COVID19 AND GDP LOSS DISPARITY BETWEEN COUNTRIES IN 2020

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Figure 1: No relationship between the number of cases and the loss of GDP in 2020

Sources: FMI, JHU, Banque de France calculations
AGENDA OF THE PRESENTATION

• Motivation
  • Two goals:
    • Identify the factors explaining the differential effects of the health crisis in terms of activity on national economies in 2020
    • Look at the GDP loss differential between the US and Europe

• Stylized facts:
  • How to measure the Covid related economic shock?
  • No relationship between the number of cases and the loss of GDP in 2020
  • 2020 GDP losses due to losses in Q2
  • Less losses in the US than in the EA

• Methodology
  • List of candidates explanatory variables
  • Econometric strategy

• Key findings
  • 50% of GDP losses comes from the differences in the reaction of the public authorities and the adaptability of economic agents.
  • The other half is explained by sectoral specialization (mainly tourism), the pre-crisis demographic, social and economic situation and finally the level of technological development
  • Difference in the shock between the US and the Group FRA+ITA+SPA : 5 pp
    • 2,1 pp due to constraint on activity
    • 1,2 pp due to exposition to tourism
    • 1,8 pp due to the fiscal stimulus
    • 0,8 pp due to technological development
STYLISED FACTS

- Measure of the Covid Shock = Difference between the realized GDP growth in 2020 and its projection in the IMF’s October 2019 WEO

- Almost all countries affected by the pandemic have suffered significant losses in activity in 2020, but of unequal magnitude

- Difference in realized GDP losses in 2020 between the US (-5.6pp) and the Eurozone (-7.8pp) or the UK (-11.4pp) is essentially due to the loss recorded in the first half of the year

Sources : FMI, JHU, Banque de France calculations
METHODOLOGY

• First, we look at the univariate relationship (panel regressions that consider each of the explanatory variables one by one) between our measure of GDP losses in 2020 and 85 candidate variables

• 85 Explanatory variables gathered into 7 categories, 52 countries
  • (1) Macroeconomic characteristics;
  • (2) Level of development, demographics and health
  • (3) Fiscal responses;
  • (4) Government responsiveness (including IECA*);
  • (5) Degree of pandemic intensity;
  • (6) Technological Development
  • (7) State of the economy before entering the crisis.

• *IECA : Indicator of Effective Constraint on Activity. An indicator constructed at the Banque de France to track « de jure » and « de facto » pandemic-related restrictions. It is the un-weighted average between the Oxford Stringency Index and google mobility data.
METHODOLOGY

- Constraints on Activity (IECA) can explain half of GDP losses in 2020

**Figure 4**: GDP losses highly correlated with constraints on activity

\[
y = -0.15x - 0.39 \\
R^2 = 0.50
\]
METHODOLOGY

• In order to explain GDP losses and their differences across countries, we will estimate the following equation:

\[ Y_i = c + \beta . X_i + \mu_i \]  

(1)

using 2 steps

• **Step 1** : Based on the results of the previous table, we select the IECA as the main explanatory variable (pivotal variable) and estimate the bivariate equation (1) with the 83 remaining variables with 3 econometric methods (Ordinary Least Square - OLS; Robust Least Square; Least Absolute Shrinkage and Selection Operator – LASSO):

\[ Y_i = c + \alpha . ICEA_i + \beta . X_i + \mu_i \]

• **Step 2** : From the results of step 1, we retain the share of tourism as the second pivotal variable and re-estimate equation (1) with the restricted selection of 35 explanatory variables (from the ranking arising from step 1). We estimate sequentially a model that can contain from 3 to 5 variables with i) a 3rd explanatory (i.e. 35 equations), ii) models combining 2 explanatory variables (i.e. 642 estimates), iii) models combining 3 explanatory variables (i.e. 7175 estimations):

\[ Y_i = c + \alpha . ICEA_i + \gamma . Tourisme_i + \beta . X_i + \mu_i \]
RESULTS: EFFECTIVE CONSTRAINTS ON ACTIVITY PLAYED A KEY ROLE....

- The difference in the level of the Index of Effective Constraints on Activity between a country located in the first quartile of the distribution (Switzerland) and a country located in the third quartile (the UK or Spain) can explain a difference in GDP losses of 1.6 percentage points.

Fig. 5: Impact on GDP losses in 2020 between a country in the 1st quartile and a country in the 3rd quartile of the distribution for each (selected) explanatory variable.

