# The Economic Effects of COVID-19 in Italian Regions. Evidence, Expectations, Policies

*Anna Clara Monti*, Carmelo Petraglia°, Domenico Scalera**

**Abstract**

The effects of COVID-19 on the Italian economy were uneven across regions, with a slightly more severe impact in the North and a slower recovery in the South. The main determinants of the observed differences are investigated, focusing on regional structural factors such as sectoral composition, propensity to remote working, availability of human capital and technology, international openness, participation in global value chains. The analysis on short-term resilience in 2020 is complemented by a discussion on perspectives of growth for the 2021-2024 period, highlighting the elements of weakness of the Southern economy and the role possibly played by public policies.

## 1. Introduction[1]

Like many other big shocks, pandemics differently strike individuals, activities, industries and regions, leading in most cases to significant increases in inequality (Furceri *et al*., 2021). The COVID-19 crisis does not seem to be an exception. The scant evidence already available testifies that the geographical impact of the pandemic across countries and regions has been remarkably differentiated, with uneven effects on both rich and low-income areas (Miguel, Mobarak, 2021). In Europe, "asymmetries in the shock and the recovery are becoming apparent. While the initial shock of the COVID-19 crisis was largely indiscriminate, the impact has now become more uneven with investments recovering at different speeds" (European Investment Bank, 2021, p. 2).

* University of Sannio, Department of Law, Economics and Quantitative Methods, Benevento, Italy, e-mail: acmonti@unisannio.it; scalera@unisannio.it (corresponding author).

° University of Basilicata, Department of Mathematics and Economics, Potenza, Italy and SVIMEZ, Rome, Italy, e-mail: carmelo.petraglia@unibas.it.

1. We would like to warmly thank Francesco Trivieri for his fruitful comments to a previous version of this paper, and SVIMEZ for kindly providing regional data on GDP and Value Added.

Preliminary evidence confirms that similar considerations hold for Italian regions as well. Because of the large long-lasting economic divide between the more developed Centre-North and the lagging-behind South, Italy is a case of particular interest to investigate the geographical effects of the pandemic in a national context with a heterogeneous socio-economic structure of regions.[2] According to several sources (Banca d'Italia, 2021; Confindustria, SRM, 2021; SVIMEZ, 2021a), the impact of COVID-19 and the related containment measures was slightly more severe for some Northern regions in 2020 while the recovery in 2021 seems to be slower in the South (Confindustria, SRM, 2021).

The heterogeneous regional effects of the COVID-19 crisis across Italian regions and the features of both short- and medium-term recovery at the regional level are the main topic of this paper, which in particular focuses on the possible factors determining the observed differences in the impact of the pandemic and the consequent rebound. The likely relevant variables, singled out by the extant literature (i.e. sectoral composition of the regional economy, propensity to remote working, availability of human capital and technology, international openness) are considered to evaluate their importance for regional resistance and the ability to recover from the pandemic shock. Given the paucity of data on regional Gross Domestic Product (GDP) and Value Added (VA) for the most recent months, the level of economic activity in 2021 is proxied by international trade. Moreover, we complement our analysis on short-term resilience in 2020 with a discussion on available forecasts on real GDP growth for the 2021-2024 period, to highlight the regional specific factors either fuelling or hampering medium-term recovery in the Centre-Nord and the South.

A central point of the analysis is whether, even in the case of COVID-19, like for past crises, the impact of the shock has followed a clear North-South pattern, i.e. whether the effects exerted by the pandemic have been uneven among the two macro-regions (Centre-North and South) and similar across regions within the same macro-region. Our investigation confirms this hypothesis, documenting through a principal component analysis (PCA) presented in the Appendix, that Southern regions share a lower ability to recover because of their common structural weakness. On the other hand, in comparison with the global financial crisis of 2008-2012, this time the reaction of Southern economies seems to be less problematic, thanks to the expansionary fiscal policy stance. Expectations for the near future are shaped by public policies as well: if, as expected, in the next few years the support to aggregate demand in the Southern regions is adequate, we

2. As customary in the literature on the Italian economic divide, the North is meant to include the regions Piedmont, Aosta Valley, Lombardy, Liguria, Veneto, Trentino Alto Adige, Friuli Venezia Giulia and Emilia Romagna; the Centre is made by regions Tuscany, Umbria, Marche and Latium; the South comprises the peninsular regions of Abruzzo, Molise, Campania, Apulia, Basilicata and Calabria plus the islands Sicily and Sardinia.

will not observe a sizeable enlargement of the Centre-North/South gap, despite the dynamics of household consumption, which are forecast to be slow especially in the South.

The paper is organised as follows. After this introduction, Section 2 focuses on the possible reasons which explain differentiated effects of the pandemic, presenting a short survey of recent literature. Section 3 analyses the available information on the size of the shock caused by COVID-19 in Italian regions, and studies the uneven geographical impact of the pandemic through the lens of regional characteristics, in terms of sectoral specialization, international openness, participation in international production networks, technological endowment. Section 4 discusses the 2021-2024 real GDP growth forecasts, highlighting the asymmetries in the speed of the post-COVID-19 recovery between Centre-North and South, and the contribution given by different aggregate demand components (private consumption, export, private investment, and public expenditure). The section also focuses on suitable policies needed to alleviate the conditions of structural weakness behind the difficulty of Southern regions to recover from the crisis. Section 5 draws the main conclusions of the paper.

## 2. The Uneven Effects of the COVID-19 Pandemic

A broad strand of the economic literature on COVID-19 (McCann, Ortega-Argiles, 2021; Gardiner *et al*., 2021) has emphasised the possibility of significant asymmetries in the consequences of the pandemic and the related containment measures (lockdown, social distancing and green pass to access indoor venues) across different activities, industries and geographical areas.[3] A widespread argument is that, even when applied uniformly over regions and economic sectors (with obvious exceptions for the "essential activities" satisfying the basic needs of the population), social distancing is likely to affect individuals, firms and territories to a different extent, in line with some structural features of the production process and the involved economic agents (Conte *et al*., 2020).

A first factor which is likely to give place to uneven effects of the pandemic on economic activities is the intensity of the social contact required by the productive process and/or output delivery to buyers. The argument is that the more social closeness is implied in the production and distribution of goods and services, the stronger is the expected economic impact of lockdown. As a result, productive sectors such as consumer services, household activities, tourism and public transport, cultural and creative industries, for which social contact is

3. More generally, the COVID-19 pandemic has also involved uneven consequences in terms of income distribution across groups of workers (Adams-Prassl *et al*., 2020, for US, UK and Germany; Aina *et al*., 2021, for Italy,) and firms (Cevik, Miryugin, 2020).

essential for production and/or consumption, are likely to bear the worst consequences of COVID-19 (Immordino *et al*., 2021).

