

Integration of agritourism farms' microdata: economic analysis and impact assessment of the COVID-19 effects

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Abstract

The paper presents the results of the integration of different data, collected by statistical surveys and administrative sources, in order to estimate the economic results of the Italian agricultural holdings and agritourism farms. It also proposes an assessment of the consequences of COVID-19 on farmhouses through a micro-simulation, based on three hypothetical scenarios for 2020, including both the most recent economic sectoral trends and the survival probability of the agritourism farms. According to the analysis, reduction in turnover could range between -14.3% and -23.4%, while losses of value added should range between -16.9% and -27.8%. Micro-founded analysis, coupled with macro trends, allowed the evaluation of the extent of the crisis in the agritourism sector and the consequences both at territorial level and for different types of businesses. The incomes reduction is stronger for small farms in the South and Islands area of Italy, while the biggest ones show lower losses due to the diverse and larger activities.

Keywords: Micro-integration, agritourism farms, economic indicators, microsimulation.

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1. Introduction²

From the beginning of the Coronavirus pandemic, more than 2.7 million people have died. In order to contain this health emergency, at the beginning of 2020 the social and economic interconnections were affected by a sudden stop. Consequently, as affirmed by the United Nations World Tourism Organization (UNWTO) Secretary General Zurab Pololikashvili “[...] *tourism has been hit hard, with millions of jobs at risk in one of the most labour-intensive sectors of the economy*”.

The Istat survey “*Situation and prospects of enterprises in the health emergency COVID-19*” provided a first empirical evidence of the consequences of the pandemic. This survey³ had the purpose of collecting assessments directly from enterprises about the effects of the health emergency and the economic crisis on their business. The survey attests that during phase 1 of the health emergency (between 9 March and 4 May 2020), 45.0% of units with 3 and more employees (458 thousand, which cover 27.5% of employees and 18.0% of turnover) suspended operations. At sectoral level, considering construction and service the majority of the enterprises suspended their activities: 58.9% and 53.3% respectively, compared to 36.0% of industry in the strict sense and 30.3% of trade. Moreover, 38.0% (with 27.1% of employees) reported operational and sustainability risks of their business and 42.8% requested liquidity and credit support (DL 18/2020 and DL 23/2020). More than half of the enterprises (37.8% employed) have forecasted a lack of liquidity to meet the expenses planned until the end of 2020. Over 70% of units (representing 73.7% of employment) reported a reduction in turnover in the two-month period of March-April 2020 compared to the same period of 2019.

2 The assessments expressed in this article are based on the situation referring to the end of March 2021 and on data updated to December 2020. Moreover, they do not consider further government measures that could limit the accommodation activity in 2021.

3 Istat, 2020f. The target population is consistent with that defined in the permanent census of enterprises: active enterprises operating in industry, commerce and services have been considered according to the classification of economic activities “ATECO 2007”: sections “B” to “N” and “P” to “R”, divisions “S95” to “S96”. Enterprises with at least 2.5 average employees in the year were included and enterprises with an average number of employees of 99.5 or more were included as a census. The overall sample, interviewed with self-compilation CAWI, included 90,461 units, of which 46.9% have provided answers.

On this point, the Survey on “*Agritourism season 2020 – COVID-19 impact*” conducted under the Programme of the National Rural Network 2014-2020, has underlined how the 86% of the agritourism farms has suffered a loss of revenues (ISMEA, 2020*b*; 2021).

Starting from this context, our analysis aims at estimating the impact of the lockdown on the economic performance of the agritourism farms (farmhouses), on which the domestic and international demand collapse had a deep impact. To this purpose, we used an integrated database that gathers different sources to estimate the economic results of agricultural enterprises and agritourism farms with a bottom-up approach. This work is organised in four sections. The next one describes the whole population of agritourism farms (AFs) using data from the Istat census survey⁴ and the extended farm register⁵ (FR2) for the estimation of economic results at unit level. The extended farm register integrates the basic farm register⁶ (FR) with economic data derived from administrative and statistical sources such as social security contribution and tax returns data, financial statements and foreign trade data. This allows to estimate the values of the income statement and to build a pre-pandemic scenario at a micro level.

The central part (third and fourth paragraph) refers to the resume of main analyses and evaluations about the effects of the pandemic situation on AFs and to the first simulation of possible scenarios, based on electronic invoicing data at sectoral level and tourism statistics.

The final part (fifth paragraph) reports the microsimulation analysis. Three alternative scenarios have been defined, based on different hypotheses as regards the collapse of demand for accommodation and catering services. The main purpose was the estimation of a range of variation of the revenues at micro level, given the knowledge of sector trends based on data from electronic invoicing, tourism statistics and the distribution of the farms survival rate by province.

4 Istat, 2019*b*. Istat has been carrying out the survey on agritourism farms since 2007. It is an annual census survey which detects the main structural characteristics and the kind of activities carried out by AFs. Regions and Autonomous Provinces collect data.

5 Oropallo, 2021.

6 Istat, 2019*c*.

2. Agritourism farms in Italy: a pre-pandemic snapshot

The capacity of farmhouses to combine innovation and tradition (Palmi and Lezzi, 2020) could be one of the reasons of the significant signs of growth shown in the recent years. Between 2007 and 2018, in fact, the number of AFs increased by 33%, while in the same period the value added (VA) of AFs increased from 1.08 to 1.46 billion euros⁷. Between 2011 and 2018, farmhouses recorded an increase of +15.7% (equal, in absolute terms, to 3,202 units), closing 2018 with 23,615 AFs authorised to carry out agritourism activities (Table 1 and Figure 1). Among the regions with the highest growth, Puglia (+139.3%) is characterised by a high variability around this trend (the Coefficient of Variation – C.V.⁸ is 33%).

Concerning the southern regions and the Islands (10.5%), different trends characterise Abruzzo (-22.6%), Campania (-15.2%), Calabria (-3.3%) and Sardegna (-3.3%). In 2018, Toscana alone accounted for almost 20% of the total of national AFs, followed by 15.5% in Trentino-Alto Adige.

It is interesting to note that a greater diffusion of AFs is associated to longer average life (Figure 1); it happens in Toscana, Emilia-Romagna and Trentino-Alto Adige. In other regions, the picture is more heterogeneous and partly affected by administrative changes, as in the case of Sardegna.

The spatial-temporal configuration of the AFs highlights two macro-areas with high longevity, described by an average age of 15 years (the national average age is 10). This survival analysis will be also integrated in the microsimulation analysis to calibrate the risk of market exit. The first macro-area extends from the eastern side of Liguria to the south-west border of Umbria and includes all Toscana. The second one covers the regions of the Northeast. These two areas are joined by a “corridor” given by the municipalities that cross Emilia-Romagna from the north (Mirandola) to the south (Camugnano), which gives territorial continuity to these two ‘high longevity’ macro-areas.

⁷ The estimation is based on National Accounts of agricultural sector (Istat, 2020b).

⁸ The Coefficient of Variation is the ratio between the standard deviation of longevity and the average life.

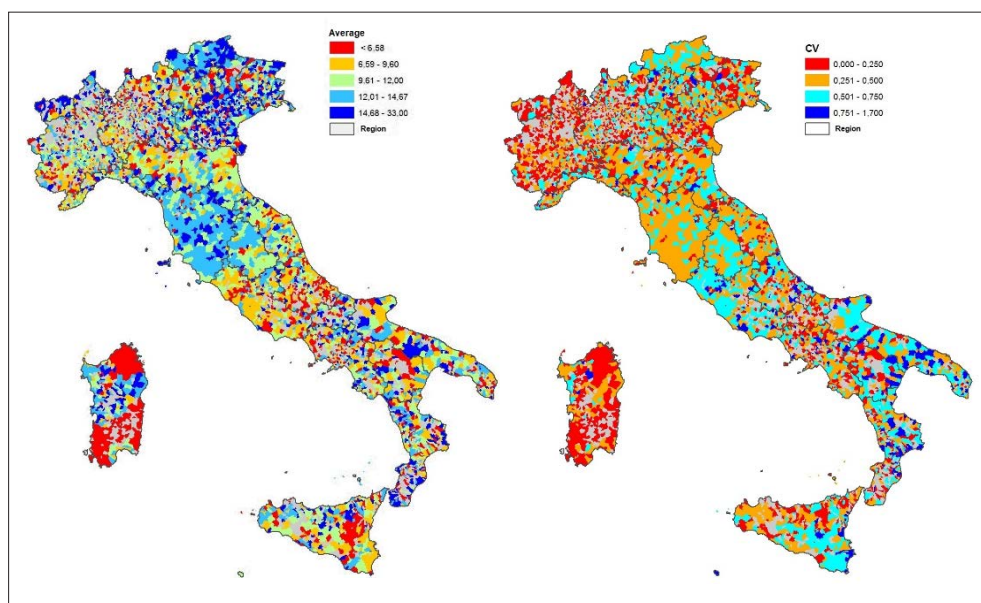
Table 1 - Active agritourism farms by region and geographical division. Years 2011-2018 (absolute values, % change 2011-2018 and Coefficient of Variation)

