edX

GTx MGT6203x
SU23: Data Analytics for Business

Help

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MM: Midterm Exam, Part 2

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Midterm Exam, Part 2 (Practice/Computational) due Jul 3, 2023 11:59 +08   Completed

Midterm Part 2 covers the topics in **Module 1, 2, 3, 4, 5, 6, 7 and 8** and is worth **7% of your overall grade**.

Also, please remember that you are to complete this exam on your own. Any help given or received constitutes cheating. **Any violations of the Georgia Tech Honor Code will be reported and penalized.** If you have any general questions about the exam, please post to the Piazza board marking it private.

Please only press SUBMIT for each question once you have your final answer. Only **one attempt** is allowed. **Please check piazza pinned posts for any clarifications/updates.**

Good luck!!

Load dataset **"College"** from Package "ISLR" in R console.

Question 1

1.0/1.0 point (graded)
Please estimate a linear regression model (using the lm function) with Personal as the dependent variable and Room.Board as the independent variable. What are the model's R-squared and adjusted R-squared values, respectively?

- ○ 0.00549, 0.048
- ○ 0.0143, 0.022
- ● 0.0398, 0.0385
- ○ 0.0325, 0.0336

✔

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Question 2

1.0/1.0 point (graded)
Based on the linear-linear regression model in the previous question (with Personal as the dependent variable and Room.Board as the independent variable), fit three nonlinear models using those two variables. Based on their adjusted R-squared values, which one of the four models is most appropriate to use?

- ○ Log-Linear
- ● Log-Log
- ○ Linear-Linear
- ○ Linear-Log

✔

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Question 3

1.0/1.0 point (graded)

Interpret the coefficient of the independent variable for the Linear-Log model.

○ 1% increase in Room.Board leads to 536.36 units decrease in Personal

○ 1 unit increase in Room.Board leads to 536.36 units decrease in Personal

○ 1 unit increase in Room.Board leads to 0.01*536.36 units decrease in Personal

◉ 1% increase in Room.Board leads to 0.01*536.36 units decrease in Personal

✔

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Question 4

1.0/1.0 point (graded)

Interpret the coefficient of the independent variable for the Log-Linear model. (E-05 = 10^{-5})

○ 1% increase in Room.Board leads to $e^{(9.187E-05)}$ units decrease in Personal

◉ 1 unit increase in Room.Board leads to $((e^{(9.187E-05)}-1) * 100)$% decrease in Personal

○ 1 unit increase in Room.Board leads to $e^{(9.187E-05)}$ units decrease in personal

○ 1% increase in Room.Board leads to $(e^{(9.187E-05)} * 100)$% decrease in Personal

✔

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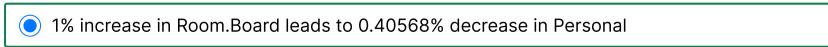
Question 5

1.0/1.0 point (graded)

Interpret the coefficient of the independent variable for the Log-Log model.

○ 1% increase in Room.Board leads to $e^{0.0040568}$ increase in Personal

○ 1 unit increase in Room.Board leads to 0.40568*100% decrease in Personal

○ 1 unit increase in Room.Board leads to $(e^{0.40568})*100$% decrease in Personal

◉ 1% increase in Room.Board leads to 0.40568% decrease in Personal

✔

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Imagine you are interested in knowing how variables like GRE (Graduate Record Exam scores), GPA (Grade Point

Average) etc affect admission into graduate school. The response variable, **"admit"** (admit/don't admit), is a binary variable (admit=1, don't admit=0).

Create a logistic regression model using the dataset <u>binary.csv</u>.

Use the information from the model to answer the following five questions. Select the closest answer.
You might want to use this code to read the file:
read.csv("binary/csv", fileEncoding="UTF-8-BOM")

Question 6

1.0/1.0 point (graded)
How should you interpret the coefficient of "gre"?

○ A. If gre increases by 1 unit, the natural log of the odds of admission increases by 0.003.

○ B. If gre increases by 1 unit, the odds of admission increase by a factor of exp(0.003).

○ C. If gre increases by 1 unit, the odds of admission increase by roughly 100*0.003 percent.

◉ All of the above.

✔

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Question 7

1.0/1.0 point (graded)
How should you interpret the coefficient of gpa?

◉ If gpa increases by 1 unit, the natural log of the odds of admission increases by 0.755.

○ If gpa increases by 1 unit, the odds of admission increase by 0.755.

○ If gpa increases by 1 unit, the odds of admission increase by 10^(0.755).

○ All of the above.

✔

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Question 8

1.0/1.0 point (graded)
A student has the GPA of 3.5 and GRE score of 330. What is the predicted probability of this student getting admitted into graduate school?

