R Markdown Demo PDF

Based on 'RMarkdownPDFExample.Rmd' by Garret Christensen

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Abstract

If I were writing an article and had an abstract, it would go here!

1 What is R Markdown?

This is an R Markdown document. Markdown is a simple formatting syntax for reports with embedded R code that can be exported as an html, pdf, MS Word, ODT, RTF, or markdown document; or as an html or pdf-based (Beamer) slide show.

Essentially, you write a document—like this one—in RStudio using Markdown syntax. Then you embed chunks of R code in the document, like this:

```
summary(iris)
```

```
##   Sepal.Length    Sepal.Width     Petal.Length    Petal.Width
##  Min.   :4.300   Min.   :2.000   Min.   :1.000   Min.   :0.100
##  1st Qu.:5.100   1st Qu.:2.800   1st Qu.:1.600   1st Qu.:0.300
##  Median :5.800   Median :3.000   Median :4.350   Median :1.300
##  Mean   :5.843   Mean   :3.057   Mean   :3.758   Mean   :1.199
##  3rd Qu.:6.400   3rd Qu.:3.300   3rd Qu.:5.100   3rd Qu.:1.800
##  Max.   :7.900   Max.   :4.400   Max.   :6.900   Max.   :2.500
##        Species
##  setosa    :50
##  versicolor:50
##  virginica :50
##
##
##
```

When you click the **Knit** button, a document (e.g., HTML, PDF) will be generated that includes the content you've typed as well as the output of any embedded R code chunks within the document.

This means that your code, analysis, and output are all in the same place! You never have to copy-and-paste a table or figure again! If you change your code and get and estimated effect size of 0.3 instead of 0.5, you don't need to scour your results section or use find and replace to change this result.

For more details on using R Markdown see http://rmarkdown.rstudio.com. Also check out this tutorial and this cheatsheet.

2 Getting Started

2.1 Installing and Loading

To use R Markdown, you need R and RStudio installed. Let's do that now:

1. Download and install R
2. Download and install RStudio—an "integrated development environment"" or IDE for R

Once you've got **RStudio open**, then

3. Install the R Markdown package by typing `install.packages("rmarkdown")` into the console
4. Open a new .Rmd document [File > New File > R Markdown . . .]

2.2 Basic Syntax

The content of an .rdm file is a mixture of different types of syntax and code, including:

- An (optional) YAML header at the beginning surrounded by "`---`"—this header gives basic document metadata and sets key style and other options, as desired
- Text using Markdown formatting—like this!
- R code chunks, which are the same bits of code you would write in a .R script file
- LaTeX syntax—enclose text in "`$`" for inline equations, e.g., $\hat{\beta} = (X'X)^{-1}X'y$ or "`$$`" for displayed equations:

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

2.3 Basic Options

Within the R code cunks, you can se the following options:

- `echo=FALSE`—prevents R source code from displaying
- `eval=FALSE`—prevents Knitr from evaluating the R code
- `results='hide'`—hides the results of the code
- `include=FALSE`—Knitr will run the code but not include in the final doc
- `warning=FALSE`—turns off warnings
- `message=FALSE`—turns off messages

3 Analysis Example

Let's first begin by clearing our workspace and setting our working directory:

```
rm(list = ls()) # clear workspace; always a good idea when starting
#setwd ("~/Documents/RA/India_BITSS/rmarkdown") # change your working directory
```

Then, let's load our packages:

```
need <- c("foreign", "sandwich", "ggplot2", "stargazer") # list packages you need
have <- need %in% rownames(installed.packages()) # see which are already
if(any(!have)) install.packages(need[!have]) # installs the missing ones
invisible(lapply(need, library, character.only=T)) # then loads them all
```

Load the data:

```
washb <- haven::read_dta("WASHBpublic_mock.dta")
```

Run the models:

```
model1 <- lm(free_chl_yn ~ treatw, data = washb)
model2 <- lm(free_chl_yn ~ treatw + kiswahili + english, data = washb)
robust.se1 <- sqrt(diag(vcovHC(model1, type = "HC")))
robust.se2 <- sqrt(diag(vcovHC(model2, type = "HC")))
```

And make our table:

```
stargazer(model1, model1, se=list(robust.se1, robust.se2),
          title="Made Automatically in R",
          out="outputR.tex", header=FALSE)
```

