

## North Macedonia Nowcasting Release: 2022 Q2 (August update)

*Tracking economic activity in real time is a difficult task for forecasters due to data publication lags, frequent and/or large revisions and lack of high-frequency indicators. For North Macedonia, first GDP estimates are typically available two months after the end of a quarter and are sometimes subject to further delays and subsequent revisions. In the absence of official GDP estimates, domestic economic activity can still be assessed and monitored with the use of other economic indicators that are available on a more frequent basis. In times of heightened uncertainty and prolonged economic instability that warrant rapid policy actions, such as the ongoing pandemic, nowcasting or real-time forecasting becomes ever more relevant.*

### **What is the objective of the economic activity nowcasting model?**

Nowcasting is often formally described as a process that enables the prediction of GDP or economic activity in the very near future, the present, or the very recent past.<sup>1</sup> Thus, the objective of the nowcasting model<sup>2</sup> is to relate official quarterly GDP figures with relevant economic indicators that are available more frequently. The modeling exercise for North Macedonia<sup>3</sup> shows that standard high-frequency indicators, such as industrial production and retail trade, appear to be weakly correlated to official GDP and GVA releases for North Macedonia, thus making this country largely an exception among its European peers.

### **How is the model for North Macedonia developed?**

Given the weak and unstable correlation between official GDP releases and standard high frequency indicators, the modeling strategy adopted proposes to decompose GDP growth into (i) an economic signal and (ii) a measurement error:

$$GDP_t^Q = signal_t + error_t = \underbrace{\alpha + \beta f_t^Q}_{signal_t} + \underbrace{\varepsilon_t}_{error_t}$$

To that end, with the use of the Principal Component analysis (PCA),<sup>4</sup> monthly factors are estimated from a pool of preselected high frequency indicators that are then aggregated into quarterly factors used to estimate the real economic signal. The remaining difference is unrelated to underlying economic conditions and is considered to be a measurement error. The model is estimated with the use of the OLS method and can be used to obtain both a nowcast and a coincident economic indicator for North Macedonia. It also accounts for the structural break in the relation between GDP growth and the selected high frequency indicators over time.

### **What are the model inputs?**

The high frequency indicators used to estimate monthly factors were selected based on (i) correlation with GDP over different samples; (ii) broad coverage of economic activities; and (iii) frequent use in relevant literature. According to these selection criteria, 23 variables are used as inputs to the model: industrial production in North Macedonia and in key trading partners, industrial confidence indexes in key

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<sup>1</sup> Bańbura, M., D. Giannone, M. Modugno, and Reichlin L. (2013): Now-casting and the real-time data flow, Working Paper Series 1564, European Central Bank.

<sup>2</sup> The nowcasting model was developed as part of the World Bank North Macedonia Crisis Response TA to the Ministry of Finance.

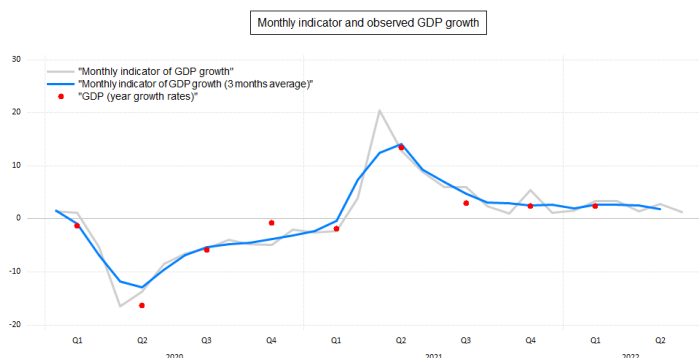
<sup>3</sup> Kunovac, D. and Madzarevic-Sujster, S. (2021): High Frequency Indicators and Tracking Real Activity in North Macedonia.

<sup>4</sup> Stock, J. H., and Watson, M.W. (2002): Forecasting Using Principal Components from a Large Number of Predictors, Journal of the American Statistical Association.

trading partners, business expectations in North Macedonia, retail and wholesale trade, external trade (imports and exports), Economic Sentiment Index in North Macedonia and key trading partners, employment in industry, money, and central government overall and VAT revenues. Alternative sources of information such as Google trends and mobility data have also been investigated, following recent suggestions in the literature.<sup>567</sup> It was found that Google trends data may be useful in capturing the turning points of the business cycle in North Macedonia, but not the magnitude of its changes.

### Should the model be trusted?

The model is able to explain around 70 percent of the historical variation in GDP growth in terms of  $R^2$  statistics. It also produces forecasts that are able to track the GDP growth rate over time relatively well, as shown in the figure to the right. The correlation between observed GDP and predicted GDP in the period between 2007Q1 and 2021Q4 is high and it hovers around 86 percent. For the same sample length, the RMSE of the model is on average 1.7 percent. It also fares relatively better in terms of the RMSE of a benchmark random walk model.



### How should the output of the model be interpreted?

Using data available up to a particular point in time, the model produces a monthly estimate of GDP growth that can be aggregated to obtain an estimate of quarterly GDP growth on an annual basis.

### What is the GDP growth nowcast for Q2 of 2022?

Based on high frequency data available up to June, the GDP growth nowcast for Q2 2022 from the model is 1.8 percent. The nowcast for the second quarter of the year is primarily driven by solid government revenues and strong external trade, amidst weak industrial production and retail trade growth and low confidence indicators. The table on the right also shows the most recent nowcasts with the corresponding quarterly GDP estimate of the State Statistical Office.

Date	Actual GDP	Nowcasted GDP
2020 Q1	-1.3	-0.7
2020 Q2	-16.4	-11.1
2020 Q3	-5.9	-4.5
2020 Q4	-0.8	-3.0
2021 Q1	-1.9	0.3
2021 Q2	13.1	13.9
2021 Q3	3.0	5.8
2021 Q4	2.3	3.2
2022 Q1	2.4	3.1
2022 Q2	n.a.	1.8

### Contact Us

The model can be accessed at the following [link](#). If you have any questions about the model, please submit them by e-mail to [jmadjoska@worldbank.org](mailto:jmadjoska@worldbank.org).

<sup>5</sup> Koop, G. and Onorante, L., (2019): Macroeconomic Nowcasting Using Google Probabilities. In *Topics in Identification, Limited Dependent Variables, Partial Observability, Experimentation, and Flexible Modeling: Part A*. Emerald Publishing Limited.

<sup>6</sup> Woloszko, N. (2020): Tracking activity in real time with Google Trends.

<sup>7</sup> Bobeica, E., Pérez-Quirós, G., Rünstler, G., and Strasser, G. (2021): After floods and pandemics: How to obtain a meaningful forecast, VoxEU.