Case (1 of 2): An Overview of the S&P500

Chapter 17.

S&P 500

The S&P 500, also called the Standard & Poor's 500, is a stock market index that tracks the performance of 500 major publicly traded companies listed on U.S. stock exchanges. It serves as a widely accepted benchmark for assessing the overall health and performance of the U.S. stock market.

S&P Dow Jones Indices, a division of S&P Global, is responsible for maintaining the index. The selection of companies included in the S&P 500 is determined by a committee, considering factors such as market capitalization, liquidity, and industry representation.

The S&P is a float-weighted index, meaning the market capitalizations of the companies in the index are adjusted by the number of shares available for public trading. [1]

The performance of the S&P 500 is frequently used to gauge the broader stock market and is commonly referenced by investors, analysts, and financial media. It provides a snapshot of how large-cap U.S. stocks are faring and is considered a reliable indicator of overall market sentiment.

Aside: Typically, the S&P 500 index consists of 500 stocks. However, in reality, there are actually 503 stocks included. This discrepancy arises because three of the listed companies have multiple share classes, and each class is considered a separate stock that needs to be included in the index. [1]

Strengths:

1. **Diverse Representation**: The S&P 500 isn't fixated on a single industry. From technology to healthcare, it offers a panoramic view of various economic sectors, making it an inclusive representation of the U.S. corporate sector.
2. **Benchmark for Investors**: For many fund managers, outperforming the S&P 500 stands as a golden standard. It's a yardstick, establishing it as a critical touchstone for gauging investment success.

3. **Liquidity and Visibility**: Constituent companies enjoy high liquidity and are subject to rigorous screening processes, ensuring that the index represents financially viable entities.

Critiques:

1. **Market Capitalization Weighting**: The index is weighted by market capitalization, meaning companies with higher market values have a more pronounced effect on its performance. Critics argue this approach can skew perceptions, especially during market bubbles when certain sectors are overvalued.
2. **Exclusivity**: Despite its broad purview, 500 companies cannot encapsulate the entire U.S. economy. Many sectors, especially emerging industries or smaller businesses, might not be adequately represented.
3. **Potential for Complacency**: The prominence of the S&P 500 has led many investors to adopt passive investment strategies, tracking the index rather than actively managing portfolios. Detractors argue this might lead to market inefficiencies and reduced capital allocation efficacy.

While the S&P 500 remains an influential and pivotal tool for investors, its dominance prompts a double-edged sword of advantages and critiques. In a constantly evolving economic landscape, understanding both its power and limitations is essential for informed financial decision-making. [2]

The broad purpose of this Case Study is to review and analyze the different sectors and stocks within the S&P500.

S&P 500 Data

Load some useful R packages

```r
# Load the required libraries, suppressing annoying startup messages
library(dplyr, quietly = TRUE, warn.conflicts = FALSE) # For data manipulation
library(tibble, quietly = TRUE, warn.conflicts = FALSE) # For data manipulation
library(ggplot2, quietly = TRUE, warn.conflicts = FALSE) # For data visualization
library(ggpubr, quietly = TRUE, warn.conflicts = FALSE) # For data visualization

library(gsheet, quietly = TRUE, warn.conflicts = FALSE) # For Google Sheets
library(rmarkdown, quietly = TRUE, warn.conflicts = FALSE) # For writing
library(knitr, quietly = TRUE, warn.conflicts = FALSE) # For tables
library(kableExtra, quietly = TRUE, warn.conflicts = FALSE) # For tables
library(scales)  # For formatting currency
```

Read the S&P500 data from a Google Sheet into a tibble

1. We will analyze a real-world, recent dataset containing information about the S&P500 stocks, sourced from TradingView.com. [3]
2. The dataset is located in a Google Sheet and periodically updated.
3. The complete URL of the Google Sheet that has the data is

   https://docs.google.com/spreadsheets/d/14mUlNNpeuV2RouT9MKaAWKUpvjRijzQu40DdWJgyKPQ/
4. Its Google Sheet ID is: `14mUlNNpeuV2RouT9MKaAWKUpvjRijzQu40DdWJgyKPQ`.

