THE PERFORMANCE OF LOCAL ECONOMIES BEFORE AND AFTER THE COVID-19: AN ANALYSIS AT THE MUNICIPAL LEVEL[1]

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Abstract. The economic crisis triggered by the Covid-19 pandemic has had a profound impact on companies' performance and, consequently, on local economies. Against this backdrop, this paper aims to offer a comparative analysis of local economic performance before the pandemic (2015–2019), during its first year (2020), and during the economic recovery phase (2022). The analysis highlights the impact of the crisis on the structure and dynamics of the Italian production system at a territorial level. The analysis focuses on the manufacturing and personal service sectors and uses data from the "Territorial Frame SBS" statistical register produced annually by ISTAT. Firstly, the analysis involves constructing profiles at the municipal level. For each period, it takes into account the combination of measures that capture employment trends and value added dynamics with different degrees of intensity. Secondly, the analysis focuses on business productivity, applying statistical spatial analysis methods to identify spatial correlations at the municipal level post-pandemic (2022). The method used is LISA (Local Indicator Spatial Analysis), developed by L. Anselin.

1. Introduction

This paper presents a comparative analysis of the performance of Italian local economies before the pandemic (2015–2019), during the first year of its spread (2019–2020), and during the subsequent economic recovery phase (2020–2022). The aim is to evaluate the impact of the pandemic on the structure and dynamics of Italy's production system at a local level.

Apparent labour productivity is used as a key indicator of economic performance, reflecting both classical and contemporary theories on growth and territorial development. As highlighted by Porter (1990) and Becattini (1975; 1979; 1987), local environments shape firms' productivity and competitiveness, making territory an active economic resource.

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[1] This article expresses only the opinions of the authors. Although the paper is the result of joint work, the sections are attributed as follows: paragraphs 1 and 4 to Elisabetta Bilotta and paragraphs 2, 3 and 5 to Ilaria Straccamore.

The Covid-19 pandemic was a major shock to local economies, evolving rapidly from a health emergency into a global economic crisis. In Italy, its impact on the production system was examined by institutions such as ISTAT and the Bank of Italy, alongside academic contributions like Caddemi (2023), who highlighted firms' resilience strategies and the role of organisational flexibility. Most studies focused on regional or provincial levels, revealing uneven effects: the North was initially hit hardest, while the South experienced more persistent challenges due to structural vulnerabilities (ISTAT, 2022b; Bank of Italy, 2022). Reports by Confindustria and Cerved further underscored territorial disparities in both impact and recovery capacity.

In contrast, comprehensive assessments at the municipal level remain limited. It is precisely within this gap that the present contribution is situated. Building on the initial effort presented in the Istat 2023 Annual Report—which offered a first reading of the evolution of local economies before and during the pandemic—this study extends that framework, both by incorporating post-Covid dynamics and by deepening the analytical scope.

The contribution is organised into three sections. Paragraph 2 describes the official data and methods used to compile the database. Paragraph 3 provides detailed territorial information at a municipal level on the spatial dynamics that have characterised local economies in recent years in the manufacturing and personal services activities. Paragraph 4 examines business productivity through the application of spatial statistical analysis, with the aim of identifying clusters of municipalities that demonstrated elevated productivity levels in the aftermath of the Covid-19 pandemic. Paragraph 5 presents the concluding remarks, summarising the key findings of the analysis.

2. Official data source and method

This study considers data from the Territorial Structural Business Statistics Frame (T-SBS Register), which is produced annually by ISTAT and provides information on the main economic account variables of local enterprise units operating in the industrial and non-financial service sector within the national territory.

For our purposes, we considered T-SBS Register data for 2015, 2019, 2020 and 2022. These different sources are integrated at municipal level, so the municipality is the unit of analysis. The final database is a panel consisting of municipalities that existed in all the considered years (2015, 2019, 2020 and 2022). Integrating the different sources involved complex temporal harmonisation of the input databases, which refer to different time periods. Therefore, it was necessary to consider all the changes that occurred at the territorial level during the time period in question, and

to trace all the information to the territorial configuration as of 12/31/2022. In particular, the analysis focuses on the manufacturing[2] and personal service sectors[3], which were the most affected by the pandemic. The final database consists in 7,347 municipalities with manufacturing activities on their territory and 7,799 municipalities with personal services activities.

