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FADN data to support policymaking: The potential of an additional survey

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Abstract

This paper aims to highlight the potential of a FADN additional survey when payment for organic farming is to be calculated in the rural development decision-making process. In fact, the number of organic farms included in the FADN is often too low to provide consistent results. The analysis is based on a direct survey conducted on a larger number of farms than those included in the FADN continuous sample, considering the organic grape-growing farms. The estimate of the appropriate support payments (amount per hectare) is based on the gross margin methodology which allows additional costs and income foregone at micro-level to be highlighted. The method uses the partial balance sheet of a single crop processing to compare costs and revenues of organic and conventional grape-growing farms and considering both certification and transaction costs.

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Introduction

In the next years, rural areas will face a wide range of challenges and opportunities. The European Union (EU) with the Common Agricultural Policy (CAP) will support the process with its Rural Development Policy, which provides Member States with an envelope of EU funding to manage nationally or regionally under multi-annual, co-funded Rural Development Programmes (RDPs). In Italy RDPs are managed by regions, at least so far (COM/2018/392). As from 2023, all new rural development actions will be integrated into the CAP national strategic plans. Each national plan will focus on key social, environmental, and economic objectives for EU agriculture, forestry, and rural areas. Each RDP is organized by focus areas, measures and actions that are related to their specific subsidies. Each region oversees the payment for each measure included in the financial statement. To fix the level of payments, official data sources are used, among those the FADN database. As is known, it is not designed to cover any research or institutional need and for this reason some critical issues could occur (such as a few organic farms or specific types of farming included which could affect the robustness of some statistical analysis). During the last years, policy makers had to face a more complex system as new agricultural policies and environmental issues demand for integration has grown. To meet current needs, information systems often require adaptation and need to collect additional information also in farm accounting (the beneficiaries are mainly the farms). This was the case for the Friuli Venezia Giulia region which invited the Rural Development Agency (ERSA) and CREA (Council of Agricultural Research and Economics) regional headquarters to enlarge the FADN sample with an additional survey[1]. The aim of the region was is focused on three types of farming: livestock, organic and horticultural. The three-year Project funded by ERSA (2017-2020 with a delay due to Covid-19) applies the Italian FADN methodology to collect and record data. This survey will allow the region to calculate the appropriate payments for the near future (using the integrated FADN sample). This paper aims to provide a path that could be adopted for these calculations looking at the next programming period. The RDP's measure 11 is analyzed and the organic grape growing farms are considered. The wine sector is one of the most important at regional level: It ranks second after the livestock sector, with

1. *CREA-ERSA Project, title:* "Indagini statistiche per l'analisi economica delle aziende agricole del Friuli Venezia Giulia". *Delibera giuntale 497 dd. 25/03/2016, Decreto n. 589 del 21/12/2016, Determinazione direttoriale CREA n. 31 del 26/04/2017, Decreto ERSA n. 597 DD. 10/11/2017, successivi atti aggiuntivi, Determinazione direttoriale CREA n. 291 del 13/07/2020 per emergenza epidemiologica da Covid-19.*

230 million euros, or 20% of the regional agricultural production (Italian Agriculture Yearbook, 2019). The research tries to answer the following related questions: are there any consistent differences between organic and conventional farms' performance that allow the CAP-Rural Development Policy to fund the gap? And what is the amount to be compensated? The core of this paper is the identification of the appropriate payment, based on the gross margin approach. This method, in fact, allows additional costs and income foregone at micro-level for farms adopting similar production process and located in the same area to be highlighted. The implementation of this analytical approach will provide new elements for the debate on the appropriate payment issue using original data (those coming from the additional survey) and considering the organic farming, a topic receiving growing attention from the policy makers.

While the comparison between the performance of conventional and organic farming systems in relation to their environmental impact and productivity has been widely discussed in the literature (Gomiero *et al.*, 2011; Tuomisto *et al.*, 2012; Muller *et al.*, 2017), this paper intends to shed some light on the specific aspect of the revenue and costs analysis.

