IFC-Bank of Italy Workshop on "Data Science in Central Banking: Applications and tools"

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Tracking the economy during the Covid-19 pandemic: the contribution of high frequency indicators[1]

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[1] This contribution was prepared for the workshop. The views expressed are those of the authors and do not necessarily reflect the views of the Bank of Italy, the BIS, the IFC or the other central banks and institutions represented at the event.

TRACKING THE ECONOMY DURING THE COVID-19 PANDEMIC:
THE CONTRIBUTION OF HIGH-FREQUENCY INDICATORS

IFC-BANK OF ITALY WORKSHOP
“DATA SCIENCE IN CENTRAL BANKING: APPLICATIONS AND TOOLS”

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INTRODUCTION

- The so-called “open” data used in this presentation have three main characteristics:
  - they are not included in the official statistics published by institutions and authorities;
  - they can be accessed easily and free of charge via the internet;
  - they are available at a high frequency, generally at least daily.
- Open data are essentially statistics derived from social media platforms (Twitter), the internet (Google searches, webscraping), granular open data databases (e.g. statistics linked to energy and transportation).
- Open data have proved extremely useful during the Covid-19 crisis for tracking fluctuations in economic activity:
  - bank card data (Carvalho et al., 2020);
  - electricity consumption (Cicala, 2020);
  - weekly unemployment figures (Coibion et al., 2020);
  - or the real-time location of global cargo ships (Cerdeiro et al., 2020).

COVID-19: A SOURCE OF CONCERN FOR INTERNET USERS

- Google searches for the word “overindebtedness” point to another way in which the crisis has affected households, in two phases:
  - First, a turning point after the introduction of the lockdown (17 March 2020), with searches for overindebtedness dropping to very low levels; then from mid-April onwards searches begin to rise again.
  - The physical restrictions imposed during the lockdown appear to have discouraged households from seeking information about overindebtedness – at least initially. However, the length of the lockdown appears to have weighed heavily on their finances, especially for the most vulnerable households, a month after the start of the lockdown, the issue of overindebtedness resurfaces.

- Very interestingly, these data are consistent with the massive fall in the number of overindebtedness applications submitted to the Banque de France between February and May 2020 (fall of more than 60%), and the marked upturn as of June (rise of more than 70% between May and June 2020).

C5 Google searches for the word “overindebtedness”
(2 February-11 May 2020)

Source: Google.

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COVID-19: A SOURCE OF CONCERN FOR BUSINESSES

- With regard to the risk of “business” failures, based on the analysis of Twitter messages, internet users highlight the “crisis” affecting the “economy” (causing difficulties for “private companies at risk”) and, more broadly, the “system”.
- In parallel, businesses have adapted their communication to the new environment:
  - Twitter accounts of the largest French corporations (representative sample of the SBF 120 index) from the beginning of March onwards.
  - Levels of concern and difficulty increased sharply when the lockdown was introduced.

C4 Keywords associated with tweets

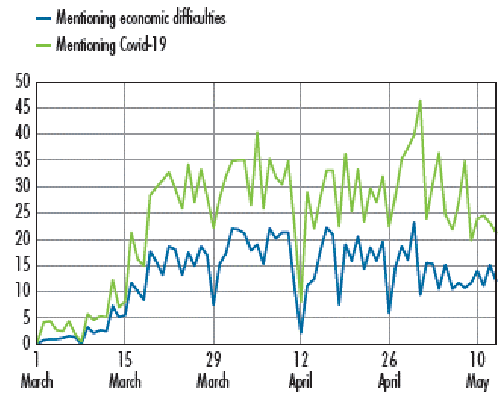
(1-10 May 2020)

Source: Twitter.

