

Business Mathematics (BK/IBA) – Quantitative Research Methods I (EBE)
Digital test 1 (15/09/2015 12:00-13:30)

Question 1

- a) Open the file “1234567_digitaltest_1.docx” on the desktop.
- b) Type your name, student number, programme (EBE), etc. at the appropriate places. **(1 point)**
- c) Save the document on the desktop under the filename in which “1234567” is replaced by your student number (=7 digits, not your VU-net ID!). Thus, the new filename becomes something like “8520981_digitaltest_1_sample.docx”.
- d) Leave the document open for inserting the answers to questions 2 and 3 in the indicated places. We recommend you to save your document regularly while doing the next questions.

Question 2

- a) Retype the following formula in a professionally typeset way into the document. You don't need to choose a font similar to the original one, but you should at least use the usual conventions for typing mathematical text, and type the mathematical part exactly as given (for instance, don't replace $\frac{1}{n}$ by $1/n$). **(1 point)**

$$\exp\left(\sum_{i=1}^n x_i\right) = \prod_{i=1}^n \exp(x_i)$$

- b) Idem. **(1 point)**

for suitable matrices **A** and **B**: $(\mathbf{AB})' = \mathbf{B}'\mathbf{A}'$

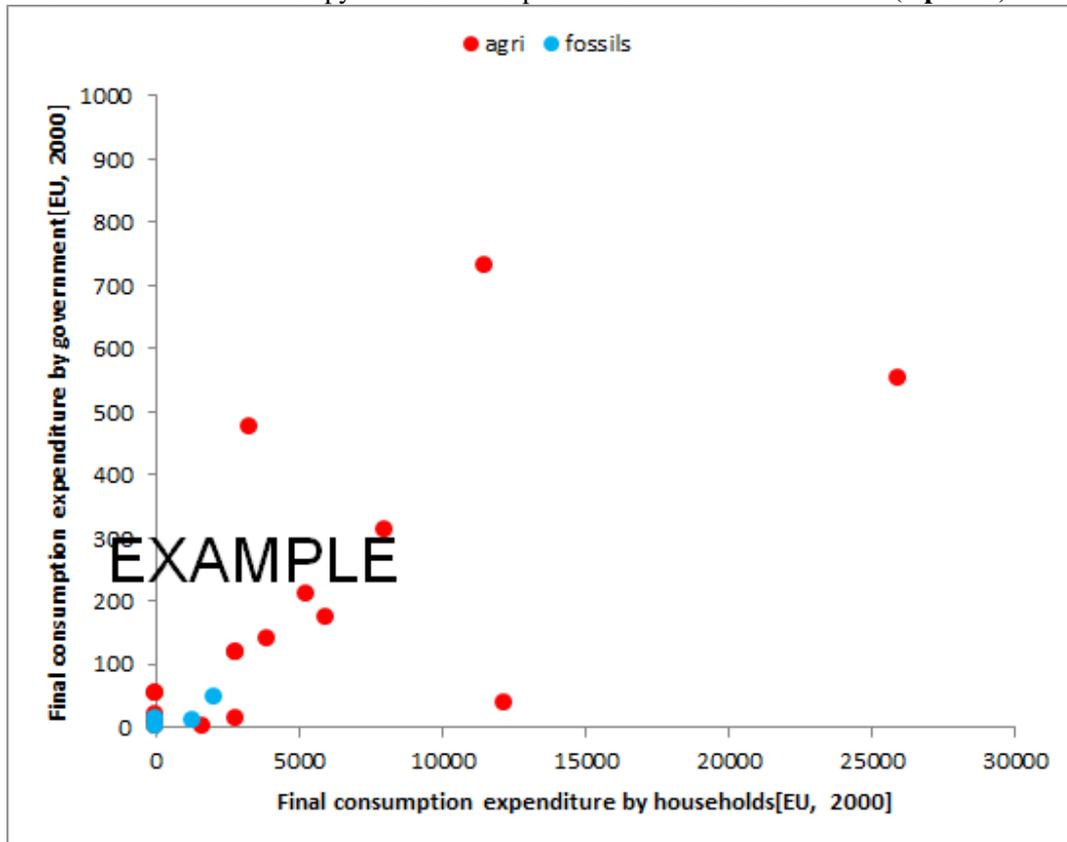
Question 3

- a) Open the file “excel_digitaltest_1.xlsx” that resides on the desktop. You will see a dataset on the consumption and stock changes of 129 different product categories (labelled “Paddy rice”, “Wheat”, etc.) by the EU and the rest of the world (“XX”). All data is in millions of euro. The different columns represent different final user categories: households, government, changes in inventories, etc. You don't need to report anything. You don't need to hand in your Excel file, but it can be convenient to save it regularly.
- b) Make a new column (Q), which contains the information in column B divided by the total of that column. In formula: $q_i = \frac{b_i}{\sum_{j=1}^n b_j}$. Do not use cell names for this question, but cell references only. Report the Excel formula used¹ by typing or pasting it in the Word file. **(1 point)**
- c) Create in an empty cell (e.g., R1) a function that counts how many cells of column F contain a value that is larger than 500. Do not use cell names for this question, but cell references only. Report the Excel formula used¹. **(1 point)**
- d) Create a new column (S) of which the cells contain the value of the cell in the same row of column B whenever that value is larger than or equal to 100, and the text “negligible” whenever it

¹ Excel formulas should be reported in plain Excel syntax, e.g., “=SQR(A1)”.

is smaller. Do not use cell names for this question, but cell references only. Report the Excel formula used¹. (1 point)

- e) Make a scatterplot of the data in rows 2-18 (“agri”) and rows 19-22 (“fossils”) of column B and column I as shown below. Try to reproduce the graph below as precisely as possible², leaving out the text “EXAMPLE”. Copy the result and paste it to the Word document³. (2 points)



- f) Given are the functions $f(x) = \lfloor x \rfloor$ and $g(x) = 5 + \frac{x+10}{x-10}$, where $\lfloor x \rfloor$ is the function which rounds the number x to below (e.g., $\lfloor 3.2 \rfloor = 3$, $\lfloor 2.9 \rfloor = 2$, $\lfloor -3.2 \rfloor = -4$, $\lfloor -2.9 \rfloor = -3$). We wish to make a graph of these two functions, with a domain for x : $[-5, 5]$. To make a smooth graph, we have taken a step size of $\Delta x = 0.01$. Try to reproduce the graph below as precisely as possible, leaving out the text “EXAMPLE”. Copy the result and paste it to the Word document³. (2 points)

² For those who are colour-blind: the dots are in red and blue, the rest is black or grey.

³ Keep in mind the possible dangers of just pasting. We recommend to paste “as picture”.

