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AGRITOURISM AND LESS FAVORED AREAS SUBSIDIES IMPACT ON TECHNICAL EFFICIENCY OF ITALIAN FARMS

ABSTRACT

In Italy, since the early 2000s, there has been a significant growth of agritourism through financial subsidies allocated in the framework of the Rural Development Program. This on-farm activity has been fundamental in reducing the socio-economic marginalization in rural areas, in particular in disadvantaged rural areas receiving direct payments aimed at supporting less favoured areas. This paper presents the findings of the impact of financial subsidies allocated by the second pillar of the Common Agricultural Policy on Italian farms and the role of agritourism in improving the technical efficiency of farms.

The analysis was carried out in the period 2004–2019 in a sample of farms part of the Italian Farm Accountancy Data Network dataset. Technical efficiency was estimated using the non-parametric method of Data Envelopment Analysis. The results revealed that the income from agritourism and the Less Favored Areas subsidies impacted the technical efficiency in farms in a different way. The economic size and the type of farming pointed out different results in the impact of agritourism revenues, First Pillar payments and Less Favored Areas subsidies on Italian farms.

Key words: DEA, first pillar, rural areas, FADN.

JEL Classification: Q18, Q19.

1. INTRODUCTION

Italian rural areas are characterized by the small farm size as a consequence of the transition from a productivist model to a post-productivist model (Ilbery, 1998). The fundamental changes in the Common Agricultural Policy (CAP) have modified farms production and their specialization. In fact, aiming to reduce the socio-economic marginalization in the European countryside (Galluzzo, 2020; 2021), the Rural Development Program of the European Union has financed many measures to stimulate rural diversification through agritourism and at the same time provided aids with the goal to support farms located in disadvantaged rural areas. The consequence was the important role of the CAP second pillar in stimulating rurality by a lot of activities such as rural tourism and agritourism. Through diversification, Italian rural areas have played a main function in protecting the

environment and in reducing the permanent outmigration from the countryside. The consequence of this is that some no traditional and codified services such as agritourism, rural tourism and environmental services have to be adequately compensated by financial support disbursed by the Common Agricultural Policy (Galluzzo, 2020; 2021; Westhoek *et al*., 2006; Milone and Ventura, 2012; Van der Ploeg *et al*., 2015). These authors argued that rural areas have been fundamental in merging diversification in the rural area to environmental protection, as proposed by Van der Ploeg in a specific peasant model in 2010. Anyway, this approach is difficult to put into practice in certain member states of the European Union, where farms are characterized by small size and very low level of output (Mursa and Paraschiv, 2009). This has been corroborated, as there are several socio-economic unbalances across EU countries, which need specific actions of the CAP tailored to specific characteristics of the rural fabric.

2. STATE OF KNOWLEDGE

A recent literature review pointed out that in the EU there has been a significant growth of agritourism and other on-farm activities, in disadvantaged rural areas in particular (Galluzzo, 2021). The diversification in on-farm activities aimed to improve the technical efficiency in farms (Forleo *et al*., 2021) and in some countries there has been a reaction to increase employment opportunities that have emphasized the role of the primary sector in being a buffer sector able to avoid socio-economic marginalization in rural territories (Galluzzo, 2020; 2021). This implies that the European Commission has to support lots of rural development initiatives in the framework of the second pillar to guarantee an adequate development of diversified activities in rural areas (Galluzzo, 2017; 2021; Van Berkel and Verburg, 2011; Bojnec and Latruffe, 2009; Petrick and Tyran, 2003).

In general, some studies on the role of financial subsidies allocated to farms located in less-favoured areas have pointed out that there is a statistically non-significant difference in technical efficiency between groups of farms located in disadvantaged rural areas and farms not operating in disadvantaged rural areas (Baráth and Fertő, 2017; Baráth, *et al*., 2018; 2020).

