

Can Google Trends be used to track economic activity in real-time?[1]

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A pre-requisite for good macroeconomic policymaking is timely information on the current state of the economy, particularly when economic activity is changing rapidly. Given that GDP is usually only available on a quarterly basis and that monthly survey-based indicators (such as the Purchasing Managers' Indices) can become unreliable when changes in economic activity are abrupt and massive, the current crisis has prompted a search for alternative high-frequency indicators of economic activity. The OECD Economic Outlook (OECD, 2020) as well as a recent OECD paper (Woloszko, 2020) discuss one such indicator based on Google Trends, which are used to construct a Weekly Tracker that provides real-time estimates of GDP growth in 46 economies covering G20, OECD and OECD partner countries. To the author's knowledge, the Tracker is the first weekly GDP proxy that covers such a large array of OECD and G20 countries.

What makes Google Trends a powerful tool for economic predictions is its coverage of a large number of aspects of economic activity. Data about search behaviour can be informative about consumption (e.g. related to searches for "vehicles", "households appliances"), labour markets (e.g. "recruitment"), housing (e.g. "real estate agency", "mortgage"), business services (e.g. "venture capital", "bankruptcy"), industrial activity (e.g. "maritime transport", "agricultural equipment") as well as economic sentiment (e.g. "recession") and poverty (e.g. "food bank"). Signals about multiple facets of the economy can be aggregated to infer a timely picture of the macro economy.

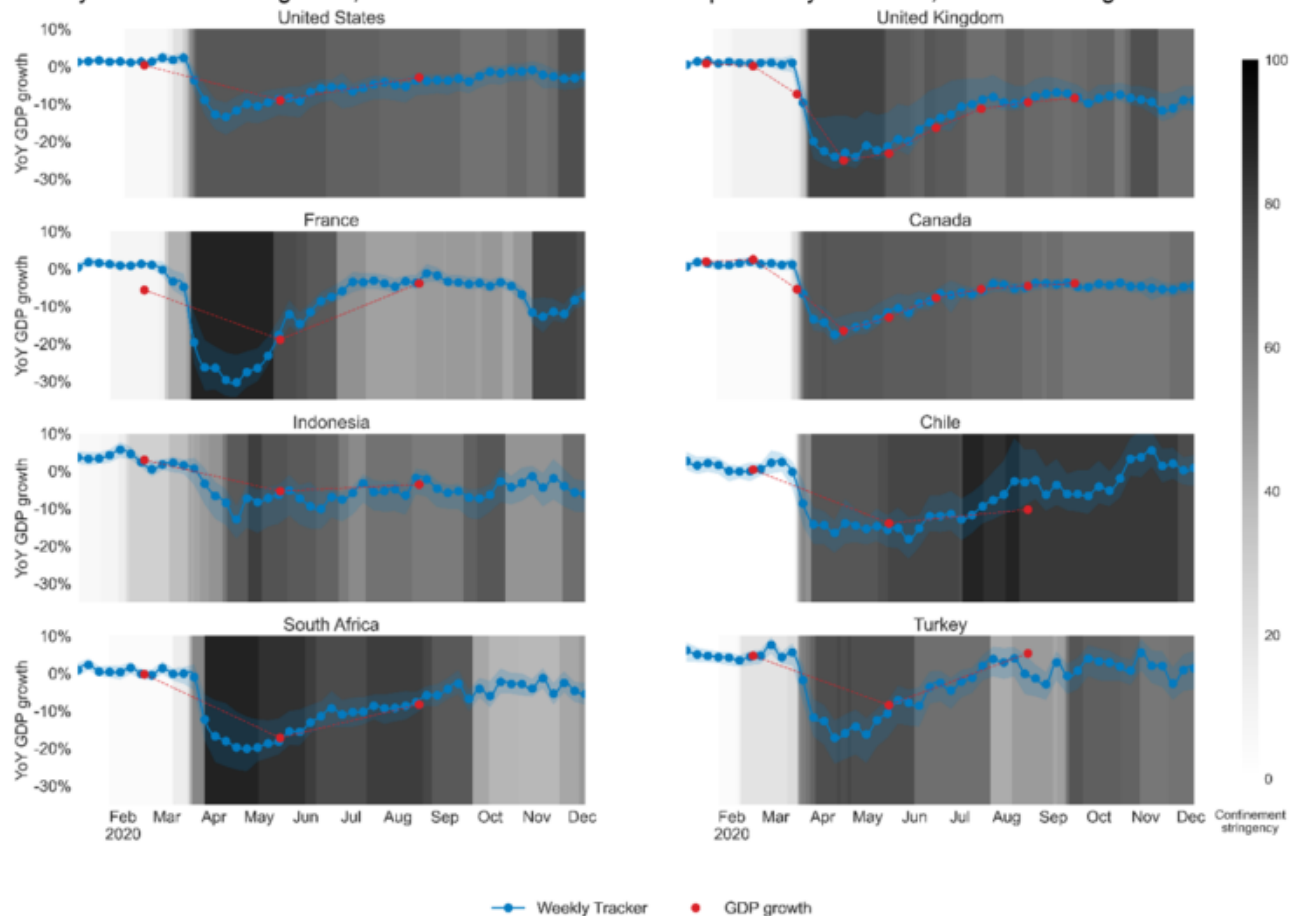
The relationship between Google Trends variables and GDP growth is fitted using a machine learning algorithm, drawing upon expertise in artificial intelligence developed in the OECD NAEC Innovation Lab. The algorithm (a “neural network”) extracts relevant information from 250 Google Trends variables, that each aggregate information about searches by Google users for thousands a keywords. Using many variables also reduces the risk related to structural breaks in specific series, which was highlighted by the failure of the “Google Flu” experiment.[2]

