

“Use of High-Frequency Indicators by Central Banks: Experience and Plans Going Forward”

As a central bank, one of the key functions of the Royal Monetary Authority of Bhutan (RMA) is to make timely and informed policy decisions based on data driven. The lack of higher frequency economic data has created difficulty in monitoring and tracking economic development especially due to significant time lag period in economic growth data. The need for timely and higher frequent data has become crucial for making informed policy decision with the recent emergence of the COVID-19 pandemic. To address the issues and challenges of existing data gaps, the Department of Macroeconomic Research and Statistics (DMRS) at RMA initiated developing Monthly Index of Economic Growth (MIEG) with Technical Assistance (TA) from the South Asian Regional Training and Technical Assistance Centre (SARTTAC), International Monetary Fund (IMF) and with other relevant stakeholders.

For credibility and reliability of produced data, the use of HFI has become an important tool at the RMA. Collection of higher frequency data and granular macroeconomic and monetary data from various sectors of economy will enable in charting out timely policy responses and conducting a deep-dive research study. Developing MIEG at the central bank can address the long-standing policy need and the areas for improvement concerning the existing data gaps.

The main objectives of initiating the MIEG exercises are:

1. To track the evolution of economic activity to provide sufficient information for policy makers about the business cycle.
2. To address existing data issues on data lag period in terms of timeliness, periodicity and coverage.
3. To bring about sectoral data consistency and comparability useful for policy analysis, and
4. To conduct the forecasting and nowcasting for policy making purpose.

Since July 2020, the MIEG exercise at RMA started with a series of consultation with the SARTTAC IMF experts. The consultative meeting mostly covers data sources, methodological aspects (concept, scope, classification, recording basis) assurance of data quality characteristics of indicators -periodicity, timeliness and reliability, index compilation and dissemination of data. The TA mission consists of assessing the feasibility of developing a comprehensive MIEG and check whether there is close co-relation between the monthly administrative data available at the RMA and corresponding actual economic data of National Accounts Report published by National Statistics Bureau (NSB). A template for the monthly compilation in line with the System of National Accounts Framework (SNA) was developed to compile the experimental indicator using the available data at RMA and other possible data sources. The experimental indicator data was collected using production approach both volume or value terms using price deflators, wherever applicable with detailed sectoral components.

The following are the steps and procedures undertaken in developing the MIEG;

1. Identification of data source and stock taking

The RMA team worked with experts and relevant stakeholders in identifying the possible data sources and potential alternative data sources for the timely gathering of monthly data from 2015 until date. The data inputs for MIEG compilation includes data on Agriculture, livestock and forestry, Industrial production, government finance statistics, international trades, labour

statistics, monetary and financial statistics, and consumer price index. The data statistics are mainly sourced from Government agencies, Autonomous agencies, major corporations, Financial Services Providers (FSPs) and manufacturing sectors on a monthly or quarterly (whichever is available) basis with time lag of around 2-3 months from the reference period. After identifying the data sources and compilation of historical database from the available data sources, the metadata including detailed definition with compilation guide and reporting template was developed.

2. Assessment and selection of Indicators

Based on the availability of the timely, reliable and accurate data for sufficient number of years, the data were sorted out and built into time series. After the assessment has been carried out, the selection of the best suitable indicators for the different sectors has been identified through empirical analysis using graphical analysis, correlation-coefficients and volatility analysis and Mean absolute Deviation (MAD) calculations.

