

Courseware

Course Info

Discussion

Progress

Syllabus

Schedule

Files

Wiki

STOCK DYNAMICS

A stock market is where buyers and sellers trade shares of a company, and is one of the most popular ways for individuals and companies to invest money. The size of the world stock market is now estimated to be in the trillions. The largest stock market in the world is the New York Stock Exchange (NYSE), located in New York City. About 2,800 companies are listed on the NSYE. In this problem, we'll look at the monthly stock prices of five of these companies: <u>IBM</u>, <u>General Electric (GE)</u>, <u>Procter and Gamble</u>, <u>Coca Cola</u>, and <u>Boeing</u>. The data used in this problem comes from <u>Infochimps</u>.

Download and read the following files into R, using the read.csv function: IBMStock.csv, GESTOCK.csv, <a href="GESTOCK.cs

Call the data frames "IBM", "GE", "ProcterGamble", "CocaCola", and "Boeing", respectively. Each data frame has two variables, described as follows:

- **Date**: the date of the stock price, always given as the first of the month.
- **StockPrice**: the average stock price of the company in the given month.

In this problem, we'll take a look at how the stock dynamics of these companies have changed over time.

PROBLEM 1.1 - SUMMARY STATISTICS (1/1 point)

Before working with these data sets, we need to convert the dates into a format that R can understand. Take a look at the structure of one of the datasets using the str function. Right now, the date variable is stored as a factor. We can convert this to a "Date" object in R by using the following five commands (one for each data set):

IBM\$Date = as.Date(IBM\$Date, "%m/%d/%y")

GE\$Date = as.Date(GE\$Date, "%m/%d/%y")

CocaCola\$Date = as.Date(CocaCola\$Date, "%m/%d/%y")

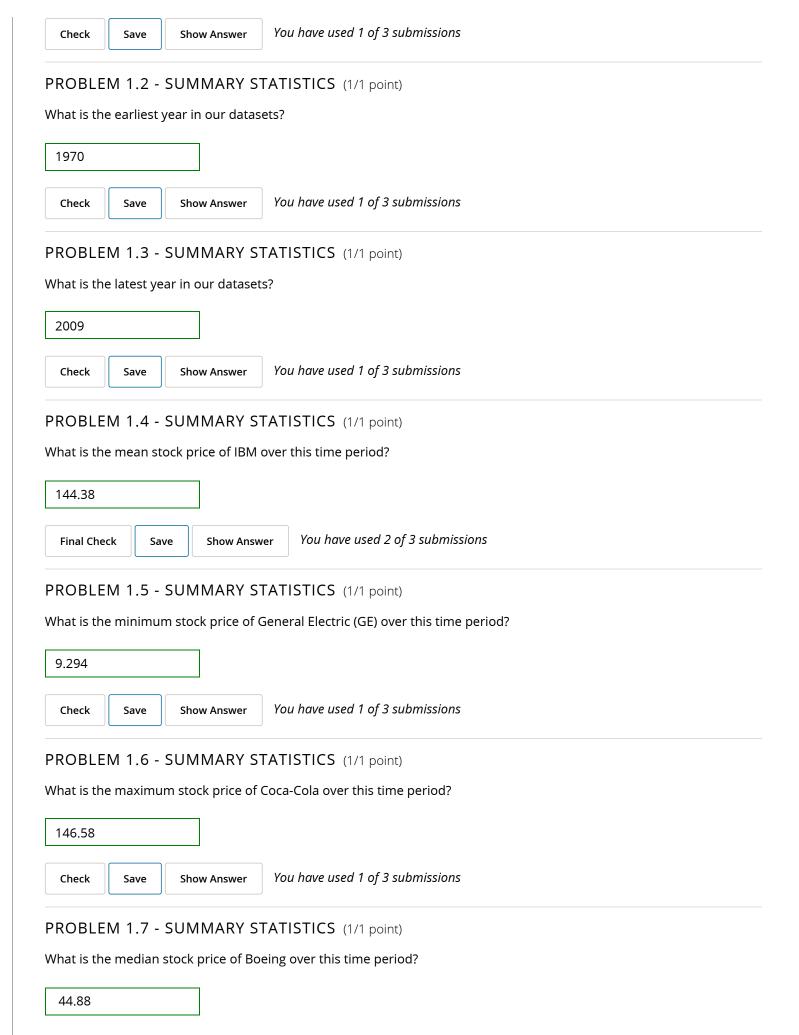
ProcterGamble\$Date = as.Date(ProcterGamble\$Date, "%m/%d/%y")

