

## Assignment 10: Best Practices in Computing

### Instructions:

- **Deadline:** April 30, before class
- Submit via your GitHub repository in a separate folder (assignment10)
- (No solutions this time, but no take home part either)

### Contents

1	Task: Build a Mini Research Project	2
2	Extensions	3

# 1 Task: Build a Mini Research Project

The goal of this assignment is to build a small, self-contained project that integrates R analysis with a  $\LaTeX$  document. The idea is simple: R produces output files (a table and a figure), and the  $\LaTeX$  document loads them automatically. When the analysis changes, you recompile the document and it updates — no copy-pasting.

Use any dataset from previous assignments, available at the course GitHub repository ([github.com/franvillamil/AQM2/tree/master/datasets/](https://github.com/franvillamil/AQM2/tree/master/datasets/)).

## 1.1 What to build

Create a folder `assignment10` in your course repository with the following components:

1. **An R script** (e.g., `analysis.R`) that:

- Loads the dataset
- Runs at least two regression models (e.g., CPI on GDP with and without controls, using the `corruption` dataset)
- Saves a regression table as a `.tex` file using `modelsummary()` with the output argument
- Creates at least one figure (e.g., a scatter plot) and saves it as a `.pdf` file using `ggsave()`

2. **A  $\LaTeX$  document** (e.g., `document.tex`) that:

- Includes a brief title and one or two sentences describing the analysis
- Loads the regression table using `\input{path/to/table.tex}`
- Loads the figure using `\includegraphics{path/to/figure.pdf}`
- Compiles into a PDF that shows the table and figure

The specifics of the analysis, the model specification, the plot design, and the folder structure are up to you. What matters is that the pipeline works: run the R script, compile the  $\LaTeX$  document, and you get a PDF with the results embedded automatically.

**Note:** at the very least, I recommend creating directories `img/` and `tab/` to save graphs and tables, respectively. (We'll see why when we use Overleaf.)

## 1.2 Requirements

- The R script should run without errors from the `assignment10` folder (using relative paths only)
- The  $\LaTeX$  document should compile without errors and include the table and figure produced by R
- Include a short `README.md` describing the project, what each file does, and how to reproduce the output

## 2 Extensions

### 2.1 Extension A: Overleaf workflow

If you prefer to use Overleaf instead of compiling  $\text{\LaTeX}$  locally, adapt the project to work with Overleaf via Git:

1. Create an Overleaf project with your document .tex file
2. Clone the Overleaf project to your computer using Git (Overleaf provides a Git URL for each project under Menu → Git)
3. Run your R script locally to produce the .tex table and .pdf figure
4. Copy the output files into the cloned Overleaf folder. You can do this manually, or write a small copy.sh shell script that automates the copying. For example, this is what I use (from the Overleaf folder<sup>1</sup>):

```
mkdir -p tab
mkdir -p img
cp -v ~/Documents/Projects/mycurrentproject/tab/*.tex tab/
cp -v ~/Documents/Projects/mycurrentproject/img/*.pdf img/
```

5. Push to Overleaf via Git (git add, git commit, git push) so the document updates with the latest results

In your README.md, describe the steps you followed and how the Overleaf integration works.

### 2.2 Extension B: Makefile

Create a Makefile in the assignment10 folder that automates the full pipeline. Running make from the terminal should:

1. **At least:** Run the R script to produce the table and figure
2. **Potentially:** Compile the  $\text{\LaTeX}$  document to produce the final PDF

Remember that each rule in a Makefile specifies a **target** (the output file), its **dependencies** (what it needs), and a **recipe** (the command to run). Makefile recipes must be indented with **tabs**, not spaces. (*Use AI to go through this.*)

---

<sup>1</sup>Because my project folder is always in the same place (Documents/Projects/) but the Overleaf one can change. Sometimes I just clone it locally to update empirical files but work on the website if it's only about text.