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Financial Econometrics, 2021 T2

Case Study Part I

(30% of the course mark)

1. This Part I of the Case Study must be completed in a **group of 3 or 4 students**. Each group is identified by a class time (e.g. Wed12) and a group number (e.g. Group 2).
2. Each group will be assigned a dataset for the project.
3. Each group must submit one copy of the assignment via Turnitin. Only one submission per group. Each group must select one person to submit the assignment.
4. **The online submission deadline is 11:55 pm on Monday 12 July, (WEEK 7).**

Each group **MUST** submit the online copy to Turnitin.

The project Cover Sheet must be properly filled, which includes tutorial/group id, names and student numbers of the group members.

5. A late-submission penalty of 20% will apply for each 24 hours late.
6. All submissions will be checked for plagiarism. The University regards plagiarism as a form of academic misconduct, and has very strict rules regarding plagiarism. Where it can be established that individual students are responsible for the plagiarism, those individual students will be penalised. However, where it is judged that the plagiarism should have been clear to the other group members, the penalty will apply to all members of the group.

Assignment Project Exam Help

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UNSW Business School
School of Economics

Financial Econometrics, 2021 T2
Case Study Part I

Group Cover Sheet

Check-list

1. Choose one member to submit the assignment: one soft-copy to be submitted online.
2. Class number, group number, all names and student numbers of the group must be filled in on this Cover Sheet.

Class/Group ID

	Full Name	Student No.
1. (person for submission)		
2.		
3.		
4.		

Software

You MUST use Python to complete this assignment. You must attach a copy of your codes with your submission.

Topics

This assessment requires you to use material covered in the lectures of Week 1 to Week 4 inclusive.

Data

Select the company corresponding to your group (all these are large companies significant for superannuation funds, international share portfolios likely to hold most of these companies). The data allocation (company name) to groups can be seen in the Excel sheet: https://docs.google.com/spreadsheets/d/1shPrDAbxrNuGEuz9Qp_SHRLKGj66rl9eDtG0aLOyFJU/edit?usp=sharing

Download open/close stock prices and volume information from <http://finance.yahoo.com> as described below.

Enter the company name in the window near **GET QUOTES** button

Please, make sure that you download the information for the “main” stock of the company (not its derivative, or a non-US quote). See appendix for some example screen shots.

Once you are on the company page download historical prices by clicking on the corresponding link on the left-side menu.

Select the following data-period for your historical quotes:

1 September 2015 till the day of download

Enter the date range and click on “download to spreadsheet” on the bottom of the page (see Appendix). You will receive a comma-delimited file opened by Excel. The data are sorted in descending date order. For the purpose of the analysis you need to re-sort the data in the **ascending date** order.

Note: Some companies may have shorter periods of data available. Possible reason: company changed its name or merged with another company. Investigate if this is the case and add the data on the predecessor. Talk to me if you have difficulties.

REPORT

Write a report on the tasks below. Keep your answers short and to the point. Show the necessary information (the null of a test and the decision rule, derivation of analytical results, and only necessary Python output that is needed to answer the question). Make sure to provide comments on all of your results. Please keep the page numbers limited to 7 pages maximum.

Python codes are added as an appendix and are not counted in the pages limit.

Case Study (I) Description

Suppose that you work as a financial advisor. Your client (bank) is interested in investing in a given share.

1. Give a short profile of the company, its business and recent history (2-4 sentences).

(2 Points)

2. Transform daily close adj. prices to (log) returns. Plot returns over time. Plot the histogram and obtain basic descriptive statistics. Discuss your findings.

(3 Points)

3. CAPM Model

- a) Estimate CAPM model for your company. Use S&P500 index returns as a proxy for the market portfolio. The data on the index are available from yahoo (you still need to transform them into log returns). As a proxy for interest rates use the rate of return on a three-month U.S. Treasury bill (short-term government-issued securities have virtually zero risk of default). The data are available from <https://fred.stlouisfed.org/series/DGS3MO>

(3 Points)

Notes:

Dates when shares were traded may not fully coincide with the dates when TBills were traded. To match the dates use Excel's VLOOKUP function (make sure to use false option for range_lookup to disable approximate date match). Alternatively, you may use MS Access database.

