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COVID-19 and decreasing consumption: a multisectoral assesment for Italy

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Abstract

The outbreak of Covid-19 pandemic caused an important decrease in GDP worldwide; mobility, job markets, and the efficiency of national health systems were particularly affected dimensions of everyday life. In the second quarter of 2020, household expenditure decreased by more than 10% on average compared to that of the second quarter of 2019. The present study quantifies the impact of Covid-19 pandemic on final demand and economic growth adopting a multi-sectoral analysis of recent official statistics (national accounting) for Italy. A multi-sectoral approach allows for the estimation of the inherent growth (or decline) of economic activities by industry type, contributing to clarify the post-pandemic resilience potential of one of the most affected countries among advanced economies.

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1. Introduction

The outbreak of Covid-19 pandemic has caused two-digit decreases in Gross Domestic Product (GDP) all over the major economies. Households were severely hit by this crisis, having to face job shortage and unemployment, poverty, and more stressed (and likely less effective and responsive) health systems (Rontos *et al.* 2021; Alexander and Karger 2021). In response to Covid-19 pandemic, consumers' expenditures, one of the main engines of economic activities, collapsed worldwide: in the second quarter of 2020, household expenditure decreased, on average, by nearly 10% with respect to the same quarter of 2019. The spread of Covid-19, however, involved world regions and populations in a different way (Malliet *et al.* 2020). At the same time, consumers were forced to modify their economic behaviours in response to different social frameworks. Mediterranean countries in Europe suffered the most relevant decreases in consumption expenditures and higher increases in the saving rate. Anti-Covid healthcare measures preventing the spread of pandemics, added instability to economic dynamics in terms of output and job shortage, both in the involved industries and in the whole economy (Cutrini and Salvati 2021). These measures seriously affected economic activities, depending on the relative output share of each individual sector. Following Federal Reserve Economic Data (FRED) and Eurostat observations, household private consumption expenditures in Italy in 2020 have severely decreased by more than 10%, with respect to the previous year. This never happening fall has been complemented with a milder contraction of about 3% in household (disposable) real income, supported by the package of administrative incentives implemented to respond to pandemic. Subsequently, the worldwide trade of goods, after the fall by 15% (volume) experienced between February and May 2020, has rapidly recovered during summer 2020 reaching, at the end of the year, higher levels than the pre-crisis period. In the first quarter of 2021, the economic cycle reinforced in China and the United States while, in the Euro area, activities underwent a new (moderate) decrease because of the introduction of further measures against the health emergency (Cárdenas *et al*. 2021). Saving rates, after the peak of Spring 2020 (20%), remained above the pre-pandemic level by the end of 2020. Despite the good performance of manufacturing, economic results since the last months of 2020 have put under question the possibility of a complete economic recovery in the near future, based e.g., on the growth rates observed between 2017 and 2019. However, especially in the case of external shocks, as it occurs in our case, the scrutiny of aggregate growth/fall of macroeconomic variables reveals unsatisfactory, since the shocks tend to hit unevenly individual components of aggregates, invalidating the intrinsic (sectoral) significance of aggregate/average indicators. By complementing the loss of significance of aggregated indicators, while exploiting the availability of recent and systematic data on family budgets, our work applied the multi-sectoral approach to estimate the inherent growth (or decline) of economic activities by industry type, contributing to clarify the post-pandemic resilience potential of Italy, one of the most affected countries among advanced economies. There are many aspects connected with consumption and saving trends in Italy before and after the outbreak of Covid-19. The generalized fall in consumption, connected with the uncertainty on future outcomes, was accompanied by a different inner composition of households' expenditures, which penalized some categories affected by the lockdown and by the fear of the risk of contagion, as restaurants, hotels, travels and tourism, as well as movies and shows (Guglielminetti and Rondinelli 2021). Based on these premises, our contribution estimates the effects of change in households' consumption levels and composition on total output, comparing economic dynamics in the years of Covid-19 pandemic (2020-2021) with respect to earlier pre-Covid dynamics (2018-2019). We adopted a multi-sectoral framework allowing for a comprehensive evaluation of both direct and indirect impacts of households' consumption expenditures on total output, channelled by changes in industrial demands (Socci *et al.* 2023). Technically speaking, we applied the Leontief inverse of 2018 to the consumptions of 2018-2021. In this way, we estimated changes over time in the level of activities (Codagnone *et al.* 2021), as reflected in sectoral total outputs, *vis à vis* changes in household expenditure.

