Episode 22 – On Zero Tax Firms Data Visualization Exercise

This assignment will give students practice visually analyzing a large dataset. Students will work with data on public corporations' pretax income and cash tax payments from their financial statements. All dollar amounts are in millions.

The deliverable is a word document that includes charts and graphs that students create in Tableau, along with an explanation of the data.

Required:

1. Save the Excel file, "ETR data".

2. Open Tableau. On the left-hand side menu, select to connect to a Microsoft Excel file. Find where "ETR data" is stored and click on it.

   After clicking the file, a new menu should pop up that shows the various worksheets in the file. Click "Financial Data" to load that as the main database and drag to the top box/area. The data should populate in Tableau.

   Drag the "SIC" worksheet into the top box to allow a connection between the two sheets. In "Financial Data", the field SIC 2 is the company's two-digit Standard Industrial Classification code. In "SIC", these numeric codes are linked to descriptions.

3. Click on "Sheet 1" and rename it "Stats Full Sample." In this sheet, **create a new variable – Cash ETR**. To do so, select "Analysis" from the top bar and select "Create Calculated Field". Name the variable "Cash ETR" and in the box type [Income Taxes Paid]/[Pretax Income]. This will create a ratio of taxes paid to pretax income. This variable is the focus of this assignment.

4. **Compute descriptive statistics for Cash ETR** in the full sample: average, minimum, 25th percentile, median, 75th and maximum. Be sure the statistics are in this order. To do this, drag "Cash ETR" from the list of variables in the left-hand side menu to "rows" on top. The default is to SUM Cash ETR. Select the dropdown arrow and change the measure to "Average". Repeat these steps for all requested statistics. Using the "Show Me" menu on the top right, select "Text Table". **This is TABLE 1.** Within Tableau, drag the width of each column to see the full label for each descriptive statistic.

5. Next, plot average and median Cash ETR over time.

    a. **Predict whether there will be a trend.** Do you expect mean and median Cash ETRs to increase, decrease or remain stable over time? Why

    b. Add a new sheet at the bottom left using the + sheet button. Rename this sheet "Average by Year". **Plot a graph of average and median Cash ETR over time**. Drag "Data Year-Fiscal" to "Columns". Be sure to change the measure of Cash ETR to "Average". Repeat to add medians. Select "dual lines" from "Show Me" to be sure the two lines are on the same graph. Add trendlines. **This is TABLE 2. Describe and explain the pattern in Cash ETRs over time. Was your prediction correct?**

    c. Right click on 2015 and "Explain the data". Which observation is contributing to the low average Cash ETR in 2015? How does the trend in average Cash ETR change when this observation is excluded? Why does this observation have such an extreme value of Cash ETR?

6. Next, examine how size affects Cash ETR.

    a. **Predict whether larger firms have higher or lower Cash ETRs.** Explain your prediction briefly.

    b. Add a new sheet called "Size Effects". Create a new variable called "Size" calculated as the natural log of Assets. Drag "Cash ETR" to Rows and "Size" to Columns. Under "Analysis", uncheck aggregate measures. You now have a scatter plot of Cash ETR and Size. **Describe how this graph looks.**

    c. Click on Cash ETR and filter the variable so only values between 0 and 100% appear. Filter Size to positive values. In the "Analytics" tab, add a trend line by dragging it into the scatter plot. Right click on the trendline to "Describe Trend Model". **This is TABLE 3. In general, do firms' Cash ETRs increase or decrease as they become larger? Is Size a significant predictor of Cash ETR? Does the model explain a lot of the variation in Cash ETR? How can you tell?**

7. Finally, examine Cash ETR by industry.

    a. **Predict which industry will have the lowest average Cash ETR.** Explain your prediction. Think of one company in this industry that you predict will have a low ETR.

b. Add a new sheet called “Industry”. Drag “SIC Description” to Columns and Avg(Cash ETR) to Rows. Filter Cash ETR to be between 0 and 100%. Drag “Data Year – Fiscal” to Filters shelf and filter to 2018-2022.

c. Select a horizontal bar chart and make sure the industries are across the bottom (You may need to switch rows and columns on the top toolbar to do this). You now have a graph of average ETR by industry after the TCJA for all observations with a Cash ETR between 0% and 100%. Select markers to show the average Cash ETR in each industry and drag “SIC Description” to “Color” to make the chart multicolored.

d. Click on “Analytics” and add the average line. **This is TABLE 4.**

e. Click on Services to Explain data.

i. **Which observation has an extreme value?**
ii. **After you exclude this observation from the Services industry, is your prediction correct? Does the company you named in “a” above have an average Cash ETR below the full-sample average?**

Discussion questions

1. Conceptually, what does a Cash ETR represent?
2. What does it mean conceptually when a company’s Cash ETR is negative? Greater than one?
3. Would you rather invest in a company with a high or low Cash ETR?
4. Do you think a Cash ETR can ever be too low? That is, at some point, does a low Cash ETR signal something negative?