LaTeX and Overleaf

Štěpán Jabůrek[1] Flynn Schirott[2]

[1] Institute of Political Studies,
Charles University

[2] Department of Political Science and European Affairs,
University of Cologne

Statistical models beyond linear regression, April 2025

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TEX, LATEX, Overleaf?

- TEX
  - A typesetting program/language, originally for mathematical notation in documents.
  - Ultimate customization, very hard to use effectively.
- LATEX
  - Built on top of TEX, easier to use.
  - Popular in the natural sciences and quantitative political science for writing papers and presentations.
- Overleaf
  - An online LATEX work space that allows collaboration and has pre-defined commands.
- **Think of LATEX as R, and Overleaf as RStudio**

Why are you doing this to us? Isn´t Rmarkdown enough?

- Rmarkdown is great when R codes are the center of your document, for reports, teaching materials etc.
- If you want to write a full paper, presentation, etc, where R codes are not central, but:
  - You want to add nice regression tables or R code snippets.
  - You want to collaborate with others.
  - You want slightly more complex math

$\rightarrow$ In these cases LaTeX might be a good option to consider

So why Overleaf?

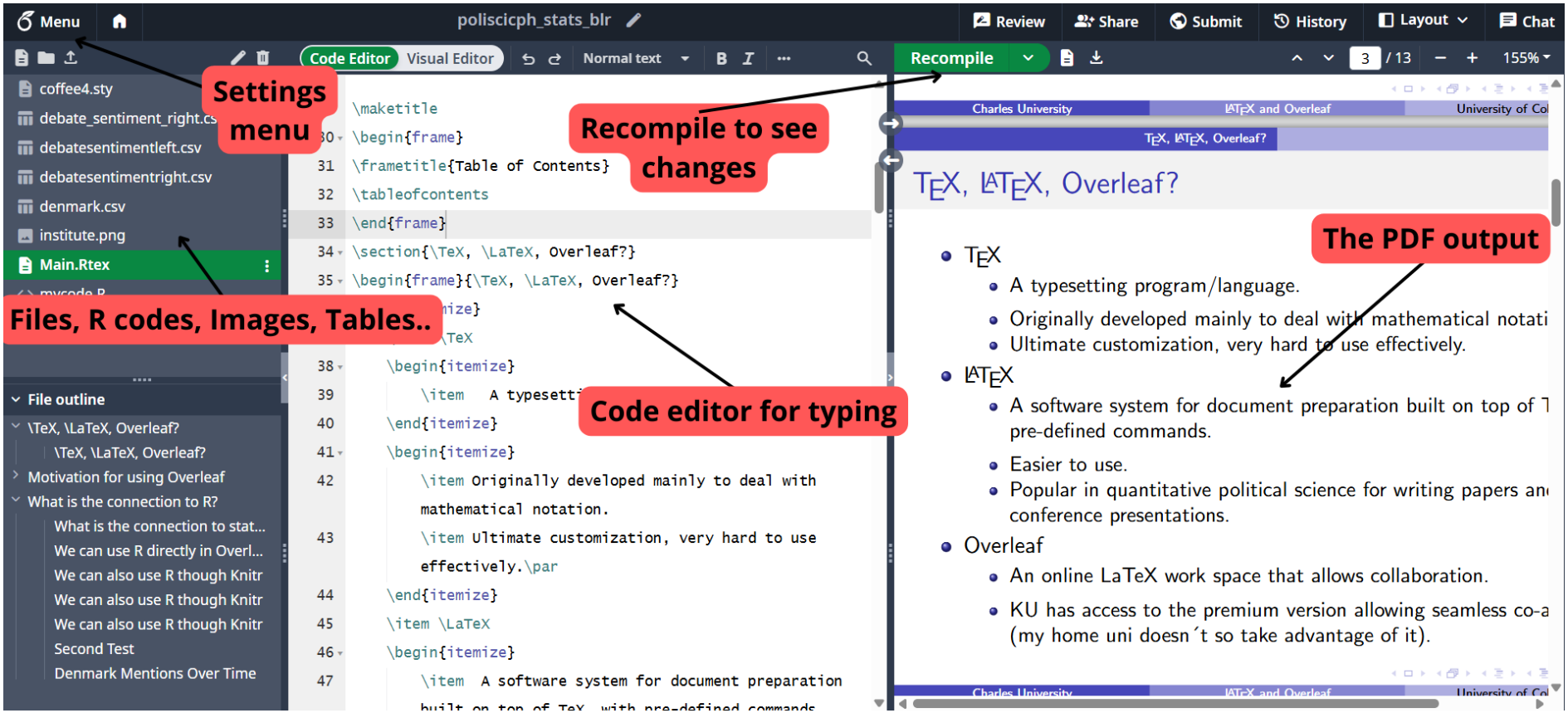
- In Overleaf you can have all the customization of LaTeX, **but** you do not have to.
- You can do a lot of stuff through drop-down menus like in Word or Google docs if you get lost
- You have hundreds of really cool templates that look nice and save you time (browse through templates of academic CVs for example)
- Real time collaboration, comments, restoring old versions etc. My best experience of co-authoring anything.