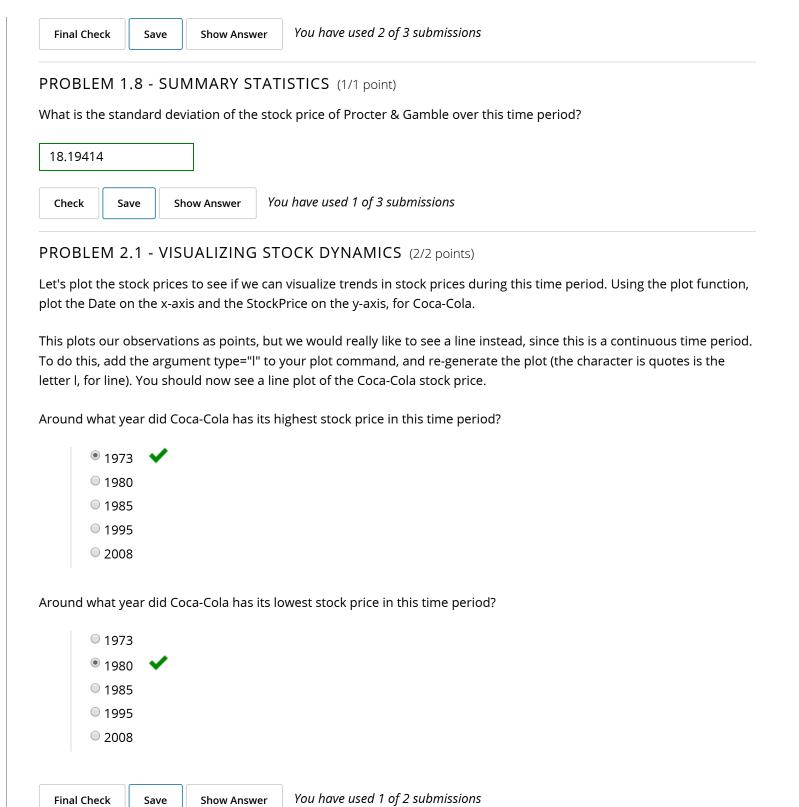
Boeing\$Date = as.Date(Boeing\$Date, "%m/%d/%y")

The first argument to the as.Date function is the variable we want to convert, and the second argument is the format of the Date variable. We can just overwrite the original Date variable values with the output of this function. Now, answer the following questions using the str and summary functions.

Our five datasets all have the same number of observations. How many observations are there in each data set?

400	
ДХП	





PROBLEM 2.2 - VISUALIZING STOCK DYNAMICS (1/1 point)

Now, let's add the line for Procter & Gamble too. You can add a line to a plot in R by using the lines function instead of the plot function. Keeping the plot for Coca-Cola open, type in your R console:

lines(ProcterGamble\$Date, ProcterGamble\$StockPrice)

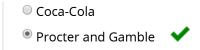
Unfortunately, it's hard to tell which line is which. Let's fix this by giving each line a color. First, re-run the plot command for Coca-Cola, but add the argument col="red". You should see the plot for Coca-Cola show up again, but this time in red. Now, let's add the Procter & Gamble line (using the lines function like we did before), adding the argument col="blue".

You should now see in your plot the Coca-Cola stock price in red, and the Procter & Gamble stock price in blue.

As an alternative choice to changing the colors, you could instead change the line type of the Procter & Gamble line by adding the argument lty=2. This will make the Procter & Gamble line dashed.

Using this plot, answer the following questions.

In March of 2000, the technology bubble burst, and a stock market crash occurred. According to this plot, which company's stock dropped more?



To answer this question and the ones that follow, you may find it useful to draw a vertical line at a certain date. To do this, type the command

abline(v=as.Date(c("2000-03-01")), lwd=2)

in your R console, with the plot still open. This generates a vertical line at the date March 1, 2000. The argument lwd=2 makes the line a little thicker. You can change the date in this command to generate the vertical line in different locations.

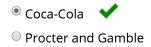
Show Answer

You have used 1 of 1 submissions

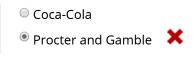
PROBLEM 2.3 - VISUALIZING STOCK DYNAMICS (1/2 points)

Answer these questions using the plot you generated in the previous problem.

Around 1983, the stock for one of these companies (Coca-Cola or Procter and Gamble) was going up, while the other was going down. Which one was going up?



In the time period shown in the plot, which stock generally has lower values?



Show Answer

You have used 1 of 1 submissions

PROBLEM 3.1 - VISUALIZING STOCK DYNAMICS 1995-2005 (1/1 point)

Let's take a look at how the stock prices changed from 1995-2005 for all five companies. In your R console, start by typing the following plot command:

plot(CocaCola\$Date[301:432], CocaCola\$StockPrice[301:432], type="l", col="red", ylim=c(0,210))

This will plot the CocaCola stock prices from 1995 through 2005, which are the observations numbered from 301 to 432. The additional argument, ylim=c(0,210), makes the y-axis range from 0 to 210. This will allow us to see all of the stock values when we add in the other companies.