The article is structured as follows: section one provides a review of the previous studies conducted in the field and a brief description of the organic sector at national and regional level. The methodology and sample data are described in section two. The research results and discussion on data processing are presented in section three, then the paper ends with some conclusions.

1. Background

EU legislation on payments to subsidize farmers with agro-climatic and environmental measures has evolved over time. The first agri-environmental schemes date back to 1992, when the Common Agricultural Policy (CAP) MacSharry Reform introduced the accompanying measures (Berkhout *et al.*, 2018). Regulation n. 2078/92 provided that the subsidies should be based on the commitment made by the beneficiary and the income foregone. With Regulation n. 1257/99, the additional costs were included. During the 2007-2013 programming period (Regulation n. 1698/2005) the wording changed, but the basic principle remained the same. In addition to covering additional costs and income foregone resulting from the commitment, support payments may also consider transaction costs if necessary. In the current programming, payments compensate beneficiaries for most or part of the additional costs and income foregone resulting from the commitments made (Regulation n. 1305/2013). If necessary, they can also cover transaction

costs (Ciccarelli *et al.*, 2013) up to a value of 20% of the premium paid for agri-environmental and climate commitments. The impact of the CAP on sustainability is addressed by the literature in agricultural economics and rural studies disciplines, but analyses are often based on case studies and use different methodologies (that produce different results) which are very difficult to compare. Despite this heterogeneity, there is a consensus regarding ineffectiveness in terms of achieving environmental objectives. The proposal for the post-2020 CAP indicates a more flexible and measure-based approach that focuses on paying for the results achieved (Bartolini *et al.*, 2021). The subsidized farmers are affected by the regional administrations decisions as regards the available measures. As is known, the Commission provides an overall framework, a set of measures that are not fully considered in the regional RDPs, which in fact adopt those considered more appropriate to enhance their agricultural systems/rural areas development. The regions make their choices according to the needs of the territory. In this context, Regions are required to provide documents supporting the identification of payments using the available sources. These include FADN, which was mentioned for this purpose in a publication of the Italian Rural Network containing the first guidelines for calculating payments (Italian Rural Network, 2010). To our knowledge there is little in the literature in this field and it mainly refers to methodological guidelines related to both the 2007-2013 and 2014-2020 programming periods (Cesaro *et al.*, 2009; Cagliero *et al.*, 2011; Cesaro *et al.*, 2014; Italian Rural Network 2014, 2015). Following those, there are three important approaches that could be adopted for rural development payments in Italy: counterfactual analysis, hypothetical analysis, and analysis of partial balance sheet. Counterfactual analysis has been adopted in several studies focused on the evaluation of single measures at farm level (on investments' impact or compensatory actions for less-favored areas or to assess environmental or agri-environmental and organic farming constraints) (Ferraro, 2009; Chabé-Ferret and Subervie, 2013; Arata and Sckokai, 2016; Cisilino *et al.*, 2019). The partial balance sheet, instead, requires data at productive process level. The literature on this subject, to our knowledge, is rather poor. This methodology was applied to Friuli Venezia Giulia RDP measures (Cisilino *et al.*, 2014), based on gross margin calculation and the partial balance sheets, which evaluate additional costs and income foregone. That study aimed to support the regional policy decision making process in developing the rural development strategy 2014-2020. In that case, a farm classification by type of farming, economic size, and geographical location was performed. Furthermore, there was no accurate sample information, so it was necessary to use a hypothetical cost and/or income values that caused the economic burden. This methodology, named as standard cost method, has been applied, for example, in the calculation

