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MONGOLIA

TECHNICAL ASSISTANCE REPORT—HIGH FREQUENCY INDICATORS MISSION

May 2022

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MONGOLIA

AUGUST 2021

REPORT ON THE HIGH FREQUENCY INDICATORS MISSION (MARCH 1–12, 2021)

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Glossary

D4D	Data for Decisions trust fund
ESD	Economic statistics department
IPI	Industrial Production Index
ISIC	International Standard Industrial Classification of All Economic Activities
MIEA	Monthly Indicator of Economic Activity
NA	National Accounts
NASRD	National Accounts and Statistical Research Department
NSOM	National Statistics Office of Mongolia
QGDPP	Quarterly Gross Domestic Product by Production Approach
TA	Technical Assistance

SUMMARY OF MISSION OUTCOMES AND PRIORITY RECOMMENDATIONS

1. The IMF conducted a remote technical assistance (TA) mission from March 1 to 12, 2021, to help the National Statistics Office of Mongolia (NSOM) compile a monthly indicator of economic activity (MIEA). Experimental results describe monthly economic activity from January 2010 to January 2021 as well as the impact of the COVID-19. This second mission for developing the MIEA was funded by the IMF's Data for Decisions trust fund[1] (D4D).

2. A MIEA provides a timely signal of economic activity within a jurisdiction that complements quarterly and annual national accounts (NA). A comprehensive monthly indicator that is consistent with other NA outputs provides a more robust dataset by which to judge a jurisdictions economic performance as compared to individual sectoral indicators produced by the NSOM such as an industrial production index or other high frequency indicators that are generally not based on the System of National Accounts framework. Continued efforts from the NSOM to improve the provision of statistics are demonstrated by previous parliamentary budgetary requests to expand statistical programs and specifically to expand the computation of a MIEA, as indicated authorities from the NSOM.

3. The NSOM implemented recommendations made by the first D4D mission at a slow pace. The mission conducted in September 2019 identified 3 priority recommendations, including the creation of a dedicated team, a workplan for creation of a MIEA, as well as the creation of a dedicated database of high-frequency data. These items were not implemented by the start of the mission. The NSOM indicated that understaffing, changes in priorities with a focus on the ongoing GDP rebase, and pending budgetary allocations for compiling the MIEA partly accounted for the lack of progress.

4. Against this background, this TA report focuses on three key work areas that can help improve the timeliness and frequency of national accounts for Mongolia:

- **Assessment and organization of source data:** Source data examined consisted of monthly indicators representing approximately 72 percent of GDP and quarterly indicators representing approximately 16 percent of GDP. The remaining 12 percent accounts for Agriculture, forestry and fishing industrial sector which is primarily derived from annual sources and allocated across the year. The mission helped to create a database of source data inputs to the MIEA computation process to ensure clarity of processes and repeatability of methods from month to month.
- **Development of framework to prepare experimental MIEA estimates aligned to quarterly GDP by production (QGDPP) estimates at constant prices.** Given the preference for unadjusted data noted by the NSOM authorities, the proposed framework developed during the mission computed both unadjusted and seasonally adjusted estimates that are

[1] See https://www.imf.org/en/Capacity-Development/D4D.

consistent with that of the QGDPP NA program. Seasonally adjusted measures are suitable for sound period-to-period comparisons over time. Extreme movements in indicator series because of impacts from the COVID-19 pandemic have been initially modelled and will be reviewed in the future as additional data and observations become available.

- **Improvement and standardization of seasonal adjustment practices.** The mission helped the NSOM to use the internal benchmarking features within the seasonal adjustment software to equate the raw and seasonally adjusted time series on an annual basis. The current practice within the NSOM to implement this consistency after seasonal adjustment processes creates step adjustments in the first period of the year and inaccuracy of seasonal movements in the differing components of GDP.

5. The experimental MIEA estimates can be used by both country officials and IMF surveillance teams with appropriate caveats. The current major caveats include volatility at the end of the year provided by quarterly GDP estimates for Agriculture, Forestry and Fishing, and Construction sectors; and selection of the suitable method to seasonally adjust the overall GDP.