Secondly, the effects of the pandemic can be heterogeneous according to the different degree of technological advancement of the production process and the level of human capital and workers' abilities, which are essential in determining the technical suitability and economic profitability of remote working. Since the endowment of technology and human capital differs across firms, industries and geographical areas, the actual substitutability of face-to-face with tele-working, and therefore the impact of containment measures is likely to be different. This in particular implies that relatively backward regions, characterised by a specialization in traditional industries, a larger presence of small firms (often endowed with lower technical and organizational abilities and a less advanced ITC equipment; Bartik *et al*., 2020), and a worse telecommunication infrastructure, are basically more vulnerable and therefore destined to undergo the heaviest consequences of social distancing.

A third important factor of heterogeneity is connected to the diverse international openness of regions, and unequal integration of areas and economic sectors in local and international production networks. Inter-firm connections facilitate the propagation of shocks across sectors (Carvalho, Tahbaz-Salehi, 2018), which spread out to downstream and/or upstream industries (Barrot *et al*., 2021), over and above the direct effects of lockdown and social distancing. The development of Global Value Chains (GVCs), occurred since the mid-1980s, has made local and national productive systems increasingly interconnected, thus exposing to a supply-chain contagion even those areas where, from a medical viewpoint, the pandemic was less severe.

The twofold nature of supply and demand shock of the pandemic (Guerrieri *et al*., 2020) implies that contagion can diffuse both the ways, from upstream to downstream sectors, and vice versa. Indeed, in the COVID-19 crisis both the kinds of propagation mechanisms seem to have taken place (Coveri *et al*., 2020). On the one hand, the interruption of GVCs owing to containment measures involved the negative externality consisting in more difficult and expensive sourcing for client industries. On the other hand, the demand reaction to the pandemic brought about slowdown in production, increased unemployment, and a drastic worsening of expectations, which from final markets was conveyed and amplified through GVCs to upstream sectors.[4]

4. A typical mechanism of propagation takes place through inventory adjustment. Following the fall in the demand for final goods, firms not only decrease their demand for inputs but also reduce inventories so that their purchases of intermediates diminish more than final demand. The initial shock is therefore magnified for suppliers along the entire value chain, generating the so-called bullwhip effect (Alessandria *et al*., 2011).

Finally, uneven effects of COVID-19 across territories are possibly a consequence of economic policy. Following the opinion of many economists (Baldwin, Weder di Mauro, 2020) sharing the view that "the case for fiscal stimulus was overwhelming" (Krugman, 2020, p. 213), policy support from European institutions, central governments and local authorities has been massive and prolonged in the last two years. Public intervention may have had different effects across regions and helped to counteract the crisis in a more or less effective way.

The discussion on the regional effects of COVID-19 is particularly interesting in the case of Italy because of the peculiar long-lasting economic dualism characterizing that country. At the end of 2019, the relatively poor Southern regions still had per capita GDP at around 64% of the national average, and the unemployment rate at 17.6% versus 8.7% in the Centre and 6.1% in the North. How the COVID-19 shock has affected and in the near future will affect the Italian regional socio-economic divide is certainly an issue of great interest for scholars and policy makers. Currently, the scarcity of updated and reliable data prevents from giving a satisfactory response on the point. On the other hand, the first evidence collected in the next pages is useful to draw a preliminary picture on the regional differentiation of the impact of pandemic and its consequences on the Italian North-South dualism.

## 3. Resilience and Recovery in Italian Regions

The pandemic crisis involved a fall in the 2020 Italian GDP sharper than the European average (-8,9% in Italy versus -6,1% in Europe), presumably owing to both the specific productive structure of this country, and the weak productivity dynamics of the Italian economy in the previous decades.

At the regional level, the first evidence shows limited but significant differences in the territorial impact of COVID-19 in terms of changes in GDP, employment, firm sales and investments (Banca d'Italia, 2021; Confindustria, Cerved, 2020; Confindustria, SRM, 2021; Istat, 2021a, 2021b; SVIMEZ, 2021a). Unlike the case of the global financial crisis,[5] the pandemic does not seem to have affected more severely Southern regions. This can be due to the stronger intensity of the pandemic in the Northern regions, which at the end of 2020 recorded more than 1,270,000 cases and almost 54,000 deaths (respectively corresponding to 4.58% and 0.19% of resident population) against 354,000 cases and 9,600 deaths in the Centre (2.93% and 0.08% of resident population) and 480,000 cases and 10,600 deaths in the South (2.32%

5. Between 2008 and 2014, the yearly average growth rate in the South was -1.6% against -0.9% in the rest of Italy (SVIMEZ, 2016, pp. 16-17).

and 0.05% of resident population).[6] Also, the greater international openness of Centre-North may have been somehow harmful, favouring the diffusion of the shock through supply chains. On the other hand, as we will see later, the structural weakness of the Southern economy, characterised by a long-dated gap in productivity and competitiveness with respect to the rest of Italy, and specialised in industries (consumer services, tourism and creative sectors) more exposed to the consequences of the pandemic, has probably caused a more difficult recovery in 2021.

Figure 1 shows percentage decreases in per capita GDP, total VA, industry VA and services VA recorded between 2019 and 2020 in Italian regions. In each map, darker shades denote stronger drops of the variable considered. For example, the change in GDP, being on average at around -8.9%, is larger in Centre-North (and particularly in Trentino, Veneto, Tuscany and Marche) and smaller in the South (panel A). Most of the least severely hit regions, showing decreases less than 8.5%, are in the South (Molise, Campania, Apulia and Sicily) with the exceptions of Friuli and Latium, the capital-city region, which enjoys a relatively large presence of public administration services.

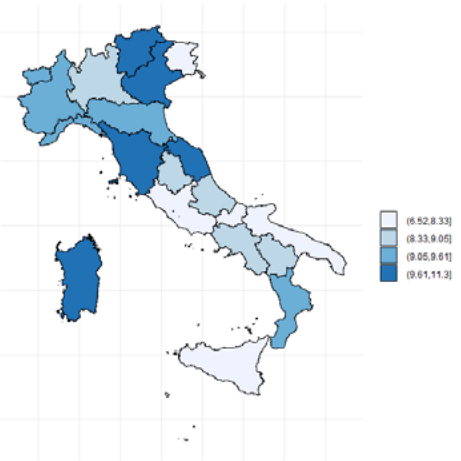
The drop in overall VA (panel B) is mainly driven by the industry, falling by about 11% at the national level and slightly more in Centre-North (panel C). Concerning industrial sectors, SVIMEZ (2021a) documents that "Textile and Apparel" (-23.3% in Centre-North and -21,8% in the South) and "Mechanics, Electrical Appliances and Transportation Means" (on average, -13,9% for Centre-Northern and -14,5% for Southern Italy) record the worst performance, while the Food industry is the most resilient (-1.7% in Centre-North and -2.3% in the South). Changes in the Value Added of service sectors are displayed in Figure 1 (panel D). Services turn out to suffer less than industry from the COVID-19 crisis, although less suitable to substitute in-presence with remote working and therefore in principle more vulnerable to social distancing. In the case of services, Aosta Valley in the North and Sardinia in the South appear in the quartile of the most severely struck regions.