Table 1: Assessment and Selection of Indicators

Sectors	Available data	Share in GDP constant prices 2021	Correlation	MAD	Period
1. Agriculture, Livestock & Forestry		11.69			
1.1 Crops	Exports Section II deflated PPI agriculture	5.45	-0.32	13.9	2015-21
	Quantity RNR products : Exports and Domestic Sale		0.89	25.0	2015-21
1.2 Livestock	Imports HS 23 deflated PPI agriculture	4.07	0.88	12.9	2015-21
1.3 Forestry & Logging	Sale of timber NRDC QT	2.18	0.82	12.1	2015-21
2. Mining & Quarrying	Exports Section V deflated PPI Mining	1.41	0.84	8.8	2015-21
3. Manufacturing	Sales of Major corporations deflated PPI Manufacturing	7.19	0.97	1.8	2015-21
4.1 Electricity	Major Power Projects - Production	17.19	0.94	4.6	2015-21
4.2 Water Supply	Very small share in GDP and no available indicator	0.04			
5. Construction	Cement - Sales Volume - Metric tons	10.69	0.77	9.3	2015-21
6. Wholesale & Retail Trade	Sales Tax Goods and Commodities RAS+RAMIS deflated CPI A	11.14	0.68	19.6	2015-21
7. Hotels & Restaurants	Number of Tourists Arrivals	0.59	0.34	10.2	2015-21
	Sales Tax Hotels and Restaurants RAS+RAMIS deflated CPI Res. and Hotels		-0.45	5.7	2015-21
8. Transport, Storage & Communications		13.42			
8.1 Storage activities	Very small share in GDP and no available indicator	0.15			
8.2 Surface Transport	Imports petrol deflated by CPI Fuels	6.00	0.76	4.1	2015-21
8.3 Air Transport	Very small share in GDP and no available indicator	0.05			
8.4 Transport and travel agency	Very small share in GDP and no available indicator	0.02			
8.5 Tele Communication	Tele Communications - revenue deflated CPI Communication	6.97	0.38	6.1	2015-21
8.6 Others	Very small share in GDP and no available indicator	0.23			
9. Financing, Insurance, Real Estates & Business Services		8.78			
9.1 Finance & Insurance	Sectoral credit - deflated CPI All items	6.54	0.43	7.1	2015-21
9.2 Real Estate & Dwellings	Sectoral Credit - Total - deflated CPI housing	1.93	0.50	6.5	2015-21
9.3 Business Services	Very small share in GDP and no available indicator	0.31			
10. Public Administration	Government Exp - Current Expenditure - Deflated CPI All iter	9.18	0.60	7.5	2015-21
11. Education & Health	Government Exp - wages Edu.+ Health - deflated CPI Educ ar	5.82	0.86	8.5	2015-21
12. Private Social & Recreation	Very small share in GDP and no available indicator	0.27			
GDP at Basic Prices		97.41			
13. Taxes Net of Subsidies	RAMIS+RAS tax data indirect taxes - deflated CPI all items	2.59	0.86	7.2	2015-21
GDP at Market Prices		100.00			

3. Index Compilation

3.1. Identification of Benchmarking Techniques

The Benchmarking methods were used to ensure consistency and movement between monthly selected indicators and annual accounts data. The most commonly used benchmarking methods includes Proportional Denton Method and the Proportional Cholette-Degum (CD) methods for the series.