REGIONS AND GEOGRAPHICAL AREAS	2011	2012	2013	2014	2015	2016	2017	2018	% change	C.V.
<i>North-west</i>	3,001	3,176	3,361	3,481	3,576	3,596	3,656	3,705	23.5	0.07
Liguria	478	543	567	588	624	621	652	656	37.2	0.10
Lombardia	1,361	1,415	1,521	1,565	1,588	1,614	1,637	1,673	22.9	0.07
Piemonte	1,110	1,164	1,220	1,271	1,305	1,300	1,305	1,316	18.6	0.06
Valle d'Aosta/Vallée d'Aoste	52	54	53	57	59	61	62	60	15.4	0.06
<i>North-east</i>	6,300	6,391	6,675	6,794	6,870	6,877	6,904	6,940	10.2	0.03
Emilia-Romagna	1,030	1,036	1,106	1,133	1,187	1,156	1,167	1,166	13.2	0.05
Friuli-Venezia Giulia	566	588	614	632	643	656	661	670	18.4	0.05
Trentino-Alto Adige/Südtirol	3,366	3,391	3,506	3,570	3,550	3,581	3,651	3,648	8.4	0.03
Veneto	1,338	1,376	1,449	1,459	1,490	1,484	1,425	1,456	8.8	0.03
<i>Centre</i>	6,935	7,076	7,152	7,274	7,642	7,777	8,264	8,382	20.9	0.07
Lazio	811	841	884	940	950	947	1,253	1,278	57.6	0.17
Marche	786	788	880	1,005	1,030	1,060	1,070	1,082	37.7	0.12
Toscana	4,125	4,185	4,108	4,052	4,391	4,518	4,568	4,620	12.0	0.05
Umbria	1,213	1,262	1,280	1,277	1,271	1,252	1,373	1,402	15.6	0.05
<i>South</i>	2,760	2,395	2,257	2,731	2,651	2,858	2,917	3,050	10.5	0.09
Abruzzo	730	774	653	790	601	575	575	565	-22.6	0.13
Basilicata	131	145	112	131	135	162	180	187	42.7	0.17
Calabria	609	610	577	544	521	605	608	589	-3.3	0.05
Campania	831	407	458	523	572	648	677	705	-15.2	0.22
Molise	93	104	104	105	135	136	125	128	37.6	0.13
Puglia	366	355	353	638	687	732	752	876	139.3	0.33
<i>Islands</i>	1,417	1,436	1,452	1,464	1,499	1,553	1,665	1,538	8.5	0.05
Sardegna	828	834	819	799	794	794	807	801	-3.3	0.02
Sicilia	589	602	633	665	705	759	858	737	25.1	0.12
<i>Italy</i>	20,413	20,474	20,897	21,744	22,238	22,661	23,406	23,615	15.7	0.05

Source: Processing based on Istat data - Survey on agritourism farms

In most of the municipalities of the first geographical area (North-west), the C.V. varies between 0.06 and 0.10, showing a low variability of the AFs' life years within the municipalities. The values of this statistical indicator for the second macro-area (North-east) are even lower. In general, the AFs of these two areas are not only longer-lived, but this longevity is not due to the presence of outliers. On the contrary, the municipalities with average values of less than 10 years also have a higher C.V. and, therefore, show greater volatility of the permanence of these structures on the market.

Figure 1 - Mean and C.V. of the number of years of agritourism farms' activity at the municipal level (Years 2011- 2018)



Source: Processing based on Istat data - Survey on agritourism farms

2.1 Economic results of the agritourism farms

The estimation of economic results in the context of the extended farm register (FR2) made it possible to obtain a measure of the economic dimension of the agritourism sector with a bottom-up approach. The FR2 expands the information content of the basic farm register⁹ through the integration of administrative and statistical sources. The basic register, available since 2014, includes the structural information of the farms such as the unit type, economic activity and technical-economic orientation (OTE) with standard production, the main crops (in terms of utilised agricultural area), livestock, the size of the farms and the location. The additional variables of the FR2 involve inputs of self-employed agricultural work, employees and their characteristics, labour costs, income statement variables such as sales and other revenues, changes in stocks, value of production, cost of goods and services, leasing cost, other charges. These variables allow us to compute

⁹ Istat, 2019c.

the VA and the gross operating margin of the agricultural activity for each farm. Other information is structure cost, investments, import-export at a detailed level, belonging to groups and level of control. For this purpose, the administrative and statistical sources have been integrated with the farm register (FR) data for each year:

- 1) National Social Security Institute (INPS) declarations relating to self-employed agricultural workers (AUTAGR) and agricultural labour (DMAG).
- 2) Tax return declarations (sole proprietorships, partnerships, corporates and non-commercial entities) and VAT returns.
- 3) Financial statements of corporates.
- 4) Istat Foreign Trade Data (Coe).
- 5) Structural business data (SBS Frame)¹⁰;
- 6) Data from the employment register and the register of business groups.

The matching of the units was carried out using the identifying code of the integrated system of microdata (SIM), which translates the tax code of the production unit or of the natural person into a unique anonymous code. The first results of integration with data from administrative sources confirm the presence of a significant portion of units without tax obligations whose economic size is minimal (about two of three units). In these cases, they are small farms that employ less than half a person-year and derive from agricultural production less than 7 thousand euros a year, which represents the threshold for exemption from tax obligations. To estimate the economic variables, the first step concerns the estimate of the self-employed and family work input based on the declarations of the 350 thousand farms from INPS-AUTAGR source. Other farms are not obliged to submit an INPS declaration relating to family labour. To this end, a logarithmic model that relates the observed independent workdays with the characteristics of the basic register has been estimated: utilised agricultural area (UAA), adult bovine units (UBA), specialisation (OTE), unit type (enterprise with farm, secondary activities of SBS enterprises, farms of public institutions and informal farms of individuals) and farms location. The estimated parameters applied to the

¹⁰ Luzi and Monducci, 2016; Istat, 2019a.

smaller farms made it possible to calculate the annual days of self-employed for the management of farm activities.

The analysis of the coverage with regard to all the sources used in the integration process allows the stratification of all farms based on both a dimensional criterion and the availability of economic data:

- Smaller units (below the threshold) with missing revenue data (equal to 66.7%). They are widespread, but predictable and not very influential from an economic point of view. They constitute a significant part of the whole population, with the possibility of estimation from a mass-imputation model, using all the auxiliary variables of the FR and considering the behaviour of farm near to the revenue threshold.
- Micro and small-medium units: farms with 2-99 employees above the exclusion threshold, with percentages of valid data in the income statement of approximately 97%. These constitute the less problematic subset with little missing data.
- Large farms with 100 employees or more with complex organisation. For these units it is important to consider the type and legal status, in order to identify farms belonging to public institutions (regions and other public bodies). Out of 139 large farms, 23 are public and private institutions (equal to 16%); this share rises to 30% for farms with 500 employees or more.

As far as data are complete, the economic value of agricultural activity was calculated using as a proxy the share of revenues from agricultural activities on the total turnover from VAT returns. The imputation procedure is the multiple hot-deck technique with stratified selection of donors (Kim, J. K., and Shao, J., 2014).

Among the 24 thousand AFs, 51% belongs to the subset of businesses with prevalent agricultural activity, 26% is associated with SBS enterprises (with prevalent activities in industry or services) and the remaining 23% concerns less structured farms. Total annual jobs of AFs are about 57 thousand, with 26,404 employees. The annual turnover reaches 3.2 billion euros in 2018. The VA of these units is about 1.6 billion and the remuneration of the labour factor is about 641 million.

The Table 2 shows the breakdown of farms by size and the main variables of the income statement together with the export values. More than two thirds of the farms employ one people-year (class 1), while 26% of the farmhouses employ between 2 and 9 workers. Small-size units (between 10 and 19 employees) are 442 (1.9%), while medium-large enterprises with at least 20 employees are 185 (0.8%). For this segment there are the highest values of turnover (981 million euros) and of employees (7,774) and these are units with more articulated organisation and with several kind of activities connected with the agritourist one; they also record high values of exports 410 million (approximately 32% of revenues). Among the micro and small farms, those with 3-4 workers employ the most part of employees and show the highest value added.

