ECON10005 Quantitative Methods 1

Tutorial in Week 3

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Introduction

Zheng Fan

- Ph.D student in Economics at Unimelb. Research interest in Bayesian Econometrics
- Personal website: *zhengfan.site* for some details

Don't be shy if you need help

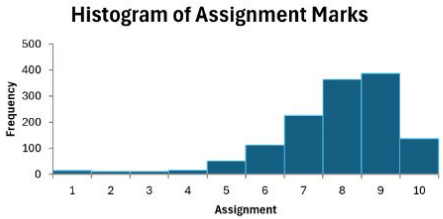
- Discuss on Ed Discussion Board
- Attend consultation sessions: see Canvas for time and location
- Consult Stop 1, in case of special considerations,
- Contact QM-1@unimelb.edu.au for admin issues
- Send me an email: fan.z@unimelb.edu.au

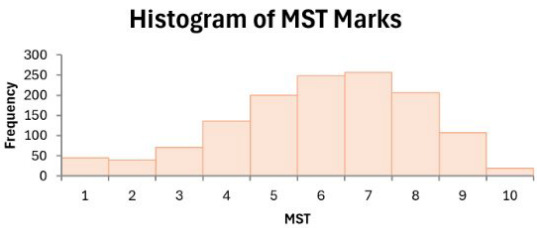
Part A

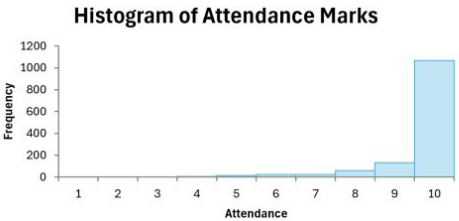
Use the Marks.xlsx file. We can now use the summary statistics you calculated for pre-tutorial two and the histograms for pre-tutorial one from week 1 to further analyse the tutorial questions. Discuss the following questions.

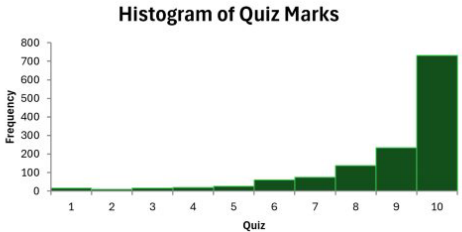
1. What can you infer about the distribution of marks for each assessment task (e.g., skewness or spread)? Are there any surprising patterns, such as many students achieving very high or low marks?
2. Which mid-semester tasks seem to have the strongest or weakest relationship with exam marks?

Part A - 1

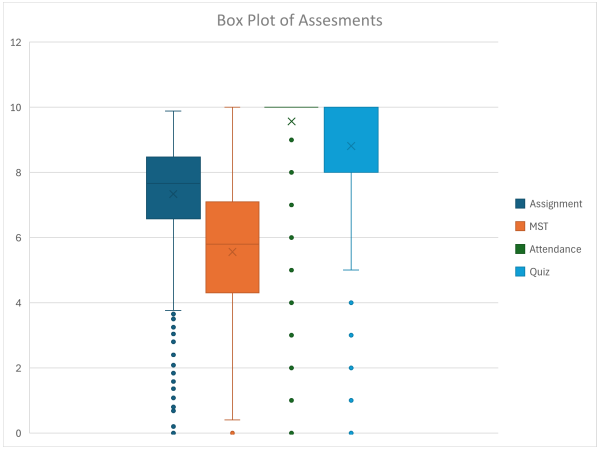

Histogram of Assignment Marks
Frequency
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10
Assignment

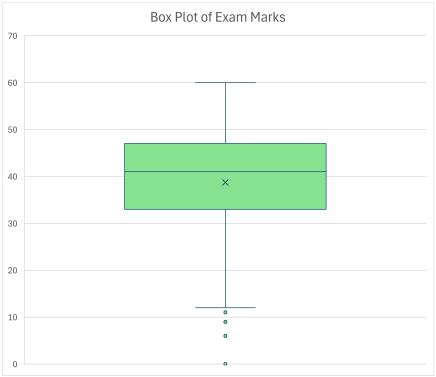

Histogram of MST Marks
Frequency
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10
MST


Histogram of Attendance Marks
Frequency
1200
1000
800
600
400
200
0
1 2 3 4 5 6 7 8 9 10
Attendance