One of the main purposes of agritourism in Italy is to strengthen connections between local food, traditions, rural tourism and farms generating rural and quality agri-food districts (Becattini, 2000; Galluzzo, 2008, 2009; Vieri, 2012). The growth, role and function of agritourism are a direct consequence of a significant decrease in farmers' income due to an increase of costs and to structural changes in the European Common Agricultural Policy strategies, like the reduction of direct payments and a rising interest in the public opinion towards the ecological role of the countryside and the socio-economic marginalization of rural areas (Galluzzo, 2018; Salvioni and Henke, 2011). Furthermore, farmers in the European Union

have changed their own model of production from a productivist to a post-productivist method that has in the multifunctionality and diversification of farm activities two main pillars of rural socio-economic growth (Ilbery, 1998); hence, agritourism in the framework of diversification and multifunctionality perspective has played a fundamental part in this transition phase in European farms.

Agritourism has been a central element in the socio-economic growth of European rural territories, to which the European Union, since Agenda 2000, as a consequence of the implementation of the Cork Conference on the rural development, has addressed its own main efforts allocating specific financial funds aimed at stimulating the process of productive diversification in the countryside (Galluzzo, 2018; 2021).

Nowak *et al*. in 2015 assessed the technical efficiency in all EU countries corroborating that there is a dichotomy between different countries, which in some cases is due to the role of financial subsidies allocated by the Common Agricultural Policy and to land capital endowment (Galluzzo, 2021; Gorton and Davidova, 2004).

The effect of subsidies on the technical and economic performance of farms pointed out some mixed results (Baráth *et al*., 2020; Latruffe *et al*., 2017). These authors, addressing their attention to the technical efficiency and the role of different types of subsidies, such as LFA payments, have argued that less favoured area and agri-environmental subsidies have not had a significant effect on the components influencing technical efficiency and also total factor productivity. The aim of LFA payments is to compensate the activities in farms operating in geographical areas where the profits are modest due to geographical and socio-economic constraints (Galluzzo, 2021; Arru *et al*. 2021; Garrone *et al*., 2019). Farmers in disadvantaged rural areas have to diversify their activities, increasing their profitability and reducing the rural emigration (Arru *et al*., 2021; Forleo *et al*., 2021; Galluzzo; 2021). In some Italian regions, the findings of studies carried out in less favoured areas underline that agritourism has been a good opportunity for the economic growth of rural territories (Forleo *et al*., 2021), corroborating the critical, but fundamental role that farms located in disadvantaged areas have and the remuneration of their activity (Arru *et al*., 2021). In fact, one of the main positive aspects of agritourism has been assessed in less populated areas, where there has been a significant agritourism growth that has protected rural areas against permanent emigration using specific funds allocated by the European Union (Galluzzo, 2021).

Rural tourism, agritourism and other activities in the countryside have been fundamental in improving farmers' incomes and in promoting socio-economic and ecological sustainability in the rural space (Arru *et al*., 2019). The estimation of the technical efficiency in agritourism has underlined that the efficiency improves if technical inputs are adequately used and the productive dimension is near the optimal threshold (Arru *et al*., 2019). These authors argued that agritourism can act on technical efficiency. In other studies, carried out in Italy in 2020, Arru *et al*. underlined that the co-presence of different activities generates positive effects in agritourism and in farms, hence an estimation of the technical efficiency, has been

influenced by on-farm activities and agritourism practices (Arru *et al*., 2020). In Italian peri-urban farms, it was pointed out that multifunctional agriculture does not have an impact on the levels of technical efficiency of farms, hence the CAP has been able to support the efficiency of farms that have diversified their activities (Gaviglio *et al*., 2021; Forleo, 2021; Galluzzo, 2021). In fact, diversification in farms, typical of small farms, reduces the socio-economic marginalization in less favored areas, which reveals the important role of specific subsidies in the framework of the second pillar of the CAP (Galluzzo 2013; 2015). The dimension of farms in terms of land capital endowment is not so fundamental because, as argued by Forleo *et al*. (2021), diversified Italian farms are able to improve their performance even if the geographical location of farms, in mountain versus plain areas, and their size are important variables in influencing the technical efficiency performance of Italian farms (Alvarez and Arias, 2004).

