Unveiling real-time economic insights with search big data

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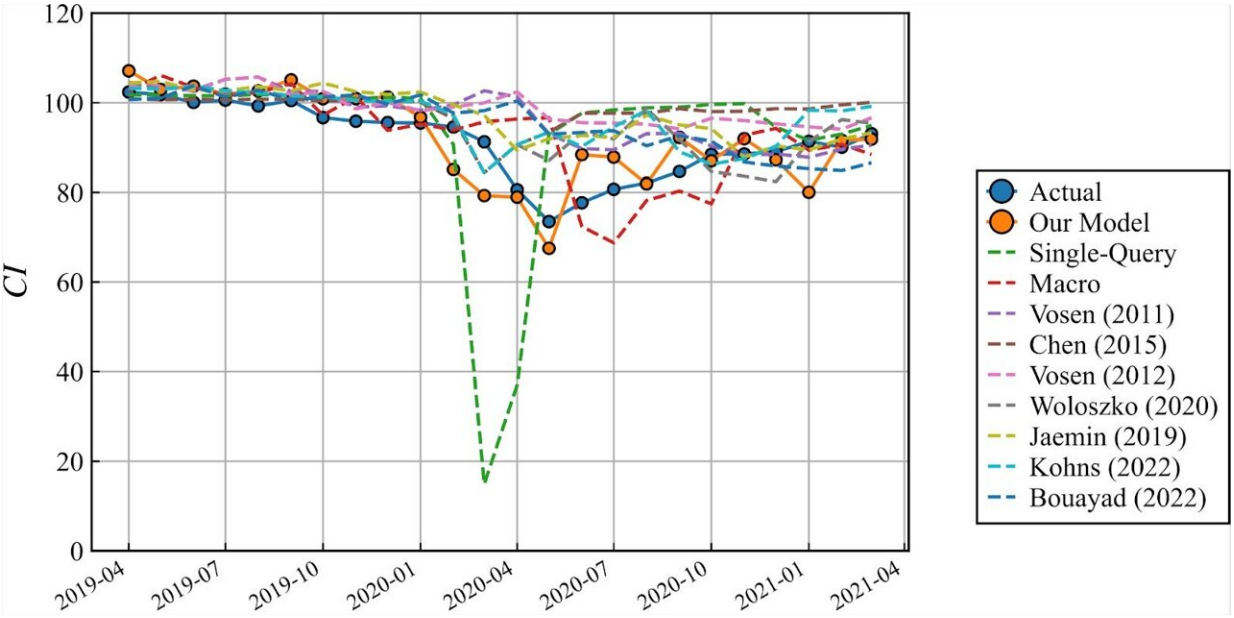


Actual and nowcasted values of the CCI from April 2019 to March 2021. Credit: Kazuto Ataka et al

