

Fast Data for Faster Decision-making: The Utility of High-frequency Economic Indicators

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ABSTRACT The COVID-19 pandemic is posing unique challenges to policymakers across the globe, necessitating efficient action in short timeframes. During such crises, having the right data at the right time is crucial to making informed policy decisions. Traditional economic indicators can be inadequate owing to issues of timeliness, granularity, and difficulty in collection. There is a need therefore for higher-frequency and more granular data to track economic activities. These “alternative” or “proxy” high-frequency indicators could help assess the economic impact triggered by COVID-19, shape new economic policies, and understand the road to recovery. This brief argues for the creation of a publicly accessible, multi-sectoral dashboard based on sectoral, high-frequency indicators.

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INTRODUCTION

“Essentially, all models are wrong, but some are useful.”

— Box, George E. P.; Norman R. Draper¹

It is a little over five months since the first case of COVID-19 was reported in Wuhan, China, and the pandemic has had an enormous impact on people’s lives and livelihoods. Businesses have been forced to shut and many have lost their jobs. Millions of migrant workers in India have been forced to walk hundreds of kilometres to reach their villages after losing their source of income in the cities. Recent estimates of the Centre for Monitoring Indian Economy (CMIE) state that India’s unemployment rate rose to 24.3² percent in the week ended 24 May, slightly higher than the figures recorded in the previous eight weeks (23.3 on 5 April).

Indeed, the pandemic which started as a geographically restricted health crisis is on its way to becoming one of the world’s worst economic crises in recent history. Several months-long lockdowns imposed by countries have triggered deep economic disruptions, domestically and internationally. In a televised address in May,³ Shaktikanta Das, the governor of the Reserve Bank of India (RBI), said that India’s GDP growth is expected to drop to negative this financial year. While economists are comparing the pandemic-induced recession with the Great Depression, they admit that the toll of

COVID-19 could in fact be higher.

EMPOWERING DECISION-MAKERS WITH MORE RELIABLE DATA

The importance of data in decision-making cannot be overemphasised. More so in times like the ongoing health crisis where there is massive uncertainty. World leaders are making crucial policy decisions every day to arrest the further spread of the pandemic and mitigate its economic impact. Making decisions on issues like the need for more ventilators or extending a lockdown have a direct impact on lives and livelihoods. When the stakes are this high, governments need reliable real-time data to make quick and effective decisions; do they have such data?

Realising the need for real-time^a health and disease data, various countries have launched their contact-tracing apps to track potential cases of infection based on the location of the user. China, for instance, uses an app⁴ which not only colour-codes people based on their risk of infection but also acts as a travel pass to access public places. The real-time data from India’s contact-tracing app, Aarogya Setu,⁵ is being used by the government to track infections. Such data on health indicators is not only helping trace individuals at risk but also to plan the delivery of health resources. The UK’s National Health Service (NHS), for its part, is testing an AI system,⁶ developed based on existing data on confirmed cases, that predicts demand for intensive-care beds and ventilators.

a Given the different types of indicators, the time taken to clean and process the underlying data may lead to minor delays. This would mean that the indicators are not technically real-time. The authors have used the term “real-time” all through the article to ensure consistency and readability, but in certain cases, it should be taken to mean “quasi-real-time” or “near-real-time”.

A similar real-time understanding of economic outcomes is unavailable due to lack of data in India. Economists and decision-makers are forced to rely on “traditional” indicators alone, which are plagued with issues of timeliness, granularity, difficulty in collection, lack of reliability.

First, due to the current disruption in economic activity,⁷ routine data collection and growth forecasting has become difficult, including for indicators like inflation and the Consumer Price Index (CPI). A recent article⁸ states that the Indian government is exploring ways to remotely collect economic data; Pravin Srivastava, the country’s chief statistician, has discussed the possibility of institutionalising alternative methods for data collection.