Final Motivation for LaTeXin Overleaf

- LaTeX lets you do fun and stupid stuff
- You can add coffee stains, halloween then l math and much more

$$Y = +\beta_1 \text{Year}_i + \beta_2 \text{Government}_i + \beta_3 \text{Election}_i + \beta_4 \text{Public Opinion}_i \tag{1}$$

Setup


Menu
poliscicph_stats_blr
Review
Share
Submit
History
Layout
Chat
Code Editor
Visual Editor
Normal text
Recompile
3 / 13
155%
Settings menu
Recompile to see changes
Files, R codes, Images, Tables..
Code editor for typing
The PDF output
coffee4.sty
debate_sentiment_right.cs
debatesentimentleft.csv
debatesentimentright.csv
denmark.csv
institute.png
Main.Rtex
File outline
\TeX, \LaTeX, Overleaf?
\TeX, \LaTeX, Overleaf?
Motivation for using Overleaf
What is the connection to R?
What is the connection to stat...
We can use R directly in Overl...
We can also use R though Knitr
We can also use R though Knitr
We can also use R though Knitr
Second Test
Denmark Mentions Over Time
\maketitle
\begin{frame}
\frametitle{Table of Contents}
\tableofcontents
\end{frame}
\section{\TeX, \LaTeX, Overleaf?}
\begin{frame}{\TeX, \LaTeX, Overleaf?}
\begin{itemize}
\item A typesetti
\end{itemize}
\begin{itemize}
\item Originally developed mainly to deal with mathematical notation.
\item Ultimate customization, very hard to use effectively.\par
\end{itemize}
\item \LaTeX
\begin{itemize}
\item A software system for document preparation
Charles University
LaTeX and Overleaf
University of Col
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TEX
A typesetting program/language.
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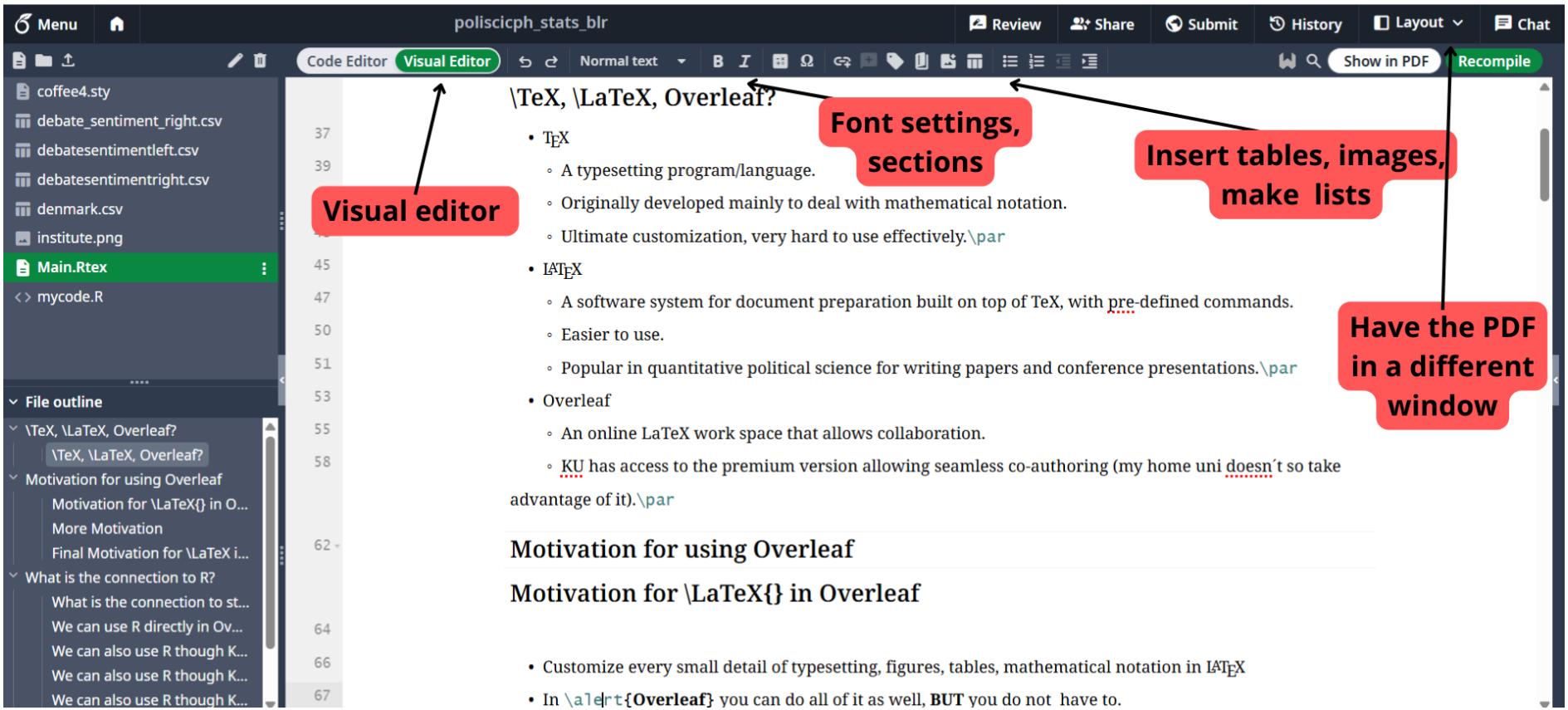
LATEX
A software system for document preparation built on top of T
pre-defined commands.
Easier to use.
Popular in quantitative political science for writing papers an
conference presentations.
Overleaf
An online LaTeX work space that allows collaboration.
KU has access to the premium version allowing seamless co-a
(my home uni doesn´t so take advantage of it).