of conservative agriculture measure support payments or in evaluating arable crops management. It provides for the comparison of detailed but hypothetical data using different sources. Some other regions developed similar studies (Abruzzo, Liguria, Marche, Veneto, Sicily). The choice of the most appropriate method – counterfactual or partial balance sheet – depends on topic and on data availability as FADN allows both to be developed. A different approach adopted by Schwarz *et al.* (2011) is the Full Cost of Management (FCM) approach which provides an alternative counterfactual analysis for agri-environmental payments. This method is applicable in some mountain areas where farming systems extensively cultivate lands that are then gradually abandoned because farms do not achieve an adequate level of income. The FCM payment calculation is based on the income foregone plus costs incurred, but because the assumed counterfactual is an absence of agricultural management, and any current agricultural activity is operating at a loss, there is no income to forego, and the payment is entirely costs incurred. In the future the FADN data approach could be augmented by both IACS (Integrated Administration and Control System – EU Commission) and EU Land Use for Agricultural Statistics. Another interesting study by Pascucci *et al.* (2013) that uses FADN data, analyses the RDP measures beneficiaries and provides some evidence of Italian farmers' choices. The analysis distinguishes between farms characteristics (size, specialization, social capital, mechanization, membership of associations, farmer age, etc.) and territorial indicators (development of the agricultural sector, environmental constraints, development of commercial networks) as factors that can affect farm choices. Generally, more attention should be paid to investment, training and marketing in those regions that mainly need to support farms competitiveness, while those presenting high environmental constraints or risks the provision of environmental services would be the most important.

The purpose of our paper is to contribute to the discussion and try to fill in the literature gap on partial balance sheet method based on additional costs and income foregone at micro-level (Cesaro *et al.*, 2014; Rete Rurale Nazionale, 2015). The paper considers organic farming, which is receiving increasing attention at international level. As is known, organic farming contributes to the protection of the environment and climate, long-term soil fertility, high levels of biodiversity and high animal welfare standards (25% of agricultural land under organic farming by 2030, Green Deal, Farm to Fork Strategy). Some aspects of organic farming have potential costs, in particular lower yields, yield stability, water use and working conditions. However, the analysis of these factors must bear in mind that "organic farming with respect to conventional farming varies considerably and is highly dependent on the context" (Seufert & Rarankutty, 2017). The

European Union agricultural organic production has been regulated since 1991. After almost thirty years the EU regulations have been changed and extended to new productions (eg. breeding) and processing (eg. wine). So far, the rules are fixed in the Reg. n. 834/2007 which will be substituted by the Reg. n. 848/2018 in 2022. During the last ten years the area under organic farming has increased in Europe by almost 66% and it now counts for about 13.8 million certified hectares (Eurostat, 2019) or 8.5% of the EU's total Utilized Agricultural Areas (UAA). Italy is one of the leading countries in Europe with Spain, France, and Germany. The 2019 data processed by SINAB (National Information System on Organic Agriculture) highlight that Italy has increased the UAA by almost 2% compared to 2018, reaching 2 million hectares which are 15.8% of the national UAA and there are 80,643 organic producers (+2% with respect to 2018). Three main productions count for over 60% of the total: pasture meadows (551,074 ha), fodder crops (396,748 ha) and cereals (330,284 ha). These are followed by olive (242,708ha) and grape growing (109,423 ha). Friuli Venezia Giulia is one of the smallest Regions in the Northeast Italy with about 1,2 million inhabitants and covering an area of 7,858 square km (it borders Austria and Slovenia). 43% of the territory is mountainous and 19% is hilly with very limited lands for agriculture. According to the Italian Institute of Statistics (Istat) (6th Agricultural Census data, 2010) the total UAA is about 220 thousands hectares (1.7% of the national one). The average size of the 22 thousand farms (–33% with respect to year 2000) is around 10 hectares. More than the half of the total UAA is for arable crops (cereals, industrial and fodder plants) and grapevines. Livestock farms, mainly cattle and pork breeding, are about 14% of the total. The agricultural system is mainly characterized by small farms with little propensity for marketing strategies, but there are also some medium-large sized farms that are well-organized in food supply chains (e.g., pig meat farms belonging to the District of San Daniele ham or the well-known certified vineyards) (Cisilino & Monteleone, 2019). In 2019 the organic agricultural area in Friuli Venezia Giulia is about 12,800 hectares cultivated by 920 operators (-8.2% with respect to 2018). The most important organic crops in Friuli Venezia Giulia are pasture and meadow (28%), fodder crops (18.5%), cereals (13.4%), grape-growing (12.5%), rough grazing (9.3%) and industrial crops (8.8%). Viticulture is one of the most important sectors with the best performance at regional level for production, quality assurance schemes and exports. Furthermore, organic grape-growing has become widespread during the last decade with a constant increase in production (Cisilino & Cesaro, 2009). Considering the last two years of available data, the crops with the highest increase in area under organic cultivation are those of olive and grape growing with +21.3% and 18% respectively.