Loading the data into R

1. We can use the function `gsheet2tbl` in package `gsheet` to read the Google Sheet into a tibble , as demonstrated in the following code.

```r
# Read S&P500 stock data present in a Google Sheet.
library(gsheet)
prefix <- "https://docs.google.com/spreadsheets/d/"
sheetID <- "14mUlNNpeuV2RouT9MKaAWKUpvjRijzQu40DdWJgyKPQ"
url500 <- paste(prefix,sheetID) # Form the URL to connect to
sp500Data <- gsheet2tbl(url500) # Read it into a tibble called sp500Data
```

2. **Note**: This data is current, as of **Fri, Jan 5, 2024**

S&P Global Industry Classification Standard (GICS®)

1. In this case study, we will classify and analyze the S&P 500 stocks based on the GICS standard!
2. The Global Industry Classification Standard (GICS®) was developed in 1999 by S&P Dow Jones Indices and MSCI. The GICS methodology aims to enhance the investment research and asset management process for financial professionals worldwide. The GICS methodology has been widely accepted as an industry analysis framework for investment research, portfolio management and asset allocation. [4]
3. The GICS classification consists of **11** sectors, – {Communication Services, Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Real Estate, Utilities}. The classification of each stock in the S&P 500 according to GICS is available at the following Google Sheet:

https://docs.google.com/spreadsheets/d/1WrVA8dPYvQsc_mXVctgTntRLS02qd7ubzcdAsw03Lgk/

4. For this file, the Google Sheet ID is `1WrVA8dPYvQsc_mXVctgTntRLS02qd7ubzcdAsw03Lgk`and we read this classification data into a tibble, we name `gics`, using similar code.

```
# Read GICS classificaiton of S&P 500 stocks from a Google Sheet.
library(gsheet)
prefix2 <- "https://docs.google.com/spreadsheets/d/"
sheetID2 <- "1WrVA8dPYvQsc_mXVctgTntRLS02qd7ubzcdAsw03Lgk"
urlgics <- paste(prefix2, sheetID2) # Form the URL to connect to
gics <- gsheet2tbl(urlgics) # Read it into a tibble called gics
```

5. Next, we join the two tibbles, using "Stock" as the key and name our joint tibble `sp500`, as follows.

```
# Merging dataframes
sp500 <- merge(sp500Data,
               gics ,
               id = "Stock")
```

Review the S&P 500 data

1. The data corresponds to **503** companies that are part of the S&P500 and includes 39 data columns, as of **Fri, Jan 5, 2024**

```
dim(sp500)
```

```
[1] 503  39
```

2. The first ten stocks in the S&P500 data, their GICS Sector and their recent prices are as follows:

```
sp500 %>%
  select(Stock, Description, GICSSector) %>%
  head(10) %>%
  kable("html", caption = "The first 10 companies in the S&P500 dataset") %>%
  kable_styling()
```

Table 0.1: The first 10 companies in the S&P500 dataset

Stock	Description	GICSSector
A	Agilent Technologies, Inc.	Health Care
AAL	American Airlines Group, Inc.	Industrials
AAPL	Apple Inc.	Information Technology
ABBV	AbbVie Inc.	Health Care
ABNB	Airbnb, Inc.	Consumer Discretionary
ABT	Abbott Laboratories	Health Care
ACGL	Arch Capital Group Ltd.	Financials
ACN	Accenture plc	Information Technology
ADBE	Adobe Inc.	Information Technology
ADI	Analog Devices, Inc.	Information Technology

