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COVER STORY

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# Nowcasting

## An economist's golden bow

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"India in a historic technical recession, RBI signals in first-ever *nowcast*" was the News in November 2020.

What does 'nowcast' mean here? It is the RBI's forecast value for Indian GDP in Q3 of 2020, which they did for the first time using the Nowcasting Technique. Gross Domestic Product (GDP) is the most important measure to assess the economic state of the country. The country's GDP is released 45 days (almost half a Quarter) post completion of the Quarter. This lag is impeding the Government from assessing the impact of its policies and updating them at the right time. This prompted economists to take more interest in accurately forecasting the country's GDP.

Traditionally, economists used simple forecasting techniques such as VAR, ARIMAX, VECM to forecast GDP. But since the last two years, nowcasting techniques rose to fame for forecasting macroeconomic indicators in Econometrics.

The term 'Nowcasting' is derived from two words, i.e., 'now' and 'forecasting'. Nowcasting is defined as the prediction of the present, the very near future, and the very recent past. It is extensively used in meteorology for weather predictions and recently became popular in economics as typical measures such as GDP used to assess the state of an economy are only determined after a long delay. In addition, Nowcasting helps in real-time forecasting due to its ability to handle high-frequency and varied-frequency input variables to nowcast Macroeconomic indicators.

Recently traditional nowcasting methods in combination with Deep Learning techniques have revolutionized weather prediction. In this article, we restrict ourselves to discuss the revolution caused by Nowcasting in the field of Economics and how it is able to out-perform traditional forecasting techniques used in Econometrics.

The macro-economic indicators are released at different frequencies in a country. For example, in India, CPI and IIP are released monthly, whereas GDP is released Quarterly. Often, traditional forecasting methods have failed to efficiently capture the information from high-frequency (monthly- CPI, IIP) indicators in forecasting the low-frequency (Quarterly - GDP) indicators. Let us say we want to forecast GDP for the Jan-Mar quarter of 2020. In the traditional forecasting techniques, we use all the data (data of both monthly and quarterly frequency) available till Dec '2019 and generate the forecast. This forecast will remain constant throughout the Quarter from Jan to March. Even though monthly indicators are released during this period, they remain unused. On the other hand, the nowcasting techniques enable using these monthly indicators to update its forecast.

The technique of Nowcasting used in econometrics that outperformed traditional simple linear forecasting techniques is **Dynamic Factor Modelling (DFM)**.

In DFM-Nowcasting, multiple input time series are normalized and transformed using Principal Component Analysis (PCA) to obtain factors (Components) on which the Vector AutoRegression (VAR) is applied. Actually, the PCA step enables the model to take more input time series without the problem of overfitting, which we observe in traditional forecasting techniques. Also, these factors are updated dynamically as more data points become available with time. So, the nowcasting technique keeps learning similar to Reinforced Learning (RL) in analytics.

The DFM-Nowcasting is able to outperform the traditional forecasting techniques used in econometrics due to its ability to take in data from more input variables with varied frequencies as soon as they become available.

The success of this technique in meteorology & econometrics can be attributed to the presence of multiple cross-correlated variables, which can be benefited by the PCA step as it retrieves the filtered information.

DFM-Nowcasting updates its nowcast value as soon as any of the input economic indicators are released. This enables us to calculate the impact of particular News (i.e., economic indicator released) on the forecast value. Hence, the nowcasting technique is effectively replicating an expert economist following News regularly.

Economics is the toughest subject to master because the level of impact of one macroeconomic indicator on another is very different across countries. For example, In the US, the spending nature of people depends a lot on the stock-market performance, but in India, the impact of stock-market performance on the spending behaviour of people is less. At present, the Nowcasting technique is limited to forecasting GDP in most cases of Economics, but in the coming future, this technique will be used to nowcast other macroeconomic indicators also. Nowcasting techniques will be able to help economists to Quantify the impact of the News on macroeconomic indicators. The Nowcasting technique can be used in many other fields where you need to handle many cross-correlated time series in the future.

## Glossary:

**VAR:** Vector Auto Regression

**ARIMAX:** ARIMA with Explanatory Variable

**VECM:** Vector Error Correction Model

**CPI:** Consumer Price Index

**IIP:** Index of Industrial Production