2. Literature Review

Since the outbreak of Covid-19, scholars started monitoring households' private consumption short-term trends as a proxy of early-warning output dynamics in the pandemic context. A generalized consumption decline emerged across all households' income classes. This trend, however, was not equally distributed across all the consumption categories (Andersen *et al.* 2020). Non-essential good sectors, e.g., traveling, accommodation and restaurants, were the most affected ones, while essential good sectors, e.g. food consumption and ICT related ones, experienced important increases in value added. Bachas *et al*. (2020) and Chetty *et al*. (2020) demonstrated that wealthy US incomers decreased their expenditures at a slower pace than low-income individuals. In Italy, however, we have assisted to a greater reduction among high and medium-high incomers (Baker *et al.* 2020). Within this context, economic and precautionary reasons, but also restrictive policies and infection troubles, have affected the behaviour of consumers during Covid-19 (Braut *et al.* 2022). Nevertheless, it is difficult to differentiate within the last factors, since they appear simultaneously driven by the diffusion of contagion. Exploiting data from the Bank of Italy Special Survey of Italian Households (SSIH), Guglielmetti and Rondinelli (2021) combined a micro-macro approach explaining the unprecedented fall of private consumption under Covid-19. Macroeconomic estimations demonstrated that many factors influenced consumption dynamics in 2020, including worse economic conditions, the fear of infection, governmental restrictions, and socio-demographic uncertainty linked with volatile healthcare perspectives (Chen *et al.* 2021). Consistently with the macroeconomic evidence, the microeconomic analysis based on SSIH data confirmed the relevance of these factors as far as short-term economic dynamics were concerned (Greene *et al.* 2022). The study mentioned above finally provided some evidence on the evolution of expenditure and saving in the near future. In Italy, expenditures in different services, such as travels, cultural events, or restaurants, were still widely regulated and contained by partial lockdowns up to the first part of 2021 (namely, April or May 2021). These limitations translated in relevant savings, even if a shift towards other categories of consumption goods (e.g., durables) has been observed (Degli Esposti *et al.*, 2021). These savings have been collected in 2020 and have been employed later on, when the pandemic was completely under control and with a reduced fear of contagion. The uncertainty of this situation could make estimation of long-term effects, hitting fragile sectors and households (Tarkar 2020), a particularly hard task.

3. Database and methodology

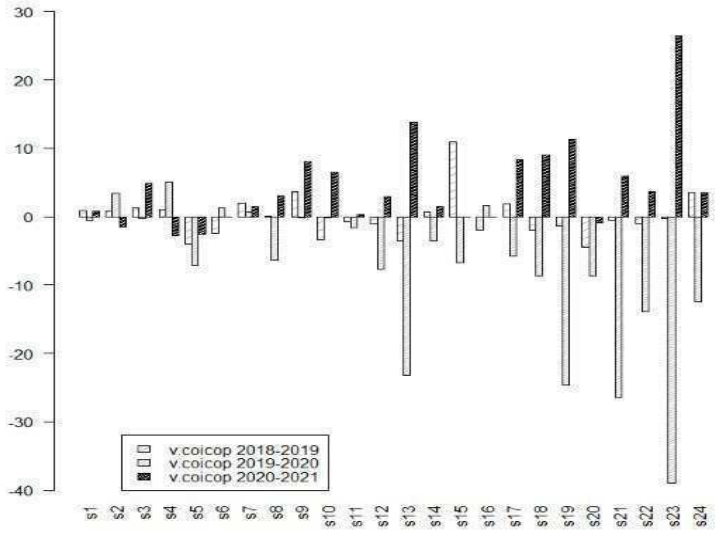
The study was carried out using the multi-sectoral approach typical of economic statistics and Input-Output analysis. The starting point has been the Italian Input-Output database (2018) retrieved from the website of Italian National Statistical Institute (Istat). Additionally, disaggregated data released from I.stat database on Italian households consumption expenditure (Table 1) according with the categories of individual consumption by purpose (COICOP), and representative of four years (2018-2021), were considered in our exercise. Figure 1 summarizes changes over time in household consumption expenditure by purpose, showing the per cent growth rate for each item in Table 1, and providing insights in the evolution of consumption expenditures. A relevant fall in the growth rate of many items of consumption expenditures was observed in 2020. Consumption sector 23 (Restaurants and accommodation services), 21 (Recreation, sport and culture), and 19 (Transport), decreased largely by more than 20%.