3. Data Columns

- The data comprises of the following 39 columns:

```
colnames(sp500)
```

```
[1] "Stock"
[2] "Date"
[3] "Description"
[4] "Sector"
[5] "Industry"
[6] "Market Capitalization"
```

```
 [7] "Price"
 [8] "52 Week Low"
 [9] "52 Week High"
[10] "Return on Equity (TTM)"
[11] "Return on Assets (TTM)"
[12] "Return on Invested Capital (TTM)"
[13] "Gross Margin (TTM)"
[14] "Operating Margin (TTM)"
[15] "Net Margin (TTM)"
[16] "Price to Earnings Ratio (TTM)"
[17] "Price to Book (FY)"
[18] "Enterprise Value/EBITDA (TTM)"
[19] "EBITDA (TTM)"
[20] "EPS Diluted (TTM)"
[21] "EBITDA (TTM YoY Growth)"
[22] "EBITDA (Quarterly YoY Growth)"
[23] "EPS Diluted (TTM YoY Growth)"
[24] "EPS Diluted (Quarterly YoY Growth)"
[25] "Price to Free Cash Flow (TTM)"
[26] "Free Cash Flow (TTM YoY Growth)"
[27] "Free Cash Flow (Quarterly YoY Growth)"
[28] "Debt to Equity Ratio (MRQ)"
[29] "Current Ratio (MRQ)"
[30] "Quick Ratio (MRQ)"
[31] "Dividend Yield Forward"
[32] "Dividends per share (Annual YoY Growth)"
[33] "Price to Sales (FY)"
[34] "Revenue (TTM YoY Growth)"
[35] "Revenue (Quarterly YoY Growth)"
[36] "Technical Rating"
[37] "Security"
[38] "GICSSector"
[39] "GICSSubIndustry"
```

- The names of the data columns are self-explanatory. The Financial terms are explained in depth on multiple external websites such as www.Investopedia.com

Rename Data Columns

4. The names of the data columns are lengthy and confusing. We will rename the data columns to make it easier to work with the data.

```r
# Define a mapping of new column names
new_names <- c(
  "Stock", "Date", "StockName", "Sector", "Industry",
  "MarketCap", "Price", "Low52Wk", "High52Wk",
  "ROE", "ROA", "ROIC", "GrossMargin",
  "OperatingMargin", "NetMargin", "PE",
  "PB", "EVEBITDA", "EBITDA", "EPS",
  "EBITDA_YOY", "EBITDA_QYOY", "EPS_YOY",
  "EPS_QYOY", "PFCF", "FCF",
  "FCF_QYOY", "DebtToEquity", "CurrentRatio",
  "QuickRatio", "DividendYield",
  "DividendsPerShare_YOY", "PS",
  "Revenue_YOY", "Revenue_QYOY", "Rating",
  "Security", "GICSSector", "GICSSubIndustry"
)
# Rename the columns using the new_names vector
colnames(sp500)<-new_names
```

5. We review the column names again after renaming them, using the `colnames()` function.

```r
colnames(sp500)
```

```
 [1] "Stock"                "Date"                 "StockName"
 [4] "Sector"               "Industry"             "MarketCap"
 [7] "Price"                "Low52Wk"              "High52Wk"
[10] "ROE"                  "ROA"                  "ROIC"
[13] "GrossMargin"          "OperatingMargin"      "NetMargin"
[16] "PE"                   "PB"                   "EVEBITDA"
[19] "EBITDA"               "EPS"                  "EBITDA_YOY"
[22] "EBITDA_QYOY"          "EPS_YOY"              "EPS_QYOY"
[25] "PFCF"                 "FCF"                  "FCF_QYOY"
[28] "DebtToEquity"         "CurrentRatio"         "QuickRatio"
[31] "DividendYield"        "DividendsPerShare_YOY" "PS"
[34] "Revenue_YOY"          "Revenue_QYOY"         "Rating"
[37] "Security"             "GICSSector"           "GICSSubIndustry"
```

Understand the Data Columns

6. Our next goal is to gain a deeper understanding of what the data columns mean. We reorganize the column names into eight tables, labeled Table 1a, 1b.. 1h.

a. The column names described in Table 1a. concern basic **Company Information** of each stock.

Table 1a: Data Columns giving basic Company Information

ColumnName	Description
Stock	Stock Ticker (e.g. AAL)
Date	Date (e.g. "7/15/2023")
StockName	Name of the company (e.g "American Airlines Group, Inc.")
GICSSector	Sector, as per GICS Classification
GICSSubIndustry	Sub-Industry, as per GICS Classification
MarketCap	Market capitalization of the company
Price	Recent Stock Price

b. The column names described in Table 1b. are related to **Technical Analysis**, including the 52-Week High and Low prices.