In general, the evidence of a larger fall in industrial VA suggests that the major effects of the pandemic derived from the drop in aggregate demand following lockdown rather than from the supply shock in itself. As a matter of fact, a contraction of demand for durable consumption goods and firm investments and inventories (i.e. industrial goods) larger than for consumption services may have engendered the observed stronger impact on industry than services. According to this interpretation, the worse dynamics of GDP in Northern regions could be ascribed to the

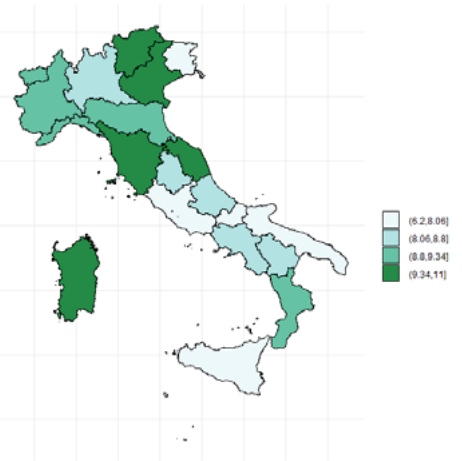
6. For the year 2020, correlation coefficients between regional changes in per capita GDP and COVID-19 occurrence are around -0.29 and -0.30 respectively for the number of cases and deaths. With respect to per capita Value Added changes, the correlation coefficient is -0.27 with cases and -0.29 with deaths.

*Figure 1 – Per capita GDP and Value Added (total, industry and service sectors) % decreases 2020/2019*

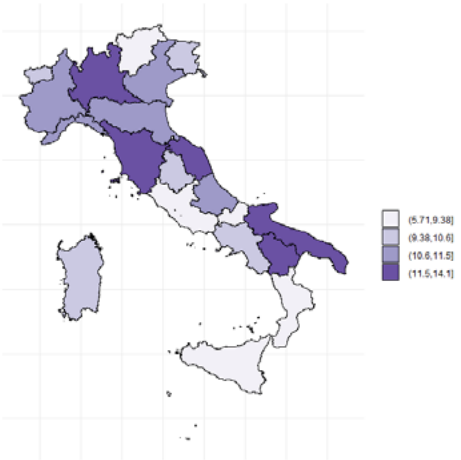
*A. Per capita GDP decrease %*



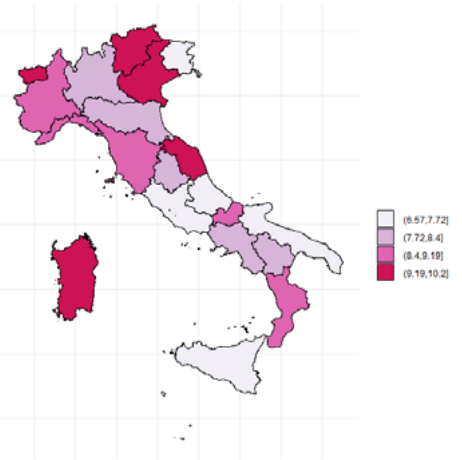

*B. Per capita total VA decrease %*




*C. Per capita industry VA decrease %*




*D. Per capita services VA decrease %*




*Source*: Data on regional GDP and VA are drawn from the SVIMEZ dataset.

*Table 1 – Correlation coefficients between regional performance (by rows) and regional specialization (by columns)*

| *Panel A* | *% of VA in industry* | *% of VA in Services* | *Tourism* | *Culture* | *S1* | *S2* |
|---|---|---|---|---|---|---|
| GDP% | -0.350* (0.065) | 0.323* (0.082) | -0.233 (0.161) | -0.143 (0.274) | 0.195 (0.205) | 0.135 (0.285) |
| VA% | -0.349* (0.066) | 0.326* (0.080) | -0.234 (0.160) | -0.141 (0.277) | 0.192 (0.209) | 0.133 (0.288) |
| *Panel B* | *Industry* | *Services* | *Tourism* | *Culture* | *S1* | *S2* |
| Wexp | 0.300* (0.099) | -0.212 (0.185) | -0.117 (0.312) | -0.222 (0.173) | -0.422** (0.032) | -0.452** (0.023) |
| Wimp | 0.161 (0.249) | -0.093 (0.348) | -0.211 (0.186) | -0.326* (0.080) | -0.452** (0.023) | -0.399** (0.041) |

*Note*: Row labels GDP% and VA% denote percentage changes in per capita GDP and per capita total value added between 2020 and 2019; Wexp and Wimp are percentage changes of regional exports and imports (for the period January-September 2021 with respect to the same period of 2020), both weighted by the share of export or import on regional GDP. Column labels "% of VA in industry" and "% of VA in services" are the VA shares on total VA. Tourism and Culture are Hoover coefficients calculated as $h_{ij}=q_{ij}/q_{i0}$, where $q_{ij}=e_{ij}/\Sigma_i e_{ij}$, $e_{ij}$ is the number of employees in sector $i$ and region $j$, and 0 denotes the whole country; the greater $h_{ij}$ the stronger the presence of industry $i$ in region $j$. *S*1 and *S*2 are coefficients of regional specialization (dissimilarity) calculated as $S_j = 1/2\sum|q_{ij}-q_{i0}|$; the greater $S_j$, the more specialised the region (i.e. the more different from the average national sectoral structure). *S*1 refers to the only manufacturing industries; *S*2 to all sectors.
Directional p-values in brackets. * and ** respectively stand for 10% and 5% statistical significance. The test statistic is $r\sqrt{n-2}/\sqrt{1-r^2}$, approximately distributed as $t$ with $n$-2 degrees of freedom, with $r$ denoting the coefficient of correlation and $n$ the number of observations.

*Source:* The data on regional GDP and VA are drawn from the SVIMEZ dataset; those on regional exports and imports, updated to September 2021, come from the website of the ICE-ITA agency www.ice.it/it/statistiche/short_stat.aspx. The data on sectoral distribution are retrieved from the Registro Statistico delle Imprese Attive (ASIA), available on the website dati.istat.it/OECDStat_Metadata.

bad performance of Northern industry, whereas a relatively larger presence of the services sector may have somehow protected the Southern regions.

