

## THE TERRITORIAL ECONOMIC IMPACT OF COVID-19 IN THE EU. A RHOMOLO ANALYSIS

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- The European Commission's Joint Research Centre (JRC) is supporting the ongoing effort by the European Commission in coordinating a common European response to the COVID-19 outbreak.
- Epidemiological research as well as socio-economic analyses focus on the multi-dimensional consequences of this pandemic in Europe and beyond.
- The European Commission presented on May 27th a proposal for a rescue and recovery plan at the European Parliament.
- The analysis reported here is based on the Rhomolo economic model, and has been used to support the Commission proposal and to inform the policy discussion between EU institutions and Member States' governments.

### 1. Introduction

The COVID-19 pandemic and, in turn, the so-called “Great Lockdown” have caused an unprecedented health and economic crisis worldwide. As a result, the global economy is expected to sink into severe recession in 2020, much worse than the one of the 2008-09 financial crisis, while strong economic growth is expected to take place in 2021.\*

This Policy Insight provides a cautionary tale about the macroeconomic implications of COVID-19-related disruptions in the European Union (EU). More specifically, we quantify the potential short-term implications on a set of key economic variables at the EU level and, more ambitiously, for all its NUTS 2 regions (French overseas territories excluded).

Quantifying the territorial/regional economic impacts of the pandemic is essential for policy makers who need to take into account existing trade-offs between public health and support of the economic activity. The sectoral structure and the trade integration in global value chains of the EU regional economies are key determinants of their economic performance, and not necessarily the economic consequences of the crisis will mirror the epidemiological damage caused by the pandemic.

We conduct our analysis using RHOMOLO, a numerical-spatial general equilibrium model based on regional account data and a set of fully observed bilateral final and intermediate shipments consistent

with the national accounts. The model covers 230 EU NUTS 2 regions plus 37 NUTS 2 regions of the UK, disaggregating all economies into 10 NACE Rev.2 sectors.†

Under a baseline adverse scenario common across the EU‡, the COVID-19 crisis appears to exert uneven effects across the EU regions. These results carry important insights regarding the heterogeneous territorial impact of the crisis. However, as the simulation scenarios are not forecasts and there is still high uncertainty regarding the evolution of the pandemic and the epidemiological data (for instance, there is debate on the possibility of a second wave later this year), the results should be read with due care.

### 2. Modelling assumptions

We firstly model a baseline scenario where the economy is hit by multiple adverse shocks at the same time. We assume that the macroeconomic transmission channels associated with the COVID-19 pandemic are both of demand and supply nature. Table 1 summarizes the set of both types of shocks under consideration.

In addition to the shocks of Table 1, we also consider an exogenous 9.2% reduction of exports to the rest of the world in 2020.

\* See the most recent Spring Forecast published by the European Commission (2020a).

† A detailed description of the RHOMOLO model can be found in Lecca et al. (2018).

‡ The rationale of this analysis follows the modelling framework described in chapter 3 of European Commission (2020a).

**Table 1: COVID-19 shocks**

**Supply shock**

Labour supply shock. 3% reduction in workforce

**Demand shocks**

Uncertainty shock. The risk premium increases by 200bps

Reduction of private consumption in the following sectors: C (-2%); F (-1%); G-I (-15%); K-L (- 8%); M-N (+ 4%); and R-U (-10%)

15% reduction in the demand of goods and services coming from the rest of the world in the following sectors: C, G-I, J, and K-L

Reduction in tourism expenditure by 50% (assuming tourism is around 3% of GDP)

10% increase in precautionary savings

Additional adverse demand effects on elderly people: 1.5% reduction in demand (assuming elderly consumption is 20% of total consumption)

In addition to the first scenario (baseline) dealing with the potential territorial impact of the adverse shocks listed above, we also model a second scenario (baseline+policy reaction) which also takes into account the policy responses already taken to counteract the impact of the crisis. Since the beginning of the pandemic crisis, many Member States have implemented national targeted measures and participated to several EU-coordinated initiatives to counteract the adverse effects of the lockdown.

The measures considered in our analysis (see Table 2) are of course an incomplete account of the many ongoing initiatives in such a fast-changing environment across the EU and the rest of the world, and are used in this analysis for illustrative purposes.

**Table 2: Policy Reactions**

0.47% GDP increase in public investment

0.41% GDP government expenditure (current)

0.36% of GDP tax relief

9% of GDP liquidity support

### 3. Main results

The shocks identified above hit all the EU regions symmetrically. However, we expect an asymmetric regional response given different initial endowments and economic characteristics of the regions. We initially focus on the EU-wide impact, with Figure 1 plotting the impact of the crisis on four key economic variables obtained both for the baseline scenario and the one including policy reactions. The results are reported as percentage deviations from the economic values in the absence of the pandemic crisis.

