Nowcasting Macroeconomic Indicators using Google Trends

Aishwarya Sharma, Harpreet Kaur, Jagdeep Brar

Nick Newstead, Marina Smailes(Statistics Canada)

Executive Summary

The information on economic indicators is crucial for policy and decision making at an appropriate time. However, such information is usually available with a lag period. The nowcasting of economic indicators can help Statistics Canada (StatsCan) to fill such lags and make economy related decision without facing any delay in the information. The economic indicators are the representatives of economic activities of a country which may be explained by Google Trends. So, the goal of this project is to develop a methodology to nowcast macroeconomic indicators such as Gross Domestic Product (GDP), Retail Trade Sales (RTS) and Retail E-Commerce (EC) Sales in real time by using the real time data source, Google Trends. Google Trends provide daily, weekly, and monthly reports on the volume of Google queries related to different industries/keywords which can exhibit the business cycles and provide signals about the multiple aspects of the economy. These can further be used to estimate the macroeconomic factors in real time. The nowcasting of economic indicators will provide more timely information for policy making.

Methods and Technology: To nowcast the economic indicators, initially the Google Trends and the historical StatsCan time series data were normalized and then made stationary by removing trends and seasonality. Thereafter, two types of models were applied – econometric and machine learning models. Since the number of predictors was more than the samples; Dynamic Factor Model (DFM) was used for dimensionality reduction. The comparative analysis between the models suggested the following suitable models for each of the macroeconomic indicators:

1. **GDP:** DFM and Autoregressive Integrated Moving Average (ARIMA)
2. **RTS:** Random Forest
3. **EC-Sales:** Random Forest

Conclusions: The macroeconomic indicators GDP, RTS and EC-Sales are nowcasted. This nowcasting is presented in the most simplified and user interactive form using the dashboard. The filters provide the user a comfort to select a particular macroeconomic indicator with a selection of year range. The filters will modify the values presented in the table along with the time series plot for the predicted and the growth rate value for the selected indicator. These nowcasting values would fill up the lags of macro-economic indicators which play a key role in policy making.

Dashboard: https://nowcasting-indicators-canada.herokuapp.com/