As the sector under study, it is important to highlight that the performance of organic grape-growing is strongly correlated to climatic conditions and so the regional level analysis is the most appropriate[2].

2. Materials and methods

The Method applied

Evaluating and planning policy interventions for the agricultural sector require increasing information about farms' technical and economic performance at regional level. The assessment process should be based on fair and verifiable calculations, as requested by the Commission (Reg. 1974/2006).

The determining of rural development support payments in Friuli Venezia Giulia is based on the one hand on FADN data, on the other, on a set of qualitative information collected from different sources. In fact, the FADN database is the only available microeconomic source with detailed information on farms' performance and crop/livestock processing, so that its use is appropriate and necessary. But if the aim of the study is too narrow or far from its content, new data collections from an additional survey could be conducted to provide data consistency. In this case, the additional sample provided by the direct survey integrates information in terms of both type of farming and crop processing. The additional regional sample is surveyed to study the economic parameters of farms belonging to three types, including those that apply organic farming methods. An additional database was then created. The method applied in this paper has its roots in a previous and comprehensive study conducted to identify the most suitable payments related to some measures included in the Friuli Venezia Giulia Rural Development Programme 2014-2020 (Cisilino *et al.*, 2014). Given the increased number of organic farms included in the FADN sample due to the additional survey and the differences between organic and conventional gross margin, some interesting results are expected. In the partial balance sheet method, the balance sheets relating to individual production processes are used to compare the costs and revenues of organic and conventional farms to estimate the amount of payment per hectare for

2. Vineyards located in wetlands as Friuli Venezia Giulia show a higher concentration of copper than those in dry areas, which suffer less from the pressure of the disease (Komárek *et al.*, 2010). Copper concentrations in Mediterranean dry climate organic vineyards in southern Italy are much lower than those found in wetlands in northern Italy (Provenzano *et al.*, 2010).

farms adopting organic farming practices. The basis of the calculation is the gross margin, which is the difference between the total gross production and the variable costs related to crop or livestock production, further charged by transaction costs, as established by Reg. EC 1305/2013. The gross margin excludes fixed costs as it is consistent with the provisions of the European Commission Regulation (EC Regulation No 1974/2006). The assets of the agricultural production process balance sheet are defined by gross production, which is the sum of the sales, secondary products, and re-uses values. The latter is determined by applying the most likely market unit value. The specific expenditure, being the passive section of the budget, consists of costs as production activity inputs, intermediate consumption of raw materials, services, and any other additional labor costs. It is assumed that the beneficiary is in a balanced position as far as the labor force is concerned, so that any increase of working units will be managed using temporary workers (Cesaro *et al.*, 2009). Fixed costs, interest (paid and calculated) on land capital and depreciation are not considered in the calculation of gross margin. The difference between the gross margin of treated and non-treated is the level on which to assess the payment's suitability. In calculating payments, the costs of organic certification are also included. These costs are the following: first registration costs (in the check system), maintenance costs and those related to the analyses required by the production specification (Reg. EC 834/07). The certification costs per hectare are calculated using the fees applied by the certifying bodies.