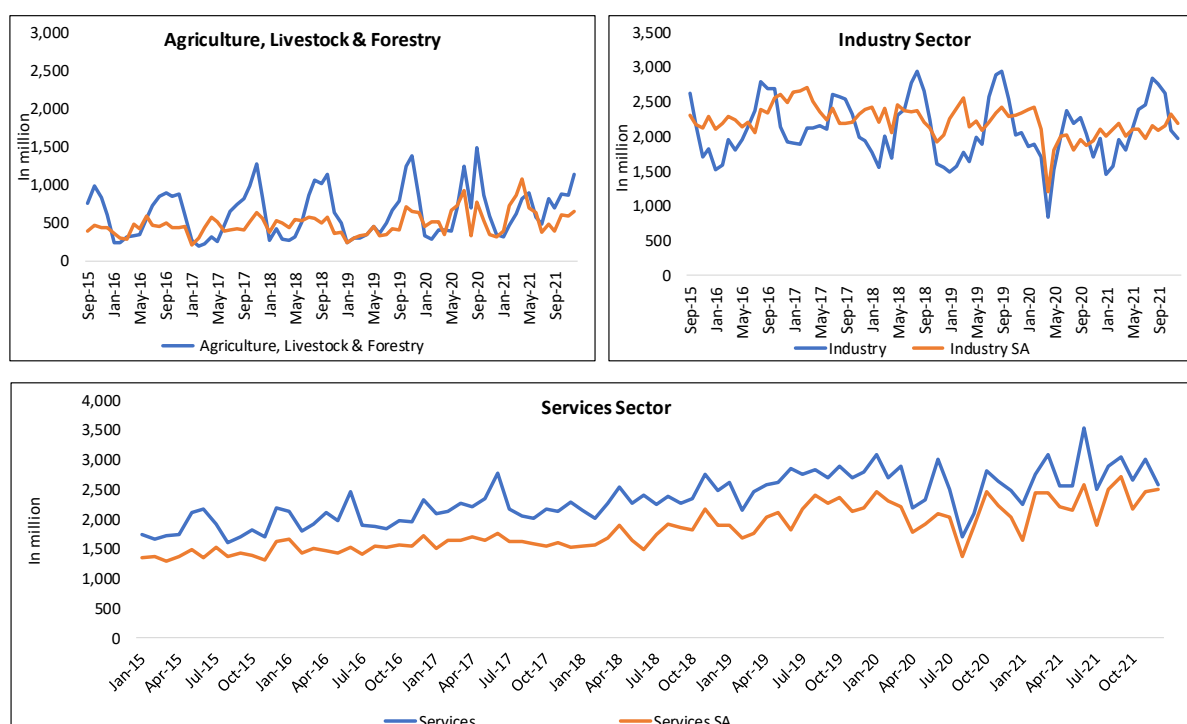
The benchmarking focuses on the largest sector where proportionate share of indicators to GDP are higher such as production of electricity & water supply, crop production, constructions, wholesale & Retail trade, Finance & Insurance, Transport and Communication, and public administration. Chart 1 shows sector wise benchmarking with series 2015- 2021.

Also, the extrapolation method is used to obtain estimates consistent with the results from annual national accounts.

