

## MSc Financial Management

### AMBS75008 Group Project B – Quantitative Methods for Financial Management

#### A1 – Individual Assignment

#### Assignment Instructions:

Assignment Reference (subject title)	QMFM-StudentNumber-Sep22-A1
Due Date	Please refer to Blackboard
Wordcount (if applicable)	Maximum 2,000 words excluding references, graphs and tables.
Weighting	100% of the course
File Format	MS Office or PDF for the written part; Raw data in Excel Spreadsheet format and any Stata (or other programmes that you have used) do-files/workfiles, data and output files.
Submission Details	Blackboard – instructions provided on Blackboard

You will notice that there is a submission date for each question of the assignment. *This does not mean that there are three assignments for the unit.* Rather, there are three submission dates involved in the assignment so that a) you can balance your work in this unit with the work in the other units that you study this semester; and b) to ensure that you engage with the material in this unit from the start. ***The 2,000-word maximum therefore applies to the assignment as a whole, not to each question or each part.***

#### Presentation

**You should include in your written assignment all relevant graphs and tables that that you then discuss in your written assignment.** If it helps, you can think of the assignment as an analyst report about various aspects of stock returns that you are writing about the company and, for question three, industries you have chosen. **Please also include a word count that excludes graphs, equations, tables and references at the end.**

The assignment is divided into three parts that cover various aspects of the techniques covered in the course unit. Each part carries equal weight. You do not have to devote an equal number of words to each part but as they carry equal weight, the discrepancy between the number of words you use in each part should not be large. However, you may decide to allocate slightly more words to one part than another. That is your choice and that is fine. Penalties will only apply if you exceed the *total* word limit.

#### Some Advice Regarding Data for the Assignment

In downloading the data for the questions, the advice I gave regarding data for the AMBS75005 *Data Analysis and Statistical Techniques* assignment applies: I am not grading the assignment based on the company you choose; I am grading it based on your analysis. You

have access to the CRSP database via WRDS, so that is the database I would use and indeed is the database I recommend using for the assignment. You can use other sources such as Bloomberg, Datastream, Yahoo Finance and so forth if you wish but if you do choose to use them, it is your responsibility to ensure that you can download everything you need to complete the assignment.

To illustrate, Question 1 is based on a model developed to overcome the empirical shortcomings of the Capital Asset Pricing Model: the Fama-French three-factor model (see the references below.) The three factors that Fama and French use are available either from Kenneth French's website or via WRDS. These factors are for the US, so choosing a US company from the CRSP database via WRDS ensures that you can easily get the data to complete the assignment and that you do not spend too long searching for the appropriate data. Remember, your primary concern should be passing the course unit. If you wish to do the analysis for a company you are interested in, you can easily do that in your own time.

To be clear, then, should you choose to pick a company from the UK, say, it is your responsibility to find the UK equivalents (or suitable proxies for the equivalents) of the Fama and French three factors. My advice is to use data that is readily available and easily accessible to complete the assignment so that you (hopefully) pass the course. If you are interested in other companies, perhaps because you want to invest in them yourself, then analysing them is something you can do when you have free time to spare.

### Assignment Question 1

Download 20 years' worth of *monthly* data for the period January 2002 to December 2021 on a company of your choice from the CRSP database via WRDS, and download the Fama-French 3 Factors from the Kenneth French Data Library or from WRDS. You can access the Kenneth French Data Library directly here:

[https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

You will find the Fama-French 3 Factors in the "U.S. Research Returns" section of the website. **Note that the returns data from the Kenneth French Data Library is in percentage form. Returns data downloaded from the CRSP database is in decimal form. You should therefore either divide the data from the Kenneth French data library by 100 or multiply the returns on your company that you download from CRSP by 100.**

Using multiple regression analysis, estimate the Fama-French 3 Factor model for your company and interpret your results. In interpreting and discussing your results and the fit of your model, you should conduct any hypothesis tests you feel are relevant, as well as undertaking and interpreting diagnostic tests (for example, testing for heteroscedasticity and serial correlation) on the residuals.

In addition to the textbook and the notes, you should find the following papers useful in motivating the analysis and interpreting your results (you do not need to provide a detailed review of the papers in your answer):

French, K.R. and E.F. Fama, 1993, Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33, 3-56. **For the purposes of the assignment, you do not need to worry about the bond factors (sections 2.1.1, 4.1 and 4.3), the discussion of the findings for bond returns, nor the material in sections 5 and 6 (what Fama and French refer to as diagnostic testing in section 6 can be thought of more as robustness checks.)**

French, K.R. and E.F. Fama, 2004, The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives* 18, 25-46. **The sections on “Early Empirical Tests”, “Recent Tests” and “Explanations: Irrational Pricing or Risk” should prove useful.**

### Assignment Question 2

Download four years’ worth of *daily* stock return data covering the period January 2018 to December 2021 on a company of your choice.

Using the time series of returns for the company you have chosen, estimate a univariate time series model (white noise, autoregressive (AR), moving average (MA) or ARMA) that you think best describes the time series you have chosen and interpret your results. Your analysis should include a discussion of why, based on the autocorrelation and partial autocorrelation functions and any additional suitable statistical tests you choose to run, you have identified the model you have and why this might be the most appropriate among the contender models you considered. Are your results consistent with the weak form of market efficiency? Briefly explain why or why not.

### Assignment Question 3

From the Kenneth French Data Library, which you can access directly here:

[https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

download four years’ worth of *daily* return data covering the period January 2018 to December 2021 on the market return and two industry portfolios of your choice from the “30 Industry Portfolios” section of the website. If you wish, you can download daily returns on the market from the CRSP database via WRDS. Describe the purpose of a Vector Autoregression (VAR), and estimate and interpret a VAR model describing the dynamic relationship between returns on the market and returns on the industry portfolios. You should include a discussion

of why you have identified the model you have and perform any additional analysis you think may be useful in interpreting the results from your VAR model.

In addition to the textbook and the notes, you should find the following paper useful in motivating the analysis and interpreting your results (you do not need to provide a detailed review of the paper in your answer):

Hong, H., W. Torous and R. Valkanov, 2007, Do industries lead stock markets? *Journal of Financial Economics* 83, 367-396.

**End of the assignment**