○ exp(-4.949 + 0.003*3.5 + 0.755*330)/[1 + exp(-4.949 + 0.003*3.5 + 0.755*330)]

◉ exp(-4.949 + 0.003*330 + 0.755*3.5)/[1 + exp(-4.949 + 0.003*330 + 0.755*3.5)]

○ [1 - exp(-4.949 + 0.003*330 + 0.755*3.5)]/[1 + exp(-4.949 + 0.003*330 + 0.755*3.5)]

○ [1 - exp(-4.949 + 0.003*330 + 0.755*3.5)]/exp(-4.949 + 0.003*330 + 0.755*3.5)

✔

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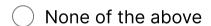

Question 9

1.0/1.0 point (graded)

If a student has a GRE score of 330, with 0.2 unit increase in GPA, what is the change of the natural log of predicted odds of this student getting admitted into graduate school?

○ exp(-4.949 + 0.003*0.1 + 0.755*330)/[1 + exp(-4.949 + 0.003*0.1 + 0.755*330)]

○ exp(-4.949 + 0.003*0.1 + 0.755*330)

◉ 0.1509

○ None of the above

✔

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Question 10

1.0/1.0 point (graded)

What is the value of area under the curve (AUC) for the model created? To calculate the AUC, use a threshold of 0.5. Please select the closest answer.

○ 0.804

○ 0.935

◉ 0.635

○ 0.832

✔

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Use the dataset Berkshire.csv with the following variables.

Sample Period: From 30th Nov 1976 - 31st Dec 2005 (Inclusive)

· Column (1): *Date*, Calendar Date

· Column (2): *BRKret*, Berkshire Hathaway's monthly return

· Column (3): *MKT*, the return on the aggregate stock market

· Column (4): *RF*, the risk free rate of return

Question 11

1.0/1.0 point (graded)

What is the arithmetic average, and standard deviation for Berkshire Hathaway's returns over the sample period, respectively? Note: Remember to filter the data for the sample period before solvling the problem.

- ◯ 1.5%, 7.42%

- ◯ 1.5%, 7.61%

- ◉ 2.3%, 7.42%

- ◯ 2.3%, 7.61%

✔

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Question 12

1.0/1.0 point (graded)

Over the sample period, relative to the aggregate market, Berkshire Hathaway has: (Remember to filter the data for the sample period before solvling the problem.)

- ◯ Underperformed the market

- ◯ Underperformed the market by 0.5% to 1.50% per month on average

- ◯ Outperformed the market by 0.5% to 1.0% per month on average

- ◉ Outperformed the market by greater than 1.0% per month on average

✔

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Question 13

1.0/1.0 point (graded)

Berkshire Hathaway's Sharpe Ratio is _____ than the aggregate stock market for the sample period? (Please use the std Sharpe ratios) Note: Remember to filter the data for the sample period before solvling the problem.

- ◉ Higher

- ◯ Lower

✔

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Use the data set contrafund.csv to for Q14.

Question 14

0.0/1.0 point (graded)

Find the Sharpe Ratio of the Following Tech Portfolio. Use stock data from tidyquant package, use the contrafund.csv to get the data for the risk free rate. Date Range: 1st Jan 2017- 31st December 2017.

Stocks	Weights
Facebook(META)	30%
Amazon(AMZN)	20%
Microsoft(MSFT)	10%
Google(GOOGL)	40%

Also, did this portfolio outperform the market in the same year? (Hint: Use the cumulative returns of the market and portfolio for this period).

- ○ 0.76, Yes
- ○ 0.91, Yes
- ○ 0.76, No
- ● 0.91, No

✖

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Question 15

0.0/1.0 point (graded)

Use stock data from tidyquant package to answer this question. You have a portfolio of $10,000. The stocks in your portfolio are as follows.

	Weights
AMZN	0.3
VMW	0.1
MSFT	0.4
AMD	0.2

The baseline stock for this portfolio is SP 500 (^GSPC). Use stock data from January 1, 2010 till January 1, 2021. What is the beta of the portfolio? Note: When querying ^GSPC with the tq_get() function, make sure to specify the "get" argument as "get='stock.prices'", as tiingo backend no longer supports scraping ^GSPC.

- ○ 1.16
- ● 1.24
- ○ 1.19
- ○ 1.21

✖

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Question 16

0.0/1.0 point (graded)

Use stock data from tidyquant package to answer this question. Create 5 new portfolios with the following weights

Portfolio	1	2	3	4	5
AMZN	0.25	0.4	0.1	0.2	0.5
VMW	0.25	0.2	0.5	0.1	0.1
MSFT	0.25	0.3	0.2	0.4	0.3
AMD	0.25	0.1	0.2	0.3	0.1

Which portfolio has the highest beta?

- ◯ Portfolio 3

- ◯ Portfolio 1

- ◯ Portfolio 4

- ◉ Portfolio 5

✖

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In this question, we will determine the factors explaining the returns for the HiTec industry portfolio. We will build a factor regression model using the data in the Factor_HiTec.csv file to answer the questions below. In the file, we have the following factor values:

- Mkt_rf: Monthly excess return on the aggregate stock market

- RF: Risk Free rate

- SMB: Size Factor

- HML: Value Factor

- QMJ: Quality Factor

- BAB: Betting against beta factor

- Mom: Momentum factor

- HiTec_rf: Monthly excess return on the HiTec industry portfolio.
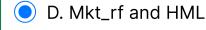

Question 17

1.0/1.0 point (graded)

Which factors have the highest positive and highest negative exposure on the portfolio respectively?