To address this issue more in detail, Table 1 (panel A) shows the correlation coefficients of *percentage changes*[7] in regional per capita GDP and total VA between 2020 and 2019 with the regional: a) share of industry VA on total VA (at the column named *% of VA in industry*); b) share of services VA on total VA (*% of VA in services*); c) Hoover coefficients of touristic services (*Tourism*); d) Hoover

7. Correlation coefficients between *absolute* changes in per capita GDP and VA and indexes of specialization and technology adoption have been considered as well. Since they are very similar to those calculated for GDP and VA *percentage* changes, they are not reported in Tables 1 and 2.

coefficients of cultural and sport services (*Culture*); e) industrial specialization (*S1*) and f) overall specialization (*S2*) indicators.[8] The latter variables are also considered in Table 1 (panel B) where their correlation coefficients with the rate of changes of regional exports and imports between the months of January and September 2021 and the same period of 2020 are displayed. In this way, the analysis is able to deal not only with the regional resilience, i.e. the aptitude to curb the consequences of lockdown in 2020 (panel A), but also the ability of Italian regions and macro-regions to recover from the crisis (panel B).[9]

The coefficients displayed in the first two columns of panel A confirm the indication of Figure 1 about the stronger impact of the pandemic on industry than services, as correlation between changes in GDP or VA and the share of VA in industry (services) comes out to be negative (positive) and statistically significant at 10% level. On the other hand, in panel B the last two rows show that a greater specialization in industry (services) has somehow favoured (hampered) the 2021 rebound, even if correlation coefficients are small and just in one case barely significant. As expected, in the third and fourth columns the coefficients are always negative (but never statistically significant), verifying that specialization in tourism and cultural services has to some extent aggravated the crisis and made recovery more difficult. Finally, regional specialization is also measured by an indicator assuming higher values when the regional sectoral structure is more specialized in specific manufacturing industries (S1) or sectors (S2). In Italy this occurs in the case of small (Molise, Basilicata, Aosta Valley) and less central (Sardinia, Calabria, Sicily) regions plus the capital-city region Latium. The intensity of specialization does not seem to have impacted on the severity of crisis while, in accordance with the literature (McCann, van Oort, 2009), larger industrial variety may have helped less specialised regional economies to better recover from the crisis, as shown by the negative and significant correlation coefficients displayed in panel B.

Another source of possible interregional heterogeneity is the diversity in the adoption of new technologies, the endowment of human capital and the attitude toward R&D activities. Indeed, as argued in Section 2, higher worker capabilities, better technological facilities, greater suitability to remote working, and

8. Details on the sources of data and the construction of Hoover and specialization indexes are given in the Note to Table 1.

9. Precisely *Wexp* and *Wimp* denote percentage changes of regional exports and imports; both are weighted by the share of export or import on regional GDP. Data on the growth of regional exports and imports are used to estimate the size of the after-pandemic recovery in the absence of other more detailed information on regional GDP or VA for 2021. The choice of international trade variables is justified by the important role that in the past export has often taken in the recovery of the Italian and especially Southern economy, in the presence of a binding domestic-demand constraint.

*Table 2 – Correlation coefficients between regional performance (by rows) and indexes of technology adoption (by columns)*

| *Panel A* | *Internet* | *Devices* | *R&D-Exp* | *R&D-Empl* |
|---|---|---|---|---|
| GDP% | 0.461** | 0.112 | -0.094 | -0.156 |
| | (0.0204) | (0.0319) | (0.3467) | (0.2557) |
| VA% | 0.463** | 0.112 | -0.084 | 0.148 |
| | (0.0199) | (0.0319) | (0.3624) | (0.2667) |
| *Panel B* | *Internet* | *Devices* | *R&D-Exp* | *R&D-Empl* |
| Wexp | -0.254 | 0.328* | 0.536*** | 0.461** |
| | (0.1399) | (0.0790) | (0.0074) | (0.0204) |
| Wimp | 0.120 | 0.431** | 0.355* | 0.246 |
| | (0.3072) | (0.0289) | (0.0623) | (0.1479) |

*Note:* Row labels GDP% and VA% denote percentage changes in per capita GDP and per capita total value added between 2020 and 2019; Wexp and Wimp are percentage changes of regional exports and imports (for the period January-September 2021 with respect to the same period of 2020), both weighted by the share of export or import on regional GDP. Column labels: 100 Mb/s Internet is the share of firms using fast Internet connection (not less than 100 Mb per second); Devices is the share of firms equipping their workers with personal electronic devices; *R&D-Exp* is the ratio of firm private *R&D* expenditure to GDP; *R&D-Empl* is the ratio of firm employment in *R&D* to total employment.

Directional p-values in brackets. *, ** and *** respectively stand for 10%, 5% and 1% statistical significance. The test statistic is $r\sqrt{n-2}/\sqrt{1-r^2}$, approximately distributed as $t$ with $n$-2 degrees of freedom, with $r$ denoting the coefficient of correlation and $n$ the number of observations.

*Source:* Data on regional GDP and VA are drawn from the SVIMEZ dataset. Indicators on regional exports and imports, updated to September 2021, are supplied by ICE-ITA agency at the website www.ice.it/it/statistiche/short_stat.aspx. The data on the adoption of ICT and R&D activities in Italian firms are retrieved respectively from the Rilevazione sulle tecnologie dell'informazione e della comunicazione nelle imprese and Rilevazione statistica sulla ricerca e lo sviluppo nelle imprese italiane, available on the website dati.istat.it/OECDStat_Metadata.

flexibility to changes in market conditions may have helped more advanced regions to mitigate the impact of lockdown and recover more easily.

To investigate this aspect, Table 2 reports the correlation coefficients of percentage changes in regional per capita GDP and total VA with two indicators of the degree of adoption of ICT and two proxies of the intensity of R&D. In particular, we use the regional: a) share of firms using fast Internet connection, i.e. not less than 100 Mb per second (*Internet*); b) share of firms equipping their workers with personal electronic devices such as smartphones, tablets, laptops and so on (*Devices*); c) ratio of firm private R&D expenditure to GDP (*R&D-Exp*); d) ratio of firm employment in R&D to total employment (*R&D-Empl*). Figures in Table 2 basically support our hypotheses. Focusing on statistically significant

coefficients, we can conclude that regions with more advanced productive structures in terms of ICT and R&D have undergone less disrupting effects (column 1, panel A), and better recovered (column 2, 3 and 4, panel B) from the crisis.

Finally, Table 3 aims at checking whether the regional impact of COVID-19 and the subsequent rebound can be associated to region international openness and its integration in international production networks such as GVCs. Unlike Tables 1 and 2, in this case even *absolute* changes in per capita GDP and VA are also considered (beside *percentage* changes) as correlation coefficients take considerably higher values.

