ISSN 2282-6483

Alma Mater Studiorum - Università di Bologna
DEPARTMENT OF ECONOMICS

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Quaderni - Working Paper DSE N°1187

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Summary

We present a statistical analysis of the impact of the Covid-19 pandemic on Italian micro enterprises. Within the period we are examining (2012-2021), our primary focus will be on the last two years. We will show that, overall, cooperatives have been more severely affected than capitalist enterprises. The challenges faced by micro cooperatives began well before the pandemic period, but the gap with capitalist enterprises widened significantly during this time. Some concern about employment seems featuring micro cooperatives more than conventional firms. Additionally, we will concentrate on micro firms operating nationwide in two sectors that the pandemic has hit very asymmetrically and on all micro enterprises operating in the Emilia-Romagna region.

JEL Codes: I31, J54, L21, L25

Keywords: micro enterprises, cooperative firms, capitalist firms, Covid-19 pandemic

We thank Daniele Brusha, Marco Tieghi and Vera Zamagni for helpful suggestions. The usual disclaimer applies.

NON-TECHNICAL SUMMARY

According to Eurostat, micro firms (those with fewer than 10 employees and an annual turnover lower than 2 million euros) represent about 94% of the total of Italian companies in 2021. Italy ranks first in Europe where micro enterprises represent about 90% of the total enterprise population and account for about one fourth of the labor force. A preliminary question to which we will try to answer is: how did Italian micro enterprises react to the recession spurred by Covid-19? A second question concerns the possible diversity of performance between micro cooperative enterprises (MICO) and micro capitalist enterprises (MICA). Italian cooperative enterprises, especially workers' ones, in the post-Lehman Brothers recession displayed greater resilience than capitalist ones, especially in limiting the consequences of the downturn on employment. The empirical evidence on the consequences of the 2008 financial crisis is confirmed also with reference to the 2020 recession following the pandemic?

Using a dataset extracted from the balance sheets of all micro firms, we concentrate on total production, added value, profits, employment, labor cost and productivity.

We will show, among other findings, that: MICOs were more fragile than MICAs during the pandemic; the fragility encountered by MICOs begin well before the pandemic period; MICOs show more resilience than MICAs regarding employment.

Our analysis regards Italian micro firms, but we also delve deeper into two sectors, transportation and catering, the former being much less hit than the latter by the pandemic. Moreover, we focus on the most important cooperative district worldwide, the Emilia-Romagna region, to verify the presence of meaningful differences with respect to the national performance.

1. Introduction

Over the past 15 years, we have witnessed three profound macroeconomic shocks, the latest of which has been caused by the Russian invasion of Ukraine, which is unfortunately still ongoing. It is therefore not surprising that a concept – and its various quantitative formulations – such as *resilience*, frequently used in other disciplines, has also spread in economic analysis. Resilience is understood as the ability (of an enterprise, of a territory, of a productive sector) to absorb the shock, as well as the ability to recover from it.

In fact, the recession triggered by the financial crisis of 2008 (- 4,9 % of Italian GDP in 2009) is the one that has so far offered more statistical elements to assess the impact on territories and different types of companies. For our purposes it should be stressed that Italian cooperative enterprises[1], especially workers' ones, in the post-Lehman Brothers recession displayed greater resilience than capitalist ones, especially in limiting the consequences of the downturn on employment. There is robust empirical evidence on the subject, supported by numerous studies: we refer, for example, to Delbono and Reggiani (2013), Euricse (2013), ICA (2017), Istat (2019), Borzaga *et al.* (2021), Caselli *et al.* (2022) and Costa and Delbono (2023) also for the bibliographical references therein cited.

Before highlighting the objectives of this study, it should be remembered that the Italian production structure reveals a marked supremacy of the micro enterprises. They represent between 73% and 94% of the total of Italian companies in 2021, depending on the aggregate reference considered (Eurostat 2023, Lomuscio *et al*. 2022). Italy ranks first in Europe where micro enterprises represent about 90% of the total enterprise population and account for about one fourth of the labor force.

[1] Cooperative enterprises constitute an important part of the Italian production system (Borzaga *et al.* 2019, Euricse, 2023).

It should also be noticed that the pandemic period was marked by special legislations in many countries (see United Nations, 2021). In Italy the government has taken some measures (emergency decrees, then converted into laws) to counter the economic fallout of the pandemic. It is worth noting that the health emergency has hit hard the entire *eurozone* (- 6.6% in GDP 2020) and that Italy was among the countries that experienced the largest drop (- 7.58%) together with Spain (- 10.8%). Such measures certainly contributed to the jump (+ 7.3%) experienced by the Italian GDP in 2021.

In a necessarily selective way, we summarize here the contents of the above legislation which seemed the most beneficial for companies. The Decree n° 18 of 17/3/2020 extends the wage support measure in derogation to the general law and prohibits job dismissal for "justified objective reason" (which is otherwise permitted under general circumstances). The Decree n° 25 of 8/4/2020 offers State guarantees on loans, the suspension of tax debts and accelerates payments by public administrations to companies. The Decree n° 34 of 19/5/2020 attributes grants to firms that had a turnover of less than 5 ml euros and the Decree n° 104 of 15/8/2020 grants the optional suspension of up to 100% of amortization and revaluation of assets subject to depreciation. We will have to take account of the effects of these legislative measures when interpreting our statistics, which are based on data from balance sheets that have been extensively influenced by these interventions.

A preliminary question to which we will try to answer is: how did micro enterprises react to the recession spurred by Covid-19?

A second question concerns the possible diversity of performance between micro cooperative enterprises (MICO, from now on) and micro capitalist enterprises (MICA, from now on). The empirical evidence on the consequences

of the 2008 financial crisis is confirmed also with reference to the 2020 recession (- 7.58% of Italian GDP) following the pandemic?

Our analysis regards Italian micro firms, but we also delve deeper into two sectors, transportation and catering, the former being much less hit than the latter by the pandemic. Moreover, we focus on the most important cooperative district worldwide, the Emilia-Romagna region, to verify the presence of meaningful differences with respect to the national performance.

