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Macroeconomic Indicators Alone can Predict the Monthly Closing Price of Major U.S. Indices: Insights from Artificial Intelligence, Time-Series Analysis and Hybrid Models

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Abstract

This paper proposes a two-stage approach that can be used to investigate whether the information hidden in macroeconomic variables (alone) can be used to accurately predict the one-month ahead price for major U.S stock and sector indices. Stage 1 is constructed to evaluate the hypothesis that the price for different indices is driven by different economic indicators. It consists of three phases. In phase I, the data is automatically acquired using freely available APIs (application programming interfaces) and prepared for analysis. Phase II reduces the set of potential predictors without the loss of information through several variable selection methods. The third phase employs four ensemble models and three time-series models for prediction. The prediction performance of the seven models are compared using the Mean Absolute Percent Error (and two additional metrics). If the hypothesis were to be true, one expects that the performance of the ensemble models to outperform the time-series models since the information in the economy is more important than the information in previous prices. In Stage 2, a hybrid approach of the recurring neural network used for time-series prediction (i.e. the LSTM) and the ensemble models is constructed to examine

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