As recalled in Section 2, there are a number of reasons to expect that exposure to international trade and especially participation in GVCs may amplify the shocks (both positive and negative) and therefore, in the case of the pandemic crisis, may have magnified the impulse of closures and the consequent contractionary reaction of aggregate demand. In Table 3, correlation coefficients between GDP and VA changes on one side and regional international openness and integration in GVCs on the other are reported. In particular, propensity to international operations is measured by *Openness*, i.e. the ratio of half the sum of exports and imports to GDP, while *GVC1* and *GVC2* are two indicators of regional firm participation in GVCs, respectively indicating the share of regional firms belonging to a broad-sense GVC and a relational GVC.[10]

As a matter of fact, the correlation coefficients in Table 3 have signs consistent with predictions and the previous evidence of Tables 1 and 2. Greater openness and integration in GVCs involve larger effects on GDP and VA and therefore a sharper fall in 2020, as proved by negative and statistically significant correlation coefficients in panel A. However, regions more internationally integrated are also those with greater capability to recover from the crisis, as shown by the positive, large and statistically significant coefficients displayed in panel B. Interestingly, a more qualified participation in GVCs (i.e. a higher value for the indicator GVC2) turns out to bring about worse effects in the contractionary stage and a weaker bounce during the recovery. Thus, the disruption in supply

10. The indicators *GVC1* and *GVC2* are based on microdata supplied by the surveys on industry and production services conducted since 2006 by the independent economic research centre MET (see MET Economia | English Section (met-economia.it)). They are built up on a sample of about 15,200 Italian firms by adopting the same criterion that Agostino *et al*. (2019) use to distinguish between belonging to broad-sense GVCs and relational GVCs. In particular, in Table 3, *GVC1* is the share of firms located in the region which are in (at least) one of these conditions: a) exporter of intermediate goods; b) both exporter and importer; c) exporter or importer *and* keeping long-lasting relationships with foreign counterparts. *GVC2* is the share of firms which beside being in one of the previous conditions, is also highly involved in the conception, R&D and/or design stages of production of the final good. We do not adopt macro indicators of participation in GVCs based on value added components of inter-regional trade flows because at the regional level the last available information needed to compute these indexes refers to 2012 (Bentivogli *et al*., 2019).

*Table 3 – Correlation coefficients between regional performance (by rows) and indexes of international openness and GVC participation (by columns)*

| *Panel A* | *Openness* | *GVC1* | *GVC2* |
|---|---|---|---|
| GDP% | -0.230<br>(0.1647) | -0.307*<br>(0.0940) | -0.385**<br>(0.0468) |
| VA% | -0.223<br>(0.1723) | -0.300*<br>(0.0994) | -0.365*<br>(0.0568) |
| GDP | -0.525***<br>(0.0087) | -0.601***<br>(0.0025) | -0.793***<br>(0.0000) |
| VA | -0.522***<br>(0.0091) | -0.597***<br>(0.0027) | -0.788***<br>(0.0000) |
| *Panel B* | *Openness* | *GVC1* | *GVC2* |
| Wexp | 0.709***<br>(0.0002) | 0.647***<br>(0.0010) | 0.359*<br>(0.0600) |
| Wimp | 0.622***<br>(0.0017) | 0.472**<br>(0.0178) | 0.252<br>(0.1419) |

*Note*: Row labels GDP and GDP% are changes in per capita GDP respectively in absolute and percentage terms; VA and VA% are changes in per capita total value added respectively in absolute and percentage terms; Wexp and Wimp are percentage changes of regional exports and imports (for the period January-September 2021 with respect to the same period of 2020), both weighted by the share of export or import on regional GDP. Column labels: Openness is the ratio of half the sum of exports and imports to GDP; GVC1 and GVC2 are indicators of regional firm participation in GVCs, respectively indicating the share of regional firms belonging to a broad-sense GVC and a relational GVC (for further details see footnote 13).
Directional p-values in brackets. *, ** and *** respectively stand for 10%, 5% and 1% statistical significance. The test statistic is $r\sqrt{n-2}/\sqrt{1-r^2}$, approximately distributed as t with n-2 degrees of freedom, with r denoting the coefficient of correlation and n the number of observations.

*Source*: Data on regional GDP and VA are drawn from the SVIMEZ dataset. Indicators on regional exports and imports, updated to September 2021, are supplied by ICE-ITA agency at the website www.ice.it/it/statistiche/short_stat.aspx. GVC1 and GVC2 are constructed from data supplied by the MET surveys on industry and production services (see MET Economia | English Section – met-economia.it).

chains caused by lockdown appears to be spread out along the whole production network penalizing more the most important actors, committed with the highest value-added segments of the production process.

Summarizing, the evidence displayed in Figure 1 and Tables 1-3 points out that the effects of COVID-19 have been actually uneven across Italian regions, that specialization in industrial sectors, technology gap and international openness has made some areas more vulnerable to the crisis in 2020, but also that openness and integration in GVCs, better technological endowment and attitude to R&D have helped territories to recover faster in 2021. All these results are consistent

with the first indications of Banca d'Italia (2021) and SVIMEZ (2021a). Clearly, the observed asymmetric impact of COVID-19 across regions has a straightforward implication in terms of the Italian North-South regional divide. Given the strong diversity of Northern and Southern regions in the characteristics (specialization, openness, integration, technology) relevant to determining regional resilience and recovery, the previous analysis can be immediately translated in North-South terms: Northern regions were hit by the crisis (slightly) more but the South encountered the heaviest difficulties in recovering.[11]

## 4. Beyond the Rebound

So far, our discussion has focused on regional asymmetries observed during the pandemic shock and the first months of the rebound. Using the forecasts recently released by SVIMEZ (2021b), and reported in Table 4, we now take a step forward and look at medium-term perspectives,[12] considering also the impact of policies, that in the post-pandemic years will be certainly particularly important.

Overall, despite the growth slowdown which is expected to follow the 2021-2022 rebound (see Table 4), the medium-term post-COVID-19 scenario (2021-2024) should be strikingly different from the period following the 2008-2013 crisis. In that case, recession was deeper and more persistent, and the recovery much weaker in the South than in the Centre-North, with GDP increasing between 2015 and 2019 by 5.4% in the Centre-North and only 2.5% in the South. Asymmetric territorial effects of fiscal consolidation at those times were a major reason for such a diverging pattern across regions. Conversely, for the period 2021-2024 the aggregate GDP growth is estimated to be at 12.4% and 15.6% in the South and in the Centre-North respectively, with a contribution of economic policy (i.e. the estimated share of growth directly imputable to public intervention), evaluated around 48% at the national level, at 58.1% in the South and 45% in the Centre-North.

Needless to say, the new policy approach emerged in Europe is behind these figures. The pandemic has urged extensive support by national European governments during the emergency and a common European strategy for the after-COVID-19 transition. The temporary suspension of European fiscal and State Aid rules together with the introduction of extraordinary flexibility in the use of unspent

11. To document that North and South deeply differ in the structural variables used by the correlation analysis of Tables 1-3, a Principal Component Analysis (PCA) was carried out, aimed at grouping regions according to those variables. As shown in detail in Appendix, the results of this analysis confirm a clear North-South pattern, fully consistent with the considerations exposed in the main text.