The model of GDP growth based on Google Trends performs well across 46 countries in forecast simulations. It captures a sizeable share of business cycle variations, including during the global financial crisis, the euro area sovereign debt crisis as well as around the exceptional volatility associated with the current COVID-crisis.

The timing of the sharp second quarter downturn in 2020 is signalled well before more conventional business cycle indicators and coincides closely with the implementation of lockdown measures (Figure 1), although the full magnitude of the negative shock is typically under-estimated, given its unprecedented scale. The Tracker suggests that in a number of countries a partial recovery began towards the end of April, with impetus slowing from June. Predictions for the third quarter proved more accurate, with a mean absolute error of around one percentage point and no evidence of systematic bias, compared with variation in quarter-on-quarter growth of between 2% and 18% across the countries in the sample. The performance of the model over the crisis period is particularly impressive when assessed for those few countries, including Canada and the United Kingdom, that publish monthly estimates of GDP. Latest estimates suggest a further brake on activity in those, mostly European countries, which imposed further lockdown measures in November (OECD, 2020).

Figure 1. The OECD Weekly Tracker: selected G20 economies in 2020

Weekly Tracker of GDP growth, measured relative to the same period a year earlier, based on Google Trends



Note: The charts show GDP relative to a year earlier. The confidence band shows 95% confidence intervals. Red dots representing GDP growth are official statistics except for the third quarter of 2020 for South Africa it is an *Economic Outlook* projection. Monthly GDP growth series are used when available (for the United Kingdom and Canada). The darkness of the grey background indicates confinement stringency.

Source: OECD *Economic Outlook* 108 database; UK Office for National Statistics; StatCan; OECD Weekly Tracker; and Oxford COVID-19 Government Response Tracker (Hale *et al.*, 2020).

See the OECD Weekly Tracker of economic activity

References

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Footnotes

[1] This note is based on an OECD Working Paper (Woloszko, 2020) as well as the Chapter 2 of the OECD Economic Outlook (OECD (2020), Issue Note 1).

[2] In 2009, Google started tracking influenza epidemics based on searches for “influenza” or related symptoms (Ginsberg et al., 2009). In 2013, the experiment was shown to be limited by media coverage of influenza epidemics during major outbreaks that were causing surges in Google searches unrelated to the virus propagation (Butler, 2013).