Table 1 – Classification of individual consumption by purpose (COICOP)

1 Cereals and cereal products	13 Clothing and footwear
2 Live animals, meat and other parts of slaughtered land animals	14 Housing, water, electricity, gas and other fuels
3 Fish and other seafood	15 Maintenance, repair and security of the dwelling
4 Milk, other dairy products and eggs	16 Imputed rentals for housing
5 Oils and fats	17 Furniture, Household textiles, Household appliances
6 Fruits and nuts	18 Health
7 Vegetables, tubers, plantains, cooking bananas and pulses	19 Transport
8 Sugar, confectionery and desserts	20 Information and communication
9 Ready-made food and other food products n.e.c.	21 Recreation, sport and culture
10 Coffee and coffee substitutes	22 Education services
11 Water, Fruit and vegetable juices	23 Restaurants and accommodation services
12 Alcoholic beverages, tobacco and narcotics	24 Other goods and services

Other services, such as 22 (Education services), 18 (Health) and 20 (Information and communication) decreased by more than 8%. Sector growth in 2021 did not compensate the sectoral expenditure growth losses in the year before. The 24 consumption expenditure items derived from the family budgets classification (COICOP) and described in Table 1 (UN, 2018) were attributed to each of the 63 industries classification items (ATECO/ISIC) shown in Table 2 (Istat 2022). This procedure allows the estimation of the activity level characteristic of each industry as far as total output is concerned (Cazcarro *et al*. 2022).

Figure 1 – Annual per cent variations of sectoral family budget consumption (see Table 1 for coding)



Given a vector of consumption expenditures I-O, made consistent with the features of the IO disaggregation, the corresponding vector **x** of direct and indirect output requirements was determined through the Leontief inverse, involving the intermediate demands. In this way, the consumption expenditure by family budgets (c_{FB}), namely the most recent data available on consumption expenditure, was transformed into a vector (c_{IO}) of consumption demands to the I-O industries following ATECO/ISIC classification. A 'bridge' matrix (*sensu* Cai and Vandyck 2020), available from authors on request, was separately built for each observation year, namely 2018, 2019, 2020, and 2021 (Cai and Rueda-Cantuche 2013). This matrix was based on the available data on consumption by family budgets, allowing the intrinsic classification of households' consumption expenditures considering together COICOP and ATECO classifications and reports the consumption expenditure classification according to COICOP sectors by column. Household's private consumption demand to the I-O industries was reported in rows, being classified according with ATECO/ISIC nomenclature for 63 industries. In a further step, the 63 industries were aggregated in 29 industries, consistent with the I-O Table. The uneven configuration of the shocks among consumption demand sectors grew over time. In fact, the aggregate rate of change amounted to -0.44% in 2019. A negative jump (-9.1%) and a modest recovery (4.1%) were detected respectively for 2020 for 2021.

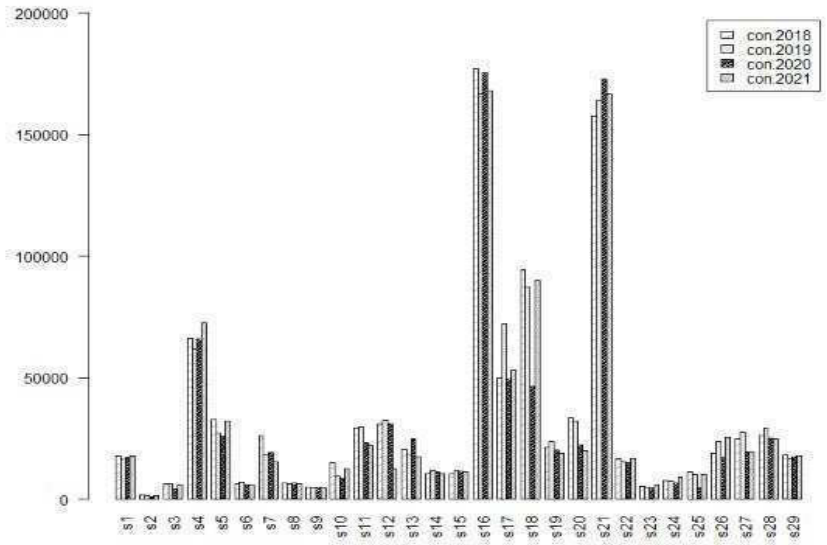
Table 2 – Input Output sectors following ATECO/ISIC classification