Table 1b: Data Columns related to Pricing and Technical Analysis

ColumnName	Description
Low52Wk	52-Week Low Price
High52Wk	52-Week High Price
Rating	Technical Rating

c. The column names described in Table 1c. are related to the **Profitability** of each stock.

Table 1c: Data Columns related to Profitability

ColumnName	Description
ROE	Return on Equity
ROA	Return on Assets
ROIC	Return on Invested Capital
GrossMargin	Gross Profit Margin
OperatingMargin	Operating Profit Margin
NetMargin	Net Profit Margin

d. The column names described in Table 1d are related to the **Earnings** of each stock.

Table 1d: Data Columns related to Earnings

ColumnName	Description
PE	Price-to-Earnings Ratio

Table 1d: Data Columns related to Earnings

ColumnName	Description
PB	Price-to-Book Ratio
EVEBITDA	Enterprise Value to EBITDA Ratio
EBITDA	EBITDA
EPS	Earnings per Share
EBITDA_YOY	EBITDA Year-over-Year Growth
EBITDA_QYOY	EBITDA Quarterly Year-over-Year Growth
EPS_YOY	EPS Year-over-Year Growth
EPS_QYOY	EPS Quarterly Year-over-Year Growth

e. The column names described in Table 1e are related to the **Free Cash Flow** of each stock.

Table 1e: Data Columns related to Free Cash Flow

ColumnName	Description
PFCF	Price-to-Free Cash Flow
FCF	Free Cash Flow
FCF_QYOY	Free Cash Flow Quarterly Year-over-Year Growth

f. The column names described in Table 1f concern the **Liquidity** of each stock.

Table 1f: Data Columns related to Liquidiy

ColumnName	Description
DebtToEquity	Debt-to-Equity Ratio
CurrentRatio	Current Ratio
QuickRatio	Quick Ratio

g. The column names described in Table 1g are related to the **Revenue** of each stock.

Table 1g: Data Columns related to Revenue

ColumnName	Description
PS	Price-to-Sales Ratio
Revenue_YOY	Revenue Year-over-Year Growth
Revenue_QYOY	Revenue Quarterly Year-over-Year Growth

h. The column names described in Table 1h are related to the **Dividends** of each stock.

Table 1h: Data Columns related to Dividends

ColumnName	Description
DividendYield	Dividend Yield
DividendsPerShare_YOY	Annual Dividends per Share Year-over-Year Growth

Stock Prices, 52-Week Low, High; Market Cap in Billions

We want to analyze stock prices relative to their 52 Week Low and 52 Week High respectively, to understand their relative price attractiveness.

Hence, a new column named `Low52WkPerc` is being added. The column contains the percentage change between the current price (`Price`) and its 52-week low (`Low52Wk`). The formula used is:

$$Low52WkPerc = \frac{(CurrentPrice - 52WeekLow) * 100}{52WeekLow}$$

Another column named `High52WkPerc` represents the percentage change between the 52-week high (`High52Wk`) and the current price (`Price`). We round off the data to two decimal places for clarity.

```
library(dplyr)
sp500 <- sp500 %>%
  mutate(Low52WkPerc = round((Price - Low52Wk) * 100 / Low52Wk, 2),
         High52WkPerc = round((High52Wk - Price) * 100 / High52Wk, 2),
         MarketCapBillions = round(MarketCap / 1e9, 3) # Convert MarketCap to billions
         )
```

For convenience, we format the Prices.

```
library(dplyr)
library(scales)  # For formatting currency

sp500 <- sp500 %>%
  mutate(
    Price = scales::dollar(round(Price, 2)),  # format the Price as a dollar amount
    High52Wk = scales::dollar(round(High52Wk, 2)),  # format the 52 Week High
    Low52Wk = scales::dollar(round(Low52Wk, 2))  # format the 52 Week Low
  )
```

