard output less than 2,000 €	Standard output less than 8,000 €
EU 27 Member States	12,015	5,637	8,056	5,132	8,507
Austria	150	16	46	21	55
Belgium	43	4	9	1	6
Bulgaria	370	295	325	254	340
Cyprus	39	29	34	22	32
Czech Republic	23	2	3	1	8
Denmark	42	1	1	1	6
Estonia	20	2	6	5	11
Finland	64	1	6	3	20
France	516	67	129	42	116
Germany	299	14	26	1	34
Greece	723	367	551	236	511
Hungary	577	413	459	359	496
Ireland	140	2	10	18	60
Italy	1,621	819	1,177	495	995
Latvia	83	10	28	39	64
Lithuania	200	32	117	97	170
Luxembourg	2	0	0	0	0
Malta	13	11	12	5	8
Netherlands	72	8	19	0	9
Poland	1,507	355	823	443	1,007
Portugal	305	152	230	117	237
Romania	3,859	2,732	3,459	2,717	3,632
Slovakia	24	9	15	8	18
Slovenia	75	20	45	16	51
Spain	990	270	503	211	538
Sweden	71	1	8	6	29
United Kingdom	187	4	13	16	54

Source: European Union, 2014

Since the 1960s, before the enforcement of the Common Agricultural Policy (CAP) in the late sixties, Italian Government brought about by the Green National Plan a significant process of improvement in the level of investments both in agrarian capital and also in machinery capital in limited agricultural companies, in cooperatives, and in traditional family farms in order to improve the level of innovation, competitiveness, and technological investments and to solve the rural depopulation due to an emigration from the countryside as well. The purpose of the Italian legislator was to reduce partially the marginalization in rural areas caused by a significant emigration towards urban areas able to offer more convenient job opportunities in industrial sector and in services. At that

time no less than 200,000 people abandoned their rural villages each year to emigrate towards the industrialized North Italy in the hope of an economic and social redemption for themselves and for their children (Aprile, 2010; Galasso, 2009; Alberoni, 1963). The first and foremost actions faced up with the first Green National Plan was to implement the low level of mechanization in Italian farms aimed to transform Italian *diretto coltivatrice* farms in labour-intensive units of production. The downside of this phenomenon of metamorphosis in the Italian countryside and in technology implementation of farms was a poor process in land reform, which tried vainly to dispossess extensive large landed estates with low level of investments in labour and capital, through legal actions of expropriation made by both the central government and by local authorities. The aim of providing land to the peasants and of improving the socio-economic backwardness was not completely met in different parts of Italy, particularly in the south, where, every year since the 1950s, many farmers decided and preferred to emigrate to other European countries such as Germany, Belgium and Switzerland instead of remaining in the rural less favoured areas with the consequence of getting poorer and more marginalized wide agrarian territories, with a drop in investments and in rural knowhow.

Another negative feature of the small Italian *diretto coltivatrice* farms is the fragmentation in small plots of cultivated surfaces, which, associated to a high emigration process, has increased the marginalization in rural areas (Galluzzo, 2013). In order to reduce this issue, the European Union has given an added value to farmer by multifunctionality. In particular, the second pillar of the Common Agricultural Policy (CAP) has implemented the role of small family farms in protecting the rural space. Hence, multifunctionality, and indirectly the farmer, has been recognized as a tool able to produce positive externalities (Galluzzo, 2012a) from the agriculture as a consequence of the transition from a productivist model of agriculture to a post-productivist one (Ilbery, 1998), very often closely linked to the territory (Wilson, 2001). Nevertheless, multifunctionality is not always an easy and unique process to understand and to satisfy the real needs of the rural population both in developed and in developing countries (Wilson and Rigg, 2003).

THE EVOLUTION OF THE COMMON AGRICULTURAL POLICY AND THE RURAL DEVELOPMENT CONCEPT

The transitions from an old model of agricultural production, able to produce only commodities, to a new paradigm of production aimed to protect the environment and the rural space has been proposed by the Common Agricultural Policy (CAP) in the last 25 years. In fact, in the early nineties, the European Commissioner Mac Sharry brought about a radical reform in order to reduce the over production in the Economic European Community (Vieri, 1994). The reform aimed at stimulating organic farming and implementing pluriactivity and multifunctionality in small farm households predominately located in upland rural areas, such as Italian *diretto coltivatrice* farms, and typical of the Italian landscape (Sereni, 2012), whose objectives were supposed to be addressed towards the protection of the rural space in both environmental and socio-economic terms (Galluzzo, 2012b; Goodman, 2004). The transformation of the Common Agricultural Policy was pivotal in ensuring a unique policy economically viable taking into account lots of kaleidoscopic aspects that distinguished different models of agricultural productions and agricultures in the European Union. Hence, it was chiefly important to set up different strategies, priorities and actions according to different types of productive specialization (Gray, 2000).

