



Introduction to Stock Performance Analysis Using Python

Case Study

This case study was written by Dr. Cheng (Suwan) Long (IESEG School of Management, LEM-CNRS 9221) and Dr. Paolo Mazza (IESEG School of Management, LEM-CNRS 9221). It is intended to be used as the basis for class discussion rather than to illustrate either effective or ineffective handling of a management situation. The case was compiled from published sources. We are grateful to the students who were confronted with the case for valuable input for the content and format of the present case.

Artificial intelligence was used via ChatGPT for the writing of this case for copy-editing and improving the flow of the text (notably the mission email). It has not been used to produce any of the elements (charts or tables) of the proposed solution.

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You have recently joined NovaFund Investments as a Junior Financial Analyst. As part of your training, your manager wants you to explore Python's capabilities for financial data analysis. You have been assigned a hands-on data analysis project to compare Tesla and Ford's stock market performance over time. Your manager expects a comprehensive report, supported by well-structured code and meaningful visualizations:

Dear [Student's Name],

I hope you're settling in well with the team. As part of your onboarding at NovaFund Investments, I'd like you to conduct a comprehensive financial analysis of Tesla and Ford stocks using Python. Your insights will help us better understand how these companies compare in terms of risk and return.

Your assignment includes the following tasks:

1. **Data Preparation:**
 - a) Load the dataset containing **monthly** Tesla and Ford stock prices.
 - b) Convert the date column to datetime format.
 - c) Handle missing data appropriately.
2. **Statistical Analysis:**
 - a) Compute key financial metrics, including mean, median, and standard deviation for Tesla and Ford.
 - b) Calculate and plot monthly returns for both stocks.
3. **Visualization and Trend Analysis:**
 - a) Create a line chart to visualize Tesla and Ford stock price trends over time.
 - b) Generate histograms to compare their monthly return distributions.
 - c) Use a boxplot to assess the volatility of each stock.
4. **Rolling Statistics & Volatility Analysis:**
 - a) Compute and visualize a 6-month and 12-month moving average for both stocks.
 - b) Calculate rolling standard deviations to assess how volatility has changed over time.
5. **Regression and Correlation Analysis:**
 - a) Compute the correlation between Tesla and Ford's monthly returns.
 - b) Generate a scatter plot to visualize their relationship.
 - c) Perform a simple linear regression to examine if Tesla's returns influence Ford's returns.

Please submit your **Python script (Google Colab)** containing your analysis, visualizations, and a short summary of your findings within the next **48 hours**.

Best regards,
[Name of the Instructor]
Senior Analyst
NovaFund Investments

Submission Instructions

The data has been provided on the course's website. Submit your completed Jupyter Notebook by the end of the session. Your instructor will review your work and provide feedback on your analysis and coding approach. Make sure to document your code appropriately, as this will help the instructor understand your coding logic and help you with future projects.