Drawing some conclusions on the role of CAP subsidies and technical efficiency in literature, the effect is mixed and unclear (Minviel and Latruffe, 2017; Garrone *et al*., 2019; Baráth *et al*., 2020). In fact, in some studies, the effect of LFA subsidies has been null (Baráth *et al*., 2020) and it has been positive in other studies (Galluzzo, 2021; 2019), corroborating that coupled payments have generally had a negative impact on technical efficiency (Garrone *et al*., 2019).

The novelty of this paper is that in Italy there are only few studies on the role of the assessment of technical efficiency in agritourism (Arru *et al*., 2019; 2021; Forleo *et al*., 2021; Galluzzo; 2021) and not so common is a mixed approach, which, using the different source of financial subsidies and the income coming from agritourism, tried to estimate how the technical efficiency changes and which of these factors impact the most on the technical efficiency.

3. MATERIAL AND METHOD

The main purpose of this study was to assess by a quantitative approach the role of the financial subsidies allocated by the CAP to Less Favoured Areas, the first pillar of the CAP, and of agritourism revenue to increase the technical efficiency of Italian farms. The research has used a sample of farms part of the Italian Farm Accountancy Data Network (FADN) since 2004 to 2019. The research question was: do financial subsides have an impact on the technical efficiency of farms? Furthermore, has diversification by agritourism increased technical efficiency?

The assessment of technical efficiency uses two different approaches based on different assumptions: a parametric approach or Stochastic Frontier Analysis (SFA) as proposed by Farrell in 1957 and the non-parametric approach or Data Envelopment Analysis (DEA) as proposed by Charnes *et al.* in 1978 and Banker *et al.* in 1984 (Lovell, 1993; Coelli *et al*., 2005; Battese and Coelli, 1992; 1995; Kumbhakar *et al*., 2015; Charnes *et al*., 1978; Banker *et al*., 1984; Cooper *et al*., 2007). The

DEA has been used in this paper because it can estimate the technical efficiency by a multiple output approach.

If the SFA is aimed at estimating in a specific function of production such as Cobb-Douglas, a logarithmic function or the translog function the distance of each enterprise from the optimal function of production, the DEA does not need a priori assumptions in the model or a well-defined function of production and the technical efficiency is simply a distance from the estimated function of production made by a linear combination of different inputs and output (Coelli *et al*., 2005; Battese and Coelli, 1992; 1995). The estimation of the production function is done by a linear programming approach that is not able to assess some random noises in the estimation of the function of production which, by contrast, can be estimated in the SFA approach (Coelli *et al*., 2005; Battese and Coelli, 1992; 1995; Kumbhakar *et al*., 2015; Charnes *et al*., 1978; Banker *et al*., 1984).

In order to assess the function of production in Italian farms the study has used an input oriented, non-parametric approach called Data Envelopment Analysis, because in this field of study there is not a well-defined function of production previously proposed in literature. Furthermore, a literature review has underlined a wide diffusion of studies and researches on the technical efficiency assessed by a parametric approach in a lot of European countries (Minviel and Latruffe, 2017; Galluzzo, 2018; 2020; Latruffe *et al*., 2017; Nowak *et al*., 2015; Nowak and Kubik, 2019; Balezentis, 2014).

The analysis has firstly used the output-oriented DEA in order to estimate the technical efficiency in all Italian farms part of the FADN dataset since 2004 to 2019, using the software R packages Benchmarking, deaR, rDEA and the software STATA. The inputs used in the model were: labour expressed in total hours of work in farms over the year, land capital in hectares of usable agricultural areas, specific cost linked to productive process and other costs with a nexus to the production, total farming overhead costs or rather supply costs linked to production activity but not linked to specific lines of production and assets. The total output produced in farm represents the output. Other sources of income were added to the total output as financial subsidies allocated by the CAP in the first pillar and in the second pillar by the LFA payments and the income from agritourism. All input and output variables expressed in euros have been deflated using the price index year 2015 published by Eurostat.

4. RESULTS AND DISCUSSION

The descriptive statistics of the entire Italian sample since 2004 to 2019 has pointed out that the average value of land capital is close to 35 hectares, with significant changes across the regions of Italy, depending on farm specialization (Table 1). The average value of labour input is close to 4,100 hours per farm; the

average incidence of input cost to total output represents 70% and the average amount of total output was 110,000 euros per farm over the investigated period.

