Title: “The Sooner, the Better: The Early Economic Impact of Non-Pharmaceutical Interventions during the COVID-19 Pandemic”

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Abstract: The size of the economic shocks triggered by the COVID-19 pandemic and the effects of the associated non-pharmaceutical interventions have not been fully assessed because the official economic indicators have not been published. This paper provides estimates of the economic impacts of the non-pharmaceutical interventions implemented by countries in Europe and Central Asia over the initial stages of the COVID-19 pandemic. The analysis relies on high-frequency proxies, such as daily electricity consumption, nitrogen dioxide emission, and mobility records, to trace the economic disruptions caused by the pandemic, and calibrates these measures to estimate the magnitude of the economic impact. The results suggest that the non-pharmaceutical interventions led to about a decline of about 10 percent in economic activity across the region. On average, countries that implemented non-pharmaceutical interventions in the early stages of the pandemic appear to have better short-term economic outcomes and lower cumulative mortality, compared with countries that imposed non-pharmaceutical interventions during the later stages of the pandemic. In part, this is because the interventions have been less stringent. Moreover, there is evidence that COVID-19 mortality at the peak of the local outbreak has been lower in countries that acted earlier. In this sense, the results suggest that the sooner non-pharmaceutical interventions are implemented, the better are the economic and health outcomes.

Data description: In our analysis, we use five data sets, the first two covering proxy measures of economic activity, and the remaining covering information on mobility, NPIs, and the evolution of the pandemic:

1) Electricity consumption. Data are presented as the total daily consumption in megawatts and were obtained from ENTSO-E for countries in the Baltic, Continental Europe, Ireland, Nordic, and UK synchronous grid areas, and from national grid operators for countries in other areas. Data are available for 37 counties in Europe and Central Asia; the period covered is January 1, 2017 to April 17, 2020.

2) NO$_2$ emissions (tropospheric vertical column densities, or VCD) obtained from the Ozone Monitoring Instrument (OMI) on NASA’s Aura satellite. The data are presented at the daily frequency for all the world in pixels of 0.25 degrees of longitude x 0.25 degrees of latitude. The mean NO2 VCD value is computed for all pixels corresponding to the surface of a country and, given variability due to weather and other factors, the 30-day moving average is used as the main variable of interest; the period covered is January 1, 2018 to April 17, 2020.
3) Mobility trends data produced by Apple as derived from the requests for directions using Apple Maps are available for 33 countries in Europe and Central Asia. The trends data distinguish mobility by types – driving and walking. The period covered is January 13, 2020 to April 21, 2020.


5) Data on daily infections and deaths from COVID-19, by country, from Our World in Data, which are sourced from the European Centre for Disease Prevention and Control (ECDC). The period covered is January 1, 2020 to April 27, 2020.

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