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**Richard Kyung\***, Choice Research Group, and **Steve Nam**, Phillips Academy Andover. *A Study on the Nonlinear Forecasting of Noisy Economic Data Using the ARIMA(Autoregressive Integrated Moving Average).*

This research aimed to forecast the economic indicators such as national unemployment rate in an effort to display how to use the ARIMA(Autoregressive Integrated Moving Average) model for time series forecasting. In order to prevent any noise from disturbing economic data, linear and nonlinear smoothers were applied to the data to make the time series analysis more efficient and accurate.

Using the MATLAB and Python programming, this paper visualized the data using time-series decomposition, allowing us to decompose time series into trend, seasonality and noise.

The low order of polynomial graphs showed low accuracy on the data set when predicting the closing values. The high order of polynomial graph showed a high accuracy, however, it was susceptible to overfitting. There seemed to be a pattern, however, it was not easy to distinguish without plotting more informative graphs.

Results show that the prediction goes up towards 5% and then converges to a horizontal line, meaning this method was useful and most likely accurate when predicting the unemployment rate in the near future, however it's nearly impossible to predict the unemployment rate in the far future based on our data. (Received August 21, 2019)