

Nowcasting Project Summary

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The aim of the project is to understand how Nowcasting is done and to practically implement it for short term forecasts of Indian GDP growth rate. There is a lot of literature on this topic. I have replicated a recent paper by Bhadury et. al. titled "Constructing a Coincident Economic Indicator for India: How Well Does It Track Gross Domestic Product?"

This draft gives a quick summary of the findings:

Econometric Specification

$$\begin{aligned} Y_t &= \Lambda f_t + E_t, & E_t &\text{ i.i.d } N(0, R) \\ f_t &= \beta f_{t-1} + u_t, & u_t &\text{ i.i.d } N(0, q) \end{aligned}$$

1. Y_t contains only monthly indicators from a balanced panel
2. Λ is the matrix of factor loadings
3. We are going to estimate only one factor f_t , which has a VAR(1) specification and loads on all the variables
4. u_t is the error term which is modelled as iid

The collected data is divide into three sections. CEII-6 contains domestic indicators. CEII-9 contains domestic + trade indicators. CEII-12 contains domestic + trade + financial indicators

Variables Chosen

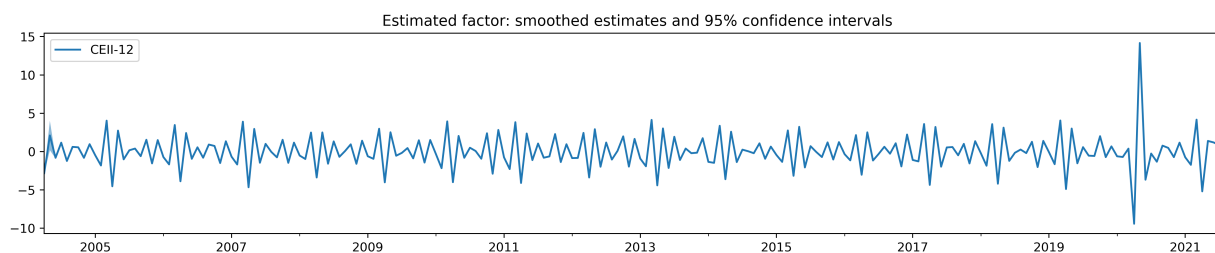
Variable	CEII-6	CEII-9	CEII-12	Source
<u>Air cargo</u>	[x]	[x]	[x]	IndiaStats
<u>Auto total</u>	[x]	[x]	[x]	FRED
<u>Government receipts</u>	[x]	[x]	[x]	Scraped from CAG website
<u>IIP consumer goods</u>	[x]	[x]	[x]	EPWRF
<u>IIP core</u>	[x]	[x]	[x]	EPWRF
<u>electricity generated</u>	[x]	[x]	[x]	IndiaStats
<u>Exports</u>		[x]	[x]	EPWRF
<u>Foreign tourist</u>		[x]	[x]	IndiaStats
<u>NONG imports</u>		[x]	[x]	EPWRF
<u>NEER</u>			[x]	RBI Database
<u>Bank credit</u>			[x]	RBI Database
<u>Sensex</u>			[x]	BSE website

The excel sheet "raw_data_final.xlsx" has detailed sources mentioned in it

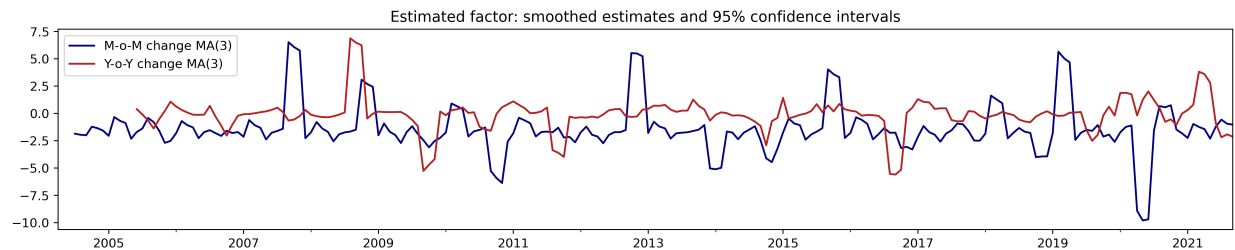
There are two steps in arriving at the forecast:

1. Estimate a latent factor which summarizes the variance in the data
2. Use this factor to predict Q2 2021 GDP growth rat, by running a simple regression

Coincident Indicator



The above is the estimated factor which captures the co-movement of all the 12 indicators chosen. There seems to be seasonality to the data. The factor shows a dip early 2020, but quickly bounces back. There is again a dip in early 2021 followed by a recovery



The month on month and year on year changes moving average 3 in the factor are plotted in the above graph. They show a more nuanced picture. There is a drastic fall in monthly change graph in the early 2020 followed by a quick recovery. The year on year line does not show any slowdown in 2020 but shows a fall in the early months of 2021.

Forecasting

We use the factor calculated before to regress year-on-year change in GDP on its lagged value ($t-1$) and its factor. This parsimonious model is used to nowcast the Q2 GDP growth rate for which official statistics are not available yet.

Regression results

Table: Nowcasting model estimates: Dep Variable GDP Y-on-Y growth

	12 indicators	9 indicators	6 indicators
Intercept	0.019*** (0.007)	0.019*** (0.007)	0.020*** (0.007)
factor	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
spliced.shift(1)	0.720*** (0.092)	0.720*** (0.092)	0.719*** (0.092)
R-squared	0.547	0.547	0.546
R-squared Adj.	0.530	0.531	0.529
F-statistic	32.628	32.657	32.509
No. observations	57	57	57

The variable spliced shift(1) is the lag of yr-on-yr change in GDP. R^2 is at the 50% range. All parameters are significant. The mean squared error of the forecast is given below

	model	mean sq error
1	12 indicator	0.118206
2	9 indicator	0.118225
3	6 indicator	0.118033

The 6 indicator factor model has the least mean squared error. Now we can predict Q2 year-on-year GDP growth rate:



Predicted Year-on-Year growth rate of GDP for Q2 2021-22 is **15.85%**