The most important consequence of the CAP transformation has been the awareness of the main role of agriculture in protecting the countryside and the environments downstream the urban fabric and the subdivision of this unique European common policy in two fundamental pillars. The first pillar is aimed to support the price of agricultural productions through decoupled subsidies allocated through the common market organizations, which are not in connection to the yield as it was in the recent past years, with serious repercussions on the budget of the European Union and also on international markets. The second pillar is a specific source of subsidies aimed at promoting rural development and protecting the environment by farms located in rural areas at risk of marginalization through the establishment of specific targets of intervention financed by the European Regional Development Fund (ERDF) and the European Agricultural Guarantee Fund.

The concept of rural development, within which multifunctionality is the most important aspect, was introduced for the first time during the conference held in the Irish county of Cork in 1996. The main purpose of the rural conference of Cork was to stimulate the European Union to take in high consideration the role of small farmers in protecting rural space. Hence, the first and foremost aim was to reward the farmers' role by allocating financial subsidies in order to support the efforts of rural communities to remain in rural territories and to slacken the depopulation of the countryside (European Commission, 1996), even if this had meaningful effects on the national political strategies and consequences on the international markets (Meijland van H. and van Tongeren, 2002).

The first pillar of the Common Agricultural Policy has predominantly revealed the effects of decoupling since 2000. The role of subsidies granted for rural development by the European Union, although with different critical negative aspects highlighted by a plenty of scholars who emphasized the necessity to enhance their efficiency, began in the nineties with a new integrated approach in the management of these funds allocated both by the European Union and by local authorities (Ward and Lowe, 2004). This has implied a greater involvement of local communities and stakeholders in the planning stage in order to define priorities and strategies of action in the rural space. The initiatives for rural development have become crucial for the Italian rural areas and, in particular, for small *diretto coltivatrice* farms located in mountain areas and in less favoured areas.

For the next 2014-2020 Rural Development Programme, the Common Agricultural Policy is trying to emphasize the local approach in defining operational actions and in planning the strategic role of small family farms in protecting rural space by partnership agreements among public and private stakeholders, multi-objective actions and multi-fund priorities. According to the proposal of the former European Commissioner for agriculture, the farmer has a pivotal role in the process of business management and environmental protection; in particular, the greening proposal is based on the need to ensure the countryside a function of biopreservation and environmental protection by essential elements in the multifunctional approach of rural development.

The role of subsidies allocated by the European Union has always had the advantage in ensuring a growth of a rural multifunctional economy, which has to be characterized by a diversification both in the type and in the amount of allocated financial supports in favour of disadvantaged areas, very often not able to guarantee employment opportunities to farmers (Gasson, 1988). Multifunctionality implies a vision of an integrated development with high involvement in the local governance in order to limit the depletion of these rural realities (Ashley and Maxwell, 2001), although it is not always clear to citizens that rural development depends upon a wide variety of factors that can strengthen rural areas protection (Van Der Ploeg and Renting, 2000) with a positive promotion of civicness in terms of a complete social integration in rural areas (Shucksmith and Chapman, 1998).

AIM OF THE PAPER
The main purpose of this study was to analyze briefly the evolution of the Italian farms in terms of utilized agricultural surface by using the data published in 2000 and in 2010 in the Italian Agricultural Census by the National Institute of Statistics. The second part of the analysis was based on the quantitative methodology and aimed to investigate the role of subsidies allocated to Italian farms by the European Union in the second pillar of the Common Agricultural Policy in order to promote rural development for the period 1995-2009. It also aimed to assess the impact of these financial supports on the farmers' net income using the data published in the Farm Accountancy Data Network dataset (FADN) launched in 1965 by the European Commission under the Council Regulation No. 79/65/EEC. The FADN is a sample database made up of 12,000 Italian farms on a total amount of 80,000 holdings able to represent approximately 5 million of European enterprises, used to assess the impact and effects of agricultural policies on the farmers' decisions throughout a common agricultural survey methodology in all member states of the European Union. The purpose of this dataset is to investigate and collect more information about the impact of the Common Agricultural Policy in different countries in order to improve or implement measures of financial support on farms funded by the Rural Development Plan.