**Table 2 - Agritourism farms and main economic variables by class of workers.
Year 2018**

CLASS OF WORKERS	Farms	Total jobs	Employees	Turnover (mil€)	Value added (mil€)	Labour cost (mil€)	Gross operating margin (mil€)	Export (mil€)
1	12,986	12,133	526	379.6	211.6	10.1	201.5	3.1
2	4,661	9,188	2,200	339.3	209.5	44.6	164.9	4.9
3-4	4,345	15,300	6,454	679.3	414.2	136.1	278.1	18.9
5-9	996	6,846	4,818	405.5	217.1	108.5	108.6	32.1
10-19	442	5,460	4,631	400.5	185.8	111.3	74.4	38.4
20 and more	185	8,067	7,774	981.3	398.8	230.3	168.5	312.4
<i>Total</i>	<i>23,615</i>	<i>56,994</i>	<i>26,404</i>	<i>3,185.5</i>	<i>1,637.1</i>	<i>640.9</i>	<i>996.2</i>	<i>409.8</i>

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

In Toscana, about 13 thousand workers are active in AFs, which produce a turnover of about 944 million and about 456 million of VA (Table 3). Bolzano/Bozen and Lombardia follow in the ranking. In the South, Puglia produces the highest VA. The economic results in 2018 represent the basis of the microsimulation analysis to evaluate the impact of pandemic made in the fifth paragraph.

Table 3 - Agritourism farms and main economic variables by Region. Year 2018

REGIONS	Farms	Total jobs	Employees	Turnover (mil€)	Value added (mil€)	Labour cost (mil€)	Gross operating margin (mil€)	Export (mil€)
Piemonte	1,316	3,067	1,298	176.7	95.8	30.3	65.5	24.2
Valle d'Aosta/ <i>Vallée d'Aoste</i>	60	107	28	2.9	1.3	0.6	0.7	0.0
Lombardia	1,673	5,242	2,679	412.5	199.2	71.1	128.1	13.6
Bolzano/ <i>Bozen</i>	3,185	6,564	959	309.1	230.4	19.7	210.7	1.6
Trento	463	1,319	578	77.9	40.4	14.1	26.4	0.8
Veneto	1,456	3,933	1,684	270.9	139.5	38.4	101.1	11.7
Friuli-Venezia Giulia	670	2,066	1,063	104.2	61.5	24.8	36.7	10.0
Liguria	656	1,045	303	45.1	24.6	6.7	17.9	1.6
Emilia-Romagna	1,166	3,764	2,038	228.8	114.1	50.8	63.3	6.7
Toscana	4,620	13,058	7,690	944.0	445.9	222.4	223.5	310.2
Umbria	1,402	2,586	1,077	104.8	42.6	25.1	17.5	3.7
Marche	1,082	1,854	638	63.0	28.9	14.1	14.8	7.9
Lazio	1,278	2,532	1,227	113.5	56.3	26.7	29.7	5.3
Abruzzo	565	845	249	24.9	12.2	4.6	7.7	1.8
Molise	128	228	99	11.1	2.5	1.8	0.8	0.0
Campania	705	1,248	577	36.3	15.9	9.8	6.1	0.6
Puglia	876	2,599	1,728	103.0	47.9	32.2	15.6	1.4
Basilicata	187	344	158	8.9	3.9	2.4	1.5	4.2
Calabria	589	1,342	795	26.4	11.4	13.7	-2.3	0.4
Sicilia	737	1,726	976	67.0	32.8	19.4	13.4	3.6
Sardegna	801	1,525	561	54.6	29.8	12.3	17.6	0.4
<i>Italy</i>	<i>23,615</i>	<i>56,994</i>	<i>26,404</i>	<i>3,185.5</i>	<i>1,637.1</i>	<i>640.9</i>	<i>996.2</i>	<i>409.8</i>

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

From the point of view of performance indicators, we observe a nominal labour productivity increasing with the size of the enterprises and increasing profitability¹¹ by size (Table 4). The ratio between average profitability and VA is 15.5%. An average share of exported turnover is also estimated at 12.9%, which rises to 31.8% for farms with 20 employees or more. Nominal labour productivity is the highest in Lombardia, Bolzano/*Bozen*, Veneto and Toscana (Table 5). The share of exports on turnover is the highest in Toscana (32.9%) and Basilicata (47.4%). Profitability is negative for many farms in the South: Calabria (-103%) and Molise (-62%).

¹¹ Gross profitability (r) is equal to the adjusted EBITDA (Gross Operating Margin net of the cost of independent labour) on the value added. The cost competitiveness indicator (Comp_{et}) is equal to the ratio of value added per capita to unit labour costs (ULC) and represents the value created by the business unit for 100 euros of labour costs. The gross profitability $r = 1 - 1 / c$ can also be derived from it.

Table 4 - Economic performance indicators by class of workers. Year 2018

CLASS OF WORKERS	Average size	Turnover per worker (000€)	Value added per worker (000€)	Unit Labour Cost (000€)	Compet %	Profit %	Export share%
1	0.9	31.3	17.4	19.2	90.9	-10.0	0.8
2	2.0	36.9	22.8	20.3	112.5	11.1	1.4
3-4	3.5	44.4	27.1	21.1	128.4	22.1	2.8
5-9	6.9	59.2	31.7	22.5	140.9	29.0	7.9
10-19	12.4	73.3	34.0	24.0	141.5	29.3	9.6
20 and more	43.6	121.6	49.4	29.6	166.9	40.1	31.8
<i>Total</i>	<i>2.4</i>	<i>55.9</i>	<i>28.7</i>	<i>24.3</i>	<i>118.3</i>	<i>15.5</i>	<i>12.9</i>

Source: Processing based on Istat data and administrative data - Extended Farm Register (FR2)

Table 5 - Economic performance indicators by Region. Year 2018

REGIONS	Average size	Turnover per worker (000€)	Value added per worker (000€)	Unit Labour Cost (000€)	Compet %	Profit %	Export share%
Piemonte	2.3	57.6	31.2	23.4	133.8	25.3	13.7
Valle d'Aosta/ <i>Vallée d'Aoste</i>	1.8	26.5	12.2	21.8	55.9	-78.9	1.0
Lombardia	3.1	78.7	38.0	26.5	143.2	30.2	3.3
Bolzano/ <i>Bozen</i>	2.1	47.1	35.1	20.5	170.9	41.5	0.5
Trento	2.8	59.1	30.6	24.3	126.1	20.7	1.0
Veneto	2.7	68.9	35.5	22.8	155.6	35.8	4.3
Friuli-Venezia Giulia	3.1	50.4	29.7	23.3	127.7	21.7	9.6
Liguria	1.6	43.2	23.6	22.1	106.7	6.3	3.6
Emilia-Romagna	3.2	60.8	30.3	24.9	121.5	17.7	2.9
Toscana	2.8	72.3	34.1	28.9	118.1	15.3	32.9
Umbria	1.8	40.5	16.5	23.3	70.6	-41.6	3.6
Marche	1.7	34.0	15.6	22.1	70.5	-41.9	12.5
Lazio	2.0	44.8	22.2	21.7	102.3	2.2	4.7
Abruzzo	1.5	29.4	14.5	18.3	79.0	-26.5	7.1
Molise	1.8	48.7	11.2	18.1	61.8	-61.7	0.4
Campania	1.8	29.1	12.8	17.0	74.9	-33.5	1.8
Puglia	3.0	39.6	18.4	18.7	98.7	-1.3	1.4
Basilicata	1.8	25.9	11.4	15.1	75.5	-32.4	47.4
Calabria	2.3	19.7	8.5	17.2	49.3	-102.9	1.4
Sicilia	2.3	38.8	19.0	19.9	95.5	-4.7	5.4
Sardegna	1.9	35.8	19.6	21.8	89.5	-11.7	0.6
<i>Italy</i>	<i>2.4</i>	<i>55.9</i>	<i>28.7</i>	<i>24.3</i>	<i>118.3</i>	<i>15.5</i>	<i>12.9</i>

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

3. The effects of the pandemic: legislative measures and some assessments

Farms with agritourism activities suffered more than others from the shocks of the pandemic. The study of Mastronardi and Giaccio (2011) highlights different performance between farms with and without farmhouses. In fact, the former have a sort of advantage on the social and environmental level, while the latter have better performance on the economic side. AFs have lower profitability than other agricultural holdings, due probably to the high incidence of farm costs, in particular labour costs. In fact, they are characterised by a greater use of labour, especially of an extra-family nature, irrespective of the size of the farm.

To tackle the pandemic, several regulatory measures have taken place since spring 2020.

In the so-called *Relaunch Decree (Decreto Rilancio)*, it was planned to grant farmhouses an extraordinary contribution for each estimated failure of overnight stays of costumers, determined by the difference between the actual attendance of the period January - June 2019 and that of the same period of 2020. Missed attendance had to be quantified based on communications made to the competent Quaestors pursuant to public safety regulations. The budget for 2020 was 80 million euros and the draft version of the Decree provided that farms could be granted an advance payment.