12. This paper was completed in February 2022, before the outbreak of the war in Ukraine. The effects of that event on European economies are unpredictable, depending on scale and duration of the war and economic sanctions imposed to Russia. Of course, the medium-term perspectives for Southern Italy may be heavily affected as well.

*Table 4 – Annual % changes of GDP, private and public consumption, export and investment, 2021-2024 forecasts*

| | *South* | | | | *Centre-North* | | | | *Italy* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *2021* | *2022* | *2023* | *2024* | *2021* | *2022* | *2023* | *2024* | *2021* | *2022* | *2023* | *2024* |
| GDP | 5.0 | 4.0 | 1.9 | 1.5 | 6.8 | 4.2 | 2.6 | 2.0 | 6.4 | 4.1 | 2.4 | 1.9 |
| Total domestic consumption | 3.8 | 2.6 | 2.2 | 1.9 | 4.3 | 3.7 | 2.9 | 2.4 | 4.2 | 3.3 | 2.7 | 2.4 |
| Private consumption | 4.6 | 3.2 | 2.7 | 2.3 | 5.2 | 4.5 | 3.4 | 3.0 | 5.0 | 4.2 | 3.2 | 2.8 |
| – goods | 3.7 | 3.0 | 2.4 | 2.2 | 5.7 | 3.2 | 2.6 | 2.6 | 5.1 | 3.1 | 2.6 | 2.5 |
| – services | 5.6 | 3.5 | 2.9 | 2.3 | 4.5 | 5.7 | 4.0 | 3.1 | 4.7 | 5.2 | 3.7 | 3.0 |
| Public Administrations expenditure in goods and services | 2.0 | 1.1 | 1.0 | 0.7 | 1.4 | 0.7 | 1.2 | 0.6 | 1.6 | 0.8 | 1.1 | 0.6 |
| Export (a) | 14.3 | 4.7 | 5.6 | 4.8 | 16.5 | 6.7 | 6.1 | 5.0 | 16.3 | 6.6 | 6.1 | 5.0 |
| Total investment | 11.9 | 11.0 | 7.8 | 6.5 | 13.4 | 13.1 | 6.0 | 5.2 | 13.1 | 12.6 | 6.4 | 5.5 |
| – Investment in machinery, equipment and transportation mean | 7,4 | 4,8 | 3,3 | 1,8 | 11.4 | 11.3 | 5.1 | 5.9 | 10.7 | 10.0 | 4.8 | 5.1 |
| – Investment in buildings | 14,8 | 14,8 | 10,3 | 8,9 | 15.8 | 15.1 | 7.0 | 4.6 | 15.4 | 15.0 | 7.8 | 5.7 |

*Note*: Oil products excluded; current prices.

*Source*: SVIMEZ (2021b)

European structural funds have allowed European Member States to mobilize massive public resources to counteract the socio-economic impacts of the crisis.

The unexpected radical change of direction of European institutions towards an EU common response to the crisis materialized in the Next Generation EU (NGEU), a temporary program additional to the funds of the 2021-2027 UE budget, designed to boost the recovery through the largest fiscal stimulus package ever financed in Europe. Apart from the size, NGEU presents three main groundbreaking novelties in EU macroeconomic governance. First, the European Commission borrows on the market on behalf of the European Union up to 750 billion euro (in 2018 prices) to be allocated in grants and loans to Member States that in turn use these resources to finance their national Resilience and Recovery Plans (RRPs). Second, country allocation follows needs-based rules that imply a sizeable financial support for countries facing the greatest economic and fiscal challenges as a result of the pandemic. Third, RRPs define broad packages of investments and reforms aimed at improving social and territorial cohesion, that is at reducing internal gaps among more and less advanced regions. Finally, the "new" European approach is at the core of the Italian national interest for the conditionality imposing to link national growth strategies to the reduction of regional development gaps.

In 2020 the Italian government deficit escalated to 158 billion euro (9.6% of GDP). In 2021-2022 the expansionary stance of fiscal policy will continue to give rise to large government deficits: about 99 billion euro in 2021 and 56 billion euro expected in 2022. Government deficits are then forecast to fall significantly until 2024; the composition of public expenditure will change, gradually switching from current expenditure used to support workers, household and businesses, to public investment for the implementation of the Italian RRP. In particular, outlays around 90 billion euro of public investment are estimated for the 2021-2024 period, 40% of which allotted to the South according to the plans of the Italian RRP.

SVIMEZ (2021b) forecasts that Southern regions will participate in the 2021-2022 national recovery more actively than in the past. For 2021, real GDP growth in the South is estimated around to +5%, against +6.8% in Centre-North, a slower pace to be evaluated bearing in mind the Southern structural weakness, and the fact that the recession was worse in the Centre-North. According to SVIMEZ forecasts, the recovery will continue in 2022 at a lower speed at the national level (+4,1%) but quite homogeneously across the two areas (+4,2% in the Centre-North and +4,1% in the South). If confirmed by facts, such "hand in hand" dynamics represent an unprecedented event in recent times, which would allow the whole country to recover the pre-COVID-19 GDP levels before the end of 2022, and the South to avoid exacerbation of economic dualism, typically taking place in the uphill phases of the economic cycle.

As shown in Table 4, exports and the construction (especially buildings) sector are the main drivers of GDP growth in the 2021-2022 rebound; both aggregate demand components should return to pre-crisis levels already during 2021 in the Centre-North and Southern Italy. Because of the greater openness, exports exert a stronger expansionary effect in the Centre-North than the South, while investments in construction and infrastructure boosted by policy interventions have a more significant multiplying effect on Southern local economies. In 2023 Italian GDP is expected to increase by 2.4%, precisely: +2,6% in the Centre-North and +1.9% in the South. In 2024, national growth will further decelerate to +1.9% while the Centre-North/South growth differential should remain constant around half a percentage point (+2% in the Centre-North compared to +1.5% in the South).

In this scenario, the boosting effect of policies, mainly due to public investment financed by the national RRP, becomes the main driving force of real GDP growth. In the South, this effect should be even stronger. Once gone back to the pre-COVID-19 levels of economic activity, private demand components – both domestic consumption and exports – are expected to support GDP growth in the Centre-North. In the South instead only public investment is called to play this role while private consumption is unable to sustain economic expansion. The reasons for this forecast are several; primarily the flat growth of salaries. Italian wages are among the most stagnant in Europe and this inevitably translates into an anemic expansion of consumption. Stagnation of wages is even worse in the South due to the excess flexibility in local labor markets.

Summing up, SVIMEZ (2021b) forecasts draw a picture in which on the one hand in the South public investment supports GDP growth beyond the 2021-2022 rebound, unlike what happened in the case of the past financial crisis. On the other hand, such a boost is not strong enough to start a process of regional convergence, mainly because of stagnant dynamics of private consumption and exports. Therefore, even if the South grows a little less than the rest of the country, public support prevents the worsening of the regional gap, which instead occurred in the period after the 2008-2013 crisis.