- b) Test whether CAPM holds and interpret an estimate of β . If CAPM does not hold explain possible reasons and suggest possible solutions (you do not have to implement them). Assume that CAPM hold (at least approximately) and construct replication portfolio with S&P500 index and T-Bill. Compute the historical expected return and the variance of the portfolio and compare it to the variance of the share. Based on these findings advise your client whether investment in portfolio is a better option.

(3 Points)

- c) Check whether the CAPM model specification is stable under the COVID-19 period. You May use parameters/model stability tests like the CUSUM test. If you reject stability, re-estimate a post COVID-19 CAPM and comment on the COVID-19 market beta.

(3 Points)

4. APT Model

- a) Estimate and test an APT type pricing model using the Fama & French **three factor** model for your company stock. Data on the size/book-to-market factors can be downloaded from:

http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research

In your report interpret the meaning of the factors beta, and what they represent in addition to the CAPM premium.

(3 Points)

- b) Investigate whether unexpected changes in oil prices, and currency exchange rate are sources of risk that pay premium on your company stock.

Hint: Data on oil price and currency exchange rates are also available from Yahoo.Finance. Whether you include an exchange rate and which currency you want to consider depends on your company. If your company is domiciled in Australia and buys parts from China, changes in the AUD/YUAN exchange rate may impact profitability of the company and the return on investment.

(3 Points)

5. Model Selection:

- a) Test for Unit root in the series. Describe the Dickey-Fuller test (the null hypothesis and the alternative) and comment on the conclusion of the test.

(2 Points)

- b) If you do not reject the null of unit root, describe your strategy for transforming the series into stationarity. Note that you may have deterministic source of non-stationarity. For example a structural break around COVID-19 pandemic!

(2 Points)

- c) Fit an ARIMA(1,1) model to your company returns data. Obtain the standardized residuals from your model and investigate if there is any dependence structure left in the residuals.

Hint: To do this you can use BDS test (Brock, Dechert and Schienkman [1987](*)). Explain why this test is appropriate, and why this test is more informative than a test for zero correlation in the residuals series. Shortly explain the test, the null hypothesis and the outcomes. What conclusions do you reach?

(3 Points)

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- In Python, you can find codes for implementing the BDS test in:

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https://programtalk.com/vs2/python/12423/statsmodels/statsmodels/tsa/tests/test_bds.py

(*)Brock, Dechert, Scheinkman, and LeBaron, A test for independence based on the correlation dimension, *Econometric Reviews*, 15, 1996: 197-235.

- d) Derive and plot the impulse response function of the ARIMA model you have estimated in (c)

(3 Points)

Yahoo! Finance - Windows Internet Explorer

http://finance.yahoo.com/

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Crystallex International Corp. AMEX

Ramtron International Corp. NASDAQ

Tyco International Ltd. NYSE

GT Solar International, Inc. NASDAQ

Show all results for "intern"

Tip: Use comma (,) to separate multiple quotes. Learn more...

MARKET SUMMARY

US EUROPE ASIA

Dow 11,543.55 -171.63 -1.47%

Nasdaq 2,367.52 -44.12 -1.83%

S&P 500 1,282.83 -17.85 -1.37%

10 Yr Bond 3.5130% +0.0180

Weekly Recap - Week ending 29-Aug-08

We said at the beginning of the week that participation would be on the low side, but that low volume didn't preclude the market from making big swings. In...

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Brokers: E*TRADE FINANCIAL SCOTTRADE TD AMERITRADE

CURRENCIES

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techTICKER Tech coverage exclusively on Yahoo! Finance

Oil companies shutting down Gulf operations

Royal Dutch Shell, BP and other oil companies wrapped up evacuations and shut down production Saturday as an intensifying Hurricane Gustav churned toward the petroleum-rich waters of the Gulf of Mexico.