We will show, among other findings, that:

• MICOs were more fragile than MICAs during the pandemic;

• the fragility encountered by MICOs begin well before the pandemic period;

• MICOs show more resilience than MICAs regarding employment.

This contribution is organized as follows. Section 2 will explain the statistical sources and the characteristics of the companies we focused on. The following part will be divided into two sections: the first will cover the period pre-Covid 2012-19, (Section 3) and the second one will regard the pandemic of 2020-21 (section 4). In both sections, while examining the dynamics of production and added value, we focus on the occupational dynamics, since we attribute to the employment a central role in the comparison between cooperative enterprises and conventional ones. Moreover, we analyze the labor cost and the labor productivity. In Section 5 we present the results of a bootstrap analysis carried out to test the robustness of our results. Section 6 contains the conclusions and the Appendix includes all the Tables cited in the text.

2. The data

Our dataset is extracted from the Aida-van Dijk database that contains the balance sheets of companies for the last ten years, thus focusing not on the entire universe of companies registered as such, but only on those that submit the balance sheets. Our historical series includes the period from 2012 to 2021, and allows us to extend and expand a previous research (Legacoop 2022) related to the biennium 2019-20. The variables that we have selected and analyzed are the following: total production, added value, profit, employment, labor costs and labor productivity.

For micro-enterprises we adopt the official European definition which identifies them as those firms with fewer than ten employees and an annual turnover lower than two million euros. By employees we mean the number of positions recorded on December the 31st, regardless of the type of contract in place.

In order to better meet the aims of this study, we exclude from the analysis companies without employees, those that have a zero or negative production value and those that have a negative equity. Our intent is to eliminate statistical observations that could distort the overall interpretation. The number of observations deleted as a result of these steps is high and this certainly entails a loss of potentially relevant information; however, we are convinced that these criteria enhance the ability of the modified dataset to measure correctly the phenomena under consideration.

3. Pre-Covid

In the period 2012-19, preceding the pandemic, the number of MICOs is substantially stable (Tab. 1), with an extremely weak increase (+0.18%), which is strongly in contrast with the +22.40% observed in the number of MICAs.

However, the analysis of the employment level in the micro-enterprises (Tab. 2) shows that MICOs pay particular attention to employment aspects. With a 0.18% increase in their number, MICOs's employment increased by 5.24%, compared with a 23.19% increase in employment in MICAs, the number of which, however, had grown by 22.40%. This tendency to favor the employment of MICOs is very evident in some sectors, such as transport, and in the Emilia-Romagna region in particular.

As for the number of companies and employees, in the pre-COVID period, MICAs showed significantly better performance than MICOs in both the transportation and catering sectors, as well as in the Emilia-Romagna region. Specifically, the catering sector experienced an extraordinary growth. From 2012 to 2019, MICAs increased by 85.43%, while MICOs increased by 28.44%. The transportation sector also grew above the national average (MICAs +38.89% and MICOs +7.06%), while the Emilia-Romagna region recorded lower increases compared to the national level (MICAs +18.52% and MICOs -0.36%). When comparing the changes in the number of companies and employees, even in the disaggregated analysis, there is a trend by the MICOs in favoring employment level. In particular, in the catering sector, despite a 28.44% increase in the number of MICOs, employment increased by 40.87%, whereas when considering MICAs, which increased by 85.43%, the employment increased by 91.80%. Similarly, in the Emilia-Romagna region, despite a 0.36% decrease in the number

of MICOs, employment increased by 8.13%, while, considering MICAs, which increased by 18.52%, the employment level grew by 18.78%.

3.1. Production, added value and profits

Let's now consider the value of total production: to facilitate the comparison between MICOs and MICAs, we consider an index with base 100 in 2012, adding also the information about the Italian GDP (Tab. 3). Compared to an increase in GDP of 10.61% between 2012 and 2019, the total MICOs production increased by 4.12%, while that of MICAs increased by 17.64%.

Similar scenarios are also observed in the two sectors and in the Emilia-Romagna region, where the production of MICOs consistently grows less than the one in MICAs. In particular, the catering sector exhibits a strong growth in both MICAs and MICOs, while the transportation sector and the Emilia-Romagna region see variations higher than the national average only for MICAs.

The difficulties of the MICOs are evident from the production dynamic, which is significantly worse than the one observed for MICAs before the pandemic crisis hit and which are lagging far behind the growth in GDP. However, these data should be compared with the changes in number of enterprises and in employment levels during the same period.

Regarding the analysis of output per employee (Tab. 4), in the period 2012-19, the MICOs recover part of the gap with the MICAs, while remaining extremely distant (by about half). In the transportation sector and in ER, the gap between MICOs and MICAs is narrower compared to the national average, and in the catering sector such a disparity decreases significantly. The production per employee decreases from 2012 to 2019, both nationally and in the transportation sector and in the ER region, increasing only in the catering sector.

In terms of added value per employee (Tab. 6), the gap is smaller, but remains substantially constant between 2012 and 2019. As in the case of total output, considering the added value per employee, the gap between MICOs and MICAs is narrower in the transportation sector and in the Emilia-Romagna region compared to the national average, and minimal in the catering sector.

It is also worth noting that the comparison between the two types of enterprises on added value must consider the specificity of certain types of MICOs. As it is well known, added value is nothing other than the difference between sales revenues and intermediate costs, before depreciation, and represents the remuneration for productive factors such as labor and capital. However, contrary to what happens in the MICAs, the expenditure on intermediate goods in the MICOs may already incorporate, via mutuality, a remuneration of the "labor" factor. This is often the case for cooperatives operating in the agricultural sector, where the prices of the products delivered may be higher than those of the market which are instead indicative of the expenses incurred for the purchase of the same products by the capitalists. The obvious consequence is that, on the aggregate level, the added value of the MICOs is lower than that of the MICAs.