- ◯ A. Mom and SMB

- ◯ B. HML and Mkt_rf

- ◯ C. SMB and BAB

- ◉ D. Mkt_rf and HML

◯   E. BAB and QMJ

✔

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Question 18

1.0/1.0 point (graded)

Given a significance level of 0.001, which factor could be removed from this model if we have to limit the number of features less than 6?

⦿   A. QMJ

◯   B. SMB

◯   C. HML

◯   D. BAB

✔

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Use the data set UPS_KO.csv to answer the following questions:

- Date: This column represents date from 09/2014 to 08/2019.

- Mkt_RF: This column represents market premium (i.e., Market return – risk_free rate).

- SMB: This column represents the value of the size factor.

- HML: This column represents the value of the value factor.

- RF: This column represents risk free rate.

- UPS: This column represents the return of UPS.

- KO: This column represents the return of KO.

Sample Period : 04/2015 to 11/2018 (Inclusive)

Estimate a three-factor model by regressing return in excess of the risk free rate on Mkt_rf; SMB; and HML for both UPS and KO **for the sample period**.
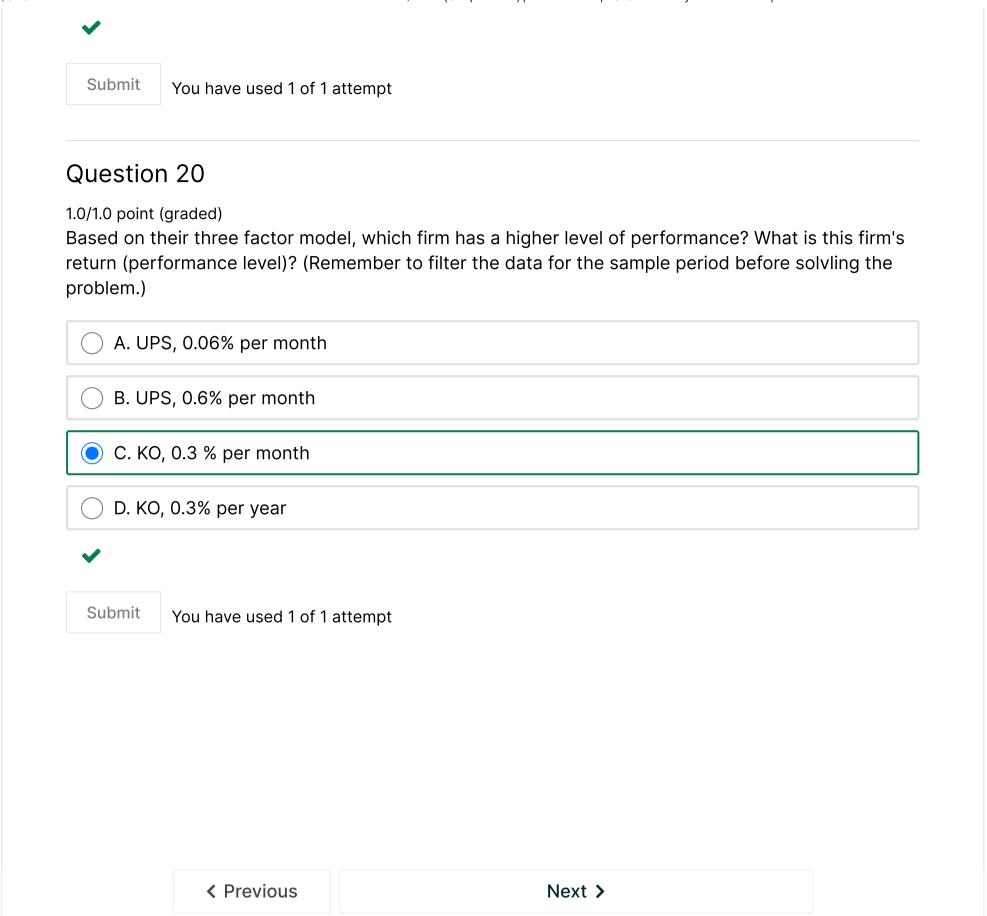

Question 19

1.0/1.0 point (graded)

The coefficient of HML for the three factor model for UPS suggests that: (Remember to filter the data for the sample period before solvling the problem.)

◯   A. UPS is tilted towards small cap stocks

◯   B. UPS is tilted towards large cap stocks

⦿   C. UPS is tilted towards value stocks

◯   D. UPS is tilted towards growth stocks

✔

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Question 20

1.0/1.0 point (graded)

Based on their three factor model, which firm has a higher level of performance? What is this firm's return (performance level)? (Remember to filter the data for the sample period before solvling the problem.)

- ○ A. UPS, 0.06% per month
- ○ B. UPS, 0.6% per month
- ⦿ C. KO, 0.3 % per month
- ○ D. KO, 0.3% per year

✔

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