1 - Crop and animal production, hunting and related service activities	11 - Manufacture of transport equipment	21 - Real estate activities
2 - Fishing and aquaculture	12 - Manufacture of furniture, other manufacturing Repair and installation of machinery and equipment	22 - Professional, scientific, and technical activities
3 - Mining and quarrying	13 - Electricity, gas, steam, and air conditioning supply	23 - Administrative and support service activities
4 - Manufacture of food products, beverages, and tobacco products	14 - Water collection, treatment, and supply	24 - Public Administration and defence; compulsory social security
5 - Manufacture of textiles and wearing apparel	15 – Construction	25 – Education
6 - Manufacture of wood and of products of wood, paper and paper products and printing	16 - Wholesale and retail trade and repair of motor vehicles and motorcycles	26 -Human health and social work activities
7 - Manufacture of coke and refined petroleum products	17 - Transportation and storage	27 - Arts, entertainment and recreation
8 - Manufacture of rubber, plastic products, and other non-metallic mineral products	18 - Accommodation and food service activities	28 - Other services activities
9 - Manufacture of fabricated metal products, except machinery and equipment	19 - Information and communication	29 - Activities of households as employers; undifferentiated good and services producing activities of households for own use
10 - Manufacture of computer, electronic and optical products, electrical equipment machinery and equipment n.e.c.	20 - Financial and insurance activities	

4. Results

Assuming stable technological coefficients in the short-term, total output quantified the activity level of each economic sector. Industry total output, in fact, establishes the effect of the demand fall due to Covid-19. The households demand vectors by 29 I-O sectors for years 2018, 2019, 2020 and 2021, are shown in Figure 2 through histograms of different colours. Wholesale trade (16) and Real estate activities (21) showed the highest values of consumption demand to I-O sectors. Following a downturn in the previous years, Agriculture (1), Food (4), Electricity, gas, steam, and air conditioning supply (13), and Activities of households as employers (29), experienced a moderate recovery in the last year, similarly to dynamics observed for sectors 10, 17, 18, 22, 23, 24, and 26.

Figure 2 – Households consumption expenditures, 2018-2021 (million Euros)

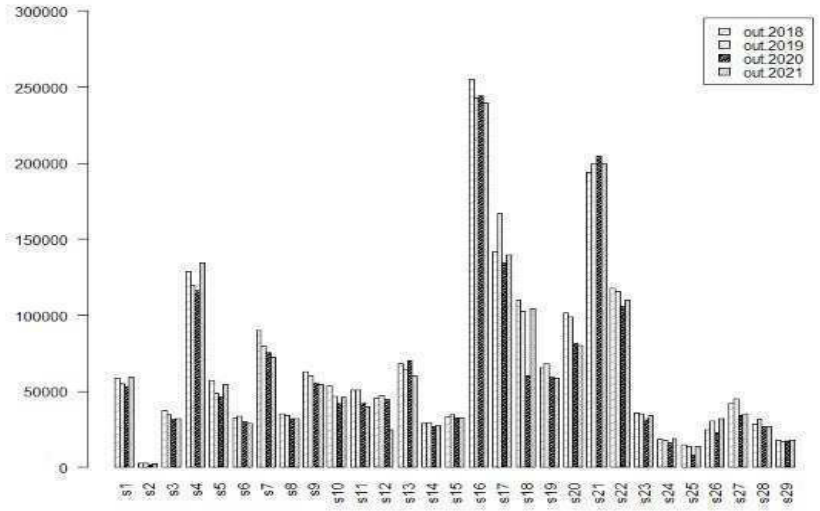


Given a (29x29) intermediate demand Matrix **A** (Bon 1986; Dobrescu 2013) referred to the base year (2018), we obtain the results for the 29 sectors output vector **x** as:

$$\mathbf{x}_t = (\mathbf{I}-\mathbf{A})^{-1}\,\mathbf{c}_{IO\,t} \qquad \text{where} \quad t = 2018, \ldots, 2021 \qquad (1)$$