C6 Perception of the impact of Covid-19 on businesses

a) Share of tweets by SBF 120 companies

(1-13 May 2020, %)

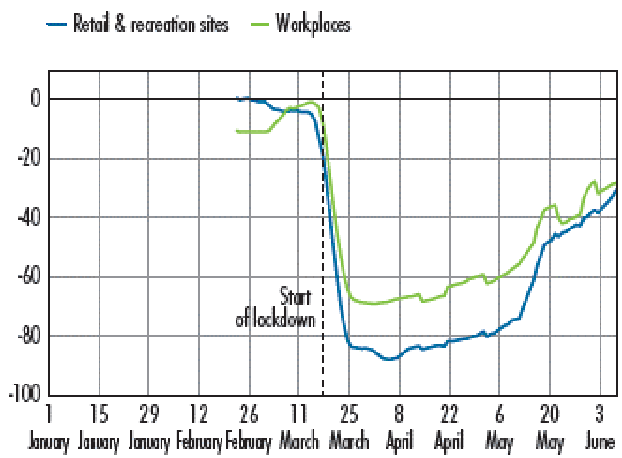


THE EFFECTS OF THE LOCKDOWN ARE REAL AND CAN BE MEASURED PHYSICALLY: MOBILITY AND POLLUTION

- Google provides a Google Mobility Index, which is based on Google Maps data on the number and length of visits to certain locations. In France, movement to leisure sites and places of work fell by 85% during the lockdown. After the lockdown was lifted mobility increased, but in June it was still 30% below its baseline level.
- Air pollution (corrected for the impact of temperatures, atmospheric pressure, wind speed and air humidity) also declined with the introduction of the lockdown. Nitrogen dioxide pollution dropped well below historical levels, reflecting the stoppage of industrial sites and of a portion of transportation activities. The decline can be seen in all French towns and Paris.

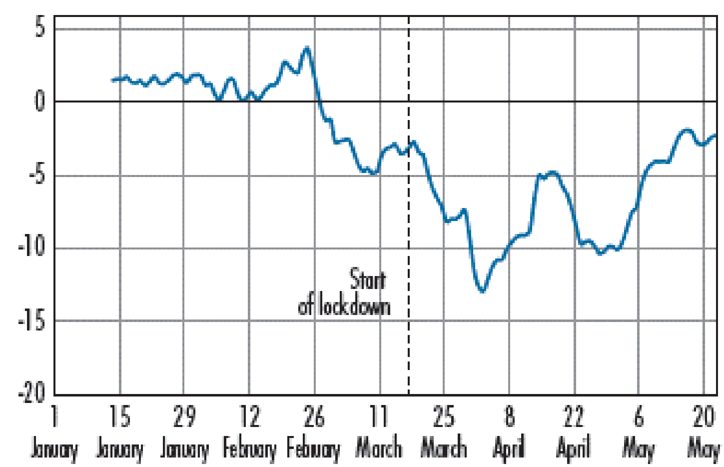
b) Mobility in France according to Google Mobility Indices

(% change versus baseline = average from 3 to 6 February 2020, 7-day moving average)



c) NO_2 pollution in Paris, corrected for meteorological data

(difference versus 2019, 14-day moving average)



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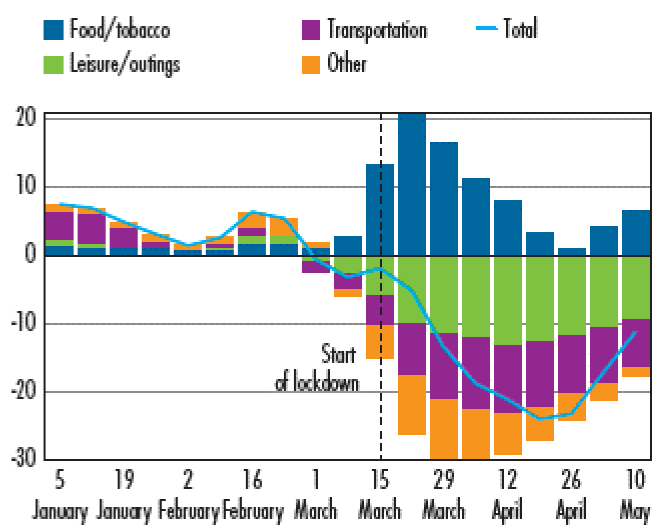
THE EFFECTS OF THE LOCKDOWN ARE REAL AND CAN BE MEASURED PHYSICALLY: TOURISM

- Google searches linked to consumer spending, dropped sharply following the lockdown in the categories “leisure” and “transportation”. Conversely, the category “food and tobacco” hit a peak during the lockdown.
- Tourism collapsed. The number of new reviews posted on Airbnb plunged by 99%, meaning that activity evaporated. Unlike the other indicators, which increased again once the lockdown was lifted, this one remained flat at end-April due to the continuing shutdown of the tourist industry.