Analysis of Stock Ratings

1. In the data, the S&P500 shares have Technical Ratings such as {Strong Buy, Buy, Neutral, Sell, Strong Sell}. Since each Stock has a unique Technical Rating, it makes sense to model the data column Rating as a `factor()` variable.

```
sp500$Rating <- as.factor(sp500$Rating)
```

2. We confirm that Rating is now modelled as a factor variable, using `str()` and use `levels()` to review the different levels it can take.

```
str(sp500$Rating)
```

```
 Factor w/ 5 levels "Buy","Neutral",..: 1 1 3 4 1 3 3 4 2 3 ...
```

```
levels(sp500$Rating)
```

```
[1] "Buy"         "Neutral"     "Sell"        "Strong Buy"  "Strong Sell"
```

3. The `table()` function allows us to count how many stocks have each Rating. see how many stocks have ratings ranging from "Strong Sell" to "Strong Buy". This completes our review of Rating.

```
table(sp500$Rating)
```

```
      Buy     Neutral        Sell  Strong Buy Strong Sell
      192          51         178          58          24
```

Analysis of GICS Sectors in the S&P500

- The S&P 500 comprises a wide array of sectors, reflecting the diverse American corporate landscape.
- The data showcases the S&P500 divided across 11 Sectors. Each stock belongs to a unique sector and it makes sense to model `GICSSector` as a `factor`.

```
sp500$GICSSector <- as.factor(sp500$GICSSector)
```

2. We confirm that `GICSSector` is now modelled as a factor variable and review the different levels it can take.

```
str(sp500$GICSSector)
```

```
 Factor w/ 11 levels "Communication Services",..: 6 7 8 6 2 6 5 8 8 8 ...
```

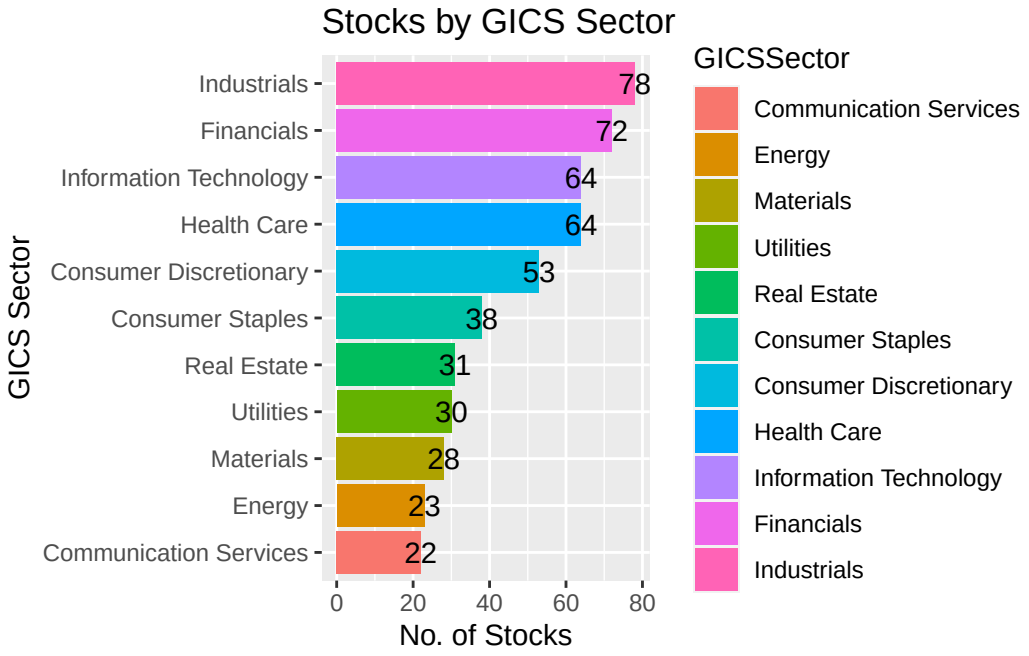
```
levels(sp500$GICSSector)
```

```
 [1] "Communication Services" "Consumer Discretionary" "Consumer Staples"
 [4] "Energy"                 "Financials"             "Health Care"
 [7] "Industrials"            "Information Technology" "Materials"
[10] "Real Estate"            "Utilities"
```