United Steelworkers, ArcelorMittal reach agreement - AP

Bush points to signs that economy is on upswing - AP

Gas prices up as Gustav threatens Gulf refineries - AP

Stocks end lower on personal income data - AP

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Dollar could make gain - CNN News

Weekly Wire: Markets One Strong Leg at Risk - Morningstar.com

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Symbol	Price	Change	% Change
HPQ	46.92	-0.41	-0.87%
ADJ	11,543.55	-171.63	-1.47%
ANZ AX	16.61	+0.41	+2.53%

Clear all recent quotes

Fidelity

Waiting for http://streamapi.finance.yahoo.com/streamer/1.0?stream=HISTOGRAM&symbol=IBM&start=2008-08-29&end=2008-08-29&frequency=1d&include=OHLCV

IBM: Summary for INTL BUSINESS MACH - Yahoo! Finance - Windows Internet Explorer

http://finance.yahoo.com/q?s=IBM

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International Business Machines Corp. (IBM)

On Aug 29 121.73 +2.85 (2.29%)

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ACTIVE TRADERS

Fidelity

INTL BUSINESS MACH (NYSE: IBM)

After Hours: 122.03 +0.30 (0.25%) 8:52pm ET

Last Trade: 121.73

Day's Range: 121.63 - 123.99

Trade Time: Aug 29

52wk Range: 97.04 - 130.93

Volume: 7,156,221

Avg Vol (3m): 7,673,150

Prev Close: 124.58

Market Cap: 164,928

Open: 123.71

PIE (3m): 15.00

Bid: N/A

EPS (3m): 8.11

Ask: N/A

1y Target Est: 136.88

Div & Yield: 2.00 (1.60%)

Quotes delayed, except where indicated otherwise. For consolidated real-time quotes (incl. prepost market data), sign up for a free trial of Real-time Quotes.

HEADLINES Filter Headlines

Patent Filings Surge in China at BusinessWeek (Sat 8:00am)

[ideo] They Just Don't Get GDP! at TheStreet.com (Sat 8:54am)

Fast Money/Recap: Beware the Banks at TheStreet.com (Fri, Aug 29)

Weekend Edition: Stronger dollar may take wind out of high-tech revenue growth at MarketWatch (Fri, Aug 29)

Dell Shares Plunge The Most Since 2000, And Fears Extend To Other Tech Companies at Investor's Business Daily (Fri, Aug 29)

Final Glance: Computers companies AP (Fri, Aug 29)

Quick Market Stats: Week Ending 8/29 at CNBC (Fri, Aug 29)

[55] Editors' Picks: RealMoney Stories of the Week at RealMoney by TheStreet.com (Fri, Aug 29)

US STOCKS-Wall St tumbles as Dell warns on tech spending at Reuters (Fri, Aug 29)

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100% 9:40 PM

IBM: Historical Prices for INTL BUSINESS MACH - Yahoo! Finance - Windows Internet Explorer

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Down 1.47% Nasdaq 1.83%

Sun, Aug 31, 2008, 8:08AM ET - U.S. Markets closed.

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On Aug 29: 121.73 + 2.85 (2.29%)

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SET DATE RANGE

Start Date: Aug 10 2008 (e.g. Jan 1, 2003)

End Date: Aug 31 2008

Get Prices

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PRICES

Date	Open	High	Low	Close	Volume	Adj Close*
29-Aug-08	123.71	123.99	121.63	121.73	7,156,000	121.73
28-Aug-08	124.06	125.45	123.58	124.58	5,448,200	124.58
27-Aug-08	122.42	124.85	122.18	123.38	5,843,800	123.38
26-Aug-08	122.58	122.85	121.50	122.50	6,218,200	122.50
25-Aug-08	124.48	124.93	122.70	122.86	5,827,400	122.86
22-Aug-08	123.30	125.35	122.80	124.93	5,989,200	124.93
21-Aug-08	121.58	123.43	121.55	122.99	6,315,000	122.99
20-Aug-08	123.50	123.97	122.01	122.51	6,871,600	122.51
19-Aug-08	123.63	124.79	122.01	122.56	9,311,600	122.56
18-Aug-08	126.49	127.00	123.68	124.59	5,970,000	124.59
15-Aug-08	127.07	127.19	125.35	126.36	5,566,200	126.36
14-Aug-08	125.01	128.25	124.80	126.94	6,813,000	126.94
13-Aug-08	125.00	126.99	124.75	125.80	6,867,800	125.80
12-Aug-08	126.01	126.50	124.40	125.22	6,996,800	125.22
11-Aug-08	128.4	128.43	125.75	126.60	7,490,400	126.60
10-Aug-08	126.5	129.35	127.00	127.00	6,511,000	128.80

* Close price as of 4:00 PM for the last trading day.

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