Finally, with regard to profits per employee (Tab. 5), a large gap can be observed between MICOs and MICAs throughout the pre-pandemic period. In the transportation sector and in the Emilia-Romagna region, MICOs outperformed MICAs in 2012, but not in 2019. In the catering sector, MICOs and MICAs were on par in 2012, whereas in 2019 the profits per employee of MICAs surpassed those of MICOs.

3.2. Labor cost and productivity

Labor costs (Tab. 7) are strongly biased in favor of the MICAs, where wages are significantly higher, even if between 2012 and 2019 the gap is narrowing, following an increase of 7.62% in the MICOs compared to +1.51% in the MICAs. Only in the catering sector is the labor cost per employee in line with MICOs and MICAs. In Emilia-Romagna, the gap between MICOs and MICAs is about 2,000 euros, while in the transportation sector it reaches 6,000 euros, reflecting the national disparity.

In the pre-pandemic period, labor costs out of added value (Tab. 8) were stable for MICOs, while they fell by 3.49% for MICAs, mainly as a result of the contribution from the added value. Two contrasting situations compared to the national data emerge in the catering sector, where labor costs as a percentage of added value decreased more in the MICOs than in the MICAs, and in Emilia-Romagna. This region, indeed, is featured by an increase of such a ratio.

4. Covid

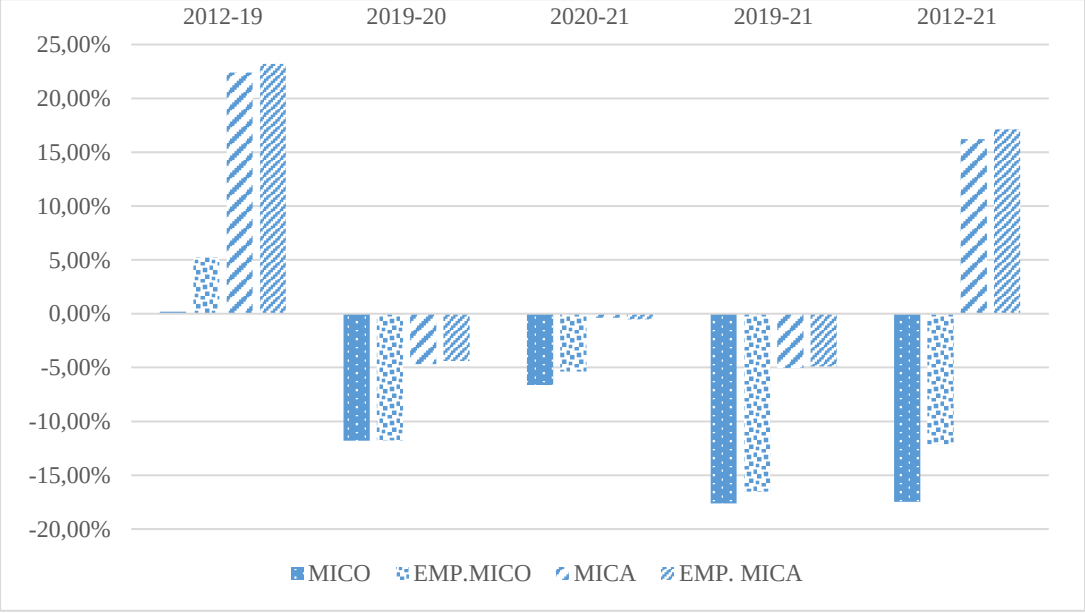
The COVID19 pandemic heavily affects the MICOs, which decrease (Tab. 1 and Fig. 1) by 11.78% in 2020 compared to 2019 and by 6.63% in 2021 compared to the previous year; also, for the MICAs is observed a decrease, but that does not assume the size of a collapse: -4.68% in 2020 and -0,39% in 2021. The catering sector remains particularly affected by the pandemic, with stronger effects in 2020 for MICOs and in 2021 for MICAs. On the contrary, during the pandemic, Emilia-Romagna exhibited slightly lower declines in both the MICOs and the MICAs compared to the national data.

Similar changes are recorded for employment levels (Tab. 2 and Fig. 1) which, in the two-year period 2019-21, decreases by 16.51% in the MICOs against -4.91% in the MICAs. This performance of the MICOs on the

employment context confirms results already highlighted for example in the Legacoop study (2022). In the two years considered layoffs were suspended, due to the aforementioned Decree n° 18 of 17/3/2020.

The employment dynamics during the pandemic seem to be more a consequence of the change in the number of micro-enterprises rather than to a specific business strategy, as the decline in employment, in the MICOs as in the MICAs, substantially reflects the decline in the number of enterprises. Considering the overall decade 2012-21, the MICOs, although falling by 17.48% in numerosity, decrease employment by 12.13%, while the MICAs, increasing by 16.22%, increase employment by 17.14%, indicating a strong concern of the MICOs for the employment level. A particular example of this attention is detectable in the Emilia-Romagna region, where from 2012 to 2021 the number of MICOs decreases by 14.53%, while the relative employment decreases only by 6.01%.

Fig. 1. Number of micro-enterprises and employees: percentage changes in the considered periods



4.1. Production, added value and profits

In the two-year period 2019-21, the total production (Tab. 3 and Fig. 2) shows that MICOs sustained heavy losses compared to MICAs. In 2021, when the Italian GDP recovers a good share of the 2020 fall, the MICAs return to pre-COVID levels for total production, while the MICOs maintain a decline of more than 10 points compared to 2019. In the transportation sector the decline in the MICOs is over 17%, while in Emilia-Romagna, it is near 12%. A separate case is represented by the catering sector, where the decline in total production between 2019 and 2021 is close to 30% for MICOs and exceeds 40% for MICAs.

It's important to underline that the dynamics of total production should be compared with that of the employment level: the -10,34% of MICOs production has to consider the decline of 16.51% of employment in the 2019-21 biennium.