In support of the process of containment of losses resulting from the pandemic, several regions, including Friuli-Venezia Giulia and Sicilia, prepared specific economic measures, aimed at farmhouses and educational farms. As a rule, all beneficiaries who fulfilled the eligibility conditions were in the condition to be eligible for funding: the holdings had to be active on the date of submission of the application for support, in order to be included in the register of enterprises of the Chamber of Commerce and in the lists of farmhouses or educational farms.

The further additional Decree (*Decreto Ristori*), published on the Official Gazette of 28 October 2020, provided for a non-repayable contribution for active entrepreneurs, with VAT number, on 25 October 2020 and who carried out one of the activities listed in the decree. Among these, the activities of agritourism (accommodation or catering) and other related to entertainment,

sport and tourism. The contribution was subject to the condition that the revenues for April 2020 were lower than 2/3 of the revenues for April 2019¹² (this requirement was not necessary for those who started after 1 January 2019).

As for the procedure, there were two modalities: those who have already benefited from the contribution provided for by the previous Decree (*Decreto Rilancio*) would receive a direct contribution on their own bank account from the Revenue Agency; the other subjects, on the other hand, should have electronically submitted a specific request. The amount of the contribution would be calculated by applying a specific coefficient related to the ATECO activity code (for farmhouses with accommodation was 150%, for those with catering to 200%) to the amount due according to the rules of the *Decreto Rilancio*.

The decree also cancelled the second tax duty IMU 2020, due within 16 December 2020, with reference to the properties and related appliances in which they exercised the agritourism activities and rent rooms, bed and breakfast, holiday homes. To benefit from the facility, it was necessary that the owners of the real estate should also be directly managers of the activities carried out there.

For the private employers of the AFs with accommodation and catering, the terms relating to the payment of social security contributions, social security premiums and compulsory insurance premiums due for the month of November 2020 were suspended. Such payments were due without the application of penalties and interest, in a single instalment by 16 March 2021 or in tranches up to a maximum of four equal monthly tranches, with the payment of the first one within 16 March 2021.

The new anti-COVID decree (end of 2020), which stated further restrictions until 15 January 2021, has continued to limit the activities of AFs, contextualising them to the possibility of take-away and home delivery, with an estimated loss of overnight stays in AFs, during the Christmas and New Year period, equal to about 2 million. The take-away and home delivery activities had a positive outcome during the Christmas holidays, although

¹² According to estimates based on the electronic invoicing data (introduced in section 5), the revenues for April 2020 were quite lower than 2/3 of the revenues for April 2019.

even until the weekend 9 and 10 January 2021 Italy remained in the “orange” zone, so with about 24 thousand Italian farmhouses still closed even at lunch.

The views expressed by the farm managers themselves represent one of the most up-to-date measurement of how the sector operators are metabolising the consequences of the pandemic. However, there are no quantitative measurements on actual losses that could have characterised the farmhouse sector in the year 2020 based on objective data and not only on estimates.

According to ISMEA (2020), one of the sectors that should pay a high price to the COVID-19 pandemic is the tourism sector. ISMEA estimates that the losses of the farmhouse sector reached one billion in 2020. After the record figure of 13.4 million overnight stays in AFs in 2018, ISMEA estimates predicted, for 2020, a total loss for the sector of about 970 million euros, equivalent to 65% of turnover, mainly derived from the collapse of international demand.

We should also consider the fall in domestic demand because of the lockdown, for which both the Easter period and the holiday bridges of 25 April and 1 May were characterised by low tourist demand, with effects estimated at a loss of about 200 million euros, equal to 40-50% of the annual quota deriving from Italian guests. In addition, there was a further lost income of about 70 million euros. This results from the cancellation of the visits to the 1,500 farms that are also educational farms (*i.e.* used by school and families). These visits are mainly concentrated in the months of April and May.

Subsequently, in July 2020, the Confagricoltura Study Center (Baccino, 2020) estimated a drop in turnover of more than two-thirds compared to 2019, with a 71% reduction in overnight stays. In details, it was estimated that the sector’s turnover fell slightly below 1.5 billion euros (1,460 million), 62% higher than the 900 million euros (970 million, including educational activities) estimated in May by ISMEA. Therefore, the turnover of accommodation and catering in the farmhouse sector should have fallen just below 600 million euros (597 million), less than a third of the turnover of 2019. Possible further deterioration could have occurred in the autumn period because of the dreaded “second wave” of infections.

According to the CIA (Italian Farmers' Confederation)¹³, the situation of inland areas was particularly problematic, fragile by nature, because they still lacked adequate physical and digital infrastructure and services. In this perspective, the Recovery Fund is a great opportunity to give the right space and projects aimed at promoting the interior areas, involving primarily the farmhouses.

In the last months of 2020, ISMEA carried out a special survey regarding the evaluation of the effects of the pandemic on the performance of Italian farmhouses (in addition, ISMEA launched a portal dedicated to farmhouses¹⁴). The first results showed that, based on the views expressed by the sample of farmhouses that participated in the survey¹⁵, because of the pandemic:

- the revenues decreased for 85% of the farmhouses, resulting in growth in only 6% of cases;
- during the lockdown, 15% of the structures thought to stop the activity, 45% to limit the damages and to wait for the return to a situation of normality and 29% to relaunch the enterprise with new strategies;
- almost half of the structures (47%) said, however, that they saw positive prospects for the future, 21% uncertain and only 9% negative, confirming how the sector analysed can be able to adapt even to unforeseen and complex situations such as the pandemic, which is still ongoing.

Following the entry into force of the *Decreto Ristori*, the main trade associations, including CIA and COLDIRETTI, have underlined the difficult situation. They highlighted how it continued to be “[...] *Impossible to work for the 24 thousand Italian agriturismo farms because of the mandatory stop in the “red” and “orange” Italian zones and the night limitations in the “yellow” areas [...] Aids do not solve much [...] because structural interventions are needed, starting with energy concessions for at least 80% of the costs*” (Amato, 2020).

13 Ranerelli, 2020.

14 www.agriturismoitalia.gov.it/it/homepage.

15 The average age of the holder of the farm that participated in the survey is 51 years. In half of the cases (49%) the management is family type (with employees). The 45% of the farmhouses has a utilised agricultural area between 6 and 20 hectares. In 78% of cases, the farms surveyed have been in business for at least 10 years.

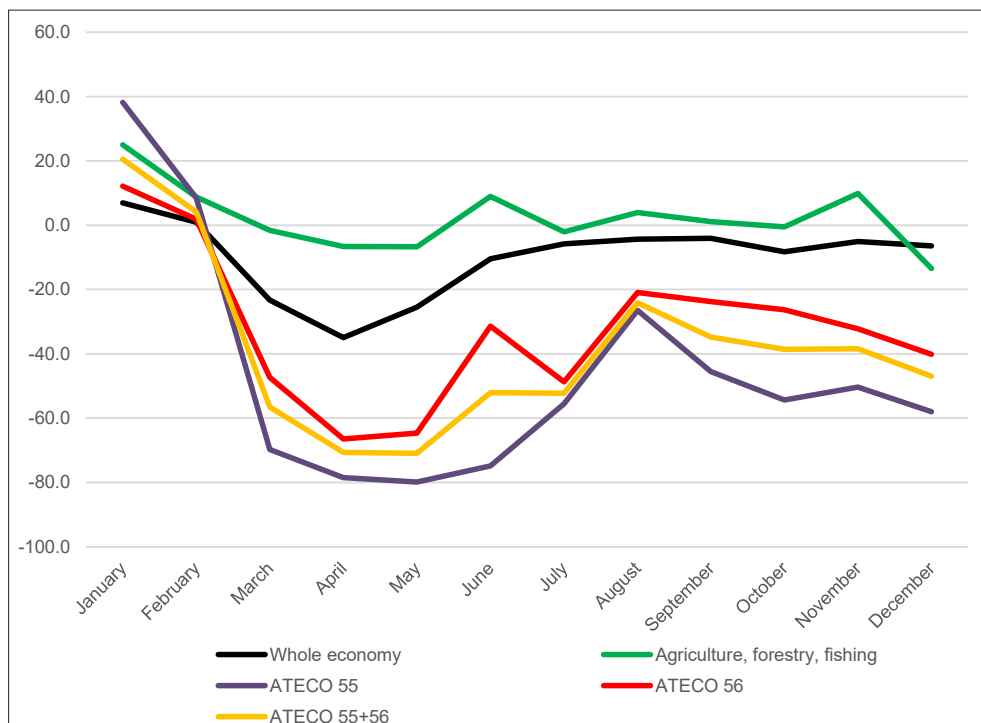
4. A first assessment of the effects of the pandemic: three scenarios

Since the beginning of 2020, Istat has been receiving from the Italian Tax and Revenue Authority (*Agenzia delle Entrate*), the data on electronic invoicing of Italian enterprises (excluding those participating in the flat-rate scheme). The variables, now available, are the number of invoices issued, the sum of incomes and the taxable amount. The data, with weekly and monthly periodicity, are available on a national scale after about 40 days from the end of the reference month. The available monthly data cover the whole 2020 and made it possible to estimate the monthly revenues of 2020 compared to 2019.