* level of the Oxford Stringency Index the day when the number of cases >100
...AND EXPLAINED LARGELY HETEROGENEITY WITHIN EUROPE AND WITHIN THE US

- The impact of the pandemic was very heterogeneous in Europe and also within the US
- In Europe, northern countries suffered a limited loss of 4.5pp on average, compared with 10.6pp for the France/Italy/Spain group, 11.4 pp in the UK and 6.5pp for Germany

Figure 6. Links between GDP losses and activity constraints

Countries are represented by the 3-letter ISO code, in blue for Europeans countries, green for non-EU, and red for the US. US states are represented in yellow by their two digit-code.
DIFFERENCES BETWEEN EUROPE AND THE US

• Stronger constraints measures in the EA and especially in France, Italy and Spain could explain more than 40% of the divergence with the US
• Followed by higher exposure to the tourism sector, which could explain 20% of the difference

Figure 7: Factors explaining the difference in the magnitude of the Covid shock between the US and countries of Europe
USEFUL REFERENCES


• ‘The Sooner (and the Smarter), the Better: COVID-19 Containment Measures and Fiscal Responses’, Amr Hosny, mars 2021


• ‘Why has COVID-19 hit different European Union economies so differently?’ André Sapir, Policy Contribution Issue n°18 September 2020, Bruegel

• .... And this paper to be published soon!
Thank you for your attention!
METHODOLOGY

- First, we look at the univariate relationship (panel regressions that consider each of the explanatory variables one by one) between our measure of GDP losses in 2020 and the 74 candidate variables
- Constraints on Activity (IECA) can account for 50% of GDP losses

<table>
<thead>
<tr>
<th>Variables</th>
<th>OLS</th>
<th>Robust least Square</th>
<th>R² (average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Effective Constraints on Activity (IECA)</td>
<td>-0.13***</td>
<td>-0.12***</td>
<td>0.46</td>
</tr>
<tr>
<td>Oxford Stringency Index</td>
<td>-0.13***</td>
<td>-0.13***</td>
<td>0.38</td>
</tr>
<tr>
<td>Share of Tourism (% GDP)</td>
<td>-0.55***</td>
<td>-0.53***</td>
<td>0.30</td>
</tr>
<tr>
<td>Share of NTIC patents</td>
<td>0.1***</td>
<td>0.1***</td>
<td>0.28</td>
</tr>
<tr>
<td>National Saving</td>
<td>0.18***</td>
<td>0.18***</td>
<td>0.22</td>
</tr>
<tr>
<td>Index of quality of Governance</td>
<td>0.26***</td>
<td>0.25***</td>
<td>0.20</td>
</tr>
<tr>
<td>GDP/Head</td>
<td>1.68***</td>
<td>1.72***</td>
<td>0.19</td>
</tr>
<tr>
<td>Current Account (% GDP)</td>
<td>0.27***</td>
<td>0.26***</td>
<td>0.18</td>
</tr>
<tr>
<td>Output Gap</td>
<td>0.68**</td>
<td>0.64*</td>
<td>0.17</td>
</tr>
<tr>
<td>Index of Human development (log)</td>
<td>9.56***</td>
<td>10.16***</td>
<td>0.16</td>
</tr>
<tr>
<td>Internet Connection 30 mbps</td>
<td>0.04**</td>
<td>0.04**</td>
<td>0.14</td>
</tr>
<tr>
<td>Acces to the Fiber</td>
<td>0.03**</td>
<td>0.04***</td>
<td>0.14</td>
</tr>
<tr>
<td>Share of consumption (%GDP)</td>
<td>-0.1***</td>
<td>-0.09**</td>
<td>0.14</td>
</tr>
<tr>
<td>Index of online Business-to-Consumer sales</td>
<td>0.06***</td>
<td>0.06***</td>
<td>0.14</td>
</tr>
<tr>
<td>Share of e-commerce</td>
<td>0.04**</td>
<td>0.04**</td>
<td>0.14</td>
</tr>
<tr>
<td>R&amp;D corporate expenses (%GDP)</td>
<td>0.91**</td>
<td>1.02**</td>
<td>0.13</td>
</tr>
<tr>
<td>Share of online buyers (% internet users)</td>
<td>0.04**</td>
<td>0.04***</td>
<td>0.13</td>
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<tr>
<td>Mean of Temperatures</td>
<td>-0.11**</td>
<td>-0.11**</td>
<td>0.13</td>
</tr>
<tr>
<td>Share of online buyers (% of Population)</td>
<td>0.04**</td>
<td>0.04***</td>
<td>0.13</td>
</tr>
<tr>
<td>Pre-crisis share of teleworkable jobs</td>
<td>10.49**</td>
<td>9.92**</td>
<td>0.12</td>
</tr>
<tr>
<td>Budgetary Measures (above the line) : Accelerated expenses/ tax defferals</td>
<td>0.3*</td>
<td>0.31*</td>
<td>0.10</td>
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<tr>
<td>Number of hospital beds per 1000 habitants (log)</td>
<td>1.22**</td>
<td>1.17**</td>
<td>0.10</td>
</tr>
<tr>
<td>Pre-crisis unemployment rate</td>
<td>-0.17**</td>
<td>-0.16**</td>
<td>0.10</td>
</tr>
<tr>
<td>Public balance (% GDP)</td>
<td>0.3**</td>
<td>0.3**</td>
<td>0.10</td>
</tr>
</tbody>
</table>