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Validating Large Language Models (LLMs) for Economic and Inflation Forecasting in Aotearoa New Zealand's Public Sector

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Abstract

This study explores a hybrid CPI forecasting approach combining traditional statistical models with large language models (LLMs) to enhance accuracy and policy awareness in Aotearoa New Zealand's public sector. Using quarterly CPI data and Reserve Bank Monetary Policy Statements (MPS) from 2015 to 2024, we evaluated autoregressive integrated moving average (ARIMA), auto-ARIMA, seasonal autoregressive integrated moving average (SARIMA) and SARIMA+BB hybrid models. SARIMA (1,2,1)(1,0,1)[4] was identified as the most robust by achieving the lowest root mean square error (RMSE) (100.61) in the volatile period during and post-Covid. We then tested Open AI's GPT-4 using prompts both with and without Monetary Policy Statements (MPS) input. The best performing LLM model (with MPS) achieved an RMSE of 109.47 and 78.9% directional accuracy during and post-Covid, which showed strong alignment with economic trends. In Phase 3, the without MPS input version achieved 87.5% directional alignment with SARIMA, demonstrating strong generalisation capabilities. While SARIMA offers numerical precision, LLMs bring narrative reasoning and policy sensitivity. This hybrid approach supports transparent, explainable forecasting and presents an innovative solution for improving inflation analysis and public-sector decision making in uncertain economic environments.

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