The Rural Development Regulation also allows transaction costs (Reg 1698/2005 and Reg 1974/2006). These can be counted as 20% of the payment. The estimation of transaction costs is based on a specific survey conducted by the authors: farms unions, professional trade organizations and experts were involved. According to the evidence, transaction costs are distinguished into three classes (small <5 ha, average 5-10 ha, large > 15 ha) as the dimension of the area under treatment is considered. The transaction costs for organic farming consist mainly of costs incurred by the farmer in managing the funding application, including those related to the time spent to fill it in and the relative hourly work cost. For time assessment, the cost of a skilled agricultural worker has been considered using both hourly rate and severance package applied to agricultural workers by the sector's collective agreement at regional level.

The Dataset used to identify the support payment

The Dataset collects 1,637 accounts, 1,266 of which belong to the online Friuli Venezia Giulia FADN Database (FADN FVG) and 371 from CREA-

ERSA additional survey. The three-year's survey ended in 2020, six months later than the scheduled time due to Covid-19 epidemic. The activities were organized in three phases: a) a preliminary contact (by telephone) to arrange meetings between interviewers-farms; b) direct survey/data collection; c) information checking and processing. As expected, some failures occurred: some of the farms included in the first list were replaced. Data monitoring showed an average drop rate of 35% during the whole period. The survey, conducted in the four provinces of Friuli Venezia Giulia, shows a greater concentration of farms in the provinces of Udine and Pordenone, those more suited to agriculture. The project was carried out as follows: first of all a desk data check and harmonization of databases. Starting from the lists of farms provided by ERSA, three samples were identified following three criteria: geographical location, farm-size and public funding requirements to access the provisions of the RDP. Then three samples of farms belonging to the organic, horticultural and livestock sectors were then produced. To conduct the survey using the FADN-CREA methodology, specific training was provided to interviewers.

The dataset therefore consists of the two merged databases: the Additional Survey database (ADDS) and the Friuli Venezia Giulia FADN database (FADN FVG). Both use the Italian FADN-CREA methodology on the time series 2016-2018. The same data collecting method was applied in both surveys, so the dataset is considered as a single homogeneous source of data. The following data stores were analyzed: a) Crops, which includes variables related to each single production process (one to many data); b) Farms, which includes structural data at farm level (one to one data); c) Certification, which includes information related to the quality production schemes (one to many data). The Italian FADN data include information additional to those required by the European Commission. For example, in the Italian Crops data store revenues and costs are recorded at single process level, so this allows the gross margin for any different crops cultivated by the farm to be obtained. This is crucial for the analysis presented here. Furthermore, the Certification data store includes organic farming information, even if there is not any specification about the single process. Therefore, it is assumed that farms with organic certification are entirely organic. The data processing is performed considering a three-year dataset, applying the same method used in Cisilino *et al.* (2015). The gross margin is calculated per hectare. The production processes with a positive gross margin are considered, as well as those having a positive production value. Certification costs are identified using the tariff of certifying bodies (e.g. ICEA). In the current analysis, however, since the additional sample of farms is made up of organic farms, specific attention is paid to certification. The transaction costs consider a re-valuation of the components according to the ISTAT annual rate (2018).

The value is then broken down according to the area covered by the crop. This is consistent with the administrative burden arising from the CAP and published by the European Commission (European Commission, 2019), as far as the application submission costs incurred by farms are concerned. All items determining administrative costs are considered and some farmers have been also interviewed. The paper tries to highlight how private transaction costs depend on several factors, distinguishing between internal costs (i.e. the value of the time spent by farmers, their families and employees to meet administrative obligations to submit applications), and external costs (i.e. costs for outsourced services). In the first case, the amount is affected by the farm size and its structure (livestock, arable land, permanent crops, mixed crops), by the number and types of funding support received, as well as the total support payments. Furthermore, the administrative governance (national or regional level), as well as the development level of digitalization, has a great impact on outsourced services costs (European Commission, 2019).