Table 1: Made Automatically in R

	Dependent variable:	
	free_chl_yn	
	(1)	(2)
treatw	0.364***	0.364***
	(0.043)	(0.043)
Constant	0.013	0.013
	(0.009)	(0.045)
Observations	284	284
R^2	0.223	0.223
Adjusted R^2	0.220	0.220
Residual Std. Error (df = 282)	0.340	0.340
F Statistic (df = 1; 282)	81.002***	81.002***
Note:	*p<0.1; **p<0.05; ***p<0.01	

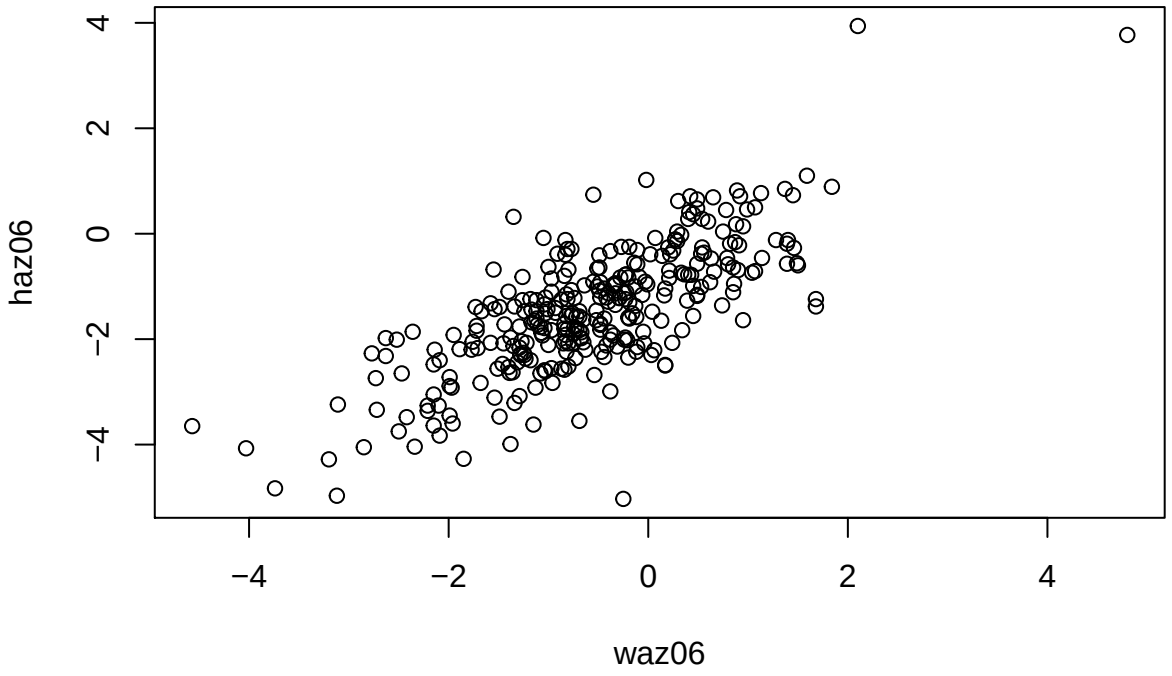
Note that we needed the `results = 'asis'` option to get the table to output correctly, otherwise we would have gotten the copy-and-paste LaTeX output like in R.

3.1 Referring to values

You can refer to values calculated in R by just surrounding "r" and the code with single accent marks. For example, the mean frequency is 0.4822888. The mean frequency rounded to two decimal place is 0.48.