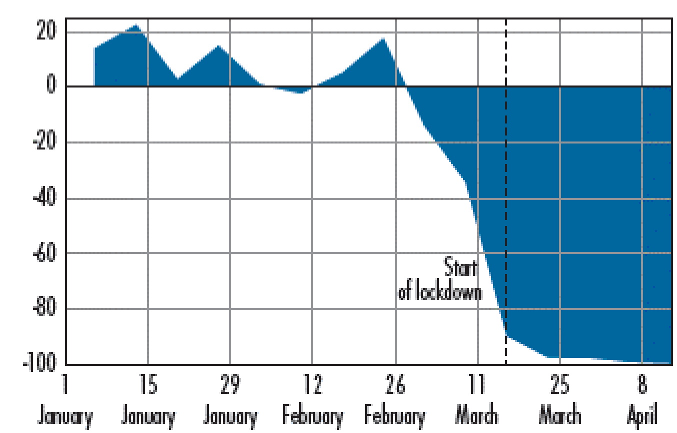
e) Popularity of searches linked to consumer spending according to Google Trends Indices

(% change versus 2019, 2-week moving average)



f) Number of new reviews on the Airbnb platform in Paris

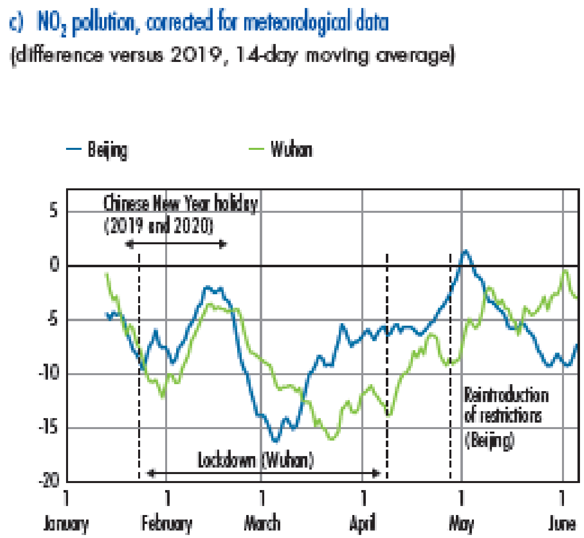
(% change versus 2019)

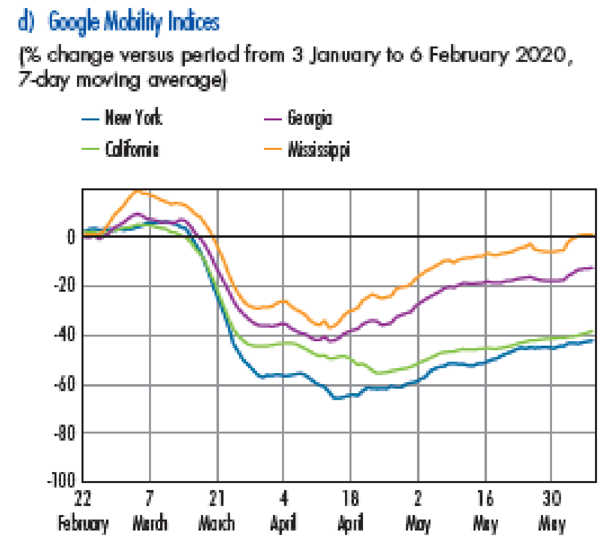


Sources: *Google Covid-19 Community Mobility Reports*, OAG Aviation Limited, World Air Quality Index, Google Trends, InsideAirbnb, authors’ calculations.

