







# Data Provenance: Why and How

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2020-10-09

The opinions expressed in this talk are solely the author's, and do not represent the views of the U.S. Census Bureau, the American Economic Association, or any of the funding agencies.





- Data provenance:
   what you want is what you should get
- Data citations:
   what you got is not yours



### AMERICAN ECONOMIC ASSOCIATION

#### American Economic Review



The American Economic Review is a general-interest economics journal. Established in 1911, the AER is among the nation's oldest and most respected scholarly journals in economics.

#### American Economic Review: Insights



AER: Insights is designed to be a toptier, general-interest economics journal publishing papers of the same quality and importance as those in the AER, but devoted to publishing papers

with important insights that can be conveyed succinctly.

#### Journal of Economic Literature



The Journal of Economic Literature (JEL), first published in 1969, is designed to help economists keep abreast of and synthesize the vast flow of literature.

#### **Journal of Economic Perspectives**



The Journal of Economic Perspectives (JEP) fills the gap between the general interest press and academic economics journals.

#### American Economic Journal: Applied Economics



American Economic Journal: Applied Economics publishes papers covering a range of topics in applied economics, with a focus on empirical microeconomic issues.

#### American Economic Journal: Economic Policy



American Economic Journal: Economic Policy publishes papers covering a range of topics, the common theme being the role of economic policy in economic outcomes.

#### American Economic Journal: Macroeconomics



American Economic Journal: Macroeconomics focuses on studies of aggregate fluctuations and growth, and the role of policy in that context.

#### American Economic Journal: Microeconomics



American Economic Journal: Microeconomics publishes papers focusing on microeconomic theory; industrial organization; and the microeconomic aspects of

international trade, political economy, and finance.



# AEA Data & Code Availability Policy (2019)

- It is the policy of the American Economic Association to publish papers only if the data used in the analysis are <u>clearly and precisely</u> documented and <u>access to the data and code is clearly and precisely</u> documented and is non-exclusive to the authors.
- Authors of accepted papers that contain empirical work, simulations, or experimental work must provide, prior to acceptance, the data, programs, and other details of the computations sufficient to permit replication, as well as information about access to data and programs.



### Current efforts at the AEA

### Pre-emptively improve code archives

- By conducting reproducibility checks when we can
- By working with groups that conduct reproducibility checks
   when we cannot

#### Better archives

Greater transparency of the code and data archives

### Better provenance tracking