Table 1

Main descriptive statistics in all Italian farms

	Labour	UAA	Output	Input	Specific cost	Farming overhead cost
Average	4,155.902	35.506	110,197.7	76,555.17	32,629.12	17,087.36
Median	3,421.395	19.515	54,047.5	37,367.5	12,668.5	9,475
St. dev	2,816.228	45.55	175,855.9	132,916.7	72,603.88	28,332.03
Min	917,91	0.44	5,676	4,442	1,026	790
Max	34,937.57	490,08	1,886,891	1,323,132	865,586	443,020
n°	1,620	1,620	1,620	1,620	1,620	1,620
	Assets	Total CAP	LFA payment	RDP payments	Agritourism revenue	Pillar1 financial support
Average	669,066.6	13,914.24	825.00	2,850.377	3,382.092	11,063–86
Median	422,025.5	7,356.5	58	1,128.5	1,166.79	5,760.5
St. dev	816,874.4	20,399.96	2,813.398	5,214.707	7,776.753	18,120.31
Min	61,514	0	0	0	4.06	0
Max	8,772,182	272,307	63,537	68,307	148,478	269,759
n°	1,620	1,620	1,620	1,620	1,620	1,620

Source: Author's elaboration on data
https://agridata.ec.europa.eu/extensions/FarmEconomyFocus/FADNDatabase.html

Focusing the attention on the income from other on-farm activities such as agritourism, this was equal to 3,382 euros per farm; the average incidence of total CAP subsidies to total output was close to 13%, out of which most subsidies were allocated from the first pillar. By contrast, the financed subsidies allocated to disadvantaged areas were close to 825 euros, which represents 29% of total subsidies allocated in the second pillar of the CAP or rather by the Rural Development Program. The average value of revenues from agritourism was close to 3,382 euros per farm, ranging from 4 euros as minimum value to 148,478 euros as maximum value.

Only a few percentages of the total Italian FADN sample are classified in the economic size between 2,000–8,000 euros and above 500,000 euros; most farms are equally distributed among other economic size clusters.

In this analysis, six different simulations in Italian FADN farms have been carried out in order to estimate the effect of financial subsidies and income from agritourism on the technical efficiency.

In the first scenario, farms have had only farm production in the output; the second scenario has estimated the impact of the financial subsidies allocated by the first pillar in addition to the output; the third scenario has estimated the impact of agritourism revenues besides the output in farms; the fourth simulation has used the

payments allocated to disadvantaged rural areas (LFA subsidies) in addition to output; the fifth scenario has used the CAP first pillar financial subsides and LFA payments in addition to total output; the sixth scenario has estimated the technical efficiency by adding the agritourism revenue, LFA payments and first pillar subsidies to total output. In all six simulations the highest value of technical efficiency has been found in farms receiving LFA subsidies, pillar 1 aids and agritourism revenues; by contrast, the lowest value of technical efficiency has been estimated in Italian farms receiving LFA payments only (Table 2).

Table 2

Main results of the technical efficiency estimated in six different simulations or scenarios

Simulation – Scenario	Obs.	Mean	St. dev	Min	Max
Total output only	1,620	0.573	0.1403	0.3133	1
Total output and first pillar subsidies	1,620	0.637	0.1540	0.2857	1
Total output and agritourism revenue	1,620	0.530	0.1744	0.1616	1
Total output and LFA payments	1,620	0.519	0.1657	0.1535	1
Total output, LFA payments and first pillar subsidies	1,620	0.646	0.1542	0.2906	1
Total output, LFA subsidies, first pillar payments and agritourism revenue	1,620	0.670	0.1570	0.3101	1

Source: Author's elaboration on data https://agridata.ec.europa.eu/extensions/FarmEconomyFocus/FADNDatabase.html

Findings have pointed out that the farms located in disadvantaged rural areas are less technically efficient than the others, hence the effect of LFA payments in order to implement the technical efficiency is not adequate. Anyway, farms receiving revenue from agritourism have increased their technical efficiency compared to farms that have received LFA payments only.

