Barcelona School of Economics

Assignment

Econometrics

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Contents

A Introduction

This is a sample LaTeX template for assignments. Its purpose is to help you quickly get started with LaTeX and provide a consistent, professional format for presenting your results throughout the Master program. While using LaTeX is not compulsory, this template includes typical elements you will often need in your assignments.

B Mathematical Notation

You can write simple equations:

$$y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \tag{1}$$

Algebraic expressions can be written inline or displayed:

$$(a+b)^2 = a^2 + 2ab + b^2$$

Summation is easy with `\sum`:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

Matrices are displayed with the `bmatrix` environment:

$$X = \begin{bmatrix} 1 & x_{11} & x_{12} \\ 1 & x_{21} & x_{22} \\ \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} \end{bmatrix}, \quad \beta = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \end{bmatrix}$$

Then the linear model in matrix form:

$$Y = X\beta + \varepsilon$$

Vectors can be expressed in bold or with arrow notation:

$$\mathbf{y} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}, \quad \vec{x}_i = \begin{bmatrix} x_{i1} \\ x_{i2} \end{bmatrix}$$

Solving for OLS estimator:

$$\hat{\beta} = (X'X)^{-1}X'Y$$

C Tables

C.1 Summary Statistics

You can generate summary statistics in Python or Stata and export directly to LaTeX. For example, in Python:

```
summary = df.describe().loc[['mean','std','count']]
latex_table = summary.T.to_latex(float_format="%.2f",
                                 caption="Summary␣statistics",
                                 label="tab:summary")
print(latex_table)
```

This produces a '.tex' file like 'summary.tex'. You can include it in your LaTeX document:

```
\input{summary.tex}
```

Example table (placeholder):

Variable	Mean	Std. Dev.	N
x	7.00	1.58	5
y	12.00	1.58	5

Table 1: Summary statistics (from Python export)

C.2 Regression Table

Regression results can also be exported from Python (using `stargazer`) or Stata. Example in Python:

```
from stargazer.stargazer import Stargazer
stargazer = Stargazer([model])
print(stargazer.render_latex())
```

This creates a '.tex' file like 'regression.tex'. Include in LaTeX:

```
\input{regression.tex}
```

Example regression table (placeholder):

	(1)	(2)
x	0.52***	0.48***
	(0.08)	(0.07)
Constant	2.15***	1.95***
	(0.50)	(0.45)
Observations	100	100
R^2	0.35	0.40

Table 2: OLS Regression Results (from Python/Stata export)

D Figures

You can include one or multiple figures:

D.1 Single Figure

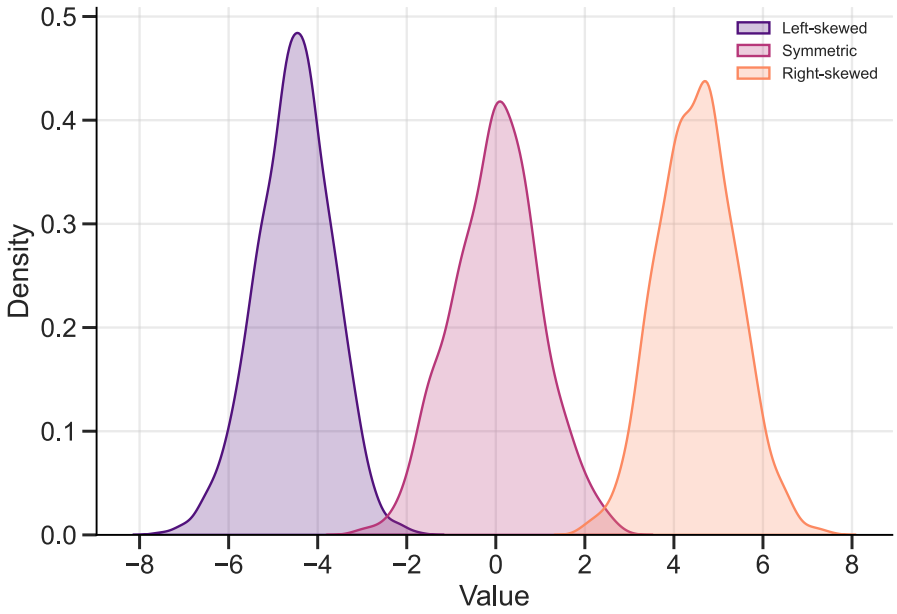
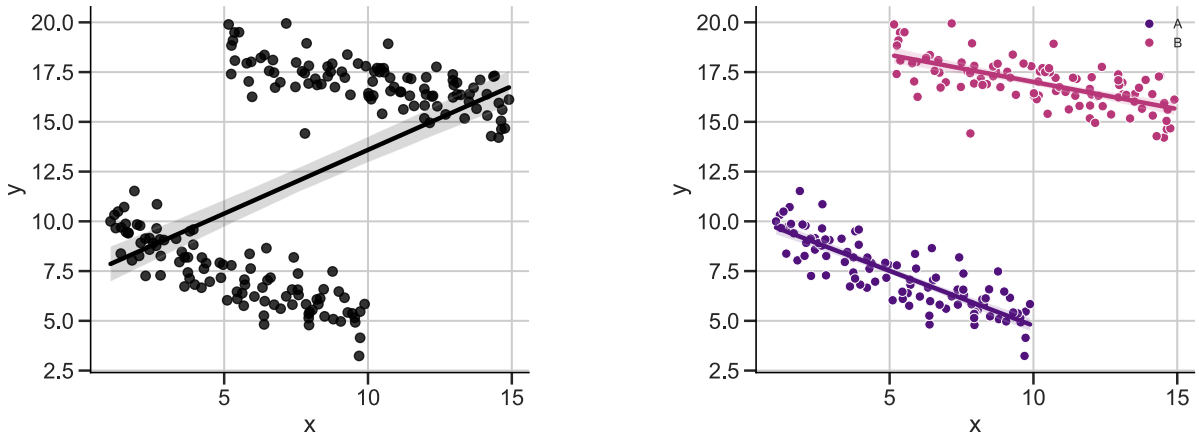


Figure 1: Single figure example

D.2 Two Figures Side by Side



(a) Figure A **(b)** Figure B

Figure 2: Two figures side by side

E Code Block Example

Python code can be included:

```python
import pandas as pd
import statsmodels.api as sm

# Load data
df = pd.read_csv("data.csv")
X = sm.add_constant(df["x"])
y = df["y"]

# Run OLS regression
model = sm.OLS(y, X).fit()
print(model.summary())
```