ARIMA

Background:

* Autoregression (AR): refers to a model that shows a changing variable that regresses on its own lagged, or prior, values.
* Integrated (I): represents the differencing of raw observations to allow the time series to become stationary (i.e., data values are replaced by the difference between the data values and the previous values).
* Moving average (MA): incorporates the dependency between an observation and a residual error from a moving average model applied to lagged observations.

Identification of Model

The process starts with the identification of the ARIMA model, which involves deciding the values of p, d, and q.

Estimation of Parameters

The second step is estimating the parameters for the model. The model uses maximum likelihood estimation or nonlinear least-squares estimation.

Assumptions:

* Stationarity: The model assumes that the time series is stationary, implying a constant mean, variance, and autocorrelation over time. If it is not, differencing is applied to achieve stationarity.
* Invertibility: Invertibility is another assumption, implying that the model's error terms can be expressed as a linear combination of current and past forecast errors.

Advantages:

* Good for situations where volatility and seasonality are to be expected between the independent and dependent variables.
* Captures complex dynamics
* Can be modified for use in more specific scenarios

Disadvantages:

* A one-time shock will affect subsequent values of an ARIMA model infinitely into the future. Therefore, the legacy of the financial crisis lives on in today’s financial autoregressive models.
* Identifying the correct model parameters can be a difficult process.