

PP4RS | R Module

Slot 7

Dora Simon

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Outline of the R-Module

Slot 1: Intro & Data Types

Slot 2: Conditionals and Functions & Loops

Slot 3: Read in Data

Slot 4: Data Manipulation

Slot 5: Regressions

Slot 6: Graphs

Slot 7: knitr

Now: knitr

Markdown and RMarkdown

Markdown

- plain text formatting syntax
- designed to be
 - easy to write using any generic text editor
 - easy to read in its raw form
- can be converted to HTML, PDF, and many others
- often used for READMEs

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What Markdown can do:

- different heading levels
- automatic table of contents
- clickable links
- images
- Latex
- citations

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What Markdown cannot do:

- run code

■ RMarkdown can do all!

Working with pure Markdown

- create a .md file
- open it in Atom
- write your content in it
- save it
- "render" it, e.g. using pandoc

Example: Dora's research plan summary

```
1  ---
2  title: "Trade, Meat, and the Environment"
3  author: Dóra Zsuzsanna Simon
4  fontsize: 18pt
5  mainfont: Times New Roman
6  geometry: margin=0.75in
7  linestretch: 1.5
8  numbersections: false
9  ---
10 <!--
11 pandoc --latex-engine=xelatex --bibliography library.bib --csl elsevier-harvard2.csl simon-research-plan-summary.md -o
12 * simon-research-plan-summary.pdf
13 -->
14
15 # Research Plan Summary
16
17 Every day, each consumer has to decide what to eat. Apart from satisfying a basic human necessity, food is considered to be one of the
18 * consumption categories with the largest environmental impact. In particular, meat consumption is thought to be among the biggest
19 * contributors to environmental losses caused by food [Benders:2012]. In our globalized world, consumers are not restricted to buy only
20 * local food. The aim of this paper is to analyze the welfare effects and environmental consequences of international trade in the livestock
21 * industry.
22
23 The focus will be on meat consumption in Switzerland, which is a small, generally open economy with a protectionist meat market. In 2017,
24 * over 80% of meat consumed in Switzerland was produced in Switzerland [proviande]. The impact of meat imports to Switzerland is not
25 * trivial: The popular "Buy Local" suggestion would imply that consuming Swiss meat in Switzerland is the way to go for a greener meat
26 * consumption. But this suggestion does not take into account the vast productivity differences in meat production across countries, both in
27 * economic and environmental terms [herrero:2013]. There is evidence that the environmental emissions of food production are much higher
28 * than those of transport [weber:2008]. Therefore, it is not clear whether meat produced and consumed in Switzerland is better ecologically
29 * than meat produced somewhere else. Moreover, Swiss meat prices are the highest in Europe [eurostat]. Imported meat is considerably
30 * cheaper, adds to product variety and can lead to a welfare improvement in economic terms.
31
32 In order to derive welfare implications, the paper builds an IO-style trade model of the Swiss meat market. Through a cooperation with a
33 * major Swiss retailer, I will obtain data on import prices, internal prices and retail prices. On the environmental side, I will model the
34 * environmental impact of final meat products originating from different countries. Thereby, several environmental outcomes including
35 * greenhouse gas emissions from production as well as transportation will be taken into account.
36
37 Equipped with these tools, I will be able to analyze several counterfactual scenarios compared to today's level of meat trade. Potential
38 * scenarios include the approval of a free trade agreement with the MERCOSUR countries, a consumption rule that leads consumers to buy 10%
39 * more local products as well as meat imports from different source countries. The implicit value of subsidies towards Swiss farmers can be
40 * backed out as well. Moreover, the pass-through of trade policy changes can be analyzed with the rich data set on prices.
41
42 This paper adds to the literature in various ways. From the perspective of a trade economist, the current state of the Swiss meat market is
43 * not optimal. The vast gains from trade literature concludes that free trade is welfare improving. However, it does not take into account
44 * the environmental impact of free trade. On an aggregate level, this has been addressed by Shapiro [shapiro:2016]. He concludes that
45 * globally, the welfare effect of international trade outweighs its ecological damage.
46
47 This analysis explores the issue further and asks whether the gains still outweigh the losses in the livestock industry which is considered
48 * to be environmentally harmful. This single country, single industry focus enables me to tackle the question with higher data quality.
49 * Contrarily to the previous research in this area, I will obtain detailed data on prices and transport routes for the products already sold.
50 * As for the environmental outcomes, I will extend the analysis by not exclusively focusing on greenhouse gas emissions.
51
52 On a broader level, this paper adds to the literature on the demand side of environmental economics. So far, the trade and environment
53 * literature has mainly focused on supply-side topics, which is very important for policies on the origins of pollution. The demand side
54 * perspective of this paper has the advantage of offering immediate implications for consumer action.
55
56 # Bibliography
57
```