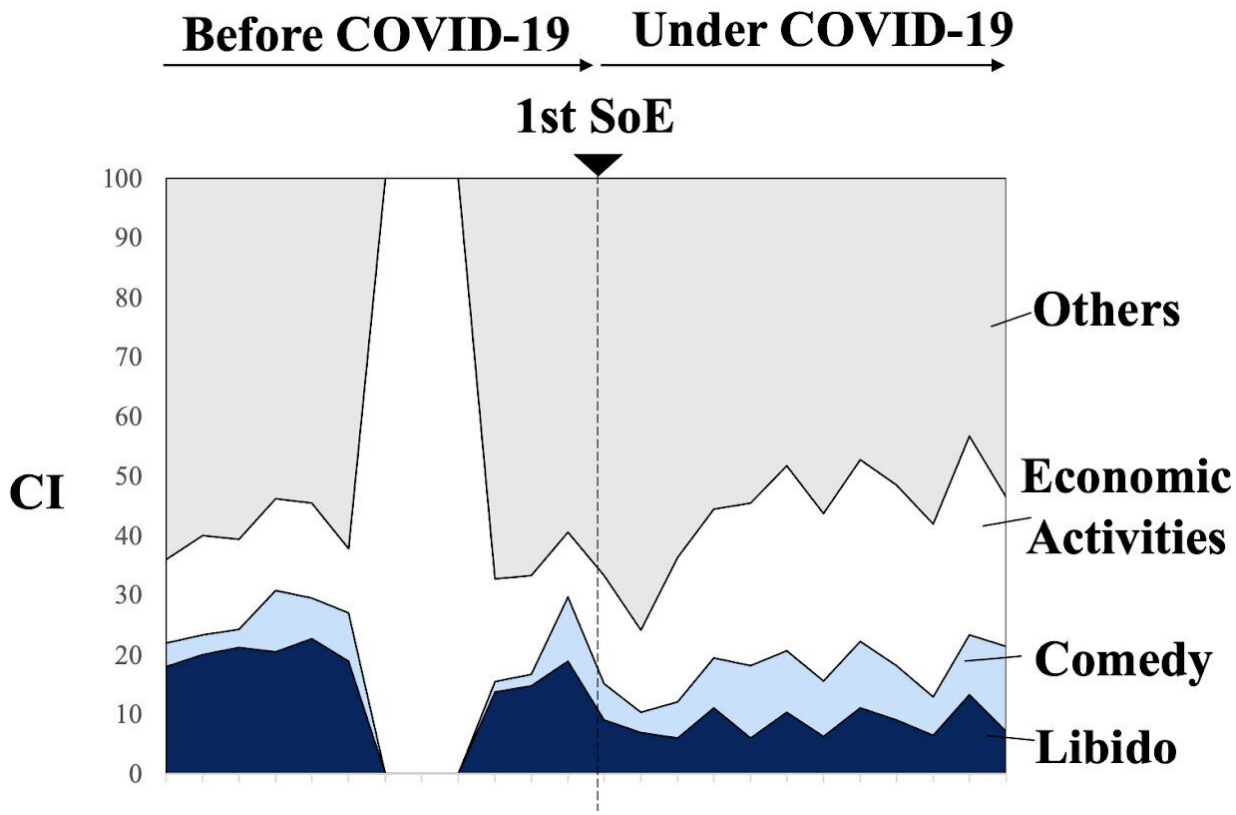
Economic indicators released by the government are pivotal in shaping decisions across both the public and private sectors. However, a significant limitation of these indicators lies in their timeliness, as they rely on macroeconomic factors like inventory turnover and iron production. For instance, in the case of Japan Cabinet Office's Indexes of Business Conditions, the indices are typically released with a two-

month delay.

To overcome the drawbacks of conventional macro-variable-driven techniques, a team of Japanese researchers developed a big data-driven method capable of providing accurate nowcasts for macroeconomic indicators. Importantly, this approach eliminates the need for aggregating semi-macroeconomic data and relies solely non-prescribed search engine query data (Search Big Data) obtained from a prominent search engine used by more than 60% of the nation's internet users.

"Our new model demonstrated the ability to forecast key Japanese economic indicators in real time (= nowcast), even amid the challenges posed by pandemic-related disruptions," said co-corresponding author of the study, Kazuto Ataka. "By leveraging search big data, the model identifies highly correlated queries and performs multiple regression analysis to provide timely and accurate economic insights."

Remarkably, the model showed adaptability and resilience even in the face of rapid economic shifts and unpredictable scenarios. Furthermore, in-depth analysis has revealed that economic activities are influenced not only by economic factors but also by fundamental human desires, including libido and desire for laughter. This underscores the complex interplay between human interests and economic developments.



Proportions of query genres used for CI and CCI nowcasting during Before COVID-19 and Under COVID-19 periods. Credit: Kazuto Ataka et al

"Our findings offer a nuanced perspective for understanding real-time economic trends. The model's outstanding performance in nowcasting during the pandemic represents a significant advancement over current methodologies, emphasizing the potential of incorporating various real-time data sources to enhance the precision of economic nowcasting," added Ataka.

The study, published in *The Journal of Finance and Data Science*, stands as a significant advancement in the field of economic nowcasting, opening avenues for more informed and timely decision-making in both the public and private sectors.

More information: Goshi Aoki et al, Data-Driven Estimation of Economic Indicators with Search Big Data in Discontinuous Situation, *The Journal of Finance and Data Science* (2023). DOI: 10.1016/j.jfds.2023.100106

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