3. Municipal profiling before, during and after the pandemic

3.1. The methodology used

Three time phases have been considered: 2015–2019, highlighting long-term trends and pre-pandemic stability at territorial level; 2019–2020, defining the immediate impact of the pandemic; and 2020–2022, defining the recovery phase. This considers the impact of the crisis and the ability to withstand endogenous shocks. The profiling of the municipalities was carried out on the basis of a combination of measures capturing employment trends and value-added dynamics at different intensity levels, for each period. This combination of measures results in the municipal profile being divided into six categories. With regard to employment trends, two categories were created: growth (positive variation above the national average) and stability or decrease (variation equal to or below the national average). Regarding value added, three categories were created based on the analysed period. For example, the categories emphasise growth in the periods 2015–2019 and 2020–2022, as well as the economic crisis in 2019–2020. In the first case, we considered high growth (positive variation above the national average), stability or low growth (variation in line with the national average or positive variation below the national average), and decrease (negative variation). In the second case, we considered growth (positive variation), stability or low decrease (variation in line with the national average or negative variation within the national average), and high decrease (negative variation below the national average) (Table 1).

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[2] Classification of Economic Activity 2007 (Ateco), section C
[3] Classification of Economic Activity 2007 (Ateco), divisions: 55 - accommodation, 56 - restaurants, 49 - land transport, 50 - sea transport, 51 - air transport, 79 - travel agency and tour operator services, 90 - creative, artistic and entertainment activities, 91 - libraries, archives, museums, 92 - lottery, betting and gambling activities, 93 - sports, recreation and amusement activities.

Table 1 – *Municipal profiling for three periods considered.*

Legend	2015-2019 and 2020-2022	2019-2020
1	High growth VA* and growth PE**	Growth VA and PE
2	Stable or low growth VA and growth PE	Stable or low decrease VA and growth PE
3	Decrease VA and growth PE	High decrease VA and growth PE
4	High growth VA and PE stable or decreasing	Growth VA and PE stable or decreasing
5	Stability or low growth VA and PE stable or decreasing	Stability or slight decrease VA and PE stable or decreasing
6	Decrease VA and PE stable or decreasing	High decrease VA and PE stable or decreasing

*Value added **Persons employed

3.2. Municipal profiles in the manufacturing

In the manufacturing, the pandemic had a widespread effect that went beyond the growth patterns observed during the previous period (2015–2019). During these years, Italian municipalities exhibited a high degree of heterogeneity in their profiles with regard to value added and employment dynamics (Figure 1). In 2015-2019, over 2,600 municipalities (35%) experienced growth in industrial value added exceeding the national average, accompanied by positive employment dynamics. These municipalities were primarily located in Northern and Central Italy, as well as in certain areas of Southern Italy (mode 1 – intensive green colour). Conversely, over 2,000 municipalities (28% of all manufacturing municipalities), primarily in Southern Italy but not exclusively, experienced a decline in value added alongside negative employment dynamics (mode 6 – intense shade of red). A further 800 municipalities (11%), located in a widespread but specific manner across the national territory, experienced strong growth in value added alongside negative employment trends (mode 4 – intensive blue), suggesting ongoing restructuring processes in local production systems. Finally, almost 500 municipalities (7%), located in specific areas across the country, experienced employment growth alongside a reduction in industrial value added (mode 3 – light blue), suggesting potential limitations to future growth prospects.

The impact of the pandemic on local economies has greatly increased the number of municipalities with negative performance (Figure 2). In 2019-2020 period, almost 3,000 municipalities (40%) experienced a sharp decline in value added and negative employment dynamics (mode 6 – intense shade of red), while only 1,200 municipalities (17%) continued to record the best positive performance (mode 1 – intensive green colour). Additionally, over 900 municipalities (12%) non-positive performance in terms of both value added and employment (mode 5 – light shade of red), primarily located in Northern and Central Italy.

The post-pandemic period (2020-2022) is characterised by economic recovery (Figure 3). Compared to 2015-2019, the number of municipalities in the top two performance categories (modes 1 – intensive green colour and 2 – light green colour) increased from 3,300 before the pandemic to 3,800. Moreover, 1,100 fewer municipalities (900 versus 2,000) recorded a decline in value added associated with negative employment trends (mode 6 – intense shade of red). However, strong growth in both indicators (mode 1 – intensive green colour) declined in 300 municipalities (2,600 versus 2,300), mostly in the North-East, suggesting that certain local economies have not yet returned to pre-Covid levels.