A preliminary conclusion has underlined the role of agritourism in partially increasing the technical efficiency in farms located in disadvantaged rural areas. Focusing the attention on the role of LFA payments and technical efficiency, the average value of LFA payments in Italy is close to 825 euros per farm per year and 270 farmers have received more than 1,000 euros. In order to estimate if an increase in LFA payments can improve the technical efficiency, the attention has been addressed on a different range of LFA subsidies from 1,000 to more 20,000. Findings have underlined that the increase of LFA payments is linked to an increase of technical efficiency in farms, even if the sample of farms receiving an increasing amount of LFA payments is very modest (Figure 1).

In all Italian farms clustered in function of their production specialization, findings have pointed out that horticulture has had the highest level of technical efficiency over time; by contrast, the field crops and mixed farms have had the lowest and unstable level of technical efficiency over time (Figure 2).

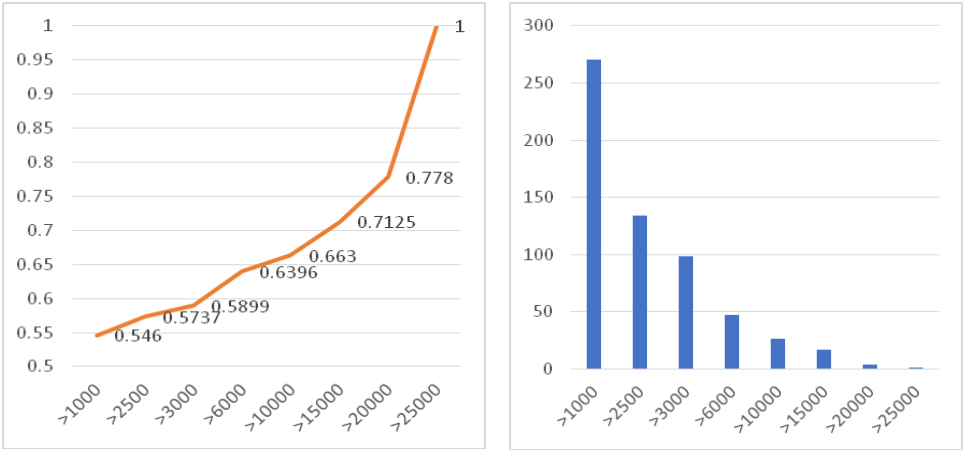

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Figure 1. Increase of technical efficiency
in farms receiving LFA subsidies in addition to the output

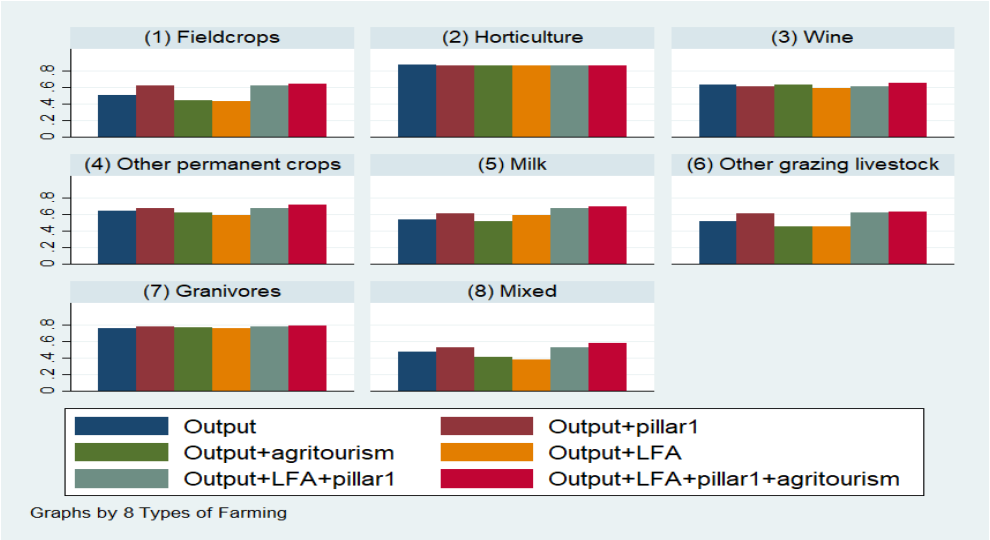

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Figure 2. Technical efficiency in farms
by their production specialization

In general, all financial subsidies allocated by the first and second pillar of the CAP in association with the revenues from agritourism have been able to improve the technical efficiency in all types of farming. With the exception of

farms specialized in horticulture and granivores, farms receiving LFA subsides have increased the less their technical efficiency, hence these enterprises located in disadvantaged rural areas have suffered the most in increasing their technical efficiency despite the CAP payments disbursed.