3.2. Seasonal Adjustments

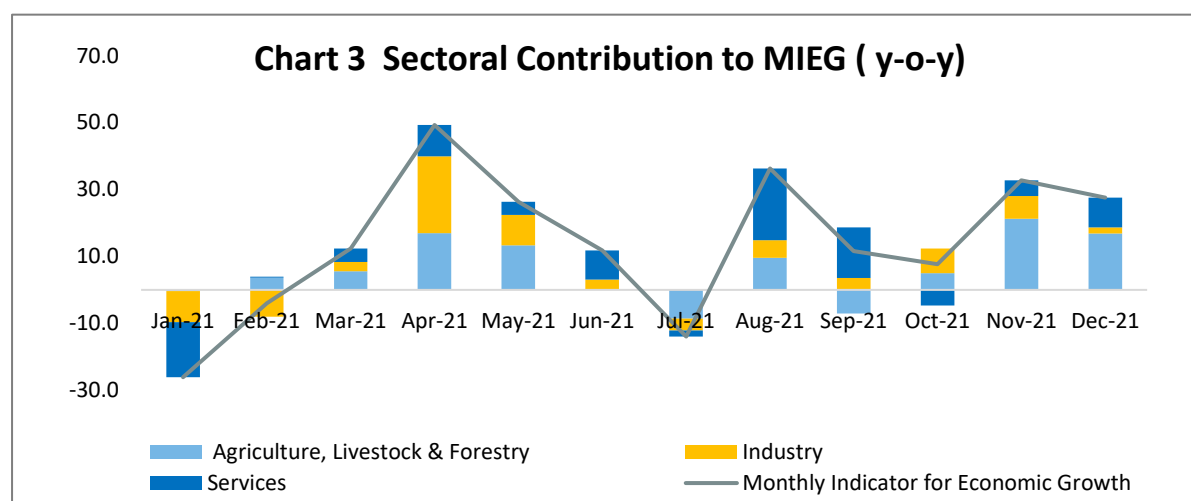
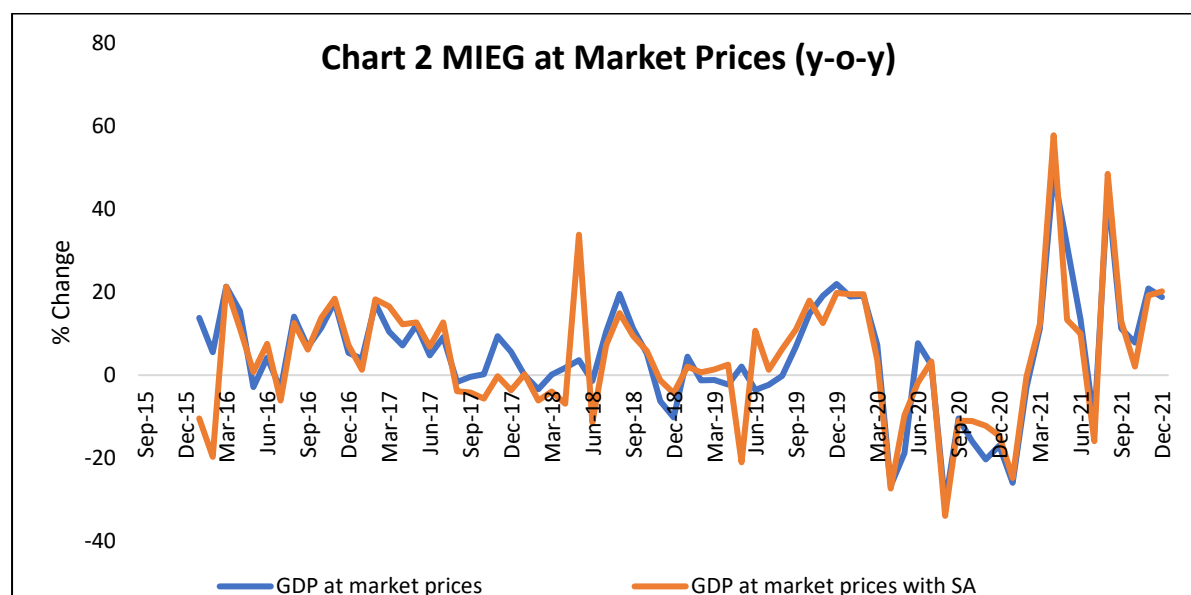
The Seasonal Adjustment (SA) is a process intended to identify and remove seasonal fluctuations and calendar effects from time series data. The commonly used method of SA are Seasonal components (Seasonality) and Calendar related components. The selected bench-marked indicator is then seasonally adjusted to maintain consistency between Annual National Accounts totals and MIEG's annual totals.

Chart 1: Sector wise benchmarking and Seasonal Adjustment



4. Aggregation of MIEG Components

The MIEG estimates are in general used to monitor the behaviour of the economy in the short term and evolution of real activity. The use of seasonal adjusted series and the analysis of contributions to growth are useful tools to facilitate a more detailed analysis of the current economic situation.



5. Issues and Challenges

Although great progress was achieved, following are some of common challenges faced in the process of developing the MIEG in terms of data availability, timeliness and quality:

- Limited alternative data sources for agriculture sector (e.g., crops and livestock)
- Development of alternative data sources for some activities (e.g., enhanced data collection of major manufacturing corporation)
- Further treatment of outliers (e.g., indirect taxes)
- Further analysis of available data (e.g., tax data used as indicator for wholesale and retail activities)
- Further improvements can be made to statistical techniques used (benchmarking and seasonal adjustment)
- Development of data dissemination calendar, revisions analysis and revision indicators.

6. Way forward

Following are the key factors to consider for further improvements for compilation of MIEG:

1. Use of same sources and methods as used in the annual national accounts estimates
2. Identification of alternative data sources should consider:
 - Methodological aspects (concept, scope, classification, recording basis)
 - Quality characteristics of indicators (periodicity, timeliness, reliability, punctuality of publication, length of data series)
 - Data producing agency (impartiality, data transmission protocol, availability of contact point)
3. Assessment of alternative indicators should consider the same process as used for the 2015-21 series:
 - Comparison with growth rates of activity in annual national accounts, based on graphical analysis, correlation, and volatility measures
4. Analysis of seasonality and presence of outliers
5. For consistency, the same data source should be used for the complete series
 - If a better data source is identified, it should be used for the complete series (2015-21 and additional years).