- We note that the S&P500 consists of 503 stocks, divided across 11 sectors.

```
library(ggplot2)  # For creating plots
library(dplyr)    # For data manipulation

sp500 %>%
  mutate(
    # Reorder the 'GICSSector' factor levels based on the count of each sector
    # 'table(GICSSector)[GICSSector]' calculates the frequency of each sector
    # 'reorder' reorders the levels of 'GICSSector' based on these frequencies
    GICSSector = reorder(GICSSector,
                         table(GICSSector)[GICSSector])
  ) %>%
  # Start a ggplot with 'GICSSector' on the y-axis
  ggplot(aes(y = GICSSector)) +
    # Create a bar plot; 'geom_bar' counts the frequency for each sector
    # 'fill = GICSSector' colors the bars based on the sector
    geom_bar(aes(fill = GICSSector)) +
    # Add text labels on the bars showing the count of stocks in each sector
    # 'stat = "count"' calculates the count for each sector
    # 'label = after_stat(count)' adds these counts as labels on the bars
    geom_text(stat = 'count',
              aes(label = after_stat(count))) +
    labs(title = "Stocks by GICS Sector",  # Title of the plot
         x = "No. of Stocks",              # Label for the x-axis
         y = "GICS Sector")                # Label for the y-axis
```



- Thus, we can see how many stocks are part of each sector. We can sum them to confirm that they add up to 503 stocks.

MarketCap by GICS Sector

1. We review the Market Cap of S&P500 stocks across GICS Sectors. We summarize the total Market Cap for each GICS Sector, using the following code.

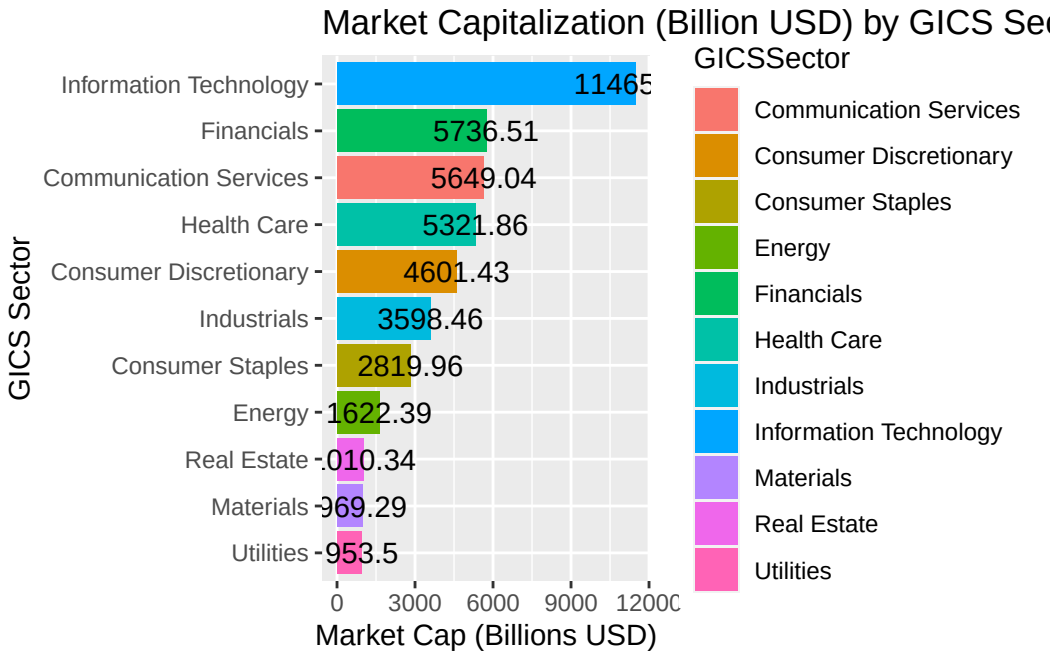
```
# Calculate Market Cap by Sector

MarketCapbySector <- sp500 %>%
  mutate(Market_Cap_Billions = round(MarketCap / 1000000000, 2)) %>%
  group_by(GICSSector) %>%
  summarise(MarketCapBillions = sum(Market_Cap_Billions, na.rm = TRUE)) %>%
  arrange(-MarketCapBillions)
```