Although electronic invoicing data do not relate to the totality of transactions in the entire national economic system, they represent an objective measurement of the cyclical dynamics at a stage of complexity such as the lockdown period, and although to a smaller extent but still relevant, of the current period. Even though electronic invoicing data cannot be referred only to farmhouse activities, the available information allows timely monitoring of how individual economic sectors are reacting to the crisis or not, although with detail limited to the two-digit ATECO and therefore to the economic divisions.

The percentage change of taxable incomes between each month of 2020 and the corresponding month of 2019 has been calculated for the available period from January to December 2020.

The data were aggregated for the whole economy (sum of all economic activity divisions), for division 01+02+03 (agriculture, forestry and fisheries), 55 (accommodation activities), 56 (catering services) and for the set 55+56. A hypothesis underlying the estimates set out below is that the dynamics recorded under Divisions 55 and 56 may approximate the dynamics related to farmhouses, since the 2007 ATECO classification has codified with 55.20.52 “Farm-related housing activities” and “Farm-related catering activities” with 56.10.12. The main outcomes should be analysed considering that: 1) farmhouse activities can be carried out by entrepreneurial structures configured as agricultural holdings only; 2) the tourist and catering activities are those that characterise the main types of services offered by farms to customers.

Figure 2 - Percentage change in the taxable incomes recorded in the months of 2020 compared to the corresponding months of 2019

Source: Processing based on data by Istat and Agenzia delle Entrate

The monthly trends (Figure 2) show the surprising resilience of the primary sector, which in the lockdown period shows only slight declines compared to 2019. The Italian economic system shows the most marked difficulties, with the lowest peak of -34.9% reached in April 2020. In this framework, the accommodation and catering services activities are characterised by a quite worst behaviour, with strong turnover losses in the lockdown period (ranging from 40% to almost 80%), recovery during the Summertime (always characterised by losses with respect to 2019) and new worsening trends from September to December 2020.

Table 6 shows, for Divisions 56 (Catering) and Lodging plus Catering (55+56), the trend changes in the taxable incomes for the 12 months of 2020, which are the same as shown in Figure 2. If one assumes, as stated above, that the data in Division 56 are attributable to farmhouses with catering activities

only and that those in Divisions 55+56 are attributable to farmhouses offering catering and accommodation, Table 6 shows the following outcomes:

- in the first 5 months of 2020, which include the lockdown phase, catering facilities have suffered a decline in revenues, compared to the same period of 2019, equal to 35.9%; this contraction (-39.9%) was more evident for facilities with catering and accommodation;
- in the only quarter characterised by lockdown, losses compared to 2019 were 59.5% for catering only and 66% for catering and accommodation;
- in 2020, the declines compared to 2019 were equal to 33.9% and 40.9% respectively.

Table 6 - Percentage change in the taxable incomes recorded in the months of 2020 compared to the corresponding months of 2019

MONTH	% change with respect to the same month of 2019		
	ATECO 55: LODGING	ATECO 56: CATERING	ATECO 55+56: LODGING AND CATERING
January	38.2	12.1	20.5
February	8.5	1.9	4.2
March	-69.8	-47.3	-56.5
April	-78.5	-66.5	-70.7
May	-79.8	-64.7	-70.9
June	-74.9	-31.4	-52.1
July	-55.5	-48.7	-52.3
August	-26.5	-20.9	-24.1
September	-45.5	-23.7	-34.8
October	-54.3	-26.3	-38.6
November	-50.4	-32.2	-38.4
December	-58.0	-40.2	-47.0
From January to May	-46.6	-35.9	-39.9
From March to May (lockdown)	-76.0	-59.5	-66.0
Whole 2020 (average of % change)	-45.5	-32.3	-38.4
Whole 2020 (average % change)	-50.2	-33.9	-40.9

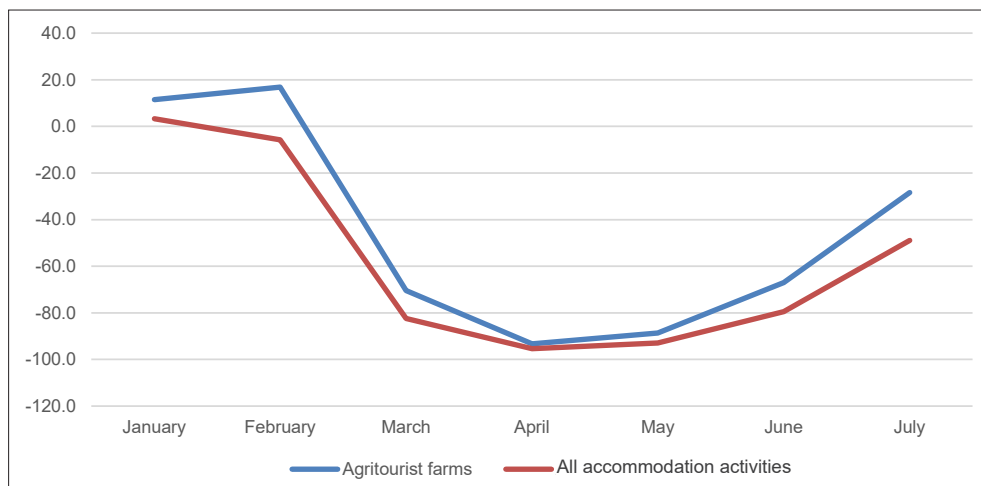
Source: Processing based on data by Istat and Agenzia delle Entrate data

As well as for descriptive purposes, the electronic invoicing data can be used to outline three possible scenarios related to the type of reaction that the Italian farmhouse sector could implement during and after the lockdown period. Even though electronic invoicing data are real data and not simulated

data, they cannot be supposed to be used as they are for analysing the economic behaviour of farmhouses, because AFs are classified as part of the ATECO divisions 55 and 56 and no more detailed electronic invoicing sector data are available up to now.

The use of electronic invoicing data for defining different scenarios makes it necessary to introduce another basic information source, which is given by the available data derived from tourism statistics carried out by Istat. The survey on “*overnight stays of costumers in hotels and other accommodation establishments*” is carried out by Istat with the support of statistical regional offices. Data picked up monthly are detailed by kind of accommodation and are available for AFs as well. At the end of January 2021, the last available data referred to July 2020, so that the available monthly time series for 2020 covers the months from January to July. Percentage change of nights spent compared to the same month of 2019 is available as well. According to the survey monthly data (Figure 3), in the first 7 months of 2020 the number of nights spent in agritourist accommodation decreases by the 51% if compared to the first 7 months of 2019.

Figure 3 - Percentage change of night spent in AFs and in all kind of accommodation in the first seven months of 2020 compared to the corresponding months of 2019



Source: Processing based on Istat data - Survey on nights spent in tourist accommodations

Hereafter the description of three draft scenarios based on tourism statistics.

1. Pessimistic scenario: it assumes that the AFs cannot reduce the gaps with respect to 2019 during the months from August to December 2020. We suppose that the uncertainties after the lockdown and the second wave of COVID-19 occurred after Summer 2020 produced a worsening effect, which led to monthly increases of losses with respect to 2019 from August to December. We suppose that losses in December 2020 are equal to the average loss accounted in the first seven months of 2020 (-51%) and that the path from August to December 2020 is characterised by the monthly increase of losses with respect to 2019 equal to 4.5%. Consequently, the monthly losses would be: -28.4 in July (true data), -32.9% in August, -37.4% in September, -41.9% in October, -46.5% in November. According to this scenario, the loss in 2020 with respect to 2019 would be equal to 44.7%.
2. Intermediate scenario: the monthly loss registered in all the months from August to December 2020 is assumed equal to the loss recorded in July 2020. As a matter of fact, in July 2020 nights spent in AFs were the 28.4% lower than the nights spent in July 2019. Therefore, in the whole 2020 nights spent in AFs would be 40.4% less than in 2019. This scenario is moderately optimistic since it would imply a loss (40.4%) lower than the -51% registered during the first seven months of 2020.
3. Optimistic scenario: it assumes that the AFs can achieve a progressive reduction in losses from July 2020 until December 2020. We suppose that the loss equal to zero with respect to the same month of 2019 could be reached in December 2020, and that reduction of losses from July to December follows a steady monthly pattern. Starting from the -28.4% registered in July 2020, we suppose -22.7% in August, -17% in September, -11.3% in October, -5.7% in November, with a monthly loss reduction equal to 5.7%. According to this scenario, the loss in 2020 with respect to 2019 would be equal to 34.9%.

Obviously, these are theoretical scenarios, because:

- true data on nights spent are not available from August to December 2020;

- no separate scenarios for AFs with: a) catering only and with b) catering and lodging are available;
- no regional breakdown is available.

