

**Step1- Data analysis: Expected delivery End of Day Monday- 05/29/2023. Price \$60 dollars**

- 1) The relevant libraries to import, and the function/purpose each library is used for.
- 2) How to read data and define target and independent variables.
- 3) Plotting dependent and independent variables to observe the trends,
- 4) Data transformation: which include lags/leads (of up to six quarters), log form, Year-over-year percentage change (for relevant variables).
- 4) For all variables from Step-4: Performing correlation analysis and plotting correlation heatmap/correlation matrix.

***Deliverable: Analysis report, Python code with comments (explaining line by line function of each line of code).***

**Step2-: Methodology analysis: Expected delivery End of Day Monday- 06/02/2023. Price \$100 dollars**

Model Build and model fit (in-sample) with performance analysis which should include the following:

- I. Model fit statistics such as ( $R^2$ ), adjusted  $R^2$ , and F-statistic, P-value, t-statistics, for each variable,
- II. Multicollinearity for each variable, based on VIF values. Select max of three independent variables.
- III. Build a GLM (Fractional Logistic model): Specifications to be discussed.
  - i. Root means square error (RMSE Statistics) and Mean Square error (MSE),
  - ii. Plots of actual Defaults curve and estimated Default curve, to measure the predictive accuracy of the model.

***Deliverable: Analysis report, Python code with comments (explaining line by line function of each line of code).***

***Check-in on 05/31 to discuss the results and finalize the model selection.***

**Step-3-: Back testing (out of sample) analysis: Expected delivery End of Day Monday- 06/05/2023. Price \$30 dollars**

- I. Root means square error (RMSE Statistics) and Mean Square error (MSE),
- II. Plots of actual Defaults curve and estimated Default curve, to measure the predictive accuracy of the model.

***Deliverable: Analysis report, Python code with comments (explaining line by line function of each line of code).***

***Step-4: Bonus: For the selected economic variables, build an OLS and repeat Step-3.***

***Expected delivery End of Day Monday- 06/08/2023. Price \$30 dollars***

***Deliverable: Analysis report, Python code with comments (explaining line by line function of each line of code).***