Example markdown file

To render this I used the shell: `pandoc --latex-engine=xelatex --bibliography library.bib --csl elsevier-harvard2.csl simon-research-plan-summary.md -o simon-research-plan-summary.pdf`

Trade, Meat, and the Environment

Dóra Zsuzsanna Simon

Research Plan Summary

Every day, each consumer has to decide what to eat. Apart from satisfying a basic human necessity, food is considered to be one of the consumption categories with the largest environmental impact. In particular, meat consumption is thought to be among the biggest contributors to environmental losses caused by food (Benders et al., 2012). In our globalized world, consumers are not restricted to buy only local food. The aim of this paper is to analyze the welfare effects and environmental consequences of international trade in the livestock industry.

The focus will be on meat consumption in Switzerland, which is a small, generally open economy with a protectionist meat market. In 2017, over 80% of meat consumed in Switzerland was produced in Switzerland (Proviande, 2018). The impact of meat imports to Switzerland is not trivial: The popular “Buy Local” suggestion would imply that consuming Swiss meat in Switzerland is the way to go for a greener meat consumption. But this suggestion does not take into account the vast productivity differences in meat production across countries, both in economic and environmental terms (Herrero et al., 2013). There is evidence that the environmental emissions of food production are much higher than those of transport (Weber and Matthews, 2008). Therefore, it is not clear whether meat produced and consumed in Switzerland is better ecologically than meat produced somewhere else. Moreover, Swiss meat prices are the highest in Europe (Eurostat, 2018). Imported meat is considerably cheaper, adds to product variety and can lead to a welfare improvement in economic terms.

In order to derive welfare implications, the paper builds an IO-style trade model of the Swiss meat market. Through a cooperation with a major Swiss retailer, I will obtain data on import prices, internal prices and retail prices. On the environmental side, I will model the environmental impact of final meat products originating from different countries. Thereby, several environmental outcomes including greenhouse gas emissions from production as well as transportation will be taken into account.

Equipped with these tools, I will be able to analyze several counterfactual scenarios compared to today’s level of meat trade. Potential scenarios include the approval of a free trade agreement with the MERCOSUR countries, a consumption rule that leads consumers to buy 10% more local products as well as meat imports from different source countries. The implicit value of subsidies towards Swiss farmers can be backed out as well. Moreover, the pass-through of trade policy changes can be analyzed with the rich data set on prices.

This paper adds to the literature in various ways. From the perspective of a trade economist, the current state of the Swiss meat market is not optimal. The vast gains from trade literature concludes that free trade is welfare improving. However, it does not take

into account the environmental impact of free trade. On an aggregate level, this has been addressed by Shapiro (2016). He concludes that globally, the welfare effect of international trade outweighs its ecological damage.

This analysis explores the issue further and asks whether the gains still outweigh the losses in the livestock industry which is considered to be environmentally harmful. This single country, single industry focus enables me to tackle the question with higher data quality. Contrarily to the previous research in this area, I will obtain detailed data on prices and transport routes for the products already sold. As for the environmental outcomes, I will extend the analysis by not exclusively focusing on greenhouse gas emissions.

On a broader level, this paper adds to the literature on the demand side of environmental economics. So far, the trade and environment literature has mainly focused on supply-side topics, which is very important for policies on the origins of pollution. The demand side perspective of this paper has the advantage of offering immediate implications for consumer action.

Bibliography

Benders, R.M., Moll, H.C., Nijdam, D.S., 2012. From energy to environmental analysis. *Journal of Industrial Ecology* 16, 163–175.

Eurostat, 2018. Price levels for 4 subcategories of food, 2017.

Herrero, M., Havlik, P., Valin, H., Notenbaert, A., Rufino, M.C., Thornton, P.K., Blümmel, M., Weiss, F., Grace, D., Obersteiner, M., 2013. Biomass use, production, feed efficiencies, and greenhouse gas emissions from global livestock systems. *Proceedings of the National Academy of Sciences*.