THE EFFECTS OF THE LOCKDOWN ARE REAL AND CAN BE MEASURED PHYSICALLY: GEOGRAPHICAL DISPARITY

- The indicators also make it possible to analyze the different stages of the lockdown lifting in each country:
  - Some indicators highlight regional disparities within countries. This is notably the case for the NO2 pollution indicator in China. The situation differs in Beijing: the faster lifting of the lockdown meant that pollution returned more quickly to its 2019 levels; however, the reintroduction of certain lockdown measures at the start of April could be behind the renewed decline in pollution – albeit a smaller one than during the first lockdown;
  - Similarly, with the Google Mobility Indices in the United States, there is a striking contrast between the first federal states to be affected by the lockdown (New York and California) and others where the lockdown was introduced later, for a shorter duration and with less stringent rules (Georgia or Mississippi).





Sources: *Google Covid-19 Community Mobility Reports*, OAG Aviation Limited, World Air Quality Index, Google Trends, InsideAirbnb, authors' calculations.

CONCLUSION

- High-frequency indicators can provide information on their own, supplement existing indicators with additional or more immediate data, or be used to estimate other variables (production, consumption, GDP, etc.) using econometric methods.

- Ongoing issues:
  - Assess the added value in normal times and link these high-frequency data with more conventional economic variables;
  - IT and legal matters for collecting, maintaining and releasing high-frequency data;
  - New avenues:
    - Use of satellite data to assess climate risk exposure and building activity;
    - Social media sentiment to gauge inflation expectations;
    - Use of webscraping data to gauge the risk on financial actors (including real estate transaction negotiation margins, reputational risk, etc.).

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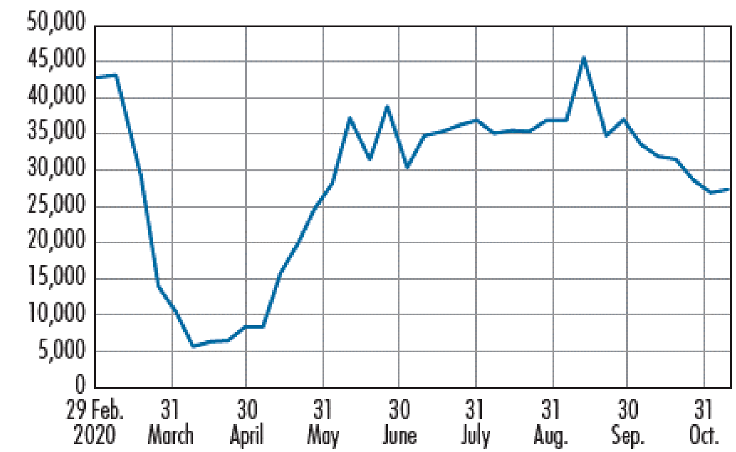
PERSPECTIVE: COVID-19 AND HOUSE PRICES, WHAT CAN BE LEARNED FROM WEB-SCRAPING DATA?

- Daily automatic upload of data on the Internet from the major real estate classified ad sites in the UK: Rightmove, Zoopla, OnTheMarket, PropertyPal.
- 1.5 million real estate listings are downloaded on average every day, corresponding to the total stock of available listings. These data confirm that during the first lockdown period, activity stalled and sellers adopted a wait-and-see attitude.
- The granular approach also reveals significant regional differences: while advertised prices were stable or even increased after the first lockdown in more rural areas, they declined continuously in London.

C1 New weekly property listings

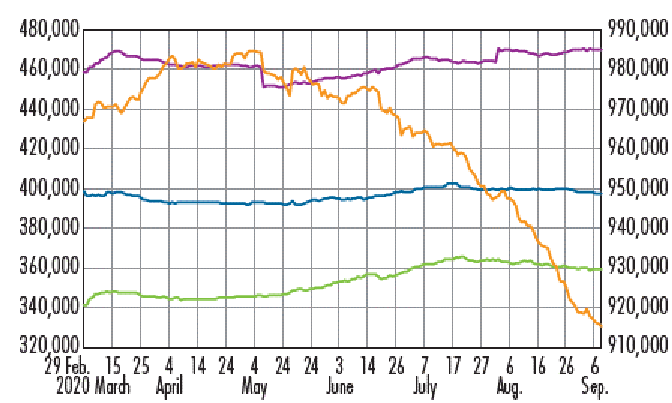
(number)



Sources: Zoopla and authors' calculations.

C3 Average listing price by region

(in GBP by property)



Sources: Zoopla and authors' calculations.