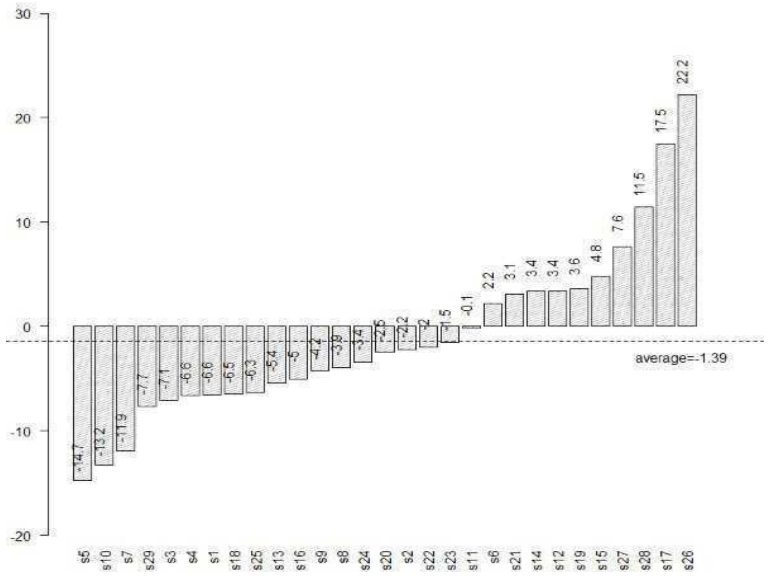
Figure 3 shows the sectoral results obtained for total output. Electricity, gas, steam, and air conditioning supply (13), Households as employers (29), Real Estate (21) and Wholesale and retail trade and repair of motor vehicles/motorcycles (16), performed a moderately positive rate of growth. All the remaining industries experienced a (more or less evident) decrease in the activity levels.

Figure 3 – Forecasts of total output, 2018-2021 (million Euros)



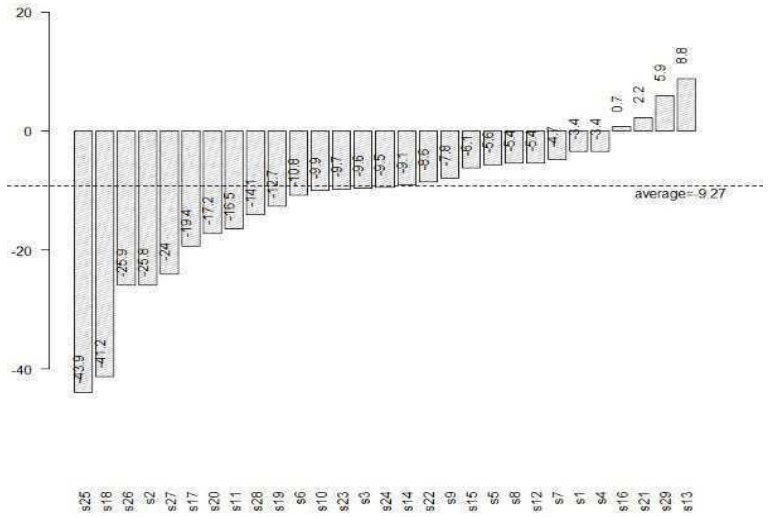
When evaluating changes over time in the level of economic activities, we referred to the rate of change in industry output (2018-2021) that emerge from Figures 4-6. In these figures, results were ordered according to the level of growth of each industry. Figure 4 shows a set of industries with rates of growth (or decline) higher than 8%. They were the three declining industries - namely (5) Manufacture of textiles and wearing apparel, (10) Manufacture of computer, electronic and optical products, electrical equipment machinery and equipment n.e.c., and (7) Manufacture of coke and refined petroleum products.

Figure 4 – Output growth, 2019 (per cent values)