Proviande, 2018. Jährlicher Konsum 2017.

Shapiro, J.S., 2016. Trade costs, CO₂, and the environment. *American Economic Journal: Economic Policy* 8, 220–54.

Weber, C.L., Matthews, H.S., 2008. Food-miles and the relative climate impacts of food choices in the United States. *Environmental Science & Technology* 42, 3508–3513.

Latex, Markdown, and RMarkdown

Of course you can use Latex for all that. But I find .md more convenient to look at.

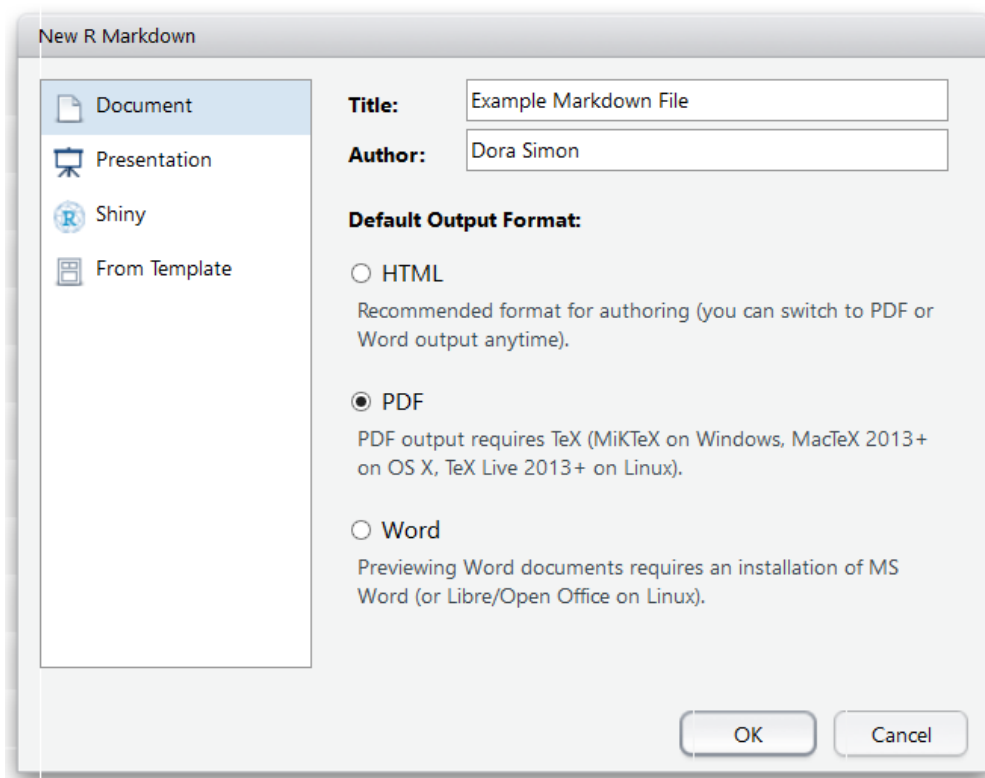
What you cannot do in Latex: Use R code! That is why we are going to look at .Rmd now.

First Steps

- First, load the package: `library(knitr)`
- In order to open an .Rmd file, do the following:
 - Go to "File"
 - Go to "New File"
 - Click R Markdown

New R Markdown

- We will be using the Document type in .pdf format.
- You might need LaTeX for that!
- If you do not have LaTeX, choose HTML for the moment.



Your .Rmd Document opens

If you click on "Knit", you will see how the finished .pdf looks like.

Now, we will go through the main parts of the .Rmd.

A screenshot of the RStudio editor window. The title bar says 'Untitled1'. The menu bar includes 'File', 'Edit', 'View', 'Session', 'Help', and a 'Knit' dropdown. The toolbar has icons for saving, undo, redo, and a green 'Run' button. The editor area shows an R Markdown document with line numbers 1 through 31. The document content includes a YAML header, R code chunks for setup, a text section about R Markdown, another R code chunk for the 'cars' dataset, a section about including plots, a third R code chunk for a 'pressure' plot, and a concluding note.

```
1 ---
2 title: "Example Markdown File"
3 author: "Dora Simon"
4 date: "17 März 2017"
5 output: pdf_document
6 ---
7
8 ```{r setup, include=FALSE}
9 knitr::opts_chunk$set(echo = TRUE)
10 ```
11
12 ## R Markdown
13
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see
15 <http://rmarkdown.rstudio.com>.
16
17 When you click the Knit button a document will be generated that includes both content as well as the output of any embedded R code chunks within the
18 document. You can embed an R code chunk like this:
19
20 ```{r cars}
21 summary(cars)
22 ```
23
24 ## Including Plots
25
26 You can also embed plots, for example:
27
28 ```{r pressure, echo=FALSE}
29 plot(pressure)
30 ```
31
32 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.
```