To obtain more specific scenarios concerning AFs with (a) catering only and with (b) catering and lodging, the three previous scenarios derived from tourism statistics have been integrated with the electronic invoicing trends resumed in the Table 6. The three yearly losses estimated for the whole agritourist sector according to the pessimistic scenario (-44.7%), the intermediate scenario (-40.4%) and the optimistic scenario (-34.9%) have been reparametrised to the losses of incomes accounted by electronic invoicing for the whole 2020 separately for AFs with catering only (-33.9%) and the AFs with lodging and catering (-40.9%). The results, resumed in the Table 7, are as follows:

- pessimistic scenario: AFs with catering only lose 40.5% of incomes, while AFs with lodging and catering lose 48.9%;
- intermediate scenario: AFs with catering only lose 36.6% of incomes, while AFs with lodging and catering lose 44.2%;
- optimistic scenario: AFs with catering only lose 31.6% of incomes, while AFs with lodging and catering lose 38.2%.

Table 7 - Estimated changes of AFs' incomes in 2020 compared to 2019, according to three scenarios, based on electronic invoicing data and tourism statistics

SCENARIOS	Night spent in agritourism farms	Agritourist farms with catering only	Agritourist farms with lodging and catering
	% change 2020/2019		% change 2020/2019
Pessimistic Scenario	-44.7	-40.5	-48.9
Intermediate Scenario	-40.4	-36.6	-44.2
Optimistic Scenario	-34.9	-31.6	-38.2

Source: Processing based on data by Istat and Agenzia delle Entrate

In order to obtain estimates for each Italian Region, the main problem was the lack of short-term indicators on available agritourism revenues at regional level. Therefore identifying different modalities and speed of reaction with regard to the pandemic depending on the territorial component was not possible.

Now, since there are not territorial indicators aimed at measuring the revenues of the farmhouses on a monthly basis, the data on the monthly tourist attendance in the Italian AFs¹⁶ in 2019 have been used (Table 8). Therefore, it was possible to assign to each region (or autonomous province) a specific seasonality pattern of revenues, crossing the number of monthly overnight stays of Italian or foreign guests with the 2019 and 2020 monthly electronic invoicing data available for Italy as a whole.

Table 8 - Estimated losses by Region based on three scenarios (percent losses with respect to the 2019 yearly revenues)

REGIONS	Pessimistic scenario		Intermediate scenario		Optimistic scenario	
	Lodging and catering	Catering	Lodging and catering	Catering	Lodging and catering	Catering
Piemonte	-46.6	-38.8	-41.1	-34.2	-35.9	-29.9
Valle d'Aosta/ <i>Vallée d'Aoste</i>	-45.5	-37.2	-41.1	-33.6	-36.6	-30.2
Lombardia	-45.7	-38.4	-39.5	-33.1	-34.8	-29.1
Bolzano/ <i>Bozen</i>	-48.0	-39.6	-43.9	-36.4	-38.0	-31.5
Trento	-44.8	-36.8	-40.6	-33.5	-36.0	-29.8
Veneto	-43.3	-35.8	-38.8	-32.2	-34.5	-28.7
Friuli-Venezia Giulia	-47.5	-39.7	-42.6	-35.7	-37.2	-31.1
Liguria	-49.5	-41.1	-45.3	-37.9	-39.1	-32.7
Emilia-Romagna	-47.9	-40.0	-43.0	-36.0	-37.7	-31.5
Toscana	-49.8	-41.5	-45.1	-37.7	-38.7	-32.3
Umbria	-48.8	-40.8	-41.8	-34.7	-36.2	-30.0
Marche	-52.4	-43.7	-48.7	-40.8	-41.8	-35.1
Lazio	-49.5	-41.5	-44.5	-37.5	-38.4	-32.3
Abruzzo	-50.5	-42.2	-45.6	-38.2	-39.4	-33.0
Molise	-49.0	-41.1	-43.4	-36.5	-37.7	-31.6
Campania	-50.5	-42.4	-44.5	-37.3	-38.4	-32.2
Puglia	-53.0	-44.4	-48.5	-40.8	-40.9	-34.3
Basilicata	-50.9	-42.3	-45.5	-37.8	-38.8	-32.2
Calabria	-53.1	-44.2	-48.0	-40.0	-39.9	-33.3
Sicilia	-48.1	-40.2	-42.3	-35.3	-36.1	-30.1
Sardegna	-54.5	-45.9	-49.6	-42.0	-41.0	-34.4
<i>Italy</i>	-48.9	-40.5	-44.2	-36.6	-38.2	-31.6

Source: Processing data by Istat (Nights spent by customers in accommodation facilities) and Agenzia delle Entrate

¹⁶ Istat, 2020*d* e 2020*e*.

A limitation of this approach is that in each region, given its specific seasonality about the accommodation service, it was necessary to assign a seasonal profile to the catering service like that of the accommodation activity. A further problem arises, as already stated, because of the lack of short-term territorial indicators that can provide information on the type of reaction that each region was able to put in place since the end of the lockdown and along all the 2020 months. According to Table 8, for example, in Piemonte, with the pessimistic scenario, in 2020 farms with accommodation and catering would lose 46.6% of revenues, while those with only catering would lose 38.8%. According to the intermediate scenario, losses would be 41.1% and 34.2% respectively.

Based on these estimated changes, the largest losses would be recorded for farms that supply highly seasonal catering or accommodation activity. In fact, the decline in the revenues of enterprises with catering only – less subject to seasonality – should be lower than the decline for those that also offer accommodation¹⁷. This interpretation also explains the territorial differences between the performance of farmhouses of the North-Centre of Italy and those of the South, on which the effects of seasonal demand weigh more significantly. In this context, the territorial reality that suffers of minor losses in all three contexts analysed is the autonomous province of Bolzano/*Bozen*.

To bridge the evaluations and the draft scenarios introduced and commented in this section with the microsimulation carried out in the next section, the concluding recommendation is as follows. The previous scenarios are “draft” because they are based on sources, as electronic invoicing and tourism statistics, which are not fully suitable for the economic activities analysed in this context. While electronic invoicing data are available for the whole economic divisions 55 and 56 (and not for the agritourist activities alone), tourism nights spent are available until July 2020 (and not for the whole 2020) and nights spent are only proxies of the true unknown AFs' incomes.

¹⁷ Istat, 2020c.

5. Microsimulation of the effects of COVID-19

The most recent trends in turnover of accommodation and restaurant services from the previous paragraph is incorporated in the following micro-founded analysis and represent a benchmark of the sectoral range of the change at regional level. In this way, we link macro analysis with micro results. It means that the values of the loss of turnover at micro level are calibrated to obtain the same percentage decreases for the farmhouses with prevalent activities in the ATECO 55 and 56 divisions (accommodation and restaurant).

The methodology used for assessing the impact of the pandemic on the turnover and of the closing risk at micro level is the microsimulation¹⁸. Traditionally, this model estimates the effects of specific policy changes (e.g. tax policy). In this case, we provide an estimate of the turnover reduction that depends on the increasing in regulatory constraints that affect the reduction of accommodation and restoration capacity. The first step involved the projection based on the sectoral and regional trends of National Account data¹⁹, to adjust the VA level to the year 2019, which represents the base year of the microsimulation analysis. The equation relating to the reduction of revenues in the year 2020, for each scenario (s) is the following:

$$\Delta R_{r,c,i}^{20,s} = rp_{r,c}^{19} np_{r,c,i}^{19} \Delta \% np_s \quad (5.1)$$

where r =region, c =class of workers and i =agritourism.

The reduction of the turnover is calculated multiplying an indicator of average unit yield of available restaurant seats and beds in lodging ($rp_{r,c}^{19}$)²⁰ for the number of seats and beds ($np_{r,c,i}^{19}$), that is the accommodation capacity of the AFs, and for the assumed reduction ($\Delta \% np_s$). This varies for each of the three scenarios²¹:

- (s = 1) the first more optimistic assumes a reduction in accommodation capacity of -25%, which corresponds to a closure of three months;

18 Caiumi and Di Biagio, 2016.

19 Istat 2020a. Benchmark values for 2019 consider a disaggregation level of 29 business sectors and 21 Regions (NUTS2).

20 The indicator is equal to the ratio between turnover and places (beds and restaurant seats) of the AFs with activities prevalent in the Ateco 55 and 56 divisions (accommodation and restaurant) by region and class of employees. The median value of this indicator has been attributed to all the farms of the belonging stratum (region r and class of workers c) to have a measure of the performance of the available places and of the losses in turnover.

21 The percentage reduction in the number of seats and beds is proportional to the months of closure during the year.

- ($s = 2$) the second also includes a reduction in places in order to comply with the distance rules and therefore a reduction of -37.5% of annual places is assumed;
- ($s = 3$) the third expects a more drastic reduction of -50% of the accommodation capacity.