Now, use the lines function to add in the other four companies, remembering to only plot the observations from 1995 to 2005, or [301:432]. You don't need the "type" or "ylim" arguments for the lines function, but remember to make each company a different color so that you can tell them apart. Some color options are "red", "blue", "green", "purple", "orange", and "black". To see all of the color options in R, type colors() in your R console.

(If you prefer to change the type of the line instead of the color, here are some options for changing the line type: lty=2 will make the line dashed, lty=3 will make the line dotted, lty=4 will make the line alternate between dashes and dots, and lty=5 will make the line long-dashed.)

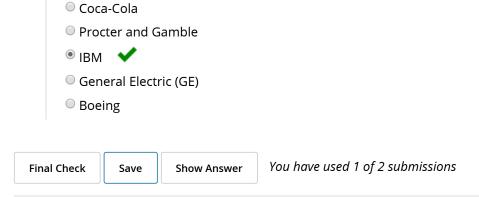
Use this plot to answer the following four questions.

Which stock fell the most right after the technology bubble burst in March 2000?

VIIICI	r stock fell the most right after the to	cermology bubble burse in Muren 2000:
	O Coca-Cola	
	Procter and Gamble	
	○ IBM	
	General Electric (GE)	
	Boeing	
Fina	l Check Save Show Answer	You have used 1 of 2 submissions

PROBLEM 3.2 - VISUALIZING STOCK DYNAMICS 1995-2005 (1/1 point)

Which stock reaches the highest value in the time period 1995-2005?



PROBLEM 3.3 - VISUALIZING STOCK DYNAMICS 1995-2005 (1/1 point)

In October of 1997, there was a global stock market crash that was caused by an economic crisis in Asia. Comparing September 1997 to November 1997, which companies saw a decreasing trend in their stock price? (Select all that apply.)

Coca-Cola
✓ Procter and Gamble
□IBM
General Electric (GE)
☑ Boeing

PROBLEM 3.4 - VISUALIZING STOCK DYNAMICS 1995-2005 (1/1 point)

In the last two years of this time period (2004 and 2005) which stock seems to be performing the best, in terms of increasing stock price?

Coca-Cola
Procter and Gamble
IBM
General Electric (GE)
Boeing

Final Check

Save

Show Answer

You have used 1 of 2 submissions

PROBLEM 4.1 - MONTHLY TRENDS (1/1 point)

Lastly, let's see if stocks tend to be higher or lower during certain months. Use the tapply command to calculate the mean stock price of IBM, sorted by months. To sort by months, use

months(IBM\$Date)

as the second argument of the tapply function.

For IBM, compare the monthly averages to the overall average stock price. In which months has IBM historically had a higher stock price (on average)? Select all that apply.

☑ January

February

March

April

May

JuneJuly

□ August

September

October

November

December

Final Check

Save

Show Answer

You have used 1 of 2 submissions

Repeat the tapply function from the previous problem for each of the other four companies, and use the output to answer the remaining questions. General Electric and Coca-Cola both have their highest average stock price in the same month. Which month is this? January February March April May June July August September October November December Final Check You have used 1 of 2 submissions Save **Show Answer** PROBLEM 4.3 - MONTHLY TRENDS (1/1 point) For the months of December and January, every company's average stock is higher in one month and lower in the other. In which month are the stock prices lower? December January After seeing these trends, we are ready to buy stock in certain months and sell it in others! But, we should be careful, because one really good or really bad year could skew the average to show a trend that is not really there in general. You have used 1 of 1 submissions **Show Answer** Please remember not to ask for or post complete answers to homework questions in this discussion forum. **Show Discussion** New Post



EdX offers interactive online classes and MOOCs from the world's best universities. Online courses from MITx, HarvardX, BerkeleyX, UTx and many other universities. Topics include biology, business, chemistry, computer science, economics, finance, electronics, engineering, food and nutrition, history, humanities, law, literature, math, medicine, music, philosophy, physics, science, statistics and more. EdX is a non-profit online initiative created by founding partners Harvard and MIT.

© 2015 edX Inc.

EdX, Open edX, and the edX and Open edX logos are registered trademarks or trademarks of edX lnc.

Terms of Service and Honor Code

Privacy Policy (Revised 10/22/2014)

About edX

About

News

Contact

FAQ

edX Blog

Donate to edX

Jobs at edX

Follow Us

Y Twitter

f Facebook

Meetup

in LinkedIn

Q+ Google+