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Anthony H. Tu, Cathy Yi-Hsuan Chen

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A Factor-based Approach of Bond Portfolio Value-at-Risk: The Informational Roles of Macroeconomic and Financial Stress Factors

Anthony H. Tu

School of Management and Economics
University of Electronic Science and Technology of China
2006 Xiyuan Ave, West Hi-Tech Zone, Chengdu 611731, China
atu1106@yahoo.com.tw

and

Cathy Yi-Hsuan Chen*

Ladislaus von Bortkiewicz Chair of Statistics, C.A.S.E. - Center for Applied Statistics and Economics, Humboldt-Universität zu Berlin, Unter den Linden 6, 10099 Berlin, Germany
chencath@hu-berlin.de; Tel:+49 30 2093-5625; Fax: +49 30 2093-5649

Abstract

Based on the Nelson–Siegel term structure framework, we develop a new factor-augmented model for the computation of the value-at-risk (VaR) of bond portfolios, and examine whether the inclusion of information contained within macroeconomic variables and financial stress shocks can enhance the accuracy of VaR forecasts. We examine three Citi US bond indices and the empirical results reveal that: (1) based upon the geometric-VaR backtest, proposed by Pelletier and Wei (2016), the new factor-augmented approach provides reasonably accurate VaR forecasts; (2) there is a clear tendency toward better VaR forecasting performance as a result of the inclusion of the macroeconomic variables and financial stress shocks in the Nelson–Siegel factor model; (3) the impact of the inclusion of financial stress shocks appears to be stronger than the impact of the inclusion of the macroeconomic variables.

JEL Classification: G12, G14, C51, C52
Keywords: Nelson-Siegel factor-augmented model; Value-at-risk; Encompassing test; Back-testing; Conditional predictive ability

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