Focusing the attention on the class of income in terms of standard output in Italian FADN farms and on the technical efficiency as a consequence of different payments and aids allocated by the CAP and on the agritourism activity, it emerges that an increase of income could improve the technical efficiency with a significant impact of financial subsidies allocated in the framework of the first pillar of the Common Agricultural Policy (Figure 3).

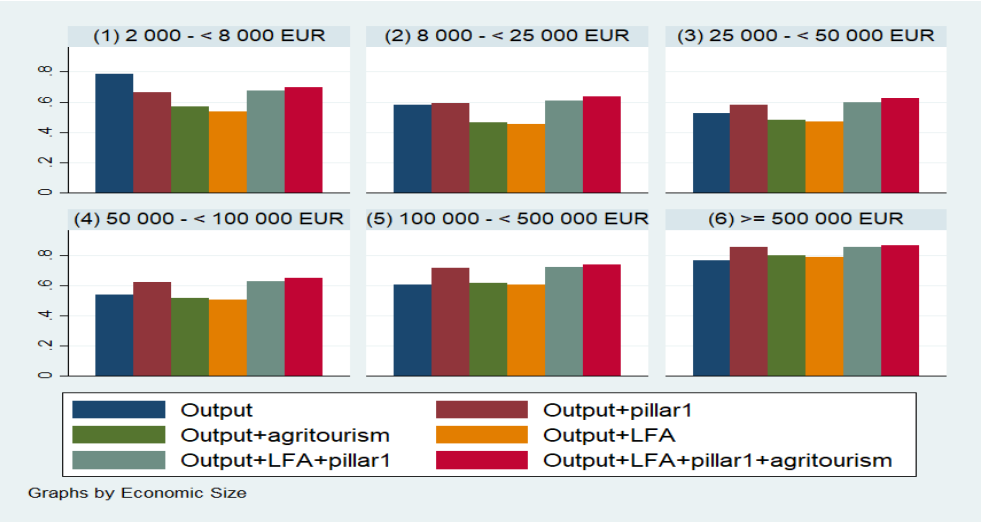

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Figure 3. Technical efficiency in farms by their cluster of income

The analysis of the six different simulations in all Italian regions has pointed out that the highest value of technical efficiency from total output has been assessed in the north and in the southern regions specialized in horticulture (Liguria in the North-West) and in other permanent crops (Calabria in the South) (Figure 4).

The regions with the oldest specialization and diffusion of agritourism since the 1980s have pointed out the significant impact of the agritourism revenues in improving technical efficiency (Figure 5).

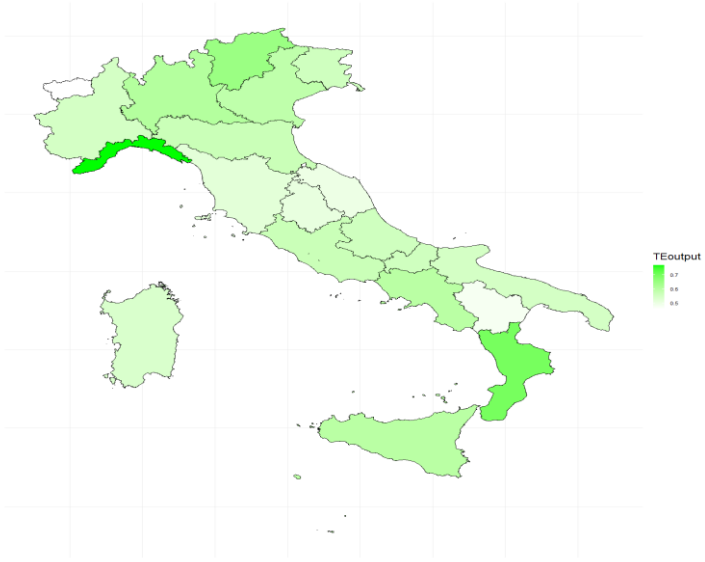

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Figure 4. Technical efficiency in the simulation produced output only.