The total production per employee (Tab. 4 and Fig. 3), after the drop in 2020, shows a strong rebound in 2021, with an increase in 2019-21 of 7.38% for the MICOs and 6.02% for the MICAs. In the transportation sector, the MICOs show a better performance than the MICAs (+8.01% versus +1.75%), while in the catering sector a general decrease of 2% is observed. In Emilia-Romagna, the MICOs experience slower growth as compared to the MICAs (+1.30% versus +5.55%).

The added value per employee (Tab. 6 and Fig. 3) follows the dynamics of production indicating, in the two-year period 2019-21, an increase of 6.71% in MICOs and 8.94% in MICAs. However, it is possible to observe that the increase in value added per employee is slightly lower than the increase in production per employee for the MICOs. Conversely, for the MICAs, the added value per employee increases more than the production per employee, with a differential of 3 percentage points. This behaviour is particularly pronounced in the transportation sector and partially in the catering sector. An exception is

represented by Emilia-Romagna, where the added value per employee increased more than the production per employee during the pandemic, even for the MICOs, with a differential of nearly 6 percentage points.

Finally, in 2020, profits per employee (Table 5) in MICAs fall much less than in MICOs. On the contrary, in the transportation sector we observe an increase in profits in MICOs, while in the catering sector, the profits of MICAs experience a more significant decline compared to that of MICOs. In 2021, profits indicate levels in MICA nearly 8 times higher than those of MICO. The gap is smaller in the transportation and catering sectors, while it becomes more significant in Emilia-Romagna.

Fig. 2. Italian GDP and total production (TP) of micro-enterprises: percentage changes in the periods considered.

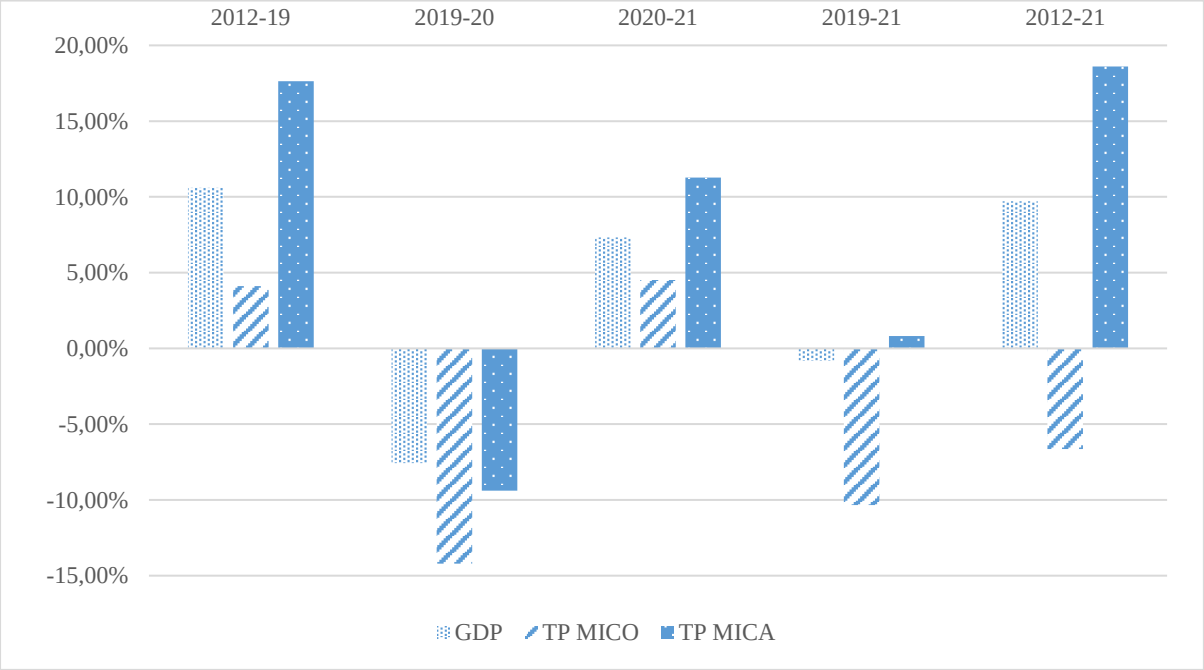
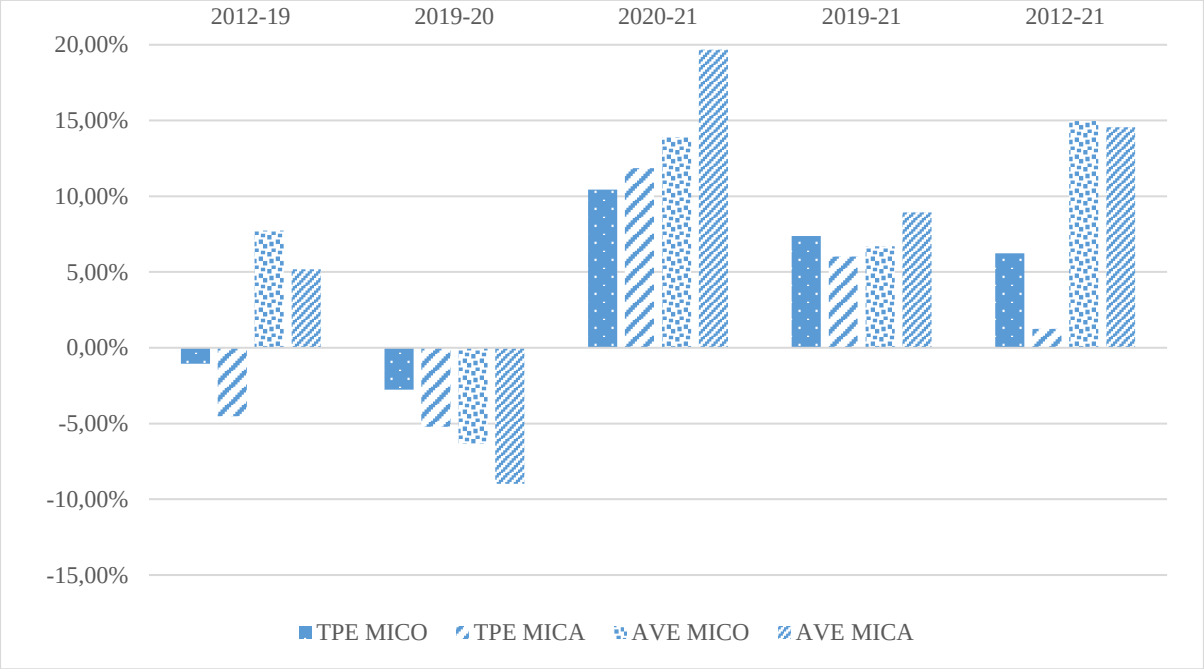


Fig. 3. Production per employee (TPE) and added value per employee (AVE) in micro-enterprises: percentage changes in the periods considered.