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Some authors have used the FADN to evaluate different types of business in farming in the EU member countries (Berkeley, 1993, 1999) and the environmental effects of the productive specialization in terms of crop specialization and livestock (Dalgaard, 2006; Wesbury et al., 2011). In general, a lot of actions financed by the Common Agricultural Policy have had a significant impact on the European farms which have been a key element during the processes of transition and transformation of the European agriculture specifically in patterns of local rural development (Roberts et al., 2013). The weight and impact of direct payments have been investigated, highlighting their negative role on the Italian farms because of the direct impact of these financial supports on the increase of farm income as a consequence of an amalgamation process in few groups of farms (Severini and Tanteri, 2013).

METHODOLOGY
The quantitative analysis has been divided into two parts: the first stage aimed to describe the entire universe of the Italian farms through a short description of the data collected during the Agricultural Censuses on agriculture carried out by the National Institute of Statistics in 2000 and 2010. The second part used a multiple regression model on the dataset published by the European Union in a sample of farms located in all member states of the European Union that are part of the Farm Accountancy Data Network (FADN).
The FADN dataset is composed of a series of repetitive data both over time and among Italian regions; hence, it was possible to build a panel dataset which was estimated using a multiple regression model, estimating the parameters by Ordinary Least Square (OLS), and also by fixed (FE) or random panel data (RE).
The parameters of the multiple regression model in the second part of this research were estimated by the Ordinary Least Square using the open source software GRETL 1.8.6. In its algebraic form of matrix, the multiple regression models can be so expressed (Verbeek, 2006):

$$y = X\beta + \varepsilon \tag{1}$$

where **y** is a dependent variable and ε is the error but both are vectors with n-dimensions **X** is an independent variable that has dimension n x k.
In analytical terms, the model of multiple regression, in its general formulation, can be written in this way (Asteriou and Hall, 2011; Baltagi, 2011):

$$y = \alpha_0 + \alpha x_1 + \beta x_2 + \gamma x_3 + \delta x_4 + \varepsilon_{jt} \tag{2}$$

where y is the dependent variable
α_0 constant term
x_1, x_2, x_3, x_4 independent variables in the model
α, β, γ, δ estimated indicators or parameters of the model
ε_{jt} term of statistic error.

Basis assumptions, to use a multiple regression model, are:
statistic error *ui* has conditional average zero that is $E(ui|Xi) = 0$;
(*Xi*, *Yi*), $i = 1...n$ are extracted as distributed independently and identically from their combined distribution;
Xi, *ui* have no fourth moment equal to zero.
There is no correlation among regressors and random noise so that the value between β expected and β estimated is the same and to analyze if there is heteroskedasticity on standard errors, the White's Test on error terms was used.
The quantitative methodology based on the application of a multiple regression model on a panel dataset is made by a two-dimensional set of data able to combine the characteristics of cross-sectional data with those of a time series, that is each unit (n) which was analyzed for several years (t).

The dataset was a balanced panel data because of a complete data (Baltagi, 2011). The observation units are represented by the Italian regions during a period of study and have generated a dataset of longitudinal panel data that can be modelled by using two approaches such as fixed effects (FE) or random effects (RE).

The choice between a fixed effects and a random effects model was decided by the application of a statistical test such as the Hausman test (Hausaman, 1978), which measures the difference between the results of the two estimators (FE versus RE). If the hypothesis of no correlation between the regressors identified in the model and the individual effects is accepted, the two estimates tend to be very similar to each other; if the estimates will tend to be significantly different, it is preferable to use the fixed effects model (Manera and Galeotti, 2005). The use of panel data allows to evaluate the unobserved heterogeneity between units, then the different aspects that characterize them.

