

Nowcasting GDP Growth in a Small Open Economy

The knowledge of current economic conditions is a key ingredient for economic policy-making. Unfortunately, current conditions are unobservable because economic indicators are typically released with a 1 to 3 months lag. This is problematic, especially in turbulent periods such as the Covid-19 outbreak, when data on current conditions would be needed to guide policy. Nowcasting is a type of forecasting that focuses on predicting current economic conditions. To improve forecast accuracy nowcasting often employs non-standard economic indicators that are released with a smaller lag.

The purpose of this study is to review nowcasting models, and to evaluate whether they improve the accuracy of predictions for Luxembourg's current economic conditions when compared to traditional forecasting models. The study also aims to improve our understanding of the data needed for nowcasting.

Data needed for nowcasting differs from those in forecasting. In forecasting, which entails predicting [quarterly] real GDP one or few quarters ahead, the predicting variables are typically a few and of the same frequency [e.g. quarterly unemployment or industrial production]. In contrast, nowcasting typically exploits a wider range of higher frequency data [e.g. monthly survey data, weekly financial data]. We collected a rich data set that contains conventional quarterly variables [e.g. exports] and conventional monthly variables [e.g. industrial production]. These are released with a large publication lag and tend to reflect past instead of current conditions. Therefore, we also collected more timely unconventional monthly variables [series from business and consumer surveys] and so-called alternative series [google keyword searches, vehicle registrations, petrol sales...].

Thus, the number of series is large [more than 500] and they are of mixed frequency [quarterly and monthly]. We explore eight modelling approaches which allows us to treat datasets with many series and observations at mixed frequency. We employ single-series models [autoregressive model with one explanatory series and univariate mixed data sampling model], models that extract information from multiple series simultaneously [dynamic factor model, mixed frequency dynamic factor model and three pass regression filter] and two machine learning approaches designed to accommodate a large number of series [neural networks and random forests]. For further insights, the reader should consult the paper. We compare them to a simple benchmark model, namely the autoregressive model.

We derive several recommendations for nowcasting real GDP of Luxembourg. We find that in periods of normal economic conditions [outside of financial, sovereign and Covid-19 crisis] a simple autoregressive model performs comparably to the more complex models. In turbulent periods, complex models outperform the autoregressive model by a wide margin in terms of forecast accuracy. Among the complex models, the three-pass regression filter, neural networks and mixed frequency dynamic factor model perform best. The latter reduces the mean squared forecast error, which is a standard measure of forecast accuracy, by 11-24% compared to the autoregressive model. In terms of the type of data most useful for nowcasting purposes, we find business and consumer survey series to do exceptionally well. This is likely because they are very timely. Alternative data, such as Google searches, do not seem to contribute much to nowcasting Luxembourg GDP. This is likely because the number of Google users is small relative to larger countries. These series tend to be noisy and volatile. An exception among alternative series is vehicle registrations, which carry some forecasting power, but not more than survey series.

In conclusions, complex nowcasting models produce superior forecasts of current economic conditions in turbulent times. To achieve a reasonable forecasting performance, it is sufficient to employ conventional series in conjunction with business and consumer survey series. Finally, we consider improvements that could further increase nowcasting accuracy, but these are left for future work.

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For more information

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