UNIVERSITY OF SYDNEY

BUSINESS ANALYTICS

QBUS6830: FINANCIAL TIME SERIES AND FORECASTING
SEMESTER 1, 2019

Lab Tutorial Sheet 4

Q1 (Stress testing CAPM) Get the Kenneth French data on factors and 5 industry portfolios (value weighted) on a monthly frequency (files F-F_Research_Data_Factors.txt and 5_Industry_Portfolios.txt in Canvas). Note that these data files contain Monthly and Annual data so you will have to scroll down to find and select only the appropriate data set in each of the text files.

  (a) Fit the multi-factor CAPM model to each of the five industry group portfolio excess return series.

  (b) Estimate the average (and standard deviation of) industry return, for each industry, for each combination of the following cases:

  1. The excess market return is -5%, -10%.
  2. HML is 0%, -2%.
  3. SMB is 0%, -2%.

  Discuss

  (c) For each combination in (b), estimate a Value at Risk and expected shortfall at the 1% level, for each asset, using the Gaussian distribution and a sample percentile approach. Discuss.

  (d) Using your answers in (b) and (c), discuss the risk properties of each industry portfolio and also how you could protect your investment in each against the situations in part (b).

  (e) How likely are the scenarios in part (b)?

Q2 (PCA) We use the data from the text by Tsay in Chapter 9 from the file Tsay_FM_data.txt, being monthly returns on IBM, HPQ, Intel, JP Morgan and Bank of America, from January, 1990 to December, 2008.

  (a) Form the correlation matrix from these asset return series and comment on the apparent relationships observed. Does it make sense to do a PCA on these variables?

  (b) Perform a PCA on this data and report the results.

  (c) How many principal components do you think are adequate to explain these variables? Describe the PCs found, do they make intuitive sense and/or have a relevant or useful interpretation?