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| Tutorial 3(Week starting on 14-mar-2022) |

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| **Objectives**   * Study the presence of markets in ancient times * Start getting familiar with econometric techniques in a simple manner   **Working materials**   * **Temin, P. [2013]** “*The Roman Market Economy”*. Princeton University Press. Ch. 2, 29-52 * **Excel.** Before solving the exercise guide you’ll have to download the complement called “Herramientas para análisis”.[[1]](#footnote-1) |

**Exercise guide**

The exercises marked with an asterisk (\*) are compulsory and must be submitted by email **before 12.00 on Wednesday 23rd March**. [[2]](#footnote-2) To the mark obtained on the evaluation of this assignment,**0.05 points will be subtracted for each minute late**. Consult the course program with regards to the formalities of the presentation.

1. (\*) Explain in just a few words what question is Temin [2013] chapter 2 trying to answer and how he attempts to do so. What are the main results?
2. (\*) According to the author, what should we observe in the price of grain if the existence of an interconnected market in the roman world is true?
3. Hereunder, we show table 2.2 from the chapter without the column “Año”. Copy this table onto an Excel sheet, so as to reproduce the data base from the paper. The idea is the reproduce the graphs and tables using different tools from Excel.
   1. Reproduce figure 2.1. For this, you’ll need to create a scatter plot (it is expected that the graph be self-contained, in other words, one must be able to interpret what the graph shows without having read the entirety of the research paper). Describe the graph and explain what information can be obtained from it.
   2. In his work, Temin [2013] wants to explain the distance discount with the distance to Rome, that’s why he creates a model. Assume a value for alpha and beta and calculate the estimated values of the model. Calculate the square of the difference with the estimated values. Calculate the sum of said squared differences. Graph these points on the graph from point a.
   3. In each of the rows from table 2.3, the results from the different linear regression models are shown. Replicate the first row from this table, that is, the regression that takes “Diferencia de precio con Roma” as a dependent variable.

**Table 2.2. Distance and price per grain.**

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| Región | Distancia de Roma (en km) | Precio en Roma (HS) | Precio en la provincia (HS) | “Descuento” por la distancia de Roma (HS) |
| Sicilia | 427 | 4,00 | 2,00-3,00 | -1,5 |
| España | 1363 | 3,00-4,00 | 1,00 | -2,5 |
| Italia | 1510 | 3,00-4,00 | 0,5 | -3,00 |
| Asia Menor | 1724 | 5,00-6,00 | 2,00-2,25 | -3,13 |
| Egipto | 1953 | 5,00-6,00 | 1,5 | -4,00 |
| Palestina | 2298 | 5,00-6,00 | 2,00-2,5 | -3,25 |

1. (\*) Reproduce figure 2.2. For this, you’ll need to create a scatter plot and add the trend line (it is expected that the graph be self-contained, in other words, one must be able to interpret what the graph shows without having read the entirety of the research paper). Describe the graph and explain what information can be obtained from it.
2. (\*) In each of the rows from table 2.3, the results from the different linear regression models are shown. Replicate the second row from the table, that is, the regression that takes “Diferencia de precio con Roma” as a dependent variable whilst excluding the observation from Italy. Show the regression output from Excel and highlight the “Distancia” variable’s coefficient in red. How can this be coefficient interpreted?
3. Taking into account the results obtained from the previous exercise, what information does the adjusted R2 provide? How can it be interpreted in this case?
4. What are the main criticisms to Temin [2013]’s chapter 2? Explain them in your own words and concisely.

1. Temin attempts to find whether or not, as generally accepted, there wasn’t a unified interconnected market in Rome, in which arbitrage functioned setting the prices in Rome, where demand far exceeded supply, as a benchmark for prices elsewhere. This would be proven right if the equilibrium price in any city away from Rome could be estimated as a function of it and the distance of that city to Rome, so he uses a linear regression model to try to prove whether this relationship between price and distance existed.

2. According to the author, we should expect a relationship between distance from Rome and price. Proposing that, the further from Rome, the lower the price you would find. He brings 6 different observations from several locations away from Rome and makes a regression based on these. Through this regression, we can be led to believe that there is a price relationship indicating an entire related market, as the hypothesis suggests.

3. A. From this graph we see the sample laid out and scattered on a plain where each point is made up of a distance from Rome and a price discount. Only looking at these values one can see a rough estimate of the relation being theorized.

B. The estimated beta cero is the estimation of a constant that multiplies the independent variable, that is, the slope of the curve that best fits all the datapoints, while beta is an estimation for the overall related variables that affect the trend. We took them from the excel estimation function. We then squared the difference between the data values and the new line’s values for which we got the slope and the intercept.

C. We took the coefficient (B1) and the y intercept (B0), from the excel estimation and divided those by the standard error value thrown up by excel and got the wrong result. We are not sure where we went wrong but all the results seem off beforehand anyways.

4. The graph shows the relation between prices in different places that, according to Temin, were part of the Roman unified market and the distance from those cities to Rome. We can see an inverse relationship of prices and distance where prices would appear to be lower the further away from Rome one looks, thus seemingly confirming Temin’s view that there was arbitrage going on and one could expect the price in Rome, where there was more demand than local production, to be the price at origin plus the transportation costs.

5.

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| -0,0011681 | -1,0619949 |
| 0,00033943 | 0,57014595 |
| 0,79787479 | 0,48578034 |
| 11,8422848 | 3 |
| 2,79457239 | 0,70794761 |

This number can be interpreted as saying that one kilometer you move away from Rome, our independent variable, decreases the price by the amount highlighted in red, that is, the slope of the function.

6. The r^2 value for the dataset that excludes Italy from the dataset points to, on the one hand, a result that is pretty good since the higher the r value the “more accurate” we could call the estimation, and it tells us that the regression is even more representative of reality that it would be with the excluded datapoint

7. One of the main criticisms involves a lack of enough data to draw conclusions, since there are only 6 accounts of prices and they are qualitative accounts which could be biased in one way or another, for example, be politically motivated in reporting a high price. Another criticism points out there could be other explanations for the results like coin shortages the further away from Rome to which Temin responds that that just isn’t true.

1. <https://support.office.com/es-es/article/cargar-herramientas-para-análisis-en-excel-6a63e598-cd6d-42e3-9317-6b40ba1a66b4#OfficeVersion=Windows> [↑](#footnote-ref-1)
2. Check the course’s syllabus on presentation [↑](#footnote-ref-2)