Different scenarios refer to the different abilities of farms to readjust to the new distancing regulations. They also consider the different closures at the regional level. For the regions with major restrictions with “red” colour (Piemonte, Valle d’Aosta/*Vallée d’Aoste*, Lombardia, Bolzano/*Bozen* and Calabria), an additional month of closure is expected and half a month for the orange ones (Liguria, Toscana, Umbria, Abruzzo, Puglia, Basilicata and Sicilia).

The result of AFs with zero turnover is linked to the previous survival analysis made in the second paragraph. The theoretical number of market exit in three years was used as a benchmark to reset the turnover values of the units ordered according to the levels estimated in 2020 in the three scenarios at a province level. In cases where the number of AFs with zero turnover in the province is higher than the theoretical one, a minimum value of provincial turnover has been imputed to the farm. The complement to one of the survival rate by provincial population in 2018 gives a theoretical number of exit equal to 2,004. This value was re-proportioned to the number of farmhouses with zero turnover the province calculated in the three scenarios by province, respectively, equal to 2,313 ($s=1$), 3,904 ($s=2$) and 5,559 ($s=3$). The adjustment of the number of farms with zero turnover, which therefore are at risk of market exit, follows in this way the same mortality distribution by province of the previous survival analysis. At last, we obtain a total number of units without revenues from catering and accommodation equal to 2,257 in the first scenario, 3,850 in the second and 5,508 in the third one.

5.1 Final results

The number of farm units at risk of closure ranges from 9.6% in the most optimistic scenario (Table 9) to 23.3% in the worst scenario. From a dimensional point of view, the largest farms and those with 5-9 workers are less affected. Small AFs with less than one annual worker suffer more and a risk of zero turnover is estimated at 29.7% in the worst scenario. For larger

ones, the risk is always under the average risk of closure. Among the regions, Lazio records the highest rates (Table 10), followed by Calabria and Molise, while Bolzano/*Bozen* records the lowest rates from 4.4% to 10.6%.

Table 9 - AFs at risk by class of workers, percentage values. Years 2019-2020

CLASS OF WORKERS	Exit risk rate		
	Scenario 1	Scenario 2	Scenario 3
1	11.6	20.1	29.7
2	7.9	13.5	18.6
3-4	6.8	10.7	14.0
5-9	5.1	8.2	9.7
10-19	6.7	8.5	11.1
20 and more	3.4	6.3	7.4
<i>Total</i>	9.6	16.3	23.3

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

Table 10 - AFs at risk by region, percentage values. Years 2019-2020

REGIONS	Exit risk rate		
	Scenario 1	Scenario 2	Scenario 3
Piemonte	5.0	8.6	12.4
Valle d'Aosta/ <i>Vallée d'Aoste</i>	6.7	11.7	18.3
Lombardia	7.8	13.4	19.2
Bolzano/ <i>Bozen</i>	4.4	7.4	10.6
Trento	8.6	14.7	21.0
Veneto	6.3	10.7	15.5
Friuli-Venezia Giulia	5.2	8.8	13.0
Liguria	8.7	15.1	21.6
Emilia-Romagna	7.1	12.3	17.7
Toscana	9.7	16.5	23.5
Umbria	9.4	16.0	22.9
Marche	5.2	8.8	12.6
Lazio	22.7	38.6	54.9
Abruzzo	11.0	18.8	27.3
Molise	18.8	32.8	46.9
Campania	12.6	21.6	30.8
Puglia	13.2	22.8	32.5
Basilicata	11.8	20.3	29.4
Calabria	20.5	35.3	50.4
Sicilia	16.3	27.7	39.8
Sardegna	16.1	27.5	39.2
<i>Italy</i>	9.6	16.3	23.3

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

Based on the decrease in turnover, the decrease in the VA of the whole business unit was calculated²²:

$$\Delta VA_{r,c,i}^{20,s} = \frac{\Delta R_{r,c,i}^{20,s}}{R_{r,c,i}^{19}} VA_{r,c,i}^{19} \quad (5.2)$$

In 2019, the turnover reached 3.15 billion and in 2020 we expect a reduction that may range between 14.3% and 23.4%. Value added amounts to more than 1.6 billion and in the three scenarios this value was equal to 1.33, 1.24 and 1.16 billion, respectively. The change is equal to -16.9% (Table 11) in the best scenario, falls to -22.6% in the intermediate scenario and reaches -27.8% in the worst-case scenario. The strongest reduction is recorded for smaller farms (from -25.5% to -40.6%), while larger ones contain losses from -5.7% to -9.7% due to the greater diversification of activities, such as agricultural production, processing and marketing.

Table 11 - Turnover and value added by class of workers, million euros and percentage change. Years 2019-2020

CLASS OF WORKERS	Turnover				Value added			
	2019	2020 scenario 1	2020 scenario 2	2020 scenario 3	2019	2020 scenario 1	2020 scenario 2	2020 scenario 3
1	382.5	-22.0	-28.8	-35.1	211.8	-25.5	-33.4	-40.6
2	334.6	-20.9	-27.9	-34.4	204.7	-22.2	-29.9	-37.0
3-4	665.0	-20.6	-27.5	-33.5	402.0	-21.6	-29.0	-35.6
5-9	407.3	-15.6	-20.8	-25.8	218.5	-16.1	-21.8	-27.0
10-19	395.8	-13.0	-17.1	-20.8	176.2	-15.7	-20.6	-25.0
20 and more	961.8	-4.6	-6.3	-7.9	392.2	-5.7	-7.8	-9.7
<i>Total</i>	<i>3,147.0</i>	<i>-14.3</i>	<i>-19.1</i>	<i>-23.4</i>	<i>1,605.4</i>	<i>-16.9</i>	<i>-22.6</i>	<i>-27.8</i>

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

Toscana holds the economic record with 441 million of VA (Table 12) followed by Bolzano/*Bozen* and Lombardia. Among the regions of the South and Islands area (South and Islands), Puglia records about 49 million VA, with drops that could be between -25.3% and -39.9%. The regions of the South and Islands area recorded the greatest declines and the worst situation could happen for Basilicata, Campania and Sardegna, with decreases twice higher than the Italian average.

²² In this analysis, the assessment of the economic effects of the pandemic considers the business unit including auxiliary activities. Therefore, the changes in revenues are lower if compared with the trends of the sectors that include all the hospitality businesses. The change in the VA depends on the change in turnover and does not consider the efficient behaviour of the business unit in terms of reducing intermediate variable costs.

Considering the regions of the Centre, Umbria shows the greatest drops (between -22.3% and -35.3%), while Toscana shows smaller drops in terms of VA in the three scenarios. Among the Northern regions, except for Bolzano/Bozen, Liguria and Valle d'Aosta/*Vallée d'Aoste*, which could suffer the greater seasonality, the expected decreases are always lower than or equal to the national average.