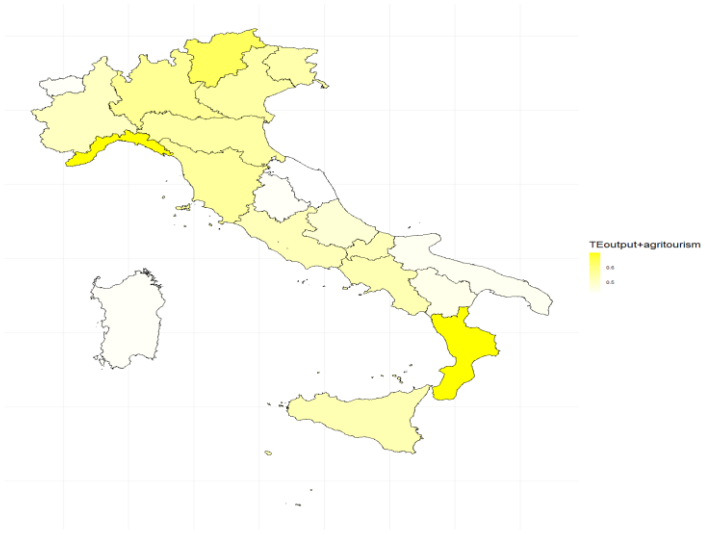

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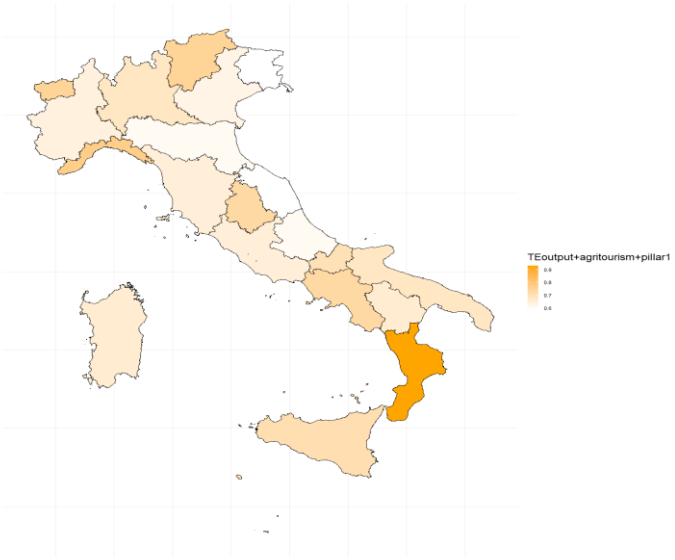
Figure 5. Technical efficiency in the simulation: produced output and agritourism revenues

In the regions from the south of Italy there was a very important impact of financial subsidies allocated by the first pillar of the CAP; by contrast, in the north-east regions, there was a more intense impact of financial subsidies allocated by the first pillar of the Common Agricultural Policy (Figure 6).



Source: Author's elaboration on data
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Figure 6. Technical efficiency in the simulation: produced output, agritourism revenues and payments allocated by the CAP first pillar

The farms located in disadvantaged rural areas such as mountain areas have pointed out the highest value of technical efficiency compared to the Italian farms located in the south and in the centre of Italy (Figure 7), even if there is a modest but strange and significant dichotomy between regions located in the north-center versus southern regions due to a different allocation of CAP first pillar payments (Figure 8). In general, payments allocated by the first pillar only in addition to total output did not impact the level of technical efficiency across Italian regions (Figure 9).