Figure 1 - *Municipal profiles in manufacturing. Years 2015-2019.*

Figure 2 - *Municipal profiles in manufacturing. Years 2019-2020.*

Figure 3 - *Municipal profiles in manufacturing. Years 2020-2022.*

1	High growth VA and growth PE
2	Stable or low growth VA and growth PE
3	Decrease VA and growth PE
4	High growth VA and PE stable or decreasing
5	Stability or low growth VA and PE stable or decreasing
6	Decrease VA and PE stable or decreasing

1	Growth VA and PE
2	Stable or low decrease VA and growth PE
3	High decrease VA and growth PE
4	Growth VA and PE stable or decreasing
5	Stability or slight decrease VA and PE stable or decreasing
6	High decrease VA and PE stable or decreasing

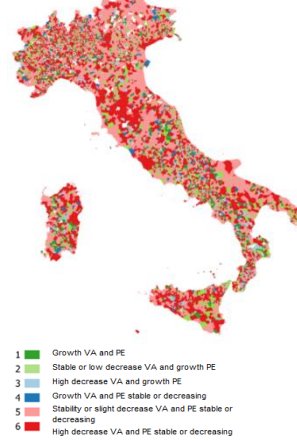|	
1	High growth VA and growth PE
2	Stable or low growth VA and growth PE
3	Decrease VA and growth PE
4	High growth VA and PE stable or decreasing
5	Stability or low growth VA and PE stable or decreasing
6	Decrease VA and PE stable or decreasing

Source: our elaborations on Istat T-SBS Register

3.3. Municipal profiles in the personal services activities

Around 60% of municipalities in the personal service sector, which are mainly located in the North-East and Centre of Italy, showed positive performance dynamics between 2015 and 2019 (Figure 4). Specifically, 3,000 municipalities (40%) recorded growth in value added above the national average and positive employment dynamics (mode 1 – intensive green colour), while 1,500 municipalities (20%) experienced stable or low growth in value added and employment (mode 2 – light green colour). Conversely, 1,500 municipalities (20%) recorded a decline in value added and a negative employment trend (mode 6 – intense shade of red), which were mainly located in the North-West and South.

During the 2019–2020 period, 71% of municipalities experienced a decline or stability in both value added and employment (modes 5 – light shade of red and 6 – intense shade of red in Figure 5). Of these, in 45% of cases, the pandemic acted as an exogenous shock, marking a transition from stability or economic growth to decline. These areas are strongly specialised in tourism-related sectors and are spread throughout the country, with the highest concentrations in the North-East and Centre. In 15% of cases, the pandemic exacerbated existing crises, especially in North-West Italy, primarily in the traditionally industrial areas of Piedmont and Lombardy, as well as the inland areas of Liguria, but also in the Centre and South. However, 9% of municipalities that experienced growth in the pre-crisis period continued to grow, remained stable, or saw a slight decline in value added during the first year of the pandemic. Southern Italy has the highest concentration of municipalities of this type, which are not usually included in traditional tourist routes and have therefore been less affected by the severe mobility restrictions aimed at combatting the spread of the pandemic.

The post-pandemic period is characterised by economic recovery (Figure 6). Compared to 2015–2019, more municipalities now are into the top two performance categories (mode 1 – intensive green colour and 2 – light green colour) than before the pandemic (4,800 versus 4,500), and 900 fewer municipalities (600 versus 1,500) record a drop in value added accompanied by negative employment dynamics (mode 6 – intense shade of red). However, when considering municipalities recording strong growth in value added accompanied by positive employment trends (mode 1 – intensive green colour), the personal service sector is not returning to pre-Covid levels, with 300 fewer municipalities (2,700 versus 3,000), primarily located in the North-East.

Figure 4 - *Municipal profiles in personal service activities. Years 2015-2019.*

Figure 5 - *Municipal profiles in personal service activities. Years 2019-2020.*

Figure 6 - *Municipal profiles in personal service activities. Years 2020-2022.*

1 High growth VA and growth PE
2 Stable or low growth VA and growth PE
3 Decrease VA and growth PE
4 High growth VA and PE stable or decreasing
5 Stability or low growth VA and PE stable or decreasing
6 Decrease VA and PE stable or decreasing

1 Growth VA and PE
2 Stable or low decrease VA and growth PE
3 High decrease VA and growth PE
4 Growth VA and PE stable or decreasing
5 Stability or slight decrease VA and PE stable or decreasing
6 High decrease VA and PE stable or decreasing

1 High growth VA and growth PE
2 Stable or low growth VA and growth PE
3 Decrease VA and growth PE
4 High growth VA and PE stable or decreasing
5 Stability or low growth VA and PE stable or decreasing
6 Decrease VA and PE stable or decreasing

Source: our elaborations on Istat T-SBS Register

4. Local spatial correlation analysis on apparent labour productivity levels

4.1. Analysis method

This analysis adopts apparent labour productivity—measured as the ratio of value added to the number of employees—as a central indicator of economic performance. The application of statistical methods of spatial analysis (LISA, Local Indicator Spatial Analysis) to the levels of apparent labour productivity at municipal level makes it possible to identify geographically contiguous clusters of municipalities that are characterised by specific development patterns.