3. Results

The organic sample surveyed main results

The organic sample surveyed by the project includes 268 farms, 130 of which belong to the Additional Data Set (ADDS). The analysis provides a structural and economic overview of both of the FADN FVG and the ADDS. The farms were classified through altimetry ranges and economic size categories. In both samples only two farms show a Standard Output (SO) higher than €500,000, mainly due to the farm-size of Friuli Venezia Giulia region (small-medium seized). In the ADDS sample there is a greater number (25%) of small companies (SO between €8,000 and €25,000) attributing greater representativeness to these farms. The territorial location, on the other hand, shows a concentration of organic farms on the plains (49% in the ADDS, 54% in the FADN FVG), which gradually decreases as altimetry increases.

According to data, the average Utilized Agricultural Area (UAA) is highest in the FADN FVG sample, 34.42 hectares, while it is 16.50 hectares in the ADDS sample. The irrigated UAA on total UAA of both samples is equal to 25% of the surface (lowland organic farms are those that irrigate most, about 55% of the UAA).

The average workforce endowment slightly exceeds 2.00 Annual Work Units (AWU) per farm, about 70% of total work is done by the farmer and his family. The largest farms of the samples (included in the fourth economic size class with a SO between €100,000 and €500,000) have the largest workforce (3.95-5.9 AWU).

Table 1 - Organic sample: structural and economic characteristics. Average values at farm level, time series 2016-2018 (ADDS and FADN FVG)

	Number of cases	UAA Utilized Agricultural Area	AWU Annual Work Units	TO Total Output*	CC Current costs	FVA Farm Value Added	FNI Farm Net Income
	n.	ha		€	€	€	€
ADDS Organic Sample							
Altimetry							
Mountain	12	17.20	2.0	75,718	33,711	42,007	36,201
Hill	54	19.85	2.0	187,116	59,309	127,807	105,862
Plain	64	13.55	2.3	160,839	80,864	79,975	42,176
Economic Size							
8,000-25,000	39	3.25	1.0	113,177	72,110	41,066	27,510
25,000-50,000	32	7.95	1.4	79,253	23,256	55,997	41,840
50,000-10,000	26	12.01	2.5	120,826	43,070	77,756	47,554
100,000-500,000	31	44.75	4.0	314,774	117,438	197,336	139,939
> 500,000	2	32.36	3.0	728,535	232,790	495,745	431,980
Total (ADDS)	130	16.50	2.15	163,896	67,558	96,339	68,079
FADN FVG Organic Sample							
Altimetry							
Mountain	18	17.97	1.4	33,117	15,035	18,082	15,603
Hill	32	18.44	2.4	180,611	73,100	107,511	72,791
Plain	58	48.33	2.1	222,942	93,750	129,192	82,307
Economic Size							
8,000-25,000	18	7.76	0.8	30,542	12,338	18,204	10,481
25,000-50,000	35	13.16	1.2	45,341	18,437	26,904	18,053
50,000-100,000	20	18.21	2.0	148,060	41,291	106,769	92,352
100,000-500,000	33	46.01	3.4	311,532	146,201	165,331	104,028
> 500,000	2	617.00	5.9	1,963,928	764,764	1,199,164	641,733
Total (FADN FVG)	108	34.42	2.06	178,762	74,512	104,249	68,370

* In the Italian FADN the Total Output also includes the income from Other Gainful Activities (OGA) directly related to the farm.

Source: own data processing from CREA-ERSA direct survey.

The economic results make it possible to draw important conclusions relating to the farm's income statement (Table 1). The Total Output (TO), which includes the income of Other Gainful Activities (OGA) is between €164,000 and €178,000. More than 80% of TO is represented by the agricultural Gross Saleable Production (GSP) (over €140,000) and the

remaining 20% comes from OGA. Current costs (CC) affect the TO by 41%. Farm net income (FNI) is about €68,000 for both samples. Above-average values are those referring to hill farms and larger economic size farms.