The YAML front matter

- "Ain't Markup Language"
- at the top of the file
- between two sets of three hyphens (---)

All YAML consists of is some name for a piece of information (title, author), followed by a colon, and then the information itself.

```
1 ---  
2 |title: "Example Markdown File"  
3 |author: "Dora Simon"  
4 |date: "17 März 2017"  
5 |output: pdf_document  
6 ---
```

Text

- hashes indicate the level of the title
- **italic**: *italic*
- ****bold****: **bold**

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <<http://rmarkdown.rstudio.com>>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

R Markdown

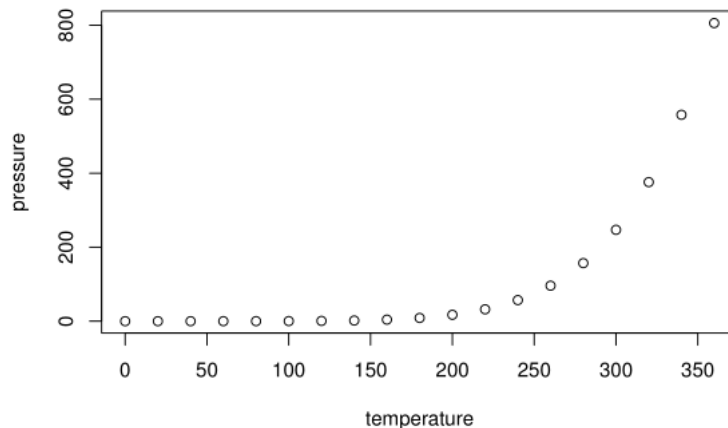
This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

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Code Chunks

```
```{r pressure, echo=FALSE}  
plot(pressure)
```

- open a so-called "chunk" with the code above
- inside the chunk, you write your normal R-code
- there are a lot of options for the chunk itself.
- `echo = FALSE`: only the output (so the plot) will appear in the .pdf, not the code itself.





# Exercise

# Exercise

We are going to combine our knowledge and replicate a table and a graph from Acemoglu's **Colonial Origins** paper and display the result in a .pdf document.

1. Create a new RProject somewhere on your computer
2. Create a new .Rmd file where the output is a .pdf. If you do not have Latex on your computer, choose .html as output.
3. All your code should be running from the .Rmd document.
  - You can run your chunks by pressing the green button.
  - You can also run highlighted code with Ctrl+Enter, but then you need to check the output in the Console.
4. Let's do a testrun: Load your libraries in a chunk. (hint: specify `message=FALSE` in the chunk options if you are annoyed by the warnings)

```
library(AER) # ivreg command
library(ivpack) # robust and clustered standard errors
library(dplyr) # data manipulation
library(ggplot2) # graphs
library(tibble) # nice dataframes
library(haven) # dta files
library(stargazer) # tables
library(sandwich) # robust se
```

# Exercise 1 : Graph

1. Read in `maketable2.dta` from the tidy-data folder
  - Create factor variables out of `africa`, `asia` and `other`
  - Only keep the base sample (`baseco==1`)
2. Replicate Figure 2 of the paper.
  - Initiate the plot
  - Average Expropriation Risk is the x axis
  - Log GDP per Capita is the y axis
  - Adjust the axis labels
  - Put a regression line in the graph
  - you can adjust the color and the size
  - Add the data points as country names

# Exercise 2 : IV Regression

1. Read in `maketable4.dta` from the tidy-data folder
  - Create factor variables out of `rich4`
  - Keep only the base sample (`baseco==1`)
2. Do the first two regressions using the `ivreg` command.
3. Compute the robust standard errors using the `robust.se` function. Your standard errors will be in the second column.
4. Display the first two regressions as a table. (hint: specify the chunk option `results=asis`)
  - for viewing the table in `.Rmd`, specify `type="text"`
  - for a nice output in the `.pdf`, specify `type="latex"`