6. To support progress in the above work areas, the mission recommended a detailed one-year action plan with the following priority recommendations to improve and complete the MIEA estimates.

Table 1. Mongolia: Priority Recommendations

Target Date	Priority Recommendation	Responsible Institutions
November 2021	Improve monthly allocation of quarterly and/or annual output within the Agriculture, forestry and fishing industrial sector.	**NSOM**
July 2022	Implement updated seasonal adjustment practices within the computation framework for the MIEA.	**NSOM**
Second half of 2022	Begin to produce unadjusted and seasonally adjusted MIEA results with accompanying sources and methods documentation.	**NSOM**

Further details on the priority recommendations and the related actions/milestones can be found in the action plan under *Detailed Recommendations*.

DEVELOPING THE MIEA

A. Indicator Series Evaluation

7. The primary data sources for the MIEA are shared with those used in the QGDPP program. To produce an experimental MIEA in short order and to make efficient use of existing resources and outputs from NSOM, source data inputs into the MIEA are shared with the QGDPP program. In many cases, data used in the compilation of the QGDPP estimates are monthly by design and as such the internal worksheets and estimations used in the QGDPP program can be extended and applied to the MIEA program with the addition of monthly seasonal adjustment.

8. The quarterly indicator series for the Agriculture, forestry and fishing industrial sector require refinement for best use in the MIEA. Extreme movements between Q4 and Q1 from unadjusted QGDPP constant price estimates provide difficulty when interpolating data to provide a monthly estimate. The mission used an experimental monthly allocation of output as an example for the framework. Pro-rating of quarterly output totals equally across the months within the quarter should not be used, as doing so allocates all output movements within a quarter to the first month of the quarter with no change in activity for the last two months. NSOM indicated there may be monthly data available from the Department of Agriculture, but during the mission that data was not available. The availability of monthly data with partial coverage of the sector was also mentioned in the TA Report from the last mission in 2019 but no such data was provided as part of this mission. The NSOM and mission adopted the proposed monthly structure for the overall agriculture outlined in Table 3 based on Harvest, hay, fodder reports, sown area reports, Agriculture baseline surveys, price data of agriculture products, livestock censuses, Livestock offspring reports, and Expert judgment. The mission recommended that the NSOM further refines the coefficients for the pro-rata and uses the estimates as an indicator in a benchmarking model to assess if the movement at the end of the year is smoothed.

Table 2. Mongolia: Quarterly and Monthly Coefficient to Allocate Output of Crops and Livestock

Agriculture												
Quarter	Q1			Q2			Q3			Q4		
	Soil cultivation			Cultivation			Harvest			Harvesting and tillage		
Quarterly Distribution of Annual	**0.05**			**0.41**			**0.44**			**0.10**		
Month	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Monthly Distribution of Quarterly	**0.17**	**0.25**	**0.58**	**0.2**	**0.32**	**0.48**	**0.34**	**0.33**	**0.33**	**0.38**	**0.35**	**0.27**

Source: NSOM and mission's calculations.

9. Indicators for the industrial sectors covered as part of the Industrial production index (IPI) are well structured (Mining, manufacturing, electricity, and gas). In large part the monthly volume indices used in the MIEA are well developed and comply with international IPI standards. These indicators are also shared with the QGDPP program and disseminated in both unadjusted and seasonally adjusted form on the NSOM website. The mission noted unexplained spike in the volume index for the manufacturing sector at the end of each quarter.

10. Construction estimates require refinement to be estimated monthly. Like the Agriculture, forestry and fishing industrial sector the lack of a composite monthly indicator series and the extreme movements between Q4 and Q1 produce poor interpolated results. Beyond the lack of monthly information, NSOM authorities spoke of potential reporting issues in construction industrial sector associated with year-end reporting that may include activity completed in previous periods.

