

Exercise 5 – Stock Price Analysis

Objective

To create a Power BI Report that uses more complex DAX formulas.

To refresh the Power BI visualization features that were covered during the session.

Files

- <https://neueda.conygre.com/pydata/StockPrices.xlsx>

Briefing

Follow the steps below to create a dashboard showing some analysis of Netflix stock price.

Try to consider these steps as a guide, use this as an opportunity to explore Power BI features and to add extra elements as part of this process.

Steps

- Download the StockPrices Excel file from the URL above. Open the file in excel or libre office to take see the general structure of the data.
- This file contains stock price data for each date across a date range for a large number of stocks.

A – Load & Transform Data

- In PowerBI create a new, empty project.
- Using the "Get Data" button or the "Excel" button. Find and load the Excel file StockPrices.xlsx. (You could use Get Data->web and load directly from the URL).
- Select all sheets and select "Transform Data". This will open the Power Query Editor window.
- Using the "Choose Columns" button, deselect "All" and then select the following columns for import:
 - Date, AAPL, AMZN, NFLX, GOOG, MSFT, NDAQ
- Verify that the data was imported correctly on the PowerBI Data view.
- Now add an index column to the data, this is useful in many DAX calculations:
 - On the Data view, right-click the table name (StockPrices) and click "Edit Query"
 - This should re-open the Power Query Editor
 - Select "Add Column" in the top ribbon
 - Select "Index Column" -> "From 0"
 - Select "Home" in the top ribbon
 - Select "Close & Apply"
- Verify that the new column was added to the table on the PowerBI Data view.

B – Initial Visualizations

- Select the “Report” view in the side nav bar.
 - Rename the report page to “Netflix”, as this will show some basic information about Netflix Stocks.
 - Add a line chart to the empty report page.
 - Drag “Date” to the Axis field.
 - Click the small downward arrow to the right of the Date, and ensure “Date” is selected instead of “Date Hierarchy”
 - Drag “NFLX” to the Values field.
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- Add a matrix to the report page.
 - Drag “Date” to the “Rows” field.
 - Drag each of “GOOG”, “MSFT”, “NFLX” and “NDAQ” to the “Values” field. In each case click the downward right arrow beside the stock name, and select “Average” rather than “Sum”.
 - Click a date element in the newly added matrix (e.g. click 2017) and verify that the line chart now only shows values for that date range.
 - Add a Slicer to the report page.
 - Drag “Date” to the Field. Click the downward arrow beside Date and ensure “Date” is selected instead of “Date Hierarchy”.
 - Verify that the slicer can also be used to control the date range displayed in the line chart.

C – Add a Quick Measure

- Add a card to the report page.
- In this card we will display the correlation coefficient between two stocks for the currently selected date range.
- Select “Home”->“Quick Measure” in the top ribbon.
- In the “Calculation” drop-down select “Mathematical Operations”->“Correlation coefficient”.
- Drag “Date” to the “Category”, “NFLX” to “Measure X”, “AMZN” to “Measure Y”.
- Click “Ok” and verify that there is a new measure shown in the data view on the right side. Take a look at the DAX formula that has been generated for this measure.
- Select the previously added Card visualization, and drag the new measure to the “Field”.
- Verify that selecting different date ranges changes the correlation coefficient. For the most part these two stocks should be highly correlated, however you should see that there is less correlation in certain years.

D – Further Depth

The steps below describe some extra details that can be added to the report. Consider them as a guide to allow you to explore and experiment with Power BI features.

- Add cards showing the correlation coefficient between NFLX and each of GOOG, MSFT and NDAQ
- Add a TreeMap containing the average of NFLX, AMZN, GOOG, MSFT and NDAQ
- In the Data View, add a new calculated column with the following formula (try to understand what this formula does):
 - `NFLX_PREV = LOOKUPVALUE([NFLX], [Index], [Index] - 1)`
- Add a KPI Visualization, with the following fields:
 - Indicator -> NFLX
 - Trend Axis -> Date
 - Target Goals -> NFLX_PREV
- Verify that the KPI shows green when a date is selected on which the NFLIX close value increased over the previous day's close. It should show red when the close value decreased.

E – Bollinger Bands Visualization

Bollinger Bands are often drawn on a price chart to indicate the regions a number of standard deviations above and below the price. This can be used to identify when prices have moved outside of their “usual” fluctuations.

Try to use the DAX documentation to generally understand what each of the 5 formulas listed in red below is doing.

<https://docs.microsoft.com/en-us/dax/>

- Bollinger bands will now be added to the line chart for NFLIX close values.
- 5 new calculated columns are needed in the data set. In each case select “Add Column” and use the following formulas to create these columns:
 - EARLIER_DATE: for each row this will be 30 days previous to that row's Date
 - `EARLIER_DATE = [Date] - 30`
 - NFLX_MVAVG: This is a 30 day rolling average for the NFLX Close price.

`NFLX_MVAVG =`

`var early_date = StockPrices[EARLIER_DATE]`

`var current_date = StockPrices[Date]`

`return CALCULATE (AVERAGE ('StockPrices'[NFLX]), filter(StockPrices, StockPrices[Date] <= current_date && StockPrices[Date] > early_date))`

- NFLX_STD: This is a 30 day std deviation for the NFLX Close price.

NFLX_STD =

var early_date = StockPrices[earlier_date]

var current_date = StockPrices[Date]

return CALCULATE (

STDEV.S('StockPrices'[NFLX]), filter(StockPrices, StockPrices[Date] <= current_date && StockPrices[Date] > early_date))

- NFLX_UPPER: This is the upper bollinger band value for the NFLX Close price.
 - $\text{NFLX_UPPER} = [\text{NFLX_MVAVG}] + ([\text{NFLX_STD}] * 2)$
- NFLX_LOWER: This is the lower bollinger band value for the NFLX Close price.
 - $\text{NFLX_UPPER} = [\text{NFLX_MVAVG}] - ([\text{NFLX_STD}] * 2)$
- Now use the newly created columns in the line chart. Add each of NFLX_MVAVG, NFLX_UPPER and NFLX_LOWER to the line chart. Using the format tab, change the color of the upper and lower bands to a light gray.

E– Bollinger Bands Visualization

Use formatting of the page and addition of static elements e.g. text box, images, shapes etc. to improve the look of the report page.

Filter the date to show just 2014 and add a bookmark for this view

Add a button with text 2014 that selects the 2014 bookmark.

Repeat adding bookmarks and corresponding buttons for 2017 and 2019.