4.2. Labor cost and productivity

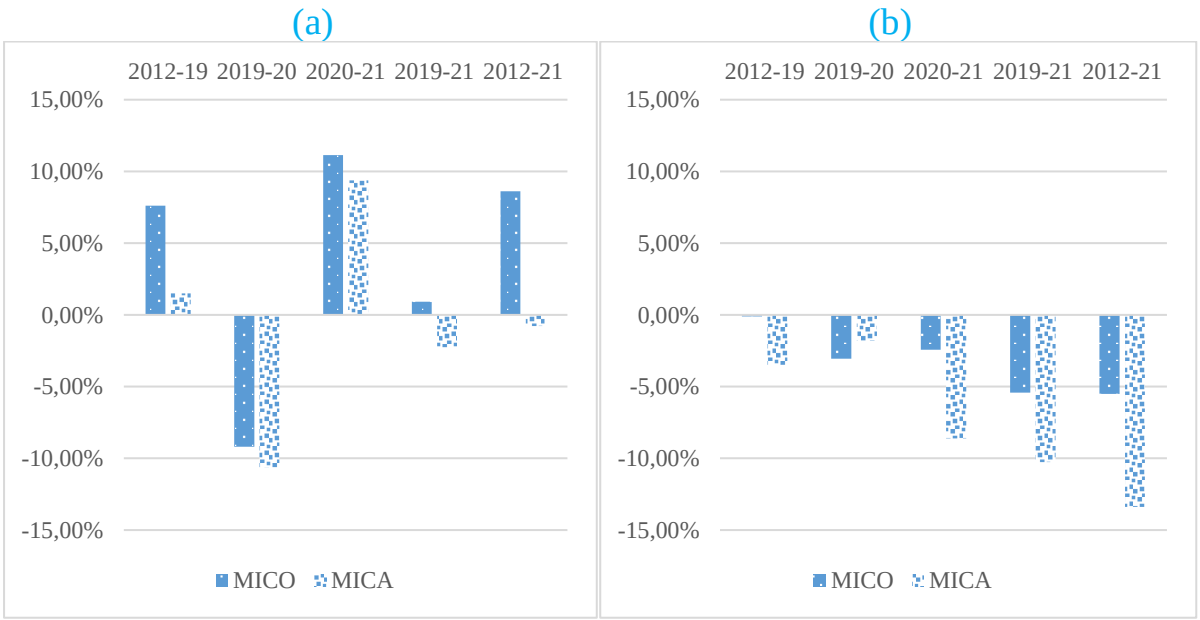
Overall, the MICAs have higher personnel costs than the MICOs (Tab. 7 and Fig. 4a), with a reduction in pay differences over time. During the pandemic, labor costs increased by 0.92% in MICOs and decreased by 2.24% in MICAs, with a more marked decline in the catering sector; in the decade 2012-21 the increase was 8.62% in MICOs compared to a decrease of 0.77% in MICAs.

During the same period, the total production per employee (Tab. 4) increased for both MICOs and MICAs. Comparing the values of the Tab. 4 to those of labor cost per employee (Tab. 7), it is clear that the value of this ratio drops for the MICOs from 3.67 in 2012 to 3.59 in 2021. MICAs, on the other hand, went from 5.69 to 5.80 in the same period. This means that average labor productivity weighted by labor costs has decreased for micro-cooperatives, while it has increased for micro-capitalist enterprises. It is important to stress how many

factors could influence the pay dynamics of cooperative and capitalist enterprises, and further insights can help to understand their causes and implications.

During the pandemic, the cost of personnel out of added value (Tab. 8 and Fig. 4b) decreased by 5.42% in the MICOs and by 10.26% in the MICAs, remaining at extremely high levels in the MICOs. In 2021 the cost of personnel accounted for 79.5% of the added value in the MICOs, whereas it reaches only 60.4% of the added value of MICAs. The data of Emilia-Romagna are close to the national one. In the transportation and catering sectors, MICOs maintain a value around 80%, whereas MICAs shrink their gap with respect to MICOs by switching to a value of 70%.

Fig. 4. Labor costs of micro-enterprises (a) and labor costs as a percentage of added value (b): percentage changes in the periods considered.