Second, traditional economic indicators like GDP and inflation rate are not frequently updated given the complexity in collecting and computing them. Relying on this data involves waiting for several months, as quarterly data on these indicators are released seven to eight weeks after the end of the reference quarter. While they do provide a fair picture of the state of the economy, they do not necessarily help gauge the near-term impact of an economic policy decision.

Third, the traditional macroeconomic indicators might not always be able to provide geographically granular data, limiting their

ability to provide insights at the level of cities and districts. City-level GDP has been a topic on the radar of the Ministry of Housing and Urban Affairs, according to the consultation paper⁹ drafted in February 2019.

To fill the current gaps, higher-frequency and more granular economic data could help decision-makers obtain a more real-time, localised understanding of the problems to target policy measures and resources and conduct a course correction more efficiently. This could facilitate economic decisions such as easing a lockdown, reallocating essential supplies and services, addressing distressed areas with targeted measures, creating roadmaps to stimulate the economy, and monitoring the road to recovery.

COMBINING TRADITIONAL AND ALTERNATIVE INDICATORS

Certain countries are experimenting with new indicators based on high-frequency data, generated primarily by the private sector, to understand the state of the economy, in general, and in particular to quantify the economic impact of COVID-19. These indicators are based on data on various economic activities such as transportation, electricity use, and road traffic. None of these indicators provide a complete and reliable picture by themselves, but taken together, they present a credible measure of the state of the economy.

Table 1: Select high-frequency economic activity indicators in various countries

Tracker	Country	Methodology	Frequency
Opportunity Insights Economic Tracker ¹⁰	US	A real-time economic activity platform that shows microeconomic indicators such as aggregated large credit card processors, payroll firms, job posting aggregators, consumer spending, job postings, and revenue of small businesses. This is aggregated from the private sectors to get a macroeconomic understanding of the US economy and track it.	Daily
COVID-19 Economic Data Tracking by Federal Reserve Bank of St Louise ¹¹	US	A combination of dashboards for the US that collects higher-frequency financial market variables along with monthly indicators that track expenditures, employment and unemployment, and key business and consumer surveys	Monthly
Capital Economics ¹²	Multiple Countries	A dashboard to show economic impact of Covid-19 in different regions and countries	Daily
Consumer Survey for Covid-19 by the Federal Reserve Bank of Cleveland ¹³	US	Survey data that captures how consumers' beliefs and expectations have changed over time as the pandemic has unfolded in the US	Weekly
Financial Times Economic Activity Index ¹⁴	China	A real-time economic index for China, based on six daily, industry-based data series, that include real estate floor space sales, traffic congestion within cities, coal consumption, container freight, box office numbers and air pollution in the 10 largest cities	Daily
The Office for National Statistics Report ¹⁵	UK	Several experimental indicators for the UK created based on close-to-real-time big data, administrative data sources, rapid response surveys and experimental statistics.	Weekly/ Fortnightly
WeBank's AI Moonshot China ¹⁶	China	A deep learning system to detect steel manufacturing activity from satellite imagery to understand China's economic recovery from the novel coronavirus outbreak	Weekly

HIGH-FREQUENCY INDICATORS FOR INDIA

Along with more conventional high-frequency indicators, several alternative and proxy indicators have also been explored in India. Most of these indicators are available at higher

frequency and at more granular level (for example, indicators like a text-based index and electricity consumption are available daily). Table 2 summarises select high-frequency indicators that have been developed in the past to proxy economy activity in India.