Further boost to the Southern economy should come from the contribution of policies to the re-build of additional production capacity to absorb greater shares of domestic and foreign demand. Indeed, the relatively lower ability of the Southern regions to recover is due to structural criticalities remained unsolved for a long time. These are determined, on the one hand, by dimensional deficiencies and sectoral composition, and on the other hand by an adverse context depressing employment and firm performance in terms of productivity, innovative ability and international openness. This is the field of industrial policy, which today as never before is called not only to promote competition and set rules for the proper functioning of markets, but also make choices on the allocation of resources to achieve

strategic objectives. In the post-pandemic phase, increased firm size, international openness, strengthening of supply chains, support for research, innovation and technology transfer, development of green products and technologies, digitalization, will be certainly goals to pursue for overcoming territorial gaps.

## 5. Conclusions

The effects of COVID-19 on the Italian economy were uneven across regions, with a slightly more severe impact in the North and a slower recovery in the South. Structural factors such as sectoral composition, propensity to remote working, availability of human capital and technology, international openness, participation in global value chains shaped regional resilience and recovery.

In particular, regional specialization in tourism and cultural services exacerbated the crisis and made recovery more difficult, but in general the pandemic impacted more severely on industry than services, while on the other hand, a greater industrial specialization favoured the regional GDP rebound in 2021. Second, regions with more advanced productive structures in terms of ICT and R&D underwent less disrupting effects and recovered from the crisis more quickly. Third, international openness and integration in GVCs involved a sharper fall of regional GDP in 2020 but also a greater capability to recover from the crisis in 2021.

The perspectives of growth after the pandemic will be importantly affected by the structural weakness of the Southern economy and the action of public policies. The latter are called not only to promote competition and set rules for the proper functioning of markets, but also to intervene on the factors of weakness of the Southern economy, i.e. to increase firm size, favor international openness, strengthen participation in supply chains, foster research, innovation, technology transfer, digitalization and the development of green products and technologies, all crucial goals to pursue in order to bridge the Italian regional gap.

## References

Adams-Prassl A., Boneva T., Golin M., Rauh C. (2020), Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public Economics*, 189: 104245. Doi: 10.1016/j.jpubeco.2020.104245.

Agostino M., Brancati E., Giunta A., Scalera D., Trivieri F. (2019), Firms' efficiency and global value chains: An empirical investigation on Italian industry. *The World Economy*, 43, 4: 1000-1023. Doi: 10.1111/twec.12866.

Aina C., Brunetti I., Mussida C., Scicchitano S. (2021), Who lost the most? Distributive effects of COVID-19 pandemic. Rome: *INAPP Working Paper* n. 65 – www.inapp.org last access April 2022.

Alessandria G., Kaboski J.P., Midrigan V. (2011), US Trade and Inventory Dynamics. *American Economic Review*, 101, 3: 303-307. Doi: 10.1257/aer.101.3.303.
Baldwin R., Weder di Mauro B. (eds.) (2020), Mitigating the COVID-19 Economic Crisis: Act Fast and Do Whatever It Takes. London: VoxEU.org & CEPR Press – voxeu.org.
Banca d'Italia (2021), L'economia delle regioni italiane. Dinamiche recenti e aspetti strutturali. *Economie regionali* n. 22 – www.bancaditalia.it last access April 2022.
Barrot J.N., Grassi B., Sauvagnat J. (2021), Sectoral effects of social distancing. *AEA Papers and Proceedings*, 111: 277-281 – Doi: 10.1257/pandp.20211108.
Bartik A.W., Bertrand M., Cullen Z.B., Glaeser E.L., Luca M., Stanton C.T. (2020), How are small businesses adjusting to COVID-19? Early evidence from a survey. Chicago: University of Chicago. *Becker Friedman Institute Working Paper* n. 42 – bfi.uchicago.edu/working-papers last access April 2022.
Bentivogli C., Ferraresi T., Monti P., Paniccià R., Rosignoli S. (2019), Italian regions in global value chains: An input-output approach. *Politica Economica*, 35, 1: 55-94. Doi: 10.1429/93307.
Carvalho V.M., Tahbaz-Salehi A. (2018), Production networks: A primer. *Annual Review of Economics*, 11: 635-663. Doi: 10.1146/annurev-economics-080218-030212.
Cevik S., Miryugin F. (2020), Pandemics and firms: Drawing lessons from history. Washington, DC: International Monetary Fund. *IMF Working Paper* n. 20/276.
Confindustria, Cerved (2020), Rapporto regionale PMI 2020. Roma: Confindustria Servizi.
Confindustria, SRM (2021), Rapporto Check-up Mezzogiorno 2021. Roma-Napoli: Confindustria, SRM.
Conte A., Lecca P., Salotti S., Sakkas S. (2020), The territorial economic impact of COVID-19 in the EU. A RHOMOLO Analysis. Territorial Development Insights Series, JRC121261. Brussels: European Commission.
Coveri A., Cozza C., Nascia L., Zanfei A. (2020), Supply chain contagion and the role of industrial policy. *Journal of Industrial and Business Economics*, 47, 3: 467-482. Doi: 10.1007/s40812-020-00167-6.
European Investment Bank (2022), Investment Report 2021/2022: Recovery as a springboard for change. Luxembourg: EIB. Doi: 10.2867/82061.
Furceri D., Loungani P., Ostry J.D., Pizzuto P. (2021), Will COVID-19 Affect Inequality? Evidence from Past Pandemics. Washington, DC: International Monetary Fund. *IMF Working Paper* n. 127. Doi: 10.5089/9781513582375.001
Gardiner B., Lewney R., Martin R. (2021), Sectoral and spatial impacts of the COVID-19 recession. In: McCann P., Vorley T. (eds.), *Productivity and the Pandemic. Challenges and Insights from COVID-19*. London: Edward Elgar Publishing. 160-172. Doi: 10.4337/9781800374607.00018
Guerrieri V., Lorenzoni G., Straub L., Werning I. (2020), *Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?* Cambridge, MA: National Bureau of Economic Research. *NBER Working Papers* n. 26918. Doi: 10.3386/w26918.
Immordino G., Jappelli T., Oliviero T., Zazzaro A. (2021), Fear of COVID-19 contagion and consumption: Evidence from a survey of Italian households. *Health Economics* 31, 3: 496-507. Doi: 10.1002/hec.4464.
Istat (2021a), Rapporto annuale 2021. La situazione del Paese. Roma: Istat.
Istat (2021b), Rapporto sulla competitività dei settori produttivi. Roma: Istat.