Source: Author's elaboration on data
https://agridata.ec.europa.eu/extensions/FarmEconomyFocus/FADNDatabase

Figure 7. Technical efficiency in the simulation: produced output and LFA payments

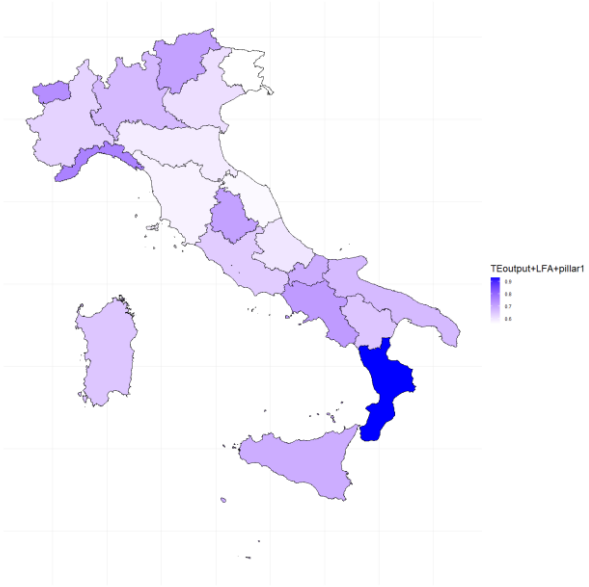

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Figure 8. Technical efficiency in the simulation: produced output, LFA subsidies and payments allocated by the first pillar.

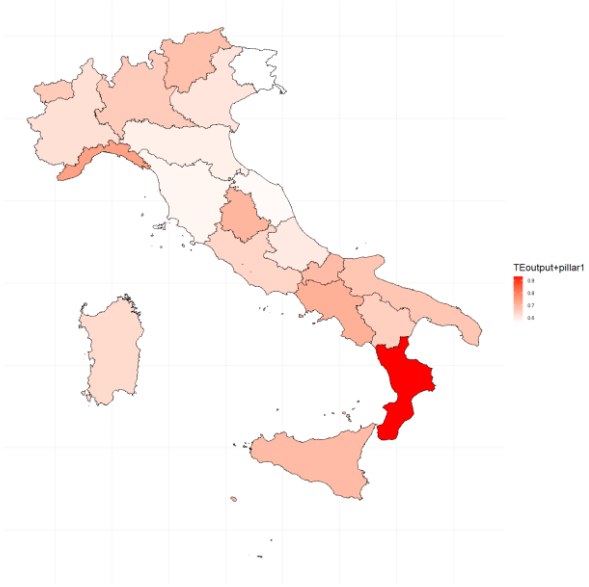

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Figure 9. Technical efficiency in the simulation: produced output and payments allocated by the first pillar

5. CONCLUSIONS

The novelty of this study is to expand the field of study on the role of agritourism and technical efficiency and on the impact of some specific financial subsidies allocated by the first and second pillar of the Common Agricultural Policy. Furthermore, this research has used a mixed approach to explain the impact of different sources of financial subsidies and of income from agritourism on technical efficiency. Drawing some conclusions about the role of CAP subsidies and technical efficiency in the literature, the effect is clear in the case of financial subsidies allocated under the first pillar of the CAP and LFA payments, even though in this latter case a negative effect was found in increasing the technical efficiency.

The reason of this negative correlation is due to the low amount of subsides allocated by the CAP; in fact, an increase of LFA financial subsidies has implied an increase of technical efficiency. In Italy, more farms have not received adequate LFA subsidies, in many cases lower than 900 euros per year, which is a very low amount to compensate farmers operating in areas with socio-economic and geographical constraints such as mountain and hilly areas.

In general, the financial subsidies allocated by the first pillar of the CAP have had the highest effect in increasing technical efficiency, as argued in the literature;

at the same time, an increase of farm economic size has implied a significant increase of technical efficiency in Italian farms. In small farms from the economic size cluster 2,000–8,000-euros, agritourism revenues and financial subsidies allocated in the first pillar and in the second pillar such as LFA payments have improved technical efficiency in farms. Furthermore, in specialized farms, the technical efficiency has been higher than in non-specialized farms such as mixed farms, even though in these farms agritourism has been a good opportunity for farmers to improve technical efficiency.

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