2. We create a bar plot of Market Cap by GICS Sector

```
# Create a bar plot of Market Cap by GICS Sector,
ggplot(MarketCapbySector,
       aes(y = reorder(GICSSector,
                       MarketCapBillions),  # Y-axis: GICSSector reordered
```

```
          x = MarketCapBillions,  # X-axis: Market Capitalization in billions
          fill = GICSSector)) +  # Fill color of the bars based on GICSSector
  geom_bar(stat = "identity") +  # 'stat = "identity"' to use MarketCapBillions for bars
  labs(title = "Market Capitalization (Billion USD) by GICS Sector",
       y = "GICS Sector",  # Label for the y-axis
       x = "Market Cap (Billions USD)") +  # Label for the x-axis
  geom_text(aes(label = MarketCapBillions))  # Add text labels to the bars
```



3. The S&P500 has a combined Market Cap of 43748.27 Billion USD.

Highest Market Cap Stocks in each GICS Sector

1. Suppose we wanted to find the top two stocks with the highest market capitalization in each GICS Sector.
2. We could group the data by **`GICSSector`**; arrange the data in descending order of **`MarketCap`** within each sector; slice the top 2 entries for each group. Here's the R code to accomplish this:

```
# Find the top two stocks by MarketCap in each GICS Sector
top_stocks_by_sector <- sp500 %>%
  group_by(GICSSector) %>%
```

```
  arrange(desc(MarketCap)) %>%
  slice_head(n = 2) %>%
  ungroup() %>%
  arrange(GICSSector)  # Arrange the final data by GICSSector

# Select only the specified columns and create a table using kable
top_stocks_by_sector %>%
  select(Stock, StockName, GICSSector, MarketCapBillions, Price) %>%
  kable("html", caption = "Top Two Stocks by Market Capitalization, by GICS Sector") %>%
  kable_styling()
```

Table 0.10: Top Two Stocks by Market Capitalization, by GICS Sector

Stock	StockName	GICSSector	MarketCapBillions	Price
GOOG	Alphabet Inc.	Communication Services	1723.840	$138.64
GOOGL	Alphabet Inc.	Communication Services	1723.430	$136.95
AMZN	Amazon.com, Inc.	Consumer Discretionary	1504.950	$145.63
TSLA	Tesla, Inc.	Consumer Discretionary	751.020	$236.32
WMT	Walmart Inc.	Consumer Staples	421.765	$156.74
PG	Procter & Gamble Company (The)	Consumer Staples	349.243	$148.14
XOM	Exxon Mobil Corporation	Energy	412.872	$103.07
CVX	Chevron Corporation	Energy	284.572	$151.22
BRK.B	Berkshire Hathaway Inc. New	Financials	796.444	$366.12
V	Visa Inc.	Financials	523.588	$260.41
LLY	Eli Lilly and Company	Health Care	583.748	$614.92
UNH	UnitedHealth Group Incorporated	Health Care	499.797	$540.65
BA	Boeing Company (The)	Industrials	149.284	$246.65
CAT	Caterpillar, Inc.	Industrials	147.054	$289.00
AAPL	Apple Inc.	Information Technology	2831.530	$182.03
MSFT	Microsoft Corporation	Information Technology	2750.200	$369.97
LIN	Linde plc	Materials	198.572	$409.66
SHW	Sherwin-Williams Company (The)	Materials	76.078	$297.26
PLD	Prologis, Inc.	Real Estate	123.424	$130.27
AMT	American Tower Corporation (REIT)	Real Estate	100.440	$214.56
NEE	NextEra Energy, Inc.	Utilities	126.878	$61.84
SO	Southern Company (The)	Utilities	78.045	$71.57

Stocks rated "Strong Sell"

1. Suppose we wanted to list the stocks that have received a Rating of "Strong Sell".

2. Recall that the following code will count the number of Stocks by Rating.

```
table(sp500$Rating)
```

```
      Buy     Neutral        Sell  Strong Buy Strong Sell
      192          51         178          58          24
```

