

# Introductory Econometrics

## Home Assignment 1

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Fall 2024

Solution of the assignment is to be delivered electronically to **254279@muni.cz** by **Saturday, 26 October, 2024 23:59:59** the latest. Late submissions will not be accepted, resulting in zero points.

Form teams of two people, please. Only one team member is supposed to submit the solution with both team members' names and email addresses on the first page of the document. Teams are required to work independently, and any form of plagiarism will be treated accordingly. Please understand that the main advantage of teamwork is the synergy from solving the problems together and the possibility to share and discuss your econometric knowledge with your teammate. It is not about a pure division of tasks. So, please, do cooperate and make sure you both understand all solutions completely.

Submit your work with **(i) a report in the .pdf format and (ii) the Excel .xls(x)**. Grade is given based mainly on report .pdf but Excel .xls(x) will be checked to ensure the calculations are correctly done.

Name the file **Surname1\_Surname2\_HA01.pdf**.

In your report, please, be clear and reasonably concise, but do explain all essential steps of your solution/reasoning. Keep in mind that not only the correctness of your answers and interpretations is assessed, but also the text-editing quality is an integral part of your output.

Fingers crossed!  
Hieu Nguyen

## Problem 1: Test scores

(2 points, 0.5pt each) A nationwide test score has a mean of 63 points and a variance of 121.

1. Convert the following raw scores to standardized  $Z$  values: 52, 91.
2. What raw scores correspond to standardized values  $Z = 2$  and  $Z = -1.5$ ?
3. Assuming that the test score is normally distributed, what is the probability that a randomly selected individual who participated in the test has obtained a test score higher or equal to 41?
4. Assuming normality again, what is the probability that a randomly selected individual has obtained a test score between 55 and 75?

## Problem 2: Modeling demand for beer consumption

(8 points) Let us consider a simple regression model to explain the demand for beer. From the theory of consumer choice in microeconomics, we know that the demand for goods also depends on income. We will thus focus on this trivialized linear relationship. The data file `HomeAssignment_01.Problem2data.xlsx` contains a data sample of 30 observations of annual beer consumption (in liters) and annual income (in USD thousands) collected from randomly selected households.

Answer the following questions. You can use Seminar #2 as a reference.

1. (1 pt) Formulate the econometric model. Using the OLS formula, estimate the intercept and slope parameters. Show the estimated model equation.
2. (1 pt) Interpret the meaning of the estimated coefficient of income. Does the direction of the income effect follow your economic intuition? Explain why/ why not.
3. (1 pt) Does the estimated intercept make sense in this situation? If yes, provide your economic interpretation. If not, explain why.
4. (1 pt) Find and list the model's estimated/fitted values and residuals. Do the sum of the residuals up to zero? (show clearly in Excel file)
5. (0.5 pt) Predict the beer consumption for households with an annual income of USD 60,000 and with USD 30,000.
6. (1pt) Consider carefully the 6 Classical Assumptions step-by-step. Which of them are likely to be violated? Explain your reasoning properly.

7. (1 pt) What are the consequences in case some specific Classical Assumptions are violated? Think mainly about OLS properties (unbiasedness, consistency, efficiency).
8. (1 pt) Comment on the overall results of your analysis. Does the model suggest a realistic relationship between beer consumption and households' income?

Attached: HomeAssignment\_01\_Problem2data.xlsx