Moran's I index is one of the most common measures of spatial association and is formalised as follows:

$$I = \frac{n \sum\limits_{i=1}^{n} \sum\limits_{j=1}^{n} w_{ij}(y_i - y)(y_j - y)}{\sum\limits_{i=1}^{n} \sum\limits_{j=1}^{n} w_{ij} \sum\limits_{i=1}^{n}(y_i - y)^2} \tag{1}$$

where n is the number of territorial units, y is the mean value of the variable, y_i is the value of the variable at location i, while w_{ij} is a measure of the relationships

between locations i and j. As is well known, the values assumed by Moran's index are sensitive to different measures of contiguity or distance between units. Moran's I index can be interpreted as a measure of the correlation of variable y and its "spatial lag", defined by the average value of all values assumed by y in neighbouring areas. This index, considering all territorial units, measures spatial correlation at a "global" level, identifying spatial patterns at a regional or macro-regional level. It is therefore not particularly suitable for identifying agglomeration processes at the local level.

Local Indicator Spatial Analysis (LISA), developed by Anselin (1995) and included as a test algorithm in the GeoDA software, provide accurate information on agglomeration processes with respect to each territorial unit. From an analytical point of view, local spatial correlation indices (LISA) are a decomposition of Moran's "global" index.

Given a statistical significance level (p value = 0.05) it is possible to identify four types of territorial unit grouping characterised by the following levels of local spatial correlation between municipalities located at the centre and at the periphery of the grouping:

- "high-high" identifies the areas that present a statistically significant association (p value = 0.05 and I_i>0) with high values of productivity within a municipality and in its contiguous areas;
- "low-low" identifies the areas that present a statistically significant association (p value = 0.05 and I_i>0) with reduced values of productivity within a municipality and in its contiguous areas;
- "low-high" identifies areas that present a statistically significant association (p value = 0.05 and I_i<0) with reduced productivity values within a municipality and with high values in its contiguous areas;
- "high-low" identifies areas that present a statistically significant association (p value = 0.05 and I_i<0) with high productivity values within a municipality and with reduced productivity in its contiguous areas.[4]

The first two types identify so-called hot-spots, distinguishing established clusters (high-high) from emerging ones (low-low), while the other two types identify so-called "spatial outlayers".

4.2. Results

In 2022, the manufacturing sector included almost 700 municipalities characterised by high and widespread productivity levels, and thus higher growth

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[4] The classification of a value as 'high' or 'low' is determined relative to the mean: if productivity exceeds the average, it is categorized as high; conversely, if it falls below the average, it is considered low.

potential (high-high). These municipalities were located in the most industrialised areas of Piemonte, Lombardia, Veneto and Emilia-Romagna. Some clusters are also found in specific areas of central Italy (Figure 7). The most widespread clusters are in Tuscany, whereas in the other central regions they are much more limited, covering parts of the Perugia municipality and the Frosinone province. Clusters of municipalities with high levels of productivity are present to a very limited extent in Southern Italy. On the other hand, the clusters of municipalities that are characterised internally by low and diffuse productivity levels (low-low), and thus lower growth potential, are 1,073 and are predominantly located in the South and Islands. The clusters of municipalities that are characterised internally by a high level of productivity in the centre but also by lower levels of productivity on the periphery (high-low) are 120 and are mainly located in the Centre, South and Islands. These clusters have a high growth potential but limited spill-over effects on the surrounding area. Clusters characterised by low productivity in the centre and high productivity in the periphery (low-higt) are 198 and are also mainly located in the Centre, the South and Islands.

In 2022, the clusters of municipalities within the personal services activities with high levels of productivity (high-high) are 511 (Figure 7). A large area of agglomeration characterised by high levels of productivity is found in Trentino Alto Adige and other specific areas in northern and central Italy. In the South and Islands, areas with high levels of productivity are found in specific areas such as Capri in Campania and Vasto in Abruzzo. Emerging clusters, which are characterised by low and diffuse productivity levels (low-low) are 667 and thus lower growth potential, are mainly located in central and southern Italy. The clusters of municipalities that are characterised internally by a high level of productivity in the centre but also by lower levels of productivity on the periphery (high-low) are 144 and are mainly located in the Centre, South and Islands. These clusters have a high growth potential but limited spill-over effects on the surrounding area. Clusters characterised by low productivity in the centre and high productivity in the periphery (low-high) are 194 and are also mainly located in the Centre, South and Islands.