Histogram of Quiz Marks
Frequency
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10
Quiz

Part A - 1


Box Plot of Assesments
12
10
8
6
4
2
0
Assignment
MST
Attendance
Quiz


Box Plot of Exam Marks
70
60
50
40
30
20
10
0

Part A - 1

Statistic	Assignment	MST	Attendance	Quiz	Exam_Marks
Mean	7.3	5.6	9.6	8.8	38.7
Standard Error	0.0	0.1	0.0	0.1	0.3
Median	7.66	5.8	10	10	41.0
Mode	8.51	6.2	10	10	37.0
Standard Deviation	1.6	2.0	1.1	1.9	12.4
Sample Variance	2.7	4.2	1.3	3.6	153.7
CV	22.3	36.8	12.0	21.7	32.0
10th Percentile	5.3	2.8	9.0	6.0	24.0
25th Percentile	6.6	4.3	10.0	8.0	33.0
50th Percentile	7.7	5.8	10.0	10.0	41.0
75th Percentile	8.5	7.1	10.0	10.0	47.0
95th Percentile	9.3	8.4	10.0	10.0	55.0
IQR	1.9	2.8	0.0	2.0	14.0
Range	9.88	10	10	10	60
Minimum	0	0	0	0	0
Maximum	9.9	10.0	10.0	10.0	60
n	1329	1329	1329	1329	1329

Note: Percentiles are calculated via *=PERCENTILE.EXC(Data!B$2:B$1330,0.25)*

Part A - 2

	Assignment	MST	Attendance	Quiz	Exam_Marks
Covariance Matrix					
Assignment	2.69				
MST	1.35	4.19			
Attendance	0.64	0.65	1.31		
Quiz	1.23	1.54	0.86	3.64	
Exam_Marks	7.94	14.31	3.64	9.39	153.59
Correlation Matrix					
Assignment	1.00				
MST	0.40	1.00			
Attendance	0.34	0.28	1.00		
Quiz	0.39	0.39	0.39	1.00	
Exam_Marks	0.39	0.56	0.26	0.40	1.00

Data Analysis Report - First Draft

Some highlights:

- The first Draft Task carries 3% of the total assessment for ECON10005.
- You **must** complete the assignment as a group. Individual submission is not accepted.
- You will soon be **randomly** allocated into groups of four students.
- The first draft has a word limit of 700 words ($\pm$ 10%), excluding graphs, tables, equations and appendices.
- Rely only on materials discussed in Weeks 1 and 2 lectures.
- Be aware of the due date and other important details.

Please make sure you go through the assignment instructions for details

Data Analysis Report - First Draft

This week, we will

- Take the attendance.
- Randomly allocate you into groups.
- Read and sign the group contract.

Part B

Use the descriptive statistics you produced for PART B of the Pre-Tutorial tasks using the Three_Assets Excel file and discuss the following questions.

1. In finance, there is the concept of the 'risk/return trade-off' that higher risk (measured as a higher standard deviation of returns) is associated with higher returns. Do the statistics you calculated support this theory?
2. Consider the histograms and the statistics you calculated above for the daily returns using the full sample and the two periods between 2020 and 2022. Discuss what these reveals. Consider Meta as example here.
3. Discuss what correlations reveal about the association between these stock returns (you may use the scatter plots as an aid for this discussion).

Part B - 1

Does the summary statistics support the concept of the 'risk/return trade-off'?

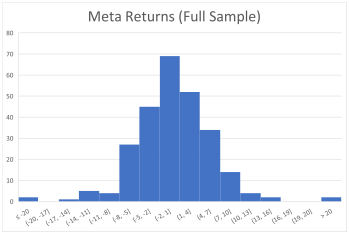
Table 1: Descriptive Statistics for Meta, Gold, and Bitcoin

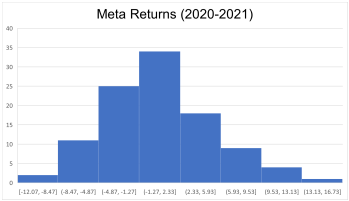
	Full Sample			6/Jan/2020 - 27/Dec/2021			10/Jan/2022 - 26/Dec/2022		
	Meta	Gold	Bitcoin	Meta	Gold	Bitcoin	Meta	Gold	Bitcoin
Mean	0.137	0.141	0.826	0.577	0.191	2.316	-1.645	-2.994	-1.690
Median	0.274	0.240	0.871	0.383	0.414	2.508	-1.500	-2.994	-0.565
SD	5.669	2.027	9.656	4.890	2.551	10.056	7.894	1.996	7.622