5. Bootstrap analysis

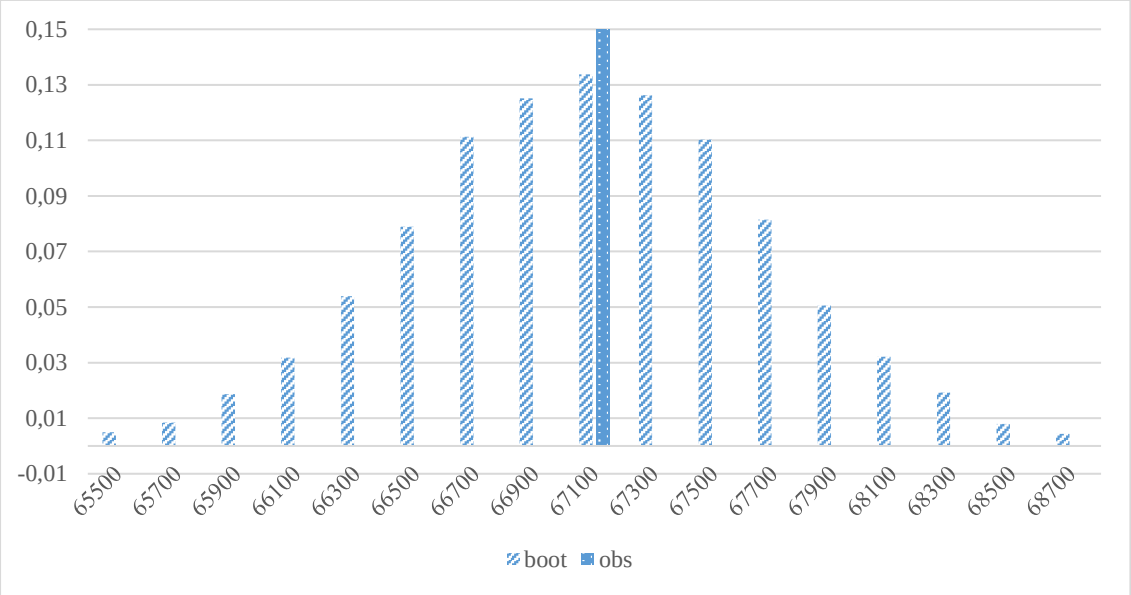
To extend the validity of our results and to evaluate their robustness, we develop a bootstrap procedure, resampling companies from the original list according to an i.i.d. sampling with replacement. First, for each of the 4 years considered (2012, 2019, 2020, 2021), and for each of the 4 settings analyzed (total, transportation, catering, Emilia-Romagna), 10,000 bootstrap replications are calculated. Then, an average of the 10,000 replications is calculated and, finally, the variation between the means for the different time intervals of interest.

To set an example, for the number of employees in the MICOs in 2021, in Tab. 9 and Fig. 5 we provide some descriptive statistics and the frequency distribution of the 10,000 bootstrap replications. Compared to the observed value (67,102), the bootstrap analysis returns an average of 67,119, extremely close to the observed value. The median, the standard deviation and the percentiles as well confirm the reliability of the bootstrap average.

The bootstrap averages are equal (or extremely close) also for the other years and other variables, compared to the averages calculated on the observed data; this finding strongly supports our results.

The bootstrap variations are reported in the tables, specifically in panel C, and those are always equal or substantially similar, if compared with the observed variations, reported in panel B. It is thus possible to attribute to our results a wider meaning, extending their validity in a more general context of comparison between MICOs and MICAs.

Fig. 5. Frequency distribution of bootstrap replicates for the number of employees in MICO in 2021.



6. Concluding remarks

In this contribution we analyze the dynamics of Italian micro-enterprises, focusing on cooperative micro-enterprises (MICOs) and capitalist micro-enterprises (MICAs), with particular reference to the period of crisis resulting from the COVID-19 pandemic. The results show that the MICOs experienced greater difficulties in comparison with the MICAs, both in terms of number of companies and economic performance. In the pre-crisis period, MICOs had already experienced a significant delay in the value of production and added value compared to MICAs, and this difference was further accentuated during the pandemic. Overall, during in the decade 2012-2021, the number of cooperative micro enterprises decreased by 17.48%, while capitalist micro enterprises increased by 16.22%. This trend has been accentuated by the COVID-19 pandemic, during which the MICOs have been subject to greater decreases compared to the MICAs.

Analyzing the economic performance of the two types of enterprises, we have observed that the MICOs have shown less resilience compared to the MICAs. MICAs were able to recover faster and already in 2021, they exceeded pre-crisis levels, while MICOs maintained a decline of more than 10% compared to 2019. Employment levels also suffered the impact of the crisis more heavily in MICOs, with a decrease of 12.13% compared to 2012, while MICAs recorded an increase in employment of 17.14% in the same period. However, we observe a reduction in MICOs employment levels which is less than proportional than the fall in the number of firms. This seems to support the view according to which cooperatives tend to protect their employees more than capitalist companies. The examination of the labor cost data suggests some further observations. Over the decade, labor costs were heavily biased in favor of the MICAs, and although the gap narrowed, in 2021 the MICAs still had higher personnel costs than the MICOs.

In conclusion, the results of our study suggest a greater resilience of capitalist enterprises than cooperative enterprises during the COVID-19 pandemic. This conclusion, therefore, is at odds with the studies on the recession following the financial crisis of 2008, when cooperatives (of whatever size) were more resilient than capitalist enterprises, even displaying counter cyclical dynamics, as shown for the Emilia-Romagna region in Caselli *et al.* (2022).

Alongside the aggregate analysis, this study also considers two sectors, transportation and catering, as well as one of the most important cooperative districts internationally, the Emilia-Romagna region. The transportation sector shows significantly more pronounced growth compared to the national average, but this growth is exclusively concentrated in the MICAs, while the MICOs sometimes exhibit dynamics even worse than the general trend. Only in terms of value per employee do the MICOs show variations similar to those of the MICAs. In the catering sector, during the pandemic, the MICOs perform better than the

MICA, even though the MICA had experienced impressive growth in the pre-pandemic period. Additionally, in the catering sector, labor costs and added value per employee exhibit aligned values between MICO and MICA. The Covid crisis in the MICOs in Emilia-Romagna is slightly milder compared to the national data, with employment decreasing at more moderate rates. The labor cost per employee in the MICOs aligns with that of the MICA, but there remains a gap both in production and in added value per employee.

An open question refers to the presence of a size effect when comparing the performance of the two types of firms. In other words, one may investigate the impact of the pandemic on larger firms (medium-large according to the European taxonomy). Previous studies (e.g., Caselli *et al.* 2022) suggest that this may be the case because, on average, cooperatives firms tend to be larger than the capitalist ones operating in the same sectors. This is left to future research, as well as it could be of interest to consider data related to 2022. This is a fairly special year because it includes both a phase of recovery from the pandemic and the new macroeconomic crisis driven by the Ukrainian conflict. Once we will have access to such data we plan to explore also these new issues.