The analysis of the two samples highlights some differences but also several similarities, especially in the results. This confirms that the structure of the farms has similar characteristics, reinforcing the solidity of the results.

Table 2 - Main crops surveyed

Organic crop species	**FADN FVG**	**ADDS**	**Dataset**
	n.	**n.**	**n.**
Grape growing – quality wine	31	39	70
Alfalfa	37	30	67
Soja	37	23	60
Polyphyta lawn	28	29	57
Corn	21	30	51
Permanent meadows and pastures	28	23	51
Potato	9	40	49
Barley	24	21	45
Apple	8	36	44
Wheat	26	16	42
Vegetable	21	17	38
Tomato	4	26	30
Radicchio	1	28	29
Onion	2	26	28
Zucchini	2	21	23
Sun flower	16	6	22
Olives for oil	2	20	22
Spelt	5	15	20
Grape growing – common wine	8	12	20
Actinidia (Kiwi)	8	10	18
Dry pea	6	12	18
Cauliflower	1	14	15
Aubergine	1	14	15
Cabbage	1	13	14
… (other crops)	…	…	…
Total organic crop	532	820	1,352

Source: own data processing on CREA-ERSA survey data.

The percentage of FADN FVG organic farms subsidized by the RDP's organic farming measure is 8.5% (Pascucci *et al.*, 2013), when considering the dataset used in this study (FADN FVG and ADD survey), the percentage increases to 14.5%. The organic crops recorded by the dataset are 1,352 or 18% of the total crop production processes (7,510), while the conventional processes are 6,158. Aggregating the data by type of cultivation, the number of organic crop species investigated is 110.

Table 2 shows the increase in the number and varieties of crops. The additional survey gives an important contribution especially on permanent crops - grape growing, apple tree, actinidia, olive tree, and on horticultural crops. Grape growing for organic quality wine is the most represented crop within 70 observations.

The support payment for organic grape growing

The support payment is provided using the production process method, identifying the differences between organic and conventional gross margins and transaction costs as established by Reg. EC 1305/2013. This allows organic additional costs and income foregone to be quantified.

Table 3 - Estimated payment - Grape growing (quality wine)

Average data	**Conventional**	**Organic**
n.	486	70
UAA	7.0	8.4
Yield (tons/hectare)	12.9	8.4
Total Output (€/tons)	719.9	956.6
Total Gross Production (€/hectare)	9,273	8,016
Total Variable Costs (€/hectare)	2,153	2,423
Certification Costs (€/hectare)		131
Gross Margin (€/hectare)	7,120	5,594
Transaction Costs (€/hectare)		93
Δ Gross Margin		1,527
Transaction Costs		93
Additional costs and income foregone		1,619

Source: own data processing on CREA-ERSA survey data.

Comparison between organic and conventional farming is a very interesting field of research started in the late 1990s with the first writings of Lampkin (1994) and then of Offermann and Lampkin (2006): since then, many approaches have been applied to highlight differences between the two systems, mainly to find out the potential gap to be compensated. The evaluation of organic versus conventional farming should consider the appropriate time horizon as this plays an important role when assessing the effects on soil fertility (effects can be observed some years after conversion). In this case, it was not possible to collect any data on the positive environmental effects coming from organic farming. However, these could be a very interesting further development of this study. The limit coming from the comparison of the two different farming system is less important in specialized viticultural farms where the profitability of the vineyard is not far from farm profitability. Still, significant differences may be observed between farms not processing and processing wine.