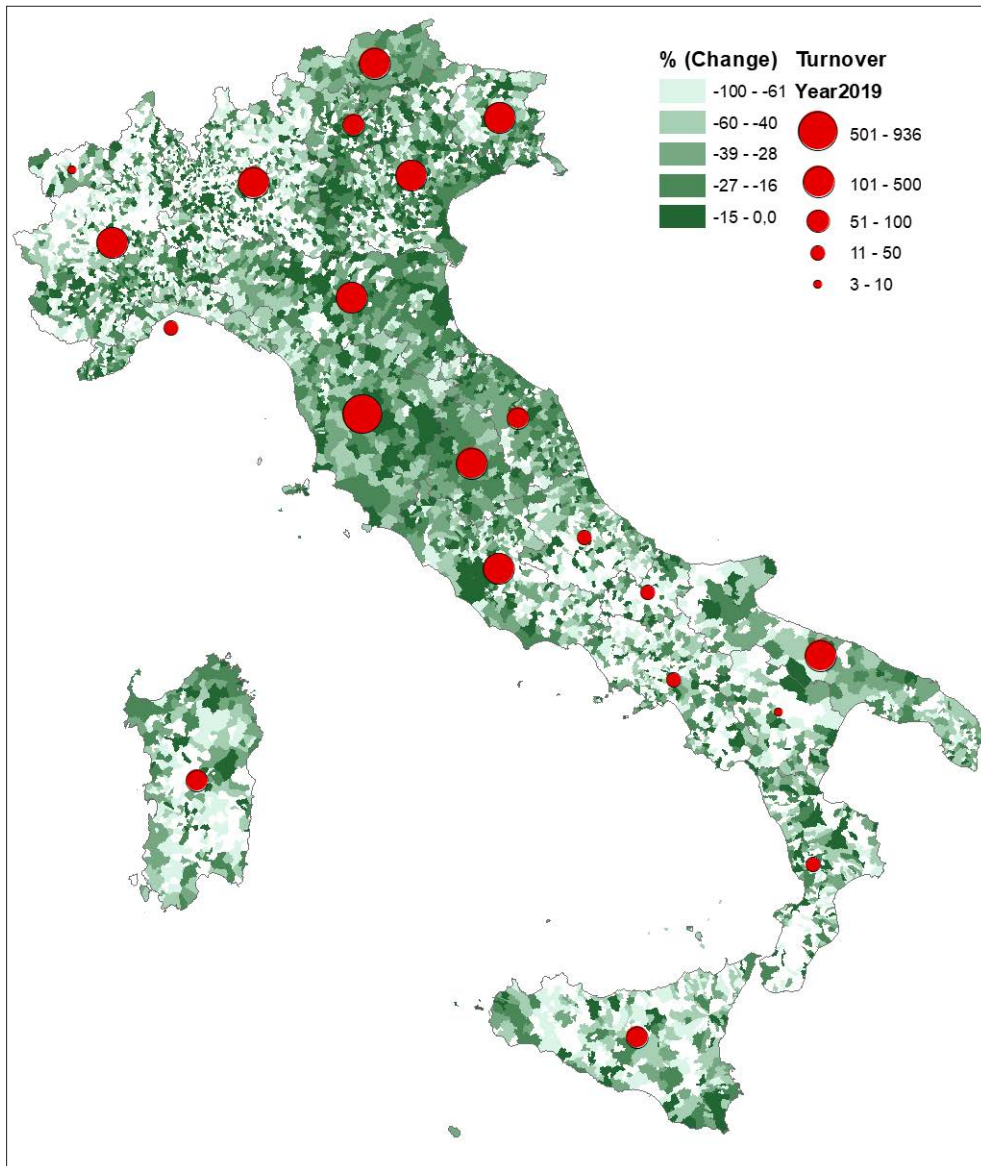
Table 12 - Turnover and value added by Region, million euros and percentage change. Years 2019-2020

REGIONS	Turnover				Value added			
	2019	2020 scenario 1	2020 scenario 2	2020 scenario 3	2019	2020 scenario 1	2020 scenario 2	2020 scenario 3
Piemonte	176.1	-14.3	-18.5	-22.5	95.2	-14.8	-19.6	-23.9
Valle d'Aosta/ <i>Vallée d'Aoste</i>	2.8	-26.1	-34.6	-42.7	1.3	-41.5	-54.3	-67.1
Lombardia	416.0	-14.8	-18.9	-23.1	199.7	-16.8	-21.7	-26.7
Bolzano/Bozen	291.9	-22.0	-29.2	-35.7	215.7	-22.6	-30.3	-37.3
Trento	74.2	-10.5	-14.1	-17.4	37.9	-12.1	-16.7	-20.9
Veneto	254.9	-10.5	-14.1	-17.4	129.2	-12.0	-16.2	-20.2
Friuli-Venezia Giulia	101.1	-14.8	-20.2	-24.8	58.9	-14.0	-19.8	-24.6
Liguria	48.0	-17.3	-22.9	-27.2	26.9	-19.6	-26.3	-31.5
Emilia-Romagna	221.9	-13.0	-17.3	-21.3	110.3	-13.6	-18.4	-22.9
Toscana	935.6	-10.3	-13.9	-17.0	441.2	-13.8	-18.3	-22.3
Umbria	109.5	-15.1	-20.0	-25.0	44.5	-22.3	-28.8	-35.3
Marche	62.9	-18.3	-24.2	-28.9	28.7	-20.7	-28.1	-33.9
Lazio	112.0	-15.8	-22.0	-27.9	55.4	-19.1	-26.8	-33.3
Abruzzo	26.0	-21.4	-28.5	-34.7	12.8	-23.2	-31.3	-38.5
Molise	11.0	-6.5	-9.0	-11.7	2.5	-16.6	-22.6	-28.4
Campania	37.7	-23.5	-31.6	-38.5	16.7	-28.9	-38.6	-46.9
Puglia	104.8	-21.8	-28.6	-33.8	48.7	-25.3	-33.4	-39.9
Basilicata	9.1	-24.9	-32.6	-39.3	4.0	-31.8	-40.2	-47.4
Calabria	29.0	-19.8	-26.5	-33.8	12.8	-23.8	-31.2	-41.0
Sicilia	66.9	-19.5	-25.5	-31.2	32.7	-21.5	-28.4	-34.7
Sardegna	55.7	-21.4	-30.2	-38.8	30.3	-22.5	-32.1	-42.0
<i>Italy</i>	3,147.0	-14.3	-19.1	-23.4	1,605.4	-16.9	-22.6	-27.8

Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

In the following map (Figure 4) we can represent the distribution of losses at the municipality level. The red circles represent the importance of the region in terms of turnover in the base year (2019). The most affected areas of Italy are those with the less intensive green colour, which identifies the AFs with greater loss of turnover (South and Islands), while the most intense colour shows the municipalities with a relatively better performance (North-Centre).

Figure 4 - Turnover, regional levels in million euros and percentage change by Municipality (Years 2019-2020 intermediate scenario)



Source: Processing based on both Istat and administrative data - Extended Farm Register (FR2)

6. Conclusions

The pandemic is producing diversified effects on the economic system. From the Istat survey “Situation and prospects of enterprises in the health emergency COVID-19”, emerged a first empirical evidence on the types of the most affected enterprises, which are those operating in the construction and service sectors, in particular catering, as confirmed by sectoral trends from electronic invoicing data. About agriculture, the secondary activities of farms which include agritourism were mainly affected with a decrease of 18.9% (Istat, 2021).

Another important evidence came from sectoral analysis made by ISMEA, where 86% of a sample of farmhouses recorded a decrease in revenues in 2020 and for two thirds of these the decrease in turnover was more than 30%. Starting from these analyses, in this work we have estimated the impact of the health emergency on the economic performance of the AFs: a sector that based its success on increasing hospitality with a raise of units of 15.7% between 2011 and 2018 and, therefore, suffered more than other farms during 2020. This work provides a comprehensive picture of the territorial distribution of AFs and survival together with a prospective micro economic analysis.

Thanks to data integration, at micro level, of the agritourism survey with the FR2, we measured the economic dimension of the AFs sector at a very detailed level and developed an impact analysis due to the pandemic crisis. Among the 24 thousand AFs, 51% belongs to the subset of businesses with prevalent agricultural activity, 26% is associated with SBS enterprises (with prevalent activities in industry or services) and the remaining 23% concerns less structured farms. In 2018, the value-added reached 1.6 billion of euros. The largest share (25%) is concentrated in farms with 3-4 workers and in some regions of the Centre and the North (Toscana, Lombardia and Bolzano/*Bozen*). For these 25 thousand farms, it was possible to explore the economic performance in terms of labour productivity, profitability and export share with Centre-North and larger farms more competitive with respect to South ones.

Several legislative actions were launched in 2020 to support agriculture and related activities, depending on the economic activity carried out. The last intervention was that of 2021 (Legislative Decree 41 of 23/03/2021), which

provides for the exemption from contributions for agricultural enterprises. Sectoral trends confirm the diversified impact on the whole economic system and catering activities show the main drops. Based on these estimated changes, the largest losses would be recorded for farms that supply highly seasonal catering or accommodation services. In fact, the decline in the revenues of enterprises with catering only, less subject to seasonality, should be lower than the decline for those that also offer accommodation.

The macro analysis of the pandemic, from electronic invoicing data, allowed us to calibrate micro-founded analysis of the effect of lockdown on each single unit and to reproduce macro trends through a bottom-up approach.

The microsimulation of economic data in 2020 includes three scenarios, so as to provide a range of variation that depends on different periods of closure or contraction of activities. We estimated a percentage of AFs with risk of closure between 9.6% and 23.3%. From a dimensional point of view, larger farms are less affected. Smaller farms risk more, with a rate of 29.7% in the worst-case scenario. Estimates for 2020 foresee a reduction in turnover between -14.3% to -23.4% (-19.1% in the mean scenario) and a reduction in value added between -16.9% and -27.8% (-22.6% in the mean scenario).

The strongest reduction is estimated for the small farms, while the large ones contain it below the 10%, due to their larger diversification of activities, such as agricultural production, processing and marketing. The regions of South and Islands area recorded the greatest drops together with Bolzano/*Bozen*, Liguria and Valle d'Aosta/*Vallée d'Aoste*, while Veneto, Trento and Toscana show lower drops. The final map offers a portrait of the distribution of losses at the municipal level and locate the fading areas, that is the territories most affected by the spread of the pandemic on the activities of AFs throughout the Italian territory.

Finally, the dimensional aspect plays a crucial role, indeed the areas with minor loss of turnover are the same area characterised by a larger average size where the capacity of diversification allows mitigating the loss in revenues for the tourism lack.

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