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APPENDIX

Table 1. Number of micro firms

	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	20.741	287.444	977	5.870	647	12.810	1.108	21.545
2019	20.778	351.836	1.046	8.153	831	23.753	1.104	25.536
2020	18.331	335.382	917	7.764	635	20.258	998	24.833
2021	17.116	334.077	819	7.683	597	13.861	947	24.607
B. variations								
2012-19	0,18%	22,40%	7,06%	38,89%	28,44%	85,43%	-0,36%	18,52%
2019-20	-11,78%	-4,68%	-12,33%	-4,77%	-23,59%	-14,71%	-9,60%	-2,75%
2020-21	-6,63%	-0,39%	-10,69%	-1,04%	-5,98%	-31,58%	-5,11%	-0,91%
2019-21	-17,62%	-5,05%	-21,70%	-5,76%	-28,16%	-41,65%	-14,22%	-3,64%
2012-21	-17,48%	16,22%	-16,17%	30,89%	-7,73%	8,20%	-14,53%	14,21%
C. bootstrap variations								
2012-19	0,18%	22,40%	7,07%	38,89%	28,48%	85,42%	-0,36%	18,52%
2019-20	-11,77%	-4,68%	-12,34%	-4,77%	-23,61%	-14,71%	-9,61%	-2,75%
2020-21	-6,63%	-0,39%	-10,70%	-1,04%	-5,99%	-31,58%	-5,12%	-0,91%
2019-21	-17,63%	-5,05%	-21,72%	-5,76%	-28,19%	-41,64%	-14,23%	-3,64%
2012-21	-17,47%	16,22%	-16,19%	30,88%	-7,74%	8,20%	-14,54%	14,21%

Table 2. Employees

	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	76.366	985.789	4.286	23.634	2.503	56.836	4.045	77.479
2019	83.240	1.169.217	4.673	32.581	3.526	109.014	4.374	92.032
2020	80.367	1.214.418	4.031	31.529	2.582	90.544	3.923	89.819
2021	70.910	1.160.933	3.568	31.485	2.570	65.552	3.802	87.972
B. variations								
2012-19	5,24%	23,19%	9,03%	37,86%	40,87%	91,80%	8,13%	18,78%
2019-20	-11,77%	-4,40%	-13,74%	-3,23%	-26,77%	-16,94%	-10,31%	-2,40%
2020-21	-5,37%	-0,53%	-11,49%	-0,14%	-0,46%	-27,60%	-3,08%	-2,06%
2019-21	-16,51%	-4,91%	-23,65%	-3,36%	-27,11%	-39,87%	-13,08%	-4,41%
2012-21	-12,13	17,14	-16,75%	33,22%	2,68%	15,34%	-6,01%	13,54%
C. bootstrap variations								
2012-19	5,24%	23,19%	9,06%	37,85%	40,81%	91,79%	8,14%	18,78%
2019-20	-11,77%	-4,40%	-13,72%	-3,23%	-26,74%	-16,94%	-10,50%	-2,41%
2020-21	-5,37%	-0,53%	-11,49%	-0,14%	-0,66%	-27,60%	-2,96%	-2,05%
2019-21	-16,51%	-4,91%	-23,63%	-3,37%	-27,22%	-39,86%	-13,15%	-4,41%
2012-21	-12,13%	17,14%	-16,71%	33,21%	2,48%	15,34%	-6,08%	13,54%

Table 3. Production

	GDP	tot		transportation		catering		ER	
		MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00
2019	110,61	104,12	117,64	103,44	132,31	147,12	194,31	102,17	116,35
2020	102,23	89,32	106,59	84,56	120,32	91,63	127,26	90,34	107,28
2021	109,71	93,35	118,60	85,30	130,10	105,17	114,43	89,97	117,38
B. variations									
2012-19	10,61	4,12	17,64	3,44	32,31	47,12	94,31	2,17	16,35
2019-20	-7,58	-14,21	-9,39	-18,25	-9,06	-37,71	-34,51	-11,58	-7,79
2020-21	7,32	4,51	11,27	0,88	8,13	14,77	-10,08	-0,41	9,42
2019-21	-0,81	-10,34	0,82%	-17,53	-1,67	-28,51	-41,11	-11,95	0,89
2012-21	9,71	-6,65	18,60	-14,70	30,10	5,17%	14,43	-10,03	17,38

Table 4. Production per employee

	tot		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	69.410	142.264	84.539	133.467	45.438	58.688	106.747	152.258
2019	68.674	135.848	80.203	128.100	47.453	59.455	100.864	149.135
2020	66.769	128.762	76.006	120.374	40.363	46.881	99.436	140.901
2021	73.741	144.031	86.625	130.344	46.541	58.225	102.177	157.407
B. variations								
2012-19	-1,06%	-4,51%	-5,13%	-4,02%	4,43%	1,31%	-5,51%	-2,05%
2019-20	-2,77%	-5,22%	-5,23%	-6,03%	-14,94%	-21,15%	-1,42%	-5,52%
2020-21	10,44%	11,86%	13,97%	8,28%	15,30%	24,20%	2,76%	11,71%
2019-21	7,38%	6,02%	8,01%	1,75%	-1,92%	-2,07%	1,30%	5,55%
2012-21	6,24%	1,24%	2,47%	-2,34%	2,43%	-0,79%	-4,28%	3,38%
C. bootstrap variations								
2012-19	-1,05%	-4,51%	-5,15%	-4,01%	4,50%	1,31%	-5,50%	-2,04%
2019-20	-2,77%	-5,22%	-5,26%	-6,04%	-14,96%	-21,16%	-1,46%	-5,53%
2020-21	10,46%	11,86%	14,06%	8,28%	15,41%	24,21%	2,83%	11,71%
2019-21	7,40%	6,02%	8,06%	1,75%	-1,86%	-2,07%	1,33%	5,53%
2012-21	6,27%	1,24%	2,50%	-2,33%	2,55%	-0,79%	-4,24%	3,38%