Table 2: High-frequency economic activity indicators in India

Indicator	Methodology	Frequency	Data Source	Developer	Unit of data collected
Consumer Confidence Survey ¹⁷	A survey of 5,100 responses on households' perceptions and expectations on the general economic situation, the employment scenario, the overall price situation and their own income and spending.	Quarterly	Consumer Confidence Survey	Reserve Bank of India	Cities
Real Estate Activity ¹⁸	Nowcasting the sales growth of real estate companies using Big Data Analytics based on Google search data	Quarterly	Google search data	Reserve Bank of India	National
Business Conditions Index ¹⁹	A real-time measurement of business conditions based on several economic activity indicators of different frequencies such as 5. Yield curve term premium, at daily frequency 6. Initial claims for unemployment insurance, a weekly flow variable 7. Employees on non-agricultural payrolls, a monthly stock variable 8. Real GDP, a quarterly flow variable	Monthly	Various economic indicators	Reserve Bank of India	National
Dynamic Factor Model ²⁰	Nowcasting the quarterly GDP using a dynamic factor model based on economic activity indicators that represent various sectors and correlate with GDP	Quarterly	Various high-frequency economic activity indicators	Reserve Bank of India	National
Text-based Economic Index ²¹	Various economic indices based on the proportion of economy-related articles in financial newspapers, the sentiment of newspaper articles related to economy and internet searches related to economy	Daily	Newspapers Internet Search	Reserve Bank of India	National

Electricity usage ²²	Indicator for assessing economic activity based on causal relationship between energy consumption and economic growth	Daily	Central Electricity Authority	-	National and sub-national
Satellite-image based Economic Index ²³	Assessing the socio-economic conditions of villages using satellite images	Yearly ^b	Google Earth Engine	NITI Aayog and IIT, Mumbai	District level

LIMITATIONS OF ALTERNATIVE INDICATORS

While alternative indicators can provide a snapshot of economic activities at a higher frequency, they are not reliable by themselves. They need to be viewed as complementary to the existing/traditional indicators which are benchmarked, multidimensional, and constructed with economic, mathematical and statistical expertise. For alternative indicators, the appropriate indicators need to be selected from a pool of potential indicators for each facet of the economy and they need to be benchmarked with the traditional indicators. Comparing them with the public statistics can help understand their biases and construct aggregates that are more representative of overall economic activity.

Given the limitations of data availability, several of these indicators are only representative of the geographies/cities they are generated from and cannot be taken as a proxy for national indicators of economic activity. Further, if data generated from the formal economy is used (such as unemployment insurance claims or aggregate credit card spending), it is important to

acknowledge that they represent the economic condition of only certain population groups. Finally, real-time indicators such as manufacturing activity, interest rates and consumer inflation rates have low predictive power as they change almost at the same time as the changes they signal occur (i.e., they are “coincident” to economic activity).

Thus, while working with alternative indicators, it is important to have clear definitions, to check them for their robustness, indicate the representativeness of the indicator, and clearly state their limitations.

MEETING ECONOMIC DATA NEEDS: WHAT COULD IT LOOK LIKE?

This brief suggests developing a real-time economic dashboard that is based on alternative indicators; the dashboard will be accessible to the public. To achieve this, a dedicated team of economists and data experts at the Ministry of Statistics and Programme Implementation could be deployed to explore new high-frequency indicators, undertake timely data collection and analyses, and develop and maintain the

b The referenced paper has taken the time period as yearly, but the same methodology can be used to develop a daily/weekly/monthly indicator

economic tracking portal. To widen the data collection net, data from the private sector²⁴ could also be used. Collecting real-time data without significant delays is undoubtedly a challenging task with the traditional methods of data collection. Thus, alternative ways for data collection such as mobile application and

reliable telephone surveys could also be explored to maintain a regular flow of data.