11. Total trade turnover data is now available monthly. As of the January 2017 reference month total trade turnover is available monthly whereby estimates for this industrial sector were previously only computed quarterly. While an improvement, the continuation of this monthly time series into the future will enable the computation of more robust seasonal factors as more

observations become available. The mission noted that additional methodological improvements such as deflating disaggregated components below the total by the NSOM would improve overall quality.

12. Industrial sectors estimated with monthly employment figures must be updated with constant price estimates. Data shared during the mission for the Public Administration and Defense, Education and Human Health and social work activities need be updated by the NSOM for incorporation into the MIEA to include volume estimates. In general, employment statistics for the above-mentioned service based industrial statistics whereby a large percentage of gross value added is composed of wages, salaries, and employers' social contributions labor indicators are adequate indicators of the volume of activity within an industrial sector.

13. Other industrial sectors where monthly information is not available represent a relatively small percentage of GDP. The remaining industrial sectors, aside from real estate, represent approximately 6 percent of GDP. While monthly estimates could potentially be developed in the future, efforts were not put forth as part of this mission to develop additional monthly indicator series. The mission has interpolated QGDPP estimates for these sectors for inclusion in the MIEA. The mission noted that for real estate, the assumptions, methods, and source data used for the computation of the QGDPP results should be replicated monthly, particularly as it relates to real estate activities with own or leased activities (International Standard Industrial Classification of All Economic Activities (ISIC) code 681) by the NSOM.

14. In 2021 NSOM will release a new base year GDP series from 2015 onward. The mission highlighted that longer time series are fit for compiling sound MIEA estimates. NSOM requested IMF support for training on back-casting to expand the coming series back to 2010.

Recommended Actions:

- Update the base year for indicator series in the MIEA for consistency across NA programs
- Improve monthly allocation of quarterly and/or annual output within the Agriculture, forestry, and fishing industrial sector
- Investigate spike in volume index for the manufacturing sector at the end of each quarter.
- Seek external assistance for preparing monthly indicator based on improved quarterly estimates for construction in QGDPP program.

B. MIEA Framework

15. The mission developed a framework to facilitate the production of MIEA estimates. The framework developed during the mission combines monthly indicator series with quarterly benchmark information from the QGDPP program to produce both unadjusted and seasonally adjusted estimates of monthly economic activity for each ISIC sector that are consistent with those produced as part of the QGDPP program.

16. The framework can also be used to store or populate a real-time (vintage) database that can be used to assess stability of estimates over time. Best practice is to create, maintain and publish a database of real-time (release vintage) data to facilitate revisions analyses.

17. Summary sources and methods documentation was prepared as part of the mission to provide ease of understanding for both NA compilers and users.

C. Seasonal Adjustment Practices

18. The mission implemented the direct seasonal adjustment of total GDP. Total quarterly GDP is directly seasonally adjusted in the NSOM. For consistency purposes, the MIEA has been created using the same methods. An alternative method is indirect seasonal adjustment whereby the total GDP is computed as the sum of the seasonally adjusted components. The latter should be clear of residual seasonality. The mission observed that many industrial sectors have distinct and different seasonal patterns which when aggregated may overshadow these distinct and stable patterns within component series.

19. The mission recommended the equation of unadjusted and seasonally adjusted data on an annual basis within the seasonal adjustment processes for the MIEA and QGDP. The NSOM equates unadjusted and seasonally adjusted estimates derived within the QGDP on an annual basis to preserve temporal consistency outside the seasonal adjustment, which might result in undesired step adjustments (positive or negative) in the first period of each calendar year. For the MIEA, the mission implemented the good practice, which recommends performing this equation within the seasonal adjustment processes.

20. Updated COVID-19 seasonal adjustment practices. As impacts on indicator series have begun to appear in the NSOM data in the latter half of 2020 and into 2021, extreme movements must be accurately modelled. In line with general IMF recommendations on seasonal adjustment for economic series impacted by the COVID-19 pandemic, the mission coded initial observations that exhibit extreme movements as additive outliers such that their values are allocated to the irregular component of the time series and excluded from the seasonal and trend components of the time series. As more observations become available in future periods the additive outliers and overall impacts on time series should be reviewed to determine if changes to additive outliers are necessary or if other treatments, such as level shifts or temporary changes, should be included in the seasonal adjustment models.