Table 5. Profits per employee

	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	-309	433	840	-3.373	-426	-408	-1.636	-3.101
2019	1.667	6.970	1.024	4.594	151	715	1.740	8.330
2020	997	6.220	1.284	3.889	66	-288	932	7.653
2021	1.863	14.467	2.055	5.493	1.067	2.284	1.046	14.443

Table 6. Added value per employee

	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	22.465	35.852	25.443	37.276	15.222	17.613	29.808	37.583
2019	24.202	37.707	28.653	42.836	17.041	18.836	30.997	41.748
2020	22.671	34.324	26.601	40.767	13.657	13.009	30.552	38.707
2021	25.825	41.077	29.839	44.323	16.030	18.322	33.165	45.874
B. variations								
2012-19	7,73%	5,17%	12,61%	14,92%	11,95%	6,94%	3,99%	11,08%
2019-20	-6,33%	-8,97%	-7,16%	-4,83%	-19,86%	-30,93%	-1,44%	-7,29%
2020-21	13,91%	19,67%	12,17%	8,72%	17,38%	40,84%	8,55%	18,52%
2019-21	6,71%	8,94%	4,14%	3,47%	-5,93%	-2,73%	6,99%	9,88%
2012-21	14,96%	14,57%	17,28%	18,91%	5,31%	4,03%	11,27%	22,06%
C. bootstrap variations								
2012-19	7,76%	5,17%	12,59%	14,93%	11,97%	6,94%	3,97%	11,10%
2019-20	-6,35%	-8,97%	-7,19%	-4,84%	-19,89%	-30,94%	-1,67%	-7,30%
2020-21	13,95%	19,68%	12,19%	8,72%	17,43%	40,85%	9,38%	18,51%
2019-21	6,71%	8,94%	4,12%	3,46%	-5,93%	-2,72%	7,55%	9,87%
2012-21	14,99%	14,57%	17,22%	18,91%	5,34%	4,03%	11,82%	22,06%

Table 7. Labor cost per employee

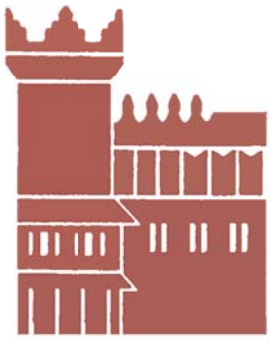
	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	18.902	25.018	21.431	27.620	13.343	13.768	24.263	26.209
2019	20.343	25.395	24.040	30.516	14.757	14.604	25.937	28.092
2020	18.473	22.697	21.925	28.603	11.502	10.564	24.882	25.660
2021	20.531	24.826	24.116	30.706	12.864	12.560	26.549	27.815
B. variations								
2012-19	7,62%	1,51%	12,17%	10,48%	10,60%	6,07%	6,90%	7,18%
2019-20	-9,19%	-10,62%	-8,80%	-6,27%	-22,05%	-27,67%	-4,07%	-8,66%
2020-21	11,14%	9,38%	9,99%	7,35%	11,84%	18,90%	6,70%	8,40%
2019-21	0,92%	-2,24%	0,31%	0,62%	-12,83%	-13,99%	2,36%	-0,98%
2012-21	8,62%	-0,77%	12,53%	11,17%	-3,59%	-8,77%	9,42%	6,13%
C. bootstrap variations								
2012-19	7,64%	1,50%	12,15%	10,48%	10,61%	6,07%	6,87%	7,19%
2019-20	-9,19%	-10,62%	-8,81%	-6,26%	-22,09%	-27,67%	-4,25%	-8,67%
2020-21	11,14%	9,38%	9,96%	7,35%	11,98%	18,90%	6,93%	8,39%
2019-21	0,92%	-2,24%	0,27%	0,63%	-12,75%	-14,00%	2,38%	-1,00%
2012-21	8,63%	-0,77%	12,45%	11,17%	-3,49%	-8,78%	9,42%	6,12%

Table 8. Labor cost out of added value

	total		transportation		catering		ER	
	MICO	MICA	MICO	MICA	MICO	MICA	MICO	MICA
2012	0,841	0,698	0,842	0,741	0,877	0,782	0,814	0,697
2019	0,841	0,673	0,839	0,712	0,866	0,775	0,837	0,673
2020	0,815	0,661	0,824	0,702	0,842	0,812	0,814	0,663
2021	0,795	0,604	0,808	0,693	0,802	0,686	0,801	0,606
B. variations								
2012-19	-0,10%	-3,49%	-0,39%	-3,86%	-1,21%	-0,81%	2,80%	-3,51%
2019-20	-3,06%	-1,81%	-1,76%	-1,51%	-2,74%	4,73%	-2,67%	-1,48%
2020-21	-2,43%	-8,60%	-1,94%	-1,26%	-4,72%	-15,58%	-1,71%	-8,54%
2019-21	-5,42%	-10,26%	-3,68%	-2,75%	-7,33%	-11,58%	-4,33%	-9,89%
2012-21	-5,51%	-13,39%	-4,05%	-6,51%	-8,45%	-12,30%	-1,65%	-13,05%
C. bootstrap variations								
2012-19	-0,11%	-3,49%	-0,39%	-3,88%	-1,21%	-0,82%	2,79%	-3,52%
2019-20	-3,04%	-1,82%	-1,74%	-1,50%	-2,75%	4,73%	-2,63%	-1,48%
2020-21	-2,46%	-8,60%	-1,99%	-1,26%	-4,63%	-15,59%	-2,24%	-8,54%
2019-21	-5,43%	-10,26%	-3,70%	-2,74%	-7,25%	-11,60%	-4,80%	-9,89%
2012-21	-5,53%	-13,39%	-4,07%	-6,51%	-8,38%	-12,32%	-2,15%	-13,06%

Table 9. Descriptive statistics of the 10.000 replicates of the bootstrap for the number of employees in MICOs in 2021 (observed value 67.102)

Mean	Median	Std.Dev.	5th percentile	95th percentile
67.100	67.103	588	66.128	68.074



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