Krugman P. (2020), The case for permanent stimulus. In: Baldwin R., Weder di Mauro B. (eds.) (2020), Mitigating the COVID Economic Crisis: Act Fast and Do Whatever It Takes. London: VoxEU.org & CEPR Press – voxeu.org. 213-219.
McCann P., Ortega-Argilés R. (2021), The COVID-19 shock: the UK national and regional implications in the light of international evidence. In: McCann P., Vorley T. (eds.), *Productivity and the Pandemic. Challenges and Insights from COVID-19*. London: Edward Elgar Publishing. 1-15. Doi: 10.4337/9781800374607.00007.
McCann P., van Oort F. (2009), Theories of agglomeration and regional economic growth: a historical review. In: Capello R., Nijkamp P. (eds.), *Handbook of Regional Growth and Development Theories*. London: Edward Elgar Publishing. 19-32. Doi: 10.4337/9781848445987.00007.
Miguel E., Mobarak A.M. (2021), The Economics of the COVID-19 Pandemic in Poor Countries. Cambridge, MA: National Bureau of Economic Research. *NBER Working Papers* n. 29339. Doi: 10.3386/w29339.
SVIMEZ (2016), Rapporto Svimez 2016 sull'economia del Mezzogiorno. Bologna: il Mulino.
SVIMEZ (2021a), Rapporto Svimez 2021. L'economia e la società del Mezzogiorno. Bologna: il Mulino.
SVIMEZ (2021b), Linee introduttive del Rapporto e nuove previsioni Nord-Sud 2021-2024. Roma: Svimez – last access April 2022.

**Gli effetti del COVID-19 nelle regioni italiane. Evidenza, previsioni, politiche**

**Sommario**

*Il COVID-19 ha prodotto effetti differenziati sull'economia delle diverse regioni italiane. Nonostante l'impatto immediato sia stato più forte nel Nord, le regioni del Sud hanno mostrato le maggiori difficoltà nella fase di recupero. Le principali determinanti di queste differenze vengono individuate in fattori strutturali regionali quali composizione settoriale, propensione al lavoro a distanza, disponibilità di capitale umano e tecnologia, apertura internazionale e partecipazione alle catene del valore globali. Lo studio della resilienza di breve termine è seguito da una discussione sulle prospettive per il periodo 2021-2024, che evidenzia gli elementi di debolezza dell'economia meridionale e il possibile ruolo delle politiche pubbliche nel superamento delle difficoltà post-pandemia.*

## Appendix

This Appendix summarizes and discusses the main results of a Principal Component Analysis (PCA) on the structural variables determining resilience and recovery of Italian regions from the COVID-19 shock. The variables of the analysis are (see Tables 1-3): Industry, Services, Tourism, Culture, S1, S2, Internet, Devices, R&D-Exp, R&D-Empl, Openness, GVC1 and GVC2.

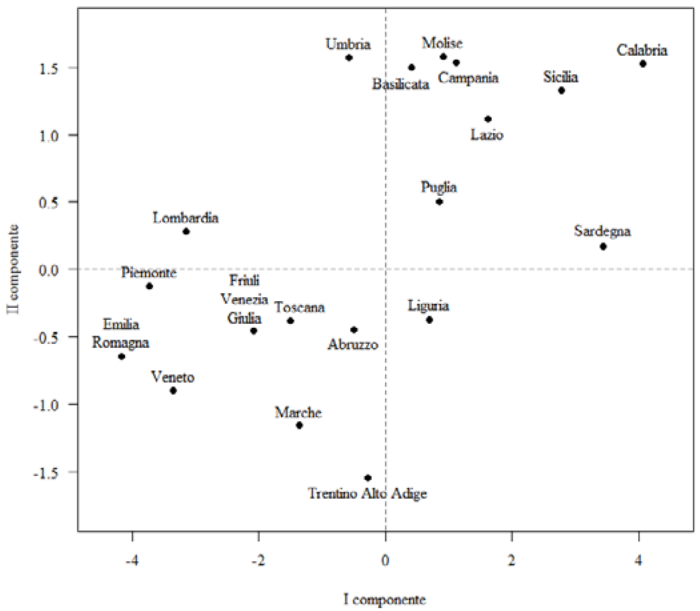
*Table A1 – Principal components. Explained variance and correlation*

| *Panel A* | *Proportion of variance* | *Cumulative proportion* |
|---|---|---|
| Component 1 | 0.514 | 0.514 |
| Component 2 | 0.189 | 0.703 |
| Component 3 | 0.102 | 0.805 |
| Component 4 | 0.058 | 0.863 |
| Component 5 | 0.043 | 0.906 |
| Component 6 | 0.037 | 0.943 |
| Component 7 | 0.022 | 0.965 |
| ⋮ | ⋮ | ⋮ |
| Component 12 | 0.001 | 1.000 |
| Panel B | Component 1 | Component 2 |
| Industry | -0.774 | -0.198 |
| Services | 0.687 | 0.127 |
| Tourism | 0.652 | -0.608 |
| Culture | 0.662 | -0.670 |
| S1 | 0.897 | 0.004 |
| S2 | 0.859 | -0.108 |
| Internet | -0.106 | 0.757 |
| Devices | -0.600 | -0.090 |
| R&D-Exp | -0.812 | -0.100 |
| R&D-Empl | -0.828 | -0.036 |
| Openness | -0.864 | -0.206 |
| GVC1 | -0.852 | -0.355 |
| GVC2 | -0.138 | -0.897 |

Table A1, panel A, displaying the proportion of variance explained by each variable, shows that the first two components cumulatively explain more than

70% of variance. As a consequence, the other components are not considered in the following analysis. Table A1, panel B reports the correlation coefficients of the structural variables with the two principal components. Inspection of the first column highlights that component 1 is positively correlated to specialization in tourism and culture, as well as overall services, and regional specialization (dissimilarity) indexes S1 and S2. Instead, negative correlation emerges with indicators of international openness and technology, as well as industrial specialization. Concerning component 2, it is negatively correlated to specialization in tourism and culture, and qualified participation in GVCs, whereas positive correlation comes up with access to fast Internet.

*Figure A1 – Italian regions in a principal component analysis*




Italian regions are graphically represented with respect to the first two principal components in Figure A1. The graph displays a neat partition between Northern and Southern regions, respectively located in the lower left and upper right corner. Central regions are basically in the middle, together with Abruzzo and Liguria, while Trentino Alto Adige and Aosta Valley (the latter not reported to keep readability) are in the lowest part of the Figure, presumably because of their strong specialization in touristic services and low Internet connectivity due to the presence of mountain areas. The PCA emphasizes the geographical dualism between more developed Northern regions, characterised by industrial

specialization, international openness, a larger propensity to research and a better technological endowment, and the South, with opposite structural features.

The analysis of Sections 2 and 3 pointed out the importance of the considered variables in shaping the geographical impact of COVID-19 and the recovery of Italian regions from the crisis. The present PCA shows that Northern regions on one side, and Southern regions on the other are characterised by common features in terms of the analysed structural factors. It follows that the regions hit more seriously from the crisis were basically the Northern ones while those with the heaviest difficulties to recover were the regions of the South.