

Midastar: Threshold autoregression with data sampled at mixed frequencies

Kaiji Motegi* and John W. Dennis†
Kobe University IDA

March 11, 2022

Abstract

This paper proposes Midastar models by combining the Mixed Data Sampling (MIDAS) approach and the threshold autoregressive (TAR) models. The Midastar model of the first kind is designed for a low frequency target variable and a high frequency threshold variable, while the second kind is designed for the reverse case. The Midastar models can detect threshold effects accurately, while the aggregated TAR model has a risk of finding spurious non-threshold effects. We show that the Midastar models have desired asymptotic and finite sample properties. In two separate empirical applications, the Midastar models detect significant threshold effects in Japan's COVID-19 data and U.S. macroeconomic indicators.

JEL codes: C22, C32, C51.

Keywords: COVID-19, Mixed Data Sampling (MIDAS), nonlinear time series, temporal aggregation, threshold effect.

* *Corresponding author.* Graduate School of Economics, Kobe University. 2-1 Rokkodai-cho, Nada, Kobe, Hyogo 657-8501 Japan. E-mail: motegi@econ.kobe-u.ac.jp

†Institute for Defense Analyses (IDA). Research results and conclusions expressed are those of the authors and do not necessarily reflect the views of IDA. No funding was provided by IDA or an affiliated organization for this paper. E-mail: jay.dennis@alumni.unc.edu