ECON10005 Quantitative Methods 1

Tutorial in Week 2

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Introduction

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Don't be shy if you need help

- visit Ed Discussion Board
- Go for lecturer's consultation sessions: see Canvas
- In case of special considerations, consult Stop 1
- For admin issues contact Chin via qm1-economics@unimelb.edu.au
- Shoot me an email: fan.z@unimelb.edu.au

Weekly commitments

- Attend Lectures
- Complete Pre-Quiz questions which are necessary for Quiz
- Complete Weekly Quiz (+ attendance: 10% marks!)
- Read and attempt tutorial questions
- Attend and practise during tutorials

Part A

1. In finance, there is the concept of "risk/return trade-off" - that higher risk (variability of returns) is associated with higher returns (on average). Are the statistics for META shares pre- and post-Covid consistent with this concept?

	Full sample	Before Covid	After Covid
Mean	0.039	0.040	0.038
StdDev	2.805	2.090	3.202
Min	-26.390	-18.961	-26.390
Max	23.282	10.816	23.282
Median	0.071	0.119	0.041
First quartile	-1.187	-0.894	-1.335
Third quartile	1.390	1.143	1.554
IQR	2.577	2.037	2.889

Part A

2. Compare the mean and median for the full sample. Discuss the histogram features and their relation to the mean and median comparison.

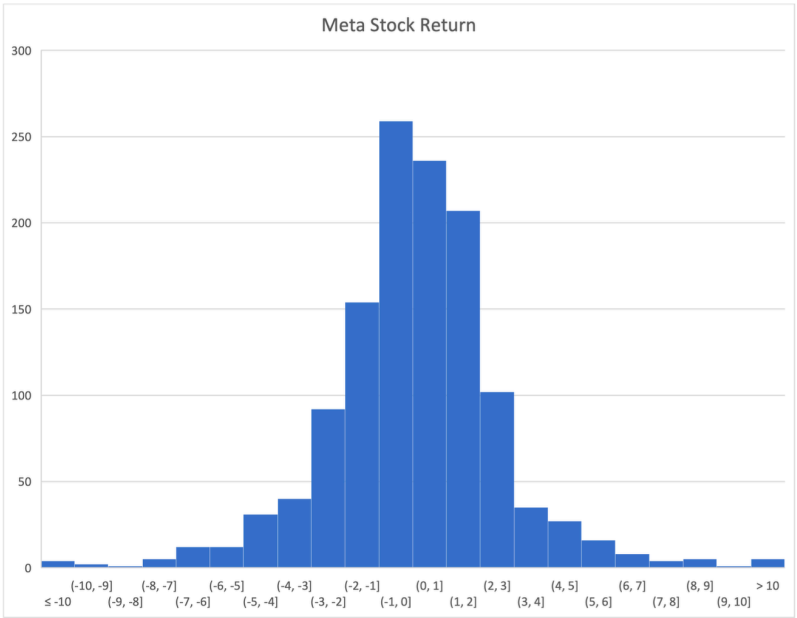

Figure 1: Histogram of the Returns

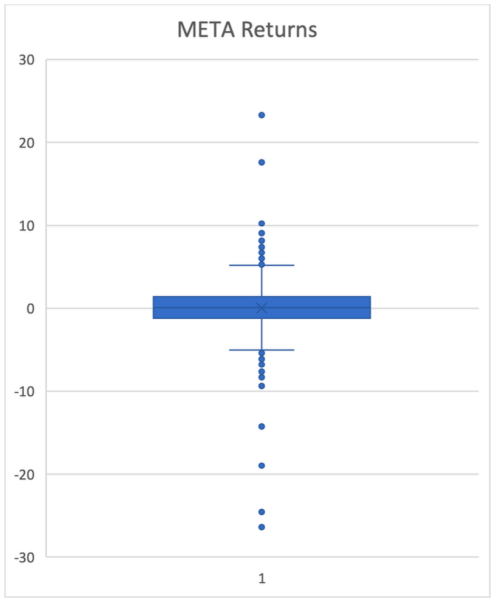

Figure 2: Box Plot of the Returns

B. Descriptive Statistics

What is the difference between the observations in Sheet1 and Sheet2? Discuss why some statistics change between the two sheets and some don't.

	Sheet1	Sheet2
Mean	4.85	6.55
Median	5	5
SD	1.60	6.82
IQR	2	2

Notice that the only difference between these two sheets are observation 9.

C. Mean (Expectation) is a Linear Operator

1. Suppose we have observations $X_1, X_2, \ldots, X_n$, and we create new observations $Z_1 = aX_1, Z_2 = aX_2, \ldots, Z_n = aX_n$, where a is a known constant (i.e. the same a multiplies each observation). Show that $\bar{Z} = a\bar{X}$.

2. Find the mean weight (in pounds) of the offensive linemen on the 2016 New England Patriots NFL roster. That is, locate the players whose position (POS) is 'OL' and then use their weight (WT), which is in pounds.

3. What is the mean weight in kilograms of the Patriots' offensive linemen? Use 1 pound = 0.45 kg and calculate two ways.

C. Mean (Expectation) is a Linear Operator

1. Suppose we have observations $X_1, X_2, \ldots, X_n$, and we create new observations $Z_1 = aX_1, Z_2 = aX_2, \ldots, Z_n = aX_n$, where a is a known constant (i.e. the same a multiplies each observation). Show that $\bar{Z} = a\bar{X}$.

$$\begin{aligned}
\bar{Z} &= \frac{1}{n}(Z_1 + Z_2 + \cdots + Z_n) \\
&= \frac{1}{n}(aX_1 + aX_2 + \cdots + aX_n) \\
&= a\frac{1}{n}(X_1 + X_2 + \cdots + X_n) \\
&= a\bar{X}
\end{aligned}$$

C. Mean (Expectation) is a Linear Operator

2. Find the mean weight (in pounds) of the offensive linemen on the 2016 New England Patriots NFL roster. That is, locate the players whose position (POS) is 'OL' and then use their weight (WT), which is in pounds.

   For players 61, 71, 75, 69, 68, the weights in pounds are 335, 320, 305, 310, 315.

$$\frac{335 + 320 + 305 + 310 + 315}{5} = 317 \text{ pounds}$$

C. Mean (Expectation) is a Linear Operator

3. What is the mean weight in kilograms of the Patriots' offensive linemen? Use 1 pound = 0.45 kg and calculate two ways.

   1. convert each individual weight to kg and then average

$$\frac{335 \times 0.45 + 320 \times 0.45 + 305 \times 0.45 + 310 \times 0.45 + 315 \times 0.45}{5}$$

$$= \frac{150.75 + 144 + 137.25 + 139.5 + 141.75}{5} = 142.65 \text{ kg}$$

   2. take the mean from question 2 and convert that to kg.

$$317 \text{ pounds } \times 0.45 = 142.65 \text{ kg}$$

The end

Thanks for your attention! 😄

Feel free to leave and see you next week!