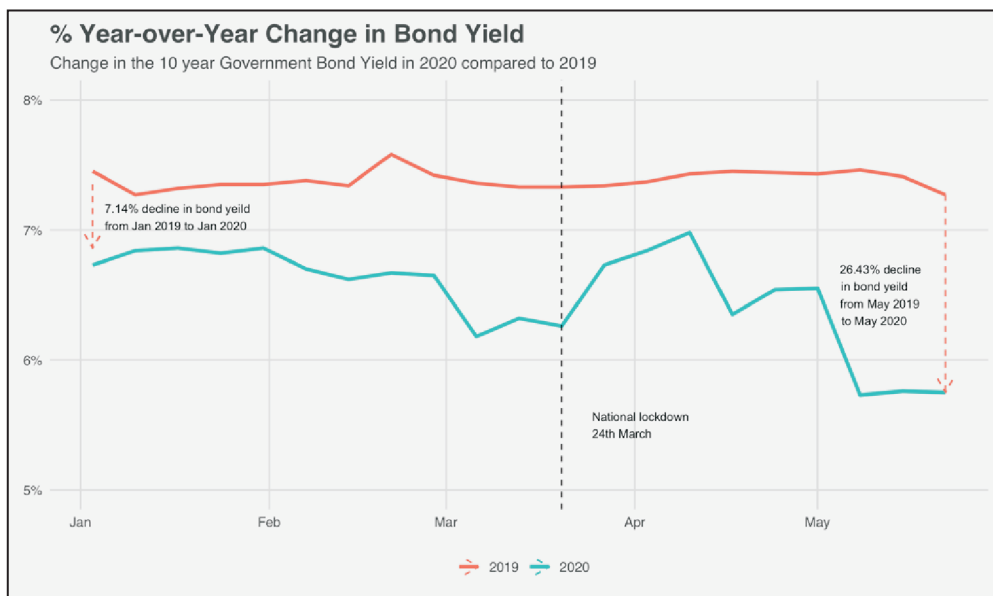
The following paragraphs, including the tables and graphs, outline the potential high-frequency indicators representing each sector. Select indicators are also visualised.

Table 3: Potential High-Frequency Economic Indicators

Sector	Indicator	Frequency	Significance
Industry and Construction	Index of Industrial Production (IIP) – Core	Monthly	IIP can be used to track manufacturing activities in different sectors of economy. Higher IIP indicates better economic growth
	Electricity Consumption	Daily	Higher electricity consumption suggests increased economic activities
	Steel Production	Monthly	Tracking production of steel as a measure of industrial activities
	Cement Production	Monthly	Tracking production of cement as a measure of industrial activities
	Capacity Utilisation	Monthly	Higher capacity utilisation at industrial firms suggests higher demand
Consumption	IIP - Consumer Goods	Monthly	Higher production of consumer goods suggests higher demand and consumption of consumer goods
	Auto Sales (subset of cars motorcycles, tractors etc.)	Monthly	Higher auto sales show higher consumer demand of vehicles, higher agricultural demand for tractors
Employment	Unemployment Rate (CMIE)	Monthly	Higher unemployment shows poor economic growth
	MGNREGA Employment	Monthly	Higher employment under MGNREGA suggests lower economic activity in rural labor market
Inflation	Consumer Purchase Index (CPI)	Monthly	Higher prices of goods and services suggests higher inflation
Credit and Finance	Bank Credit Growth	Monthly	Higher credit growth suggests pick-up in economic growth
	Stock Market Index	Daily	Higher stock market indexes indicate better economic growth
	Bond Yields	Daily/ weekly	Falling bond yields can mean the market expects turbulence
	Interest Rates	Daily	Lower interest rates signal muted economic growth

Other	Pollution Levels	Daily	Lower levels of Nitrogen Oxides (NOx) suggest decline in economic/ industrial/ vehicular activity at source
	Road Traffic	Daily	Lower road traffic suggests decline in economic activity
	Community Mobility	Daily	Lower community mobility suggests decline in economic activity
	Nighttime light satellite imagery	Daily	Lower night-time lights indicate low economic activity