### The policy impact of this research

The main result of this analysis is contained in the European Commission (2020b) Staff Working Document (SWD(2020) 98 final) "Identifying Europe's recovery needs" accompanying the Communication "Europe's moment: Repair and Prepare for the Next Generation" (COM(2020) 456 final) in which the European Commission proposes a new recovery instrument, called Next Generation EU, within a revamped long-term EU budget. In total, this European Recovery Plan will put € 1.85 trillion to help kick-start the economy and ensure Europe bounces forward.

Under the baseline scenario, our modelling exercise suggests a 13.1% reduction in EU GDP in 2020 and a fall in consumption and investment of 14.9% and 16.7%, respectively. As for the second scenario, it seems that the policy measures only partially offset the adverse effects of the negative shocks. The size of the downturn remains high with respect to no-pandemic values. The impact on EU employment is particularly harsh in the absence of offsetting policy actions (the drop would be about 12%).

Figure 1. EU-level impact on key economic variables (2020)

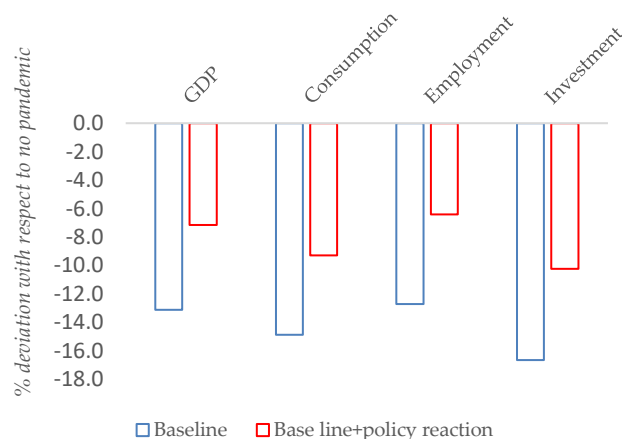
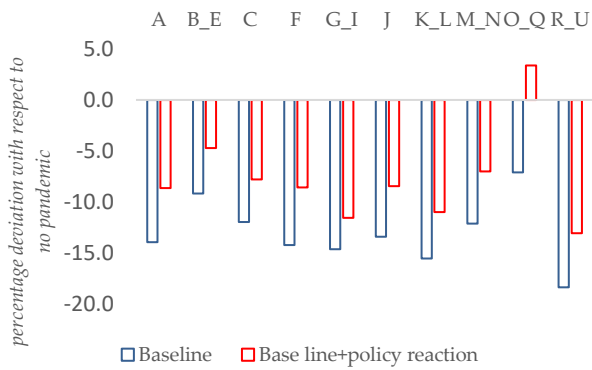


Figure 2 shows the sectoral results under the two scenarios. The Art and Recreational sector (R-U) is the most affected together with Financial and Real Estate activities (K-L) and Retail Trade, Transport, Accommodation and Food Service Activities (G-I). In the second scenario, the public administration (O-Q) experiences an increase in output due to the increase in government expenditure.

Figure 2. EU output impact by sector (2020)



We map the GDP response of the 230 EU regional economies in the baseline and in the baseline+policy reaction scenarios in Figures 3 and 4, respectively. Once again, the map shows percentage changes in GDP in 2020 with respect to a situation in which no pandemic-related adverse shocks have hit the EU economy.

The response to symmetric perturbations is uneven across regions. According to our model, the GDP impact is on average (unweighted) -12.15%, with a standard deviation of 4.25, implying a fair variation of results across the EU. The results of the scenario accounting for the policy responses show that in most of the EU the policy reaction only partially alleviates the adverse effects of the crisis (the average unweighted impact being -7.43%). This is particularly true in the peripheral countries of the EU such as Spain, Italy, and Greece. Given the lack of fiscal space in these countries, this result calls for a strong and coordinated response at the EU level, as well as for an enhanced Cohesion policy for the next multiannual financial framework.