3. Suppose we want to list the stocks that have "Strong Sell" rating. We can filter the stocks with a Rating of "Strong Sell"; select the columns: Stock, StockName, Price, GICSSector; arrange the resulting data by GICSSector. Accordingly, we can write the following code:

```
library(dplyr)
library(kableExtra)

strong_sell_stocks <- sp500 %>%
  filter(Rating == "Strong Sell") %>%
  select(Stock, StockName, Price, GICSSector) %>%
  arrange(GICSSector)

strong_sell_stocks %>%
  kable("html", caption = "Stocks with a Rating of Strong Sell") %>%
  kable_styling()
```

Table 0.11: Stocks with a Rating of Strong Sell

Stock	StockName	Price	GICSSector
TJX	TJX Companies, Inc. (The)	$92.78	Consumer Discretionary
BF.B	Brown Forman Inc	$55.24	Consumer Staples
HRL	Hormel Foods Corporation	$32.08	Consumer Staples
COP	ConocoPhillips	$116.61	Energy
EQT	EQT Corporation	$37.88	Energy
WMB	Williams Companies, Inc. (The)	$35.76	Energy
AON	Aon plc	$290.69	Financials
FDS	FactSet Research Systems Inc.	$455.56	Financials
ICE	Intercontinental Exchange Inc.	$125.73	Financials
BDX	Becton, Dickinson and Company	$241.70	Health Care
CNC	Centene Corporation	$77.08	Health Care
COO	The Cooper Companies, Inc.	$364.92	Health Care
INCY	Incyte Corporation	$65.43	Health Care
SYK	Stryker Corporation	$297.77	Health Care

Stock	StockName	Price	GICSSector
VRTX	Vertex Pharmaceuticals Incorporated	$415.27	Health Care
JCI	Johnson Controls International plc	$56.59	Industrials
PWR	Quanta Services, Inc.	$200.01	Industrials
CDW	CDW Corporation	$214.83	Information Technology
IT	Gartner, Inc.	$426.23	Information Technology
ROP	Roper Technologies, Inc.	$523.74	Information Technology
TDY	Teledyne Technologies Incorporated	$436.60	Information Technology
ZBRA	Zebra Technologies Corporation	$252.54	Information Technology
ALB	Albemarle Corporation	$135.26	Materials
STLD	Steel Dynamics, Inc.	$116.12	Materials

We could write similar code, if we instead wanted a list of stocks that were rated "Strong Buy".

With this, we conclude our brief descriptive survey of the S&P500 stocks.

Summary of Chapter 17 – Case (1 of 2): An Overview of the S&P500

This chapter provides a comprehensive case study on the S&P 500, a crucial stock market index tracking 500 major publicly traded companies in the U.S. This study outlines the S&P 500's structure, managed by S&P Dow Jones Indices, and its role as a benchmark in evaluating the U.S. stock market's health and performance. Key attributes like the index's float-weighted nature and its diverse industry representation are discussed.

The study utilizes R programming tools for data manipulation and visualization. Data is sourced from Google Sheets, capturing the most recent information on S&P 500 stocks, and is meticulously loaded, merged, and organized into a tibble for analysis. The chapter also introduces the Global Industry Classification Standard (GICS®), used for categorizing stocks into various sectors, providing a structure for detailed sector-wise analysis.

A significant portion of the chapter is dedicated to understanding and restructuring the data columns, making them more accessible and insightful for analysis. This includes adding new columns to track stock prices relative to their 52-week highs and lows, formatting prices, and analyzing stock ratings as factor variables. The study also presents a visual exploration of the stocks across different GICS sectors and their market capitalizations, offering insights into the distribution and financial magnitude of companies within each sector.

In conclusion, this case study serves as an insightful primer on the S&P 500, utilizing a blend of descriptive analysis, data visualization, and statistical summaries. This sets the stage for

more focused sectoral analyses in subsequent chapters, allowing for a deeper dive into specific areas of the U.S. stock market.

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