Recommended Actions:

- Develop a workplan to prepare main users for a future transition of headline economic measures from unadjusted to seasonally adjusted data/estimates for all economic series, including the QGDPP and MIEA.
- Use internal benchmarking functionalities within the seasonal adjustment software used in the NSOM to equate unadjusted and seasonally adjusted results on an annual basis.
- Review treatment of outliers and seasonal adjustment models, including COVID-19 impacts as part of a follow-up mission.
- Investigate whether residual seasonality remains in the total GDP.

DETAILED RECOMMENDATIONS

Table 3. Mongolia: Detailed Recommendations

Priority	Action/Milestone	Target Completion Date
Medium	Develop a workplan to prepare users for a transition of headline economic measures from unadjusted to seasonally adjusted data/estimates for all economic series, including QGDPP and MIEA.	July 2022
High	Review treatment of outliers and seasonal adjustment models, including COVID-19 impacts as part of a follow-up mission.	July 2022
Medium	Update the base year within the indicator series in the MIEA for consistency across NA programs.	October 2021
Medium	Investigate spike in the volume index for the manufacturing sector at the end of each quarter.	October 2021
High	Improve monthly allocation of quarterly and/or annual output within the Agriculture, forestry and fishing industrial sector.	November 2021
Medium	Seek external assistance for preparing monthly indicator based on improved quarterly estimates for construction in QGDPP program.	November 2021
Medium	Use internal benchmarking functionalities within seasonal adjustment software used in the NSOM to equate unadjusted and seasonally adjusted results on an annual basis.	December 2021
Medium	Investigate whether residual seasonality remains in the total GDP.	December 2021
High	Begin to produce both unadjusted and seasonally adjusted MIEA results with accompanying sources and methods documentation.	Second half of 2022

Table 4. Mongolia: Implementation Status of Previous Recommendations

Recommendations	Target Completion Date	Comments
Agree on the feasibility of developing a MIEA and assign responsibilities to implement the project.	December 2019	**In-progress**: Feasibility of development was agreed on, however dedicated resources to implement the project were not implemented.
Develop a dedicated database with all available high-frequency data, and lower-frequency benchmarks with appropriate classifications and metadata.	March 2020	**Ongoing**
Elaborate an experimental MIEA (partial information), a detailed workplan, and timeline to develop missing components.	June 2020	**Completed**. The March 2021 mission an experimental MIEA.
Develop additional monthly indicators using available data sources and replicating methods used quarterly.		**Pending**

Table 5. Mongolia: Implementation Status of Previous Recommendations (concluded)

Consider the implications of the new base year and the possible changes to the revision policy in the potential work related to the MIEA.		**In-Progress:** The NSOM requested external support on backcasting to prepare longer time series suitable for the MIEA within the GDP rebase.

A. Officials Met During the Mission

Name	Institution
Mr. Demberel Ayush	Director, National Accounts and Statistical Research Department (NASRD)
Ms. Erdenesan Eldev-Ochir	Director, Economic statistics department (ESD)
Mr. Otgonbayar Gantulga	Director, Foreign relations and cooperation division, Administration department
Ms. Bayarmaa Baatarsuren	Senior Statistician, National Accounts Section, NASRD
Ms. Oyunbileg Delgersaikhan	Senior statistician, Business Register Section, ESD
Ms. Oyunjargal Mangalsuren	Senior statistician, Economic statistics section, ESD
Ms. Ulziikhand Nyamsuren	Senior Statistician, Statistical Research and Sampling Section, NASRD
Ms. Tserenkhand Jagir	Statistician, National Accounts Section, NASRD
Ms. Lkham Narantsogt	Statistician, National Accounts Section, NASRD
Mr. Norovsambuu Oyuntunsag	Statistician, Statistical Research and Sampling Section, NASRD
Mr. Davaajargal Davaatseren	Statistician, Household income and expenditure survey section, Population and social statistics department
Mr. Gerelt-Od	Statistician, NASRD