This can be easier, right?



Basic functions

```
\documentclass{article} % Select the class for your document

\usepackage{natbib} % Load packages, just like in R

\title{Stats are cool} % Define the title, author, date etc.
\author{Awesome political scientist (your name)}
\date{\today}

%%%%%%%%%%%%%
\begin{document} % You have begin your document and set the title
\maketitle

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Basic functions

```
16 \section{First Chapter}% Define sections
17 Introduction to your cool \textbf{research} \LARGE{topic} % Set size of font with small,
   normalsize, large, Large, LARGE, Huge, HUGE. YOu always have to revert back, it applies to
   everything afterwards
18 \normalsize
19
20 \subsection{Numbered list}
21 \begin{enumerate} % Starting a sequence
22 \item First
23 \item Second
24 \end{enumerate} % You always have to end it.
25 % Seriously end it, Overleaf will scream at you otherwise :(
26
```

Basic functions

```
26
27 \subsection{Citations}
28 As \citet{hix_government-opposition_2016} argue in their article. Other research disputes this
   claim however \citep{rovny_party_2015}. % Cite in text or with complete parentheses.
29
30 \bibliographystyle{apalike} % Citation style
31 \bibliography{references} % print all used references
32
33 \end{document} % Again you have to end even the document
```

Basic functions

```
8  \usepackage{amsmath} % We need these packages now for math
9  \usepackage{graphicx} % figures
10 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
11 \begin{document}
12 \section{Math}
13 \subsection{Inline}
14 \Large Model defined as follows: $Y = \alpha + \beta_1 X + \beta_2 Z$
15
16 \subsection{Display}
17 Model defined as follows:
18 \[Y =\alpha + \beta_1 X + \beta_2 Z\]
19
20 \section{Regression tables from R}
21 \input{regression_table} % Insert LaTeX regression tables from Stargazer in R
22  % could not be simpler, it is already in Tex format
23
```

Basic functions

```
23
24 \begin{figure} % insert figures
25 \centering % center
26     \includegraphics[width=1\linewidth]{uluru_ggplot.jpg}
27     \caption{Uluru mapped with ggplot and ggridge by @researchremora
28 } % caption
29 \end{figure}
30
31
32
```

We can use R directly in Overleaf!

```r
# Create a sequence of numbers
X = 2:10

# Display basic statistical measures
summary(X)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       2       4       6       6       8      10
```

How it works in practice

- Setup Overleaf
- Copy my project
- Text basics
- Regression tables from R
- Graphs and figures
- Citations