Econometrics I, Workbook 2
Michaelmas 2011

- Answer all questions in no more than 5 pages. Please be brief. There is no credit at all for extended answers.
- The weighting of Workbook 2 is half of the total for this term's Econometrics module.
- The figure in square brackets after each question is the weight carried in Workbook 2.
- Documentation of your analysis: Your empirical analysis must be capable of being replicated. For this reason, you should annotate and include your *RExcel* script or *EViews* programme (or batch file in any other statistical package that you prefer to use) in the appendix. If you use packages that do not have batch command facility, you should report the sequence of your computational steps, such as data transformations etc in the appendix. This document / your batch file / your *RExcel*/*EViews* script file) should be printed and attached as the **only** appendix.
- Note: http://www.intranet.jbs.cam.ac.uk/students/plagiarism.html
- Please submit your assignment in the usual way: one paper copy including cover page to be placed in assignment box + electronic copy on Camtools, by 12 December at 2pm. Late submissions will be penalised according to MFin handbook.

Exercise 1

The news-magazine *The Economist* regularly publishes data on the so called *Big Mac index* and exchange rates between countries. The data for 45 countries from the July 16, 2009 issue is listed in *bigmac.csv*.

The idea that similar foreign and domestic goods should have the same price in terms of the same currency is called *purchasing power parity*. This suggests that the ratio of the *Big Mac* priced in the local currency to the U.S. dollar price should equal the exchange rate between the two countries. Calculate the predicted exchange rate per U.S. dollar by dividing the price of a *Big Mac* in local currency by the U.S. price of a *Big Mac* ($3.57).

(i) Run a regression of the actual exchange rate on the predicted exchange rate. If purchasing power parity held, what would you expect the slope and the intercept of the regression to be? Test hypotheses about the slope and the intercept.

(ii) Explain the consequence of disregarding any extreme observations in the independent variable on the standard deviation of the OLS estimator of the slope?

[25%]

Exercise 2

Use the data provided in *capm.csv*. These data include *Microsoft* stock price, *S&P 500* index, consumer price index, industrial production index, Treasury bill yields for three months, six months, one year, three years, five years and ten years, consumer credit (USD Million), and credit spread, defined as the difference in annualized average yields between a portfolios of bonds rated AAA and a portfolio of bonds rated BAA.

Microsoft	Microsoft stock price
SANDP	*S&P 500* index
CPI	consumer price index
IndProdn	industrial production index
USTB3M	Treasury bill yields for three months
CONSUMERCREDIT	consumer credit (USD Million)
BAA_AAASPREAD	credit spread

All data are monthly and commence from March 1986 and end in April 2007 (254 months). Treasury bill yields for the three months, six months, one year, three years, five years and ten years are annualized in terms of percentage points. For example, Mar-86 USTB3M which is 7.01, indicates that for that month, the annual yield for 3-month Treasury bill yields is 7.01%.

(i) Estimate a *CAPM* model for *Microsoft* and test a hypothesis of your choice about beta, using the *S&P 500* index as the market portfolio and three month US Treasury bills as the risk free asset. Interpret.

(ii) The *arbitrage pricing theory* (*APT*) states that stock returns should be explained by unexpected changes in a number of macroeconomic and financial variables. We assume that investors hold the naïve expectation that the next period's value is equal to the current value. So the unexpected change for the current period is defined as the difference between current value and the value in the earlier period. Specify a model that accords with this "theory", and test whether the additional explanatory variables have significant power in explaining Microsoft stock returns. (Hint: use the *F*-test).

(iii) For this *APT* model, carry out tests for multi-collinearity, heteroskedasticity, and departure from normality.

(iv) Estimate a suitable model in the light of the test results.

[75%]