4 Figures/Plots

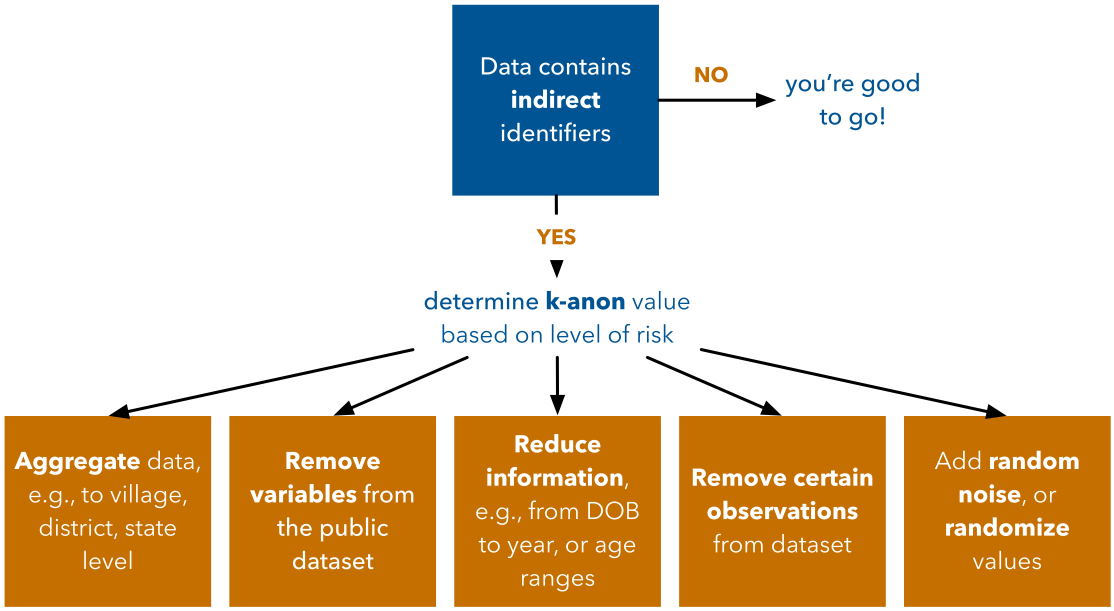
For figures generated in R, you can code them directly (here, the data comes from the `iris` dataset, which comes pre-loaded in R:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

For external files that you want to include, use `image: ![](de-identification_indirect.png)`. Or you can use LaTeX syntax if you want advanced formatting capacity, e.g.,

Figure 1: Options for De-Identifying Data



5 Basic Formatting in Markdown

5.1 Headers

Make yourself a header of different levels using # for level 1, ## for level 2 etc.

5.2 Typeface

Surround words in * for *italics*, and ** for **bold**.

5.3 Punctuation

Use "---"" to get an em-dash (—) and "--"" to get an en-dash (–). Use normal quotation marks (“”, or ”), unlike in LaTeX.

5.4 Lists

Make a numbered list using "1.", and a bulleted list using "-":

1. item 1
2. item 2
3. item 3

- item a
- item b
- item c

5.5 Hyperlinks

Rmarkdown will automatically format a copy-and-pasted URL as a hyperlink (e.g., http://rmarkdown.rstudio.com). If you want to add a link to a particular word, type "`[Rstudio](http://rmarkdown.rstudio.com)`" to get Rstudio.

5.6 Commenting

Commenting can get a little tricky to remember, as notation is different in R (#), LaTeX (%), and markdown (`<!-- -->`). In the preamble and code snippets, comment using # as in R (see above). In the rest of the document, comment by surrounding text with `<!-- -->`.

6 Footnotes and Citations

6.1 Footnotes

Add a footnote using `^[I am a footnote]`.[1]

6.2 Citations

Here's how you add a citation from your BibTex library (formatted in author-date style, using the `natbib` package loaded in the preamble):

- For a single source, use `[@citekey]`, e.g., "`[@banerjee2010pitfalls]`" gives us (Banerjee et al., 2010).
- For multiple sources, use `[@citekey1; @citekey2; etc.]`, e.g., "`[@banerjee2010pitfalls; @easterly2001elusive]`" gives us (Banerjee et al., 2010; Easterly, 2001).
- For an in-text citation, use `@citekey` with no brackets, e.g., "`@banerjee2010pitfalls`" gives us Banerjee et al. (2010).

For more, see http://rmarkdown.rstudio.com/authoring_bibliographies_and_citations.html.

And the bibliography/references will automatically show up with the sources you've added using cite keys; no need to copy and paste citations or double check to make sure you've included/removed sources as necessary!...

[1] I am a footnote.

References

Banerjee, Abhijit V, Rukmini Banerji, Esther Duflo, Rachel Glennerster and Stuti Khemani. 2010. "Pitfalls of Participatory Programs: Evidence from a randomized evaluation in education in India." *American Economic Journal: Economic Policy* pp. 1–30.

Easterly, William Russell. 2001. *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics*. MIT press.