Table 2. *Evolution of Italian farms in terms of dimension over time*

Year 2000						
	Number			**Surface**		
Agricultural usable surface	**Family farms**	**Limited companies**	**Cooperative Farms**	**Family farms**	**Limited companies**	**Cooperative Farms**
less 1 ha	982,412	2,096	123	514,310	1,408	85
1 to 2 ha	493,134	2,101	164	640,823	3,139	249
2 to 5 ha	526,995	3,899	277	1,418,628	13,455	830
5 to 10 ha	257,087	4,460	197	1,475,408	33,833	1,140
10 to 20 ha	150,739	6,772	186	1,675,177	100,070	2,561
30 to 50 ha	40,349	5,306	154	1,178,469	192,178	5,600
50 to 100 ha	25,262	5,095	207	1,253,828	32,0516	12,825
more 100 ha	11,654	4,255	334	1,299,853	653,096	88,720
Pearson's r	**-0.67**	**0,.90**	**0.76**			
test t	**0.008478**	**0.085127**	**0.240668**			
Year 2010						
	Number			**Surface**		
Agricultural usable surface	**Family farms**	**Limited companies**	**Cooperative Farms**	**Family farms**	**Limited companies**	**Cooperative Farms**
less 1 ha	489,748	1,622	290	273,478	929	138
1 to 2 ha	332,456	1,817	279	446,596	2,559	378
2 to 5 ha	349,962	4,442	533	1,094,406	14,843	1,736
5 to 10 ha	177,863	5,438	404	1,235,347	39,728	2,848
10 to 20 ha	109,531	7,713	370	1,511,194	111,597	5,215
30 to 50 ha	73,331	10,920	449	2,229,238	351,064	14,289
50 to 100 ha	21,533	5,814	243	1,456,396	406,259	17,204
more 100 ha	8,874	3,707	288	1,534,054	704,877	86,098
Pearson's r	**-0.84**	**0,.27**	**-0.30**			
test t	**0.00754**	**0.065168**	**0.172204**			

Source: our elaboration based on Census data, www.istat.it

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In the model of fixed effects model, the formula to estimate the parameters is (Greene, 2011):

$$Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it} \tag{3}$$

α_i (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts);
Y_{it} is the dependent variable during the time t referred to the unity n;
X_{it} represents one independent variable;
β_1 is the coefficient or parameter for the independent variable;
u_{it} is the error term.
   The differences across regions may have some effects and influence on dependent variables; then, the random effects panel data model should suit well compared to the fixed effects; furthermore, another advantage of random effects panel data approach is that the FE panel data model can include time invariant variables (Greene, 2011).

Table 3. *Main results of the parameter in the multiple regression model estimated by the Ordinary Least Square, dependent variable net income from farmers' time*

Variable	Coefficient	Standard error	T value	p-value	Significance
Constant	681.374	508.019	1.3412	0.18134	n.s.
Utilizable agricultural surface	68.3268	25.592	2.6699	0.00820	***
Output	1.0123	0.0182	55.346	<0.00001	***
Input	-0.9426	0.0248	-37.948	<0.00001	***
Subsidies for environmental protection	-2.7232	1.2294	-2.2151	0.02787	**
Less favoured area subsidies	-4.5401	1.1020	-4.1196	0.00006	***
Subsidies for rural development	5.5072	1.1259	4.8913	<0.00001	***
R^2 0.97					
Adjusted R^2 0.96					

n.s. not significance; * 5-10%; ** 5%; *** 1%
Source: our elaboration based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm

Table 4. *Main results of the parameter in the multiple regression model estimated by Random Effects Panel Data, dependent variable net income from farmers' time*

Variable	Coefficient	Standard error	T value	p-value	Significance
Constant	676.242	391.236	1.7285	0.08542	*
Utilizable agricultural surface	68.8875	26.7892	2.5715	0.01084	**
Output	1.01321	0.01903	53.2232	<0.00001	***
Input	-0.94464	0.02828	-33.3966	<0.00001	***
Subsidies for environmental protection	-2.95915	1.22164	-2.4223	0.01630	**
Less favored area subsidies	-4.73898	1.18277	-4.0067	0.00009	***
Subsidies for rural development	5.72776	1.18099	4.8500	<0.00001	***

* 5-10%; ** 5%; *** 1%
Source: our elaboration based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm

RESULTS AND DISCUSSION

The analysis of the main results published in the Agricultural Italian Census showed a sharp decline in farm household, a drop of *diretto coltivatrice* farms with a surface lower than 1 hectare of agricultural usable area and an increase of the agrarian surface in enterprises with a surface above 20 hectares (Table 2). Comparing the results of the 2000 Census and the 2010 Census, there was an increase in limited companies in terms of surface and in number of enterprises.

