Case DP

Case overview

For this case, you will implement an analytics mindset by comparing and contrasting different companies within different industries using the accounting ratios from the DuPont method. In Part I & II, you will load the data into R and Tableau and perform some simple tests to verify that you have loaded it correctly. In Part III, you will analyze the data.

Data

In the accompanying spreadsheet (Case DP.xls), you have financial statement data for approximately 30 companies for each of six different industry groups (total sample size of almost 180 companies). The sheets contain financial statement information for fiscal years 2013-2015, inclusive. These companies are all publicly traded on the NASDAQ stock exchange and range in size from some of the largest to the smallest in their respective industry groupings.

For this case, you will not be using all data items. The items you are most likely to use are listed by the name they appear in the spreadsheet with a small explanation also provided.

- Industry: One of six industry groupings as defined by Nasdaq.com.[1] Industries included in the sample are capital goods, consumer services, finance, public utilities, technology, and transportation.
- Name: The name of the company for each line of data.
- Net income: The bottom line number on the income statement. This is the final net income number of the company for the fiscal year.
- Net revenue: The top line number on the income statement. This represents total revenues (less a few items that you can ignore for this case) earned by the company in the fiscal year. This is also referred to as total sales.
- Ticker: The code used to identify each company on the NASDAQ stock exchange. Each company has their own unique ticker symbol.
- Total assets: The total assets of a company at the end of the fiscal year. This number appears on the balance sheet.
- Total shareholder equity: The total shareholder equity of a company at the end of the fiscal year. This number appears on the balance sheet and also can be called stockholder's equity.
- Year: The fiscal year being reported on the financial statements. For example, a year of 2015, means the balance sheet of the company is as of the last day of their fiscal year in 2015 (usually December 31st) and the income statement for all transactions that occurred during the fiscal year.

[1] See http://www.nasdaq.com/screening/companies-by-industry.aspx for industry groupings.

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Part I: Extract, transform and load the data, i.e. the ETL process – R (16%)

Background:

The data for this case was extracted from company financial statements posted online from credible sources. The extraction of the data from the online sources was performed for you and the data has been loaded into the Excel file. That is, you can assume that the web scraper accurately and completely extracted the information and loaded it into Excel. Most of the transformation work has been done for you as well. Balance sheet data and income statement data were in separate files and have been matched by company and year into a single file. The resulting file is a comma separated values file, CaseCombinedDP.csv, that is ready to be loaded into R, a widely-adopted statistical program. You may be required to do some transformation to analyze the data once it has been loaded into R (e.g., you will need to compute the ratios involved in the DuPont Method). [2]

Requirements

- Complete the following requirements and submit the following:
  - Your answer and the R code used to create your answer.
- When you are finished loading the data into R, answer the following questions to confirm that you loaded the data correctly (this is a test for completeness and accuracy).

  Hint: execute the command options (scipen = 999) to have complete numerical values appear in outputs; functions that will be useful for these requirements = sum, length, subset, aggregate.

  1. What are the combined total assets of all companies for all years?
  2. How many different companies are listed in the dataset?
  3. What are the average total sales per firm for each industry in 2014?
     - Capital goods
     - Finance
     - Public utilities
     - Transportation
     - Consumer services
     - Technology

[2] Realize for many situations, extracting, transforming, and loading (ETL) the data can account for over 80 percent of the time in the entire data analysis process. This case simplifies this process so you can focus on developing other aspects of an analytics mindset. Also, the process does not always strictly follow the ETL format. Some transformation can happen before or after data is loaded into a tool for analysis.

Part II: Extract, transform and load the data, i.e. the ETL process - Tableau (14%)

The data for this case was extracted from company financial statements posted online from credible sources. The extraction of the data from the online sources was performed for you and the data has been loaded into the Excel file. That is, you can assume that the web scrapper accurately and completely extracted the information and loaded it into Excel. Most of the transformation work has been done for you as well. You will be required to do some transformation to analyze the data once it has been loaded into the appropriate analysis tool (e.g., you will need to compute the ratios involved in the DuPont Method).[3] You should load the data into an analytics tool for analysis—we will be using Tableau in this case.

Hint: when loading the data into Tableau, you need data from both the income statement and the balance sheet tabs. Make sure that you link the income and balance sheet data correctly by matching the data on *both* ticker symbol and year.

Required

When you are finished loading the data, you should answer these simple questions to make sure you loaded the data correctly (by testing for completeness and accuracy).

1. How many different companies are there in each industry?
    a. Capital goods
    b. Finance
    c. Public utilities
    d. Transportation
    e. Consumer services
    f. Technology

2. What company had the most sales over the three-year period and what was the total amount of those sales?

[3] Realize for many situations, extracting, transforming, and loading (ETL) the data can account for over 80 percent of the time in the entire data analysis process. This case simplifies this process so you can focus on developing other aspects of an analytics mindset. Also, the process does not always strictly follow the ETL format. Some transformation can happen before or after data is loaded into a tool for analysis.

Part III: Apply appropriate data analytic techniques – Tableau or R (70%)

You are now ready to analyze the data. For each question:

- Identify the type of the analysis to perform
- Identify which data elements are needed to perform the analysis
- Create the analysis using Tableau (or other tools) and answer the questions
- Include a visual graphic with a concise written analysis of your interpretation of the analytic results

When considering your visualization, make sure to think about what type of visualization will provide the clearest and most compelling format for stakeholders to understand what you want to convey. **Visualization comprises 50% of your score in Part III**.

Required

Questions about industries

1. Which industries for fiscal year 2015 are the highest and lowest performing for each of the following performance indicators? For measuring performance, use the *median* industry performance to mitigate the potentially large effects of outliers.

Item	Highest	Lowest
Return on equity		
Profit margin ratio		
Asset turnover ratio		
Financial leverage ratio		

2. Which industry has seen the greatest improvement in median ROE from 2013 to 2015? What are the best explanations, based on the ratios in the DuPont Method, for why the ROE has improved in that industry?

3. Assume you want to invest in one of the industries included in the dataset (i.e., buy stock in all companies in one industry). Which industries do you think will offer the highest and lowest return in 2016? Which industries will provide the safest and riskiest return in 2016? Does removing outliers change your opinion?

Questions about individual companies

4. Companies that have negative profit margins but are increasing their asset turnover ratio are "accelerating into a brick wall" (i.e., they are getting better at losing money). Which three companies in 2015 are the worst in that they have a negative profit margin and the highest asset turnover ratio? Give the name of the companies.

5. Choose three different companies and evaluate how a company's ratios change between 2014 and 2015. You may examine the level of the ratios for 2014 and 2015, the percentage change from one year to the next, and the percentage change for the company's industry. Discuss what you learn about the company based on these metrics.