The results of the estimate confirm the difference between organic and the conventional farming at least for the grape growing sector. In fact, the results show the lower yield and lower gross margin per hectare of the organic grape growing. Although the total output per tons is higher for organic farms, this fails to compensate for the productivity loss. In general, grape growing gross production is quite high in Friuli Venezia Giulia. Looking at some other Italian regions, similar results have been provided by data processing as far as the total gross production is concerned (Liguria and Veneto RDPs, Annex, changes 2020 and update 2017). Furthermore, in the last decade there has been a significant increase in the spread of Glera variety to produce Prosecco wine (Cisilino, 2018; Mipaaf, 2016), which is characterized by higher yields per hectare (in the production disciplinary of Prosecco DOC in Friuli Venezia Giulia the yield is fixed in 18 tones, while in Veneto region the disciplinary for DOCG Conegliano-Valdobbiadene yield is 13,5 tons) than the limits required for other regional DOC varieties (an average value of 12 tones per hectare is normally assumed). Organic farming shows higher variable costs which also include certification costs. The certification costs per hectare have been defined using the rates published by the Institute for Ethical and Environmental Certification (ICEA). The basic tariff, the variable component and any extraordinary investigations required by the certification procedures have been considered. According to the ICEA tariff, for example, the certification cost for tree crops corresponds to €150.00/year plus €55.00 in the case of apple trees and plus €30.00 in the case of grape growing (Abruzzo RDP, update, 2018). In our analysis, it was possible to process the average value of the certification costs recorded in the dataset. The conventional and organic crops gross margin delta increases when transaction costs are also included. These costs are consistent with what has emerged in

other Italian regions (Marche RDP 2014-2020, Revision 2018; Sicilia RDP 2014-2020, Revision 2018).

The analysis presented in this study shows some limitations; the main ones are the following: i) the paper is focused on a single measure and on a single type of farming (general validity problem); ii) an additional survey was funded to overcome the FADN lacks in terms of the relatively low numbers of farms within a specific type of farming (funds' availability problem); iii) a single Italian region is considered (restricted area under study problem). To extend the validity of these results, further analyses should be applied to both other measures/types of farming and territorial context.

4. Conclusions

The analysis presented in this paper provides useful information for the rural development decision-making process, showing a method to identify the appropriate payment for RDP's organic farming measure, based on the gross margin method. To achieve this, a FADN additional survey is considered crucial and necessary, mainly to avoid some FADN limitations in terms of low number of organic farms included in the continuous database. The importance and usefulness of an integration of information by an additional survey that could enlarge the continuous FADN survey, allows on the one hand to widespread information about the Italian methodology – which is richer in information than the standard requested by the Commission – on the other to highlight the importance of filling some gaps in the database in terms of response to specific issues. In this case, the increased number of observations by crops allows a more robust result to be obtained as far as the calculation of organic grape growing payment is concerned. Furthermore the results confirm those of previous studies developed by some Italian Regions (Abruzzo, Liguria, Marche, Sicilia and Veneto). Even if the data processing has been performed for only one crop, this should be considered as a good first step, a promising one towards all the other crops. Furthermore, FADN is designed to be representative of the regional farming systems, but very small farms are not included. Instead, as is known, those are the farms that find involvement in organic farming and be less profitable with respect to large farms due to the fixed transaction costs as in the case of the agri-climate and environmental schemes (Bartolini *et al.*, 2021). The additional survey tried to fill in this gap and included a large number of small organic farms. However, this study has several shortcomings as regards the data used, which are project specific, therefore difficult to be applied elsewhere without funding. When discussion focuses on data availability, one of the most important issues to be addressed is the harmonization of statistics: this would require

above all the cooperation among Public Institutions (both related to Research and Governmental Institutions at EU, national and regional level) whitin a view of common use of available resources (costs reduction) as well as better data quality assurance. Although the transition to a more results-oriented model is desirable to better understand the link between payments and environmental performance (Reg. EU 2020/2220), the current methodologies as well as data collection systems, seem not to be satisfactory, as they cannot ensure the application of results-based payments. Furthermore, in most cases ex-post analyses are developed, while on-going monitoring and above all a different evaluation process especially for organic and environmental measures schemes would be necessary.

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