Figure 1: 10 Year Government Bond Yield



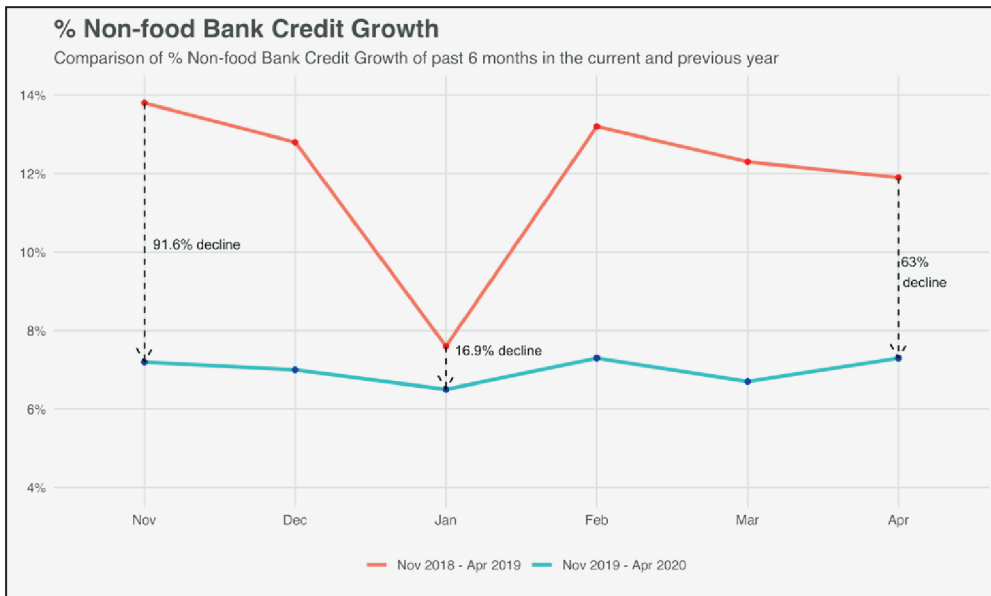
The graph shows the % year-over-year change in the 10-year government bond yield for the past 5 months compared to the previous year.

As compared to May 2019, in 2020,

the bond yields have fallen by 26.4 percent.

Bond yields is a leading indicator and is released weekly. Falling bond yields²⁶ can mean the market expects turbulence.

Figure 2: Non-food Bank Credit Growth



Source: Reserve Bank of India²⁷

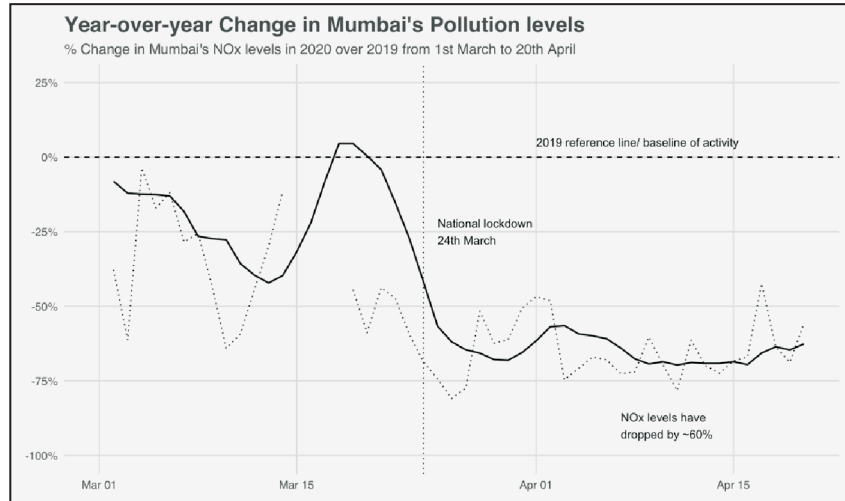
The graph shows the % of non-food bank credit growth from Nov to Apr this year and the previous year. The red bars show data for Nov-18 to Apr-20 and the blue bars show data for Nov-19 to Apr-20.

The graph shows that as compared to Apr

2019, in 2020, the % of non-food bank credit growth had fallen from 11.9 percent to 7.3 percent, a fall of 63 percent.

Credit Growth is a leading indicator and is released monthly. Falling credit rates indicates lower economic activity.