The results of the correlation between the variable class of cultivated area and the variable type of farm management (small family farms or rather *diretto coltivatrice* farms versus limited companies and co-operatives) highlighted a negative correlation between the variable numerousness of *diretto coltivatrice* farms, owned by traditional rural families, and the size in terms of agricultural usable surface. Hence, the analysis strengthened the hypothesis that in Italy *diretto coltivatrice* farms are characterized by small agrarian surfaces, which are located in upland areas. The farms managed by limited companies and cooperatives pointed out a significant increase over the inter-censual period due to national laws aimed at encouraging the creation of co-ops or associated units of production similar to limited companies, demonstrating a positive correlation between the variable class of farm size, expressed as agricultural utilizable surface, and the number of farmers. In the case of cooperatives, although they represent a minority in the Italian agricultural productive context, there was a growth in units of production compared to the data published in 2000.

The multiple regression model pointed out that the dependent variable net income of farmers in the time of study is directly linked to the independent variables utilizable agricultural surface, the total output produced by farmers, and the total amount of subsidies allocated by the European Union to promote rural development through the second pillar of the CAP. The analysis also underlined an indirect correlation between the dependent variable net income of Italian farmers and independent variables such as subsidies specifically paid for the environmental protection, subsidies and aid allocated towards less favoured areas and total inputs used by farmers in the productive process of cropping and breeding (Table 3). The value of R^2 and adjusted R^2 pointed out that the model of multiple regression model fits well to our goal of the analysis.

In order to decide whether the fixed or random effects panel data was the best model, the analysis used a diagnostic test called Hausman test aimed to evaluate whether the random effects panel model was adequate for the purposes of panel analysis. A high value of this test suggested to prefer the random effects panel data model than the fixed effects one.

The parameters estimated by the random effects panel data showed that the dependent variable net farm income is directly correlated with the independent variables subsidies allocated to support rural development financially, utilized agricultural surface, and the total amount of agricultural output produced (Table 4). Therefore, an improvement of the arable land, predominantly associated with an increase in output produced by farmers and a good use of financial support allocated by the European Union in order to promote rural development have positive effects on increasing profitability and net income in Italian farms.

A low value of the independent variable such as total input used in the productive processes in Italian farms is connected to a high level of farm net income. The independent variables such as the subsidies allocated to less favoured areas and the specific funds aimed to protect the environment had a negative correlation with the dependent variable net farmers' income.

To sum up, the results pointed out that the subsidies allocated by the EU to promote agro-environment actions and to reduce the marginalization in disadvantaged areas had a positive effect on the net farm income of large-sized farms. However, subsidies allocated to less favoured areas are fundamental in small *diretto coltivatrice* farms whose net income is not at decent level compared to other economic activities and it is lower in comparison with the level of standard output proposed by the European Union. The results of this paper underline that the specific contributions allocated by the second pillar of the CAP, in terms of rural development, have been useful in improving the net income of farms.

CONCLUSION

Italian farms, although characterized by surfaces quite limited managed by *diretto coltivatrice* farms, were quite sensitive to the subsidies allocated by the European Union in order to support Rural Development actions. Summing up, the findings of this study suggest that it is pivotal to put into action other strategic actions for the next period of rural planning (2014-2020), in terms of priorities and focus areas aimed to increase the financial allocations for rural development and farmers' living in less favoured areas. In particular, the analysis pointed out that the small family farms located in less favoured areas need a good level of funds paid by the European Union to compensate the agriculture in upland areas, help them implement their income and solve the marginalization and depopulation of rural areas. In fact, more than 1.7 million hectares in Italy are located in less favoured areas with 106,000 farmers who received an annual compensation between 25 to 250 euros per hectare during the period 2007-2013. An increase of financial support is the first and foremost tool to sustain the development in upland areas by encouraging young people to stay in the countryside.

The size of farms is the main variable able to influence the efficiency of farms, particularly depending on the technical and allocative efficiency. For the next Rural Development Plan 2014-2020, the European Union and the Italian regional authorities have to promote and give more importance to the rural sub-programs aimed to implement the diffusion of young farmers in the countryside, by a generational turnover and by increasing the farm size. This is particularly true in the southern Italian regions, characterized by small units of production, which should take advantage of the subsidies with a specific allocation to less favoured areas in order to solve rural depopulation and the marginalization of these territories.

In conclusion, recent data on the financial supports meant to implement the development of rural enterprises showed in 2013 a positive effect on the limited companies with an annual rate of growth more than 2%, but it a negative impact on individual farms, which decreased by 5%. As a consequence, mixed interventions proposed by national authorities and the European Union can be pivotal in ensuring a complete development of rural enterprises as long as the funds are managed from the perspective of operational federalism by local Italian authorities able to know the real context and the economic aspect of rural enterprises.

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