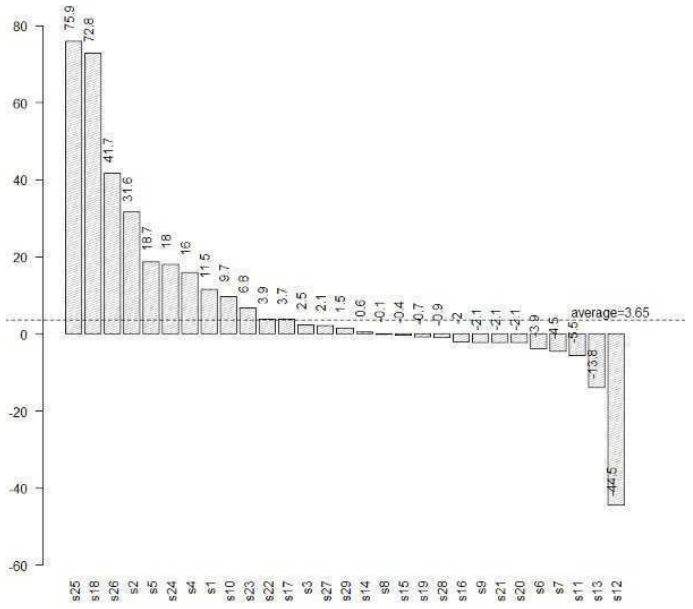
Moreover, the three growing industries were (28) Other services activities, (17) Transportation and storage, and (26) Human health and social work activities – with higher rates than the remaining industries. The economic system entered the 2020 lockdown after two years of stagnation, since the expansion of 2015-2017 had begun to run out; as a matter of fact, growth rates since 2017 have progressively decreased (Confindustria 2020). Figure 5 showed how the expected per cent decline in economic activities in 2019 and 2020, impacted each individual industry in terms of the forecasted per cent change of its own total output.

Figure 5 – Output growth, 2020 (per cent values)



Taken together, 25 sectors out of 29 experienced a more or less significant decline over time.

Figure 6 – Output growth, 2021 (per cent values)



Two industries were especially threatened, namely (25) Education (-43.9%), and (18) Accommodation and food service activities (-42.2%). Three industries declined by one-fourth: (26) Human health and social work activities (-25.9%), (2) Fishing and aquaculture (-25.8%) and (27) Arts, entertainment and recreation (-24.1%). Transportation and storage (17) declined by 19.4%. Impact of Covid-19 on economic sectors revealed to be multi-faceted, as typical of sunned economic shocks. On the one hand, 'contact intensive' services, rather insensible to the economic cycle, have been the most intensively affected ones. On the other hand, sectors with a pro-cyclical evolution, e.g. (12) Manufacture of furniture, other manufacturing, repair and installation of machinery and equipment and (15) Constructions, experienced a milder decline. As expected, services sectors employing high-skill workers and strictly tied to remote works, such as (19) Information and communication, (20) Financial and insurance activities, and (21) Real Estate activities, displayed positive dynamics or experienced only low negative impacts from Covid-19 lockdowns. Figure 6 showed results for the second year of Covid-19 pandemic (with partial lockdowns up to May 2021). The aggregate growth index was +3.6%, being unable to compensate and restore the conditions before 2020. Despite a good performance of manufacture starting in the last months of 2020, these results questioned the possibility of a rapid economic recovery in the near future.

Conclusions

Covid-19 pandemics caused a loss in consumption expenditures that did not remain confined to the demand side but propagated on the growth of economic activities, as reflected in sectoral and total output. Lockdown measures between mid-March and mid-May 2020 have determined a heavy output fall leading to the partial collapse of several economic chains. Lockdown impacts were relatively modest only in sectors where avoiding personal contacts was easy and effective, e.g., using smart working as alternative to traditional, face-to-face work and clients' interactions. The activities more dependent on close physical interactions both in the production and in the delivery of commodities and services have been significantly threatened and, therefore, they changed the nature of their operations, as much as possible (Dangelico *et al.* 2022). Perspectives of a fast and strong recovery differ largely according to the economic sectors (Oliva *et al.* 2022). However,

manufacturing output began to rise again since August 2020 (Confindustria 2020). Sectors producing essential or digital commodities as food, computers and electronics have kept the demand during the crisis and experienced a relatively modest decrease in sales. Services of greater contact, such as tourism, have suffered in a sharper way, while those facilitating activities without face-to-face contacts, such as ICT, support and remote provision of services, have been mostly unaffected. Policy measures at both national and EU level have designed and operationalized with the aim at preventing excessive unemployment. Reductions in hours worked mirrored drops in economic activities across sectors, while employment losses had so far been more contained. However, by the third quarter of 2020, around 3% of employment (or almost 6 million jobs) had been lost in the EU since the onset of the pandemic. The uncertainty climate, where operators' choices are taken, implies a parallel uncertainty on the reach of a sustained structural growth in the near future. Even if positive, 2021 economic outcomes did not restore pre-crisis levels and confirm a less intense growth than expected.

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