However, it is important to remember that spatial analysis of data using the LISA method is purely exploratory. This is because local agglomeration patterns detected at one or more dimensions can be caused by spurious spatial correlations with other variables. For example, the presence of urban areas or transport infrastructures can influence business location.

Figure 7 – *Local spatial correlation indicators (LISA) for productivity levels at municipal level in the manufacturing sector (left) and in personal service activities (right). Year 2022[1].*

High - High
Low - Low
Low - High
High - Low
No significant
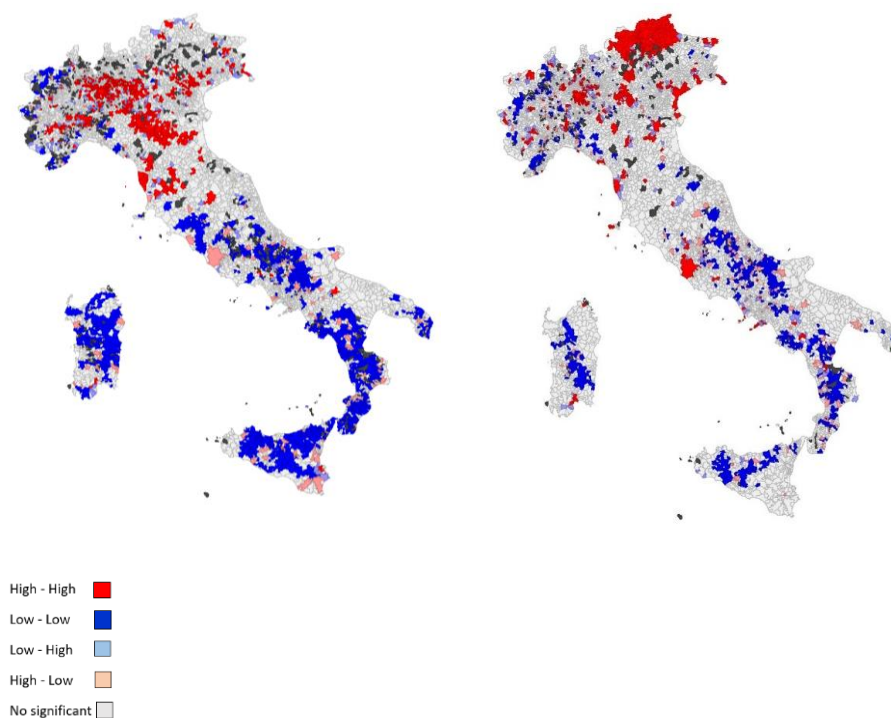
Source: our elaborations on Istat T-SBS Register.

5. Conclusions

The pandemic was an unprecedented external shock that had a profound impact on local economies, with the personal services sector being one of the worst affected. Indeed, in 2020, over 70% of municipalities experienced a decline or stagnation in value added alongside negative employment trends in this sector. However, in the post-pandemic period, signs of economic recovery emerged, particularly in the personal services sector, which was driven by the tourism rebound. Nevertheless, the performance of the best-performing municipalities is still lower than in the pre-pandemic period, indicating that certain local economies has not yet fully returned to its 2015–2019 level.

The analysis also revealed significant differences in the impact of the pandemic on the local economies and their subsequent recovery paths. These differences were influenced by the severity of the economic downturn in 2020 and the structural characteristics at the local level. In around 1,000 municipalities, mainly in the North-East and across both manufacturing and services, economies that had previously shown stability or growth transitioned to stagnation or decline. Meanwhile, other areas experienced persistent crisis conditions, with around 900 manufacturing sector municipalities – primarily in Lombardy and Piedmont, in areas known for their 'Made in Italy' and 'Manufacturing' Local Systems – and approximately 500 personal services sector municipalities, particularly in the North-West and Mezzogiorno. In contrast, certain areas exhibited a clear post-pandemic resurgence. Around 1,300 manufacturing municipalities, primarily situated in the South – particularly in Sardinia's Non-Manufacturing Local Systems and Sicily's Non-Specialised Local Systems – displayed positive recovery trends. Similarly, around 1,130 service-focused municipalities, mainly in the North-West, also recorded encouraging post-pandemic developments.

Finally, spatial correlation analysis revealed clusters of municipalities characterised by high productivity levels. In the manufacturing sector, these clusters are found in the most industrialised areas of Piedmont, Lombardy, Veneto and Emilia-Romagna. Clusters of municipalities with high productivity levels in the personal services sector are located in a large agglomeration area in Trentino-Alto Adige and in other specific areas in northern and central Italy.

In conclusion, the Italian entrepreneurial system, already heavily influenced by pre-existing structural factors, has been severely tested by the pandemic, exacerbating existing structural and economic differences between Italian regions.

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