Figure 3: NOx levels in Mumbai



Source: Central Pollution Control Board²⁸

The graph shows the change in the NOx levels in Mumbai compared to the baseline (baseline is set as values from 2019). The dotted line shows the actual value while the solid line shows the moving average for periods of seven days each.

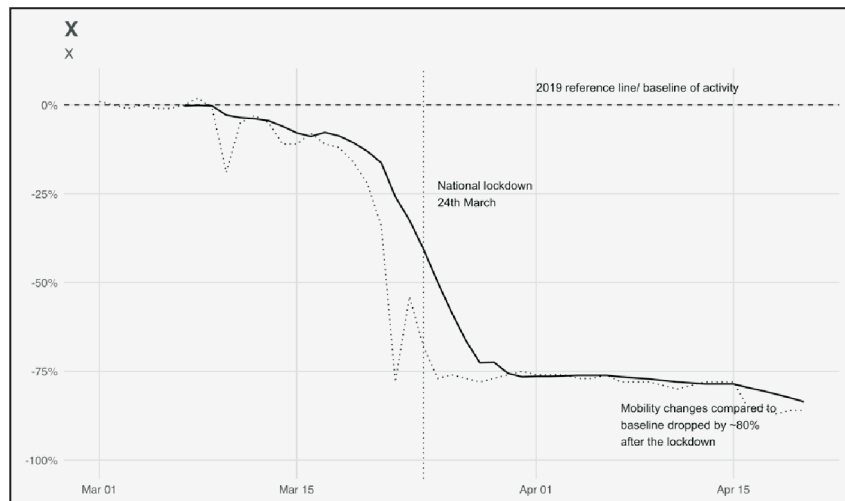
The graph shows that as compared to the baseline, NOx had fallen by 60 percent one month after the lockdown.

Lower levels of Nitrogen Oxides²⁹ (NOx) suggest decline in economic/ industrial/ vehicular activity at source.

Figure 4 shows the community mobility change in retail spaces compared to the baseline from 1 March 2020 to 20 April 2020. The vertical dotted line represents the day when the national lockdown as imposed. The dotted line shows the actual values while the solid line is the moving average for periods of seven days each.

The graph shows that as compared to the baseline, community mobility had fallen by 80 percent one month after the lockdown.

Figure 4: Community Mobility Change




Source: Google Community Mobility Report³⁰

These high-frequency indicators such as the Google Mobility and pollution data can be used in the forecasting models for real economic indicators. For example, the State Bank of India³¹ has constructed an analytical framework to estimate the GDP loss in each state by building on the GDP estimate for FY20. This model uses the high-frequency indicators such as Google Mobility and vehicle registrations data to measure the impact of COVID-19 on the state's economic activity. In an article published in June, Rathin Roy and Amey Sapre, economists at the National Institute of Public Finance and Policy argue for an approach that is rooted in intuition and inductive as well as iterative in nature to estimate the simultaneous supply and demand shocks caused by Covid-19.³² Meanwhile, a June article by Pranob Sen, Programme Director of the International Growth Centre (IGC) India, develops a dynamic factor model to project the economic growth trajectory for the next four years.³³

CONCLUSION

Countering what is being called India's "greatest economic emergency since

independence"³⁴ requires data for making informed and urgent decisions and monitoring the road to recovery. Given the complex data-gathering and computation processes, there are several issues with traditional indicators such as GDP. To account for the lack, lag and a growing distrust in government statistics, these traditional indicators must be complemented with alternatives to get real-time data on the economic health of the nation. To improve and make these alternative indicators more reliable, the concerned government agencies, along with relevant private sector entities, must work on their limitations and develop more sturdy, representative and benchmarked proxy indicators, while simultaneously pushing for more robust, more frequent, and more localised traditional indicators.

This brief recommends the development of a dashboard that will capture various real-time economic indicators. This will help the country's policymakers make better, more targeted and more informed decisions, both at the macro and micro level. 

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