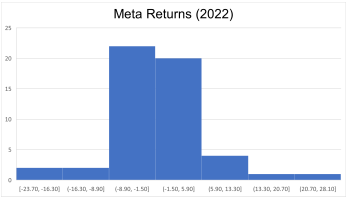
Part B - 2

2. Consider the histograms and the statistics you calculated above for the daily returns using the full sample and the two periods between 2020 and 2022. Discuss what these reveals. Consider Meta as example here.

Part B - 2


Meta Returns (Full Sample)
80
70
60
50
40
30
20
10
0
≤ -20
(-20, -17]
(-17, -14]
(-14, -11]
(-11, -8]
(-8, -5]
(-5, -2]
(-2, 1]
(1, 4]
(4, 7]
(7, 10]
(10, 13]
(13, 16]
(16, 19]
(19, 20]
> 20


Meta Returns (2020-2021)
40
35
30
25
20
15
10
5
0
[-12.07, -8.47]
(-8.47, -4.87]
(-4.87, -1.27]
(-1.27, 2.33]
(2.33, 5.93]
(5.93, 9.53]
(9.53, 13.13]
(13.13, 16.73]


Meta Returns (2022)
25
20
15
10
5
0
[-23.70, -16.30]
(-16.30, -8.90]
(-8.90, -1.50]
(-1.50, 5.90]
(5.90, 13.30]
(13.30, 20.70]
(20.70, 28.10]

Part B - 2

Table 2: Descriptive Statistics for Meta

	Full Sample	6/Jan/2020 - 27/Dec/2021	10/Jan/2022 - 26/Dec/2022
Mean	0.137	0.577	-1.645
Median	0.274	0.383	-1.500
SD	5.669	4.890	7.894

Part B - 2

Table 2: Descriptive Statistics for Meta

	Full Sample	6/Jan/2020 - 27/Dec/2021	10/Jan/2022 - 26/Dec/2022
Mean	0.137	0.577	-1.645
Median	0.274	0.383	-1.500
SD	5.669	4.890	7.894

The distribution of Meta returns in 2020-2021 is positively skewed and has the lowest SD (among the three histograms).

Part B - 3

3. Discuss what correlations reveal about the association between these stock returns (you may use the scatter plots as an aid for this discussion).

Part B - 3

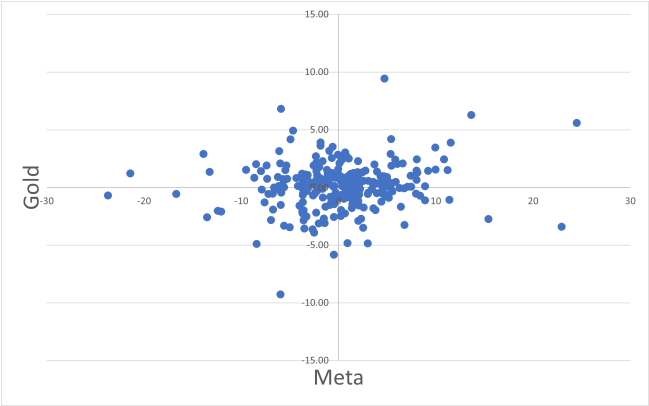
What is the strength of these correlation coefficients?

Full Sample	Meta	Gold
Gold	0.132	
Bitcoin	0.088	0.134

Table 3: Correlation for Full Sample

Part B - 3

How does this example scatterplots demonstrate the weak correlation?



Part B - 3

Why might we observe these weak correlations? Are Meta, Gold and Bitcoin in the same stock sectors?

Part B - 3

Why might we observe these weak correlations? Are Meta, Gold and Bitcoin in the same stock sectors?

- Meta is a blue-chip IT company in the stock market.
- Gold is a precious metal used for value preservation.
- Bitcoin is a new virtual asset that could represent the future of currencies.

This analysis for the full sample is similar for the two shorter periods.

Any final questions

Thanks for your attention! 😄

Let me know if you have any questions