Figure 3. GDP impact at regional NUTS 2 level (baseline)

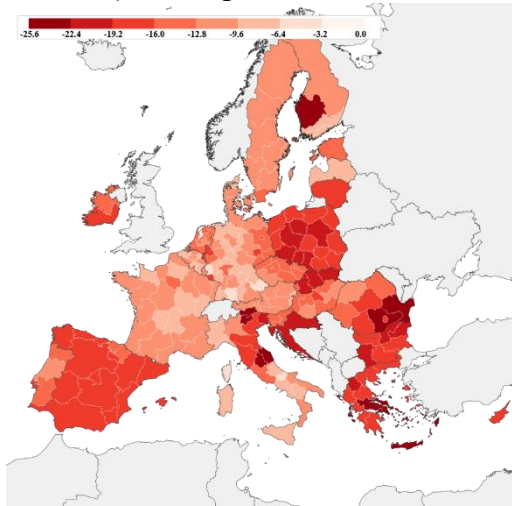
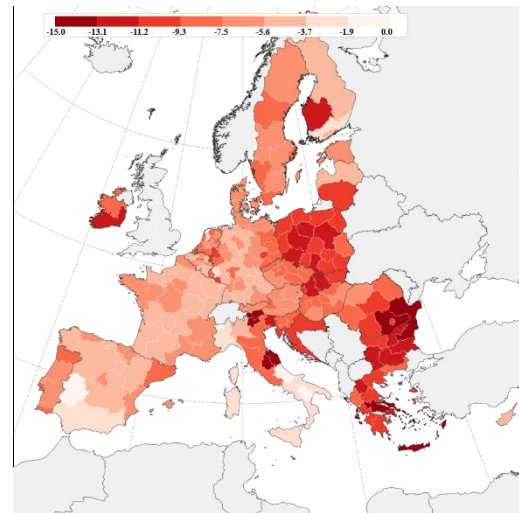


Figure 4. GDP impact at regional NUTS 2 level (baseline+policy reaction)



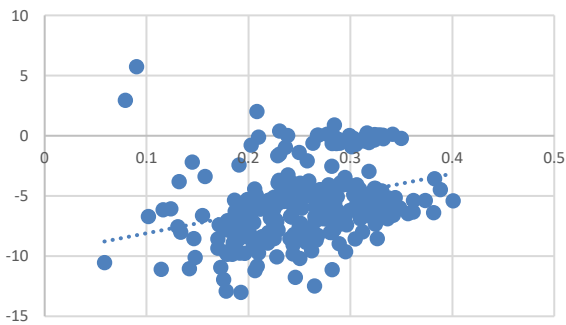
The GDP losses are highly correlated to drops in employment. In order to explore further the impact on employment of the current crisis, we present two additional pieces of evidence providing insights on what drives the GDP and employment losses related to the COVID-19 crisis. First, Figure 5 plots the changes in employment (on the vertical axis) against the shares of employment in sectors G-I (Wholesale and retail trade, transportation, and accommodation) in the baseline scenario.

Figure 5. Correlation - changes in employment / shares of employment in the G-I sector (baseline)



This correlation shows that the higher the share of employment in sectors related to tourism, the bigger the loss in employment. Second, Figure 6 plots the changes in employment (on the vertical axis) against the share of employment in sectors O-Q (Public administration, education, and human health) in the baseline+policy reaction scenario.

Figure 6. Correlation - changes in employment / shares of employment in O-Q (baseline+policy reaction)



This second piece of evidence demonstrates that, due to the policy reaction, the higher the share of employment in the public sector, the smaller the loss of jobs due to the crisis.

#### 4. Conclusions

This Policy Insight investigates the economic impact of the COVID-19-related lockdown measures and evaluates the potential offsetting effects of a subsample of policy reactions. The adverse shock is symmetric due to the global scale of the pandemic, as it hit all EU Member States. However, its territorial effects vary in terms of magnitude due to the specific characteristics of the various regional economies of the EU. For instance, regions where jobs are largely concentrated in tourism-related services sectors will experience larger job disruptions.

Moreover, regional trade integration and sector specialisation may be conducive to substantial diverging effects of apparently similar neighbouring regions. Finally, the adverse impact of the pandemic is certainly mitigated by the policy measures.

Some caution is needed when interpreting these results. For instance, in our analysis we have hypothesised symmetric adverse shocks and

symmetric policy reactions. However, different set of measures of different orders of magnitude are and will be adopted across Member States depending on epidemiological and fiscal considerations (as suggested by the most recently announced measures reported here:

<https://www.bruegel.org/publications/datasets/covid-national-dataset/>).

#### How to cite:

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#### Read more

European Commission (2020a). European Economic Forecast - Spring 2020. Institutional Paper 125, May.

European Commission (2020b). Europe's moment: Repair and prepare for the Next Generation. SWD(2020) 98 final. Brussels, 27.5.2020.

Lecca, P., Barbero, J., Christensen, M.A., Conte, A., Di Comite, F., Diaz-Lanchas, J., Diukanova, O., Mandras, G., Persyn, D., and Sakkas, S. (2018). RHOMOLO V3: A spatial modelling framework. JRC Technical Reports JRC111861, EUR 29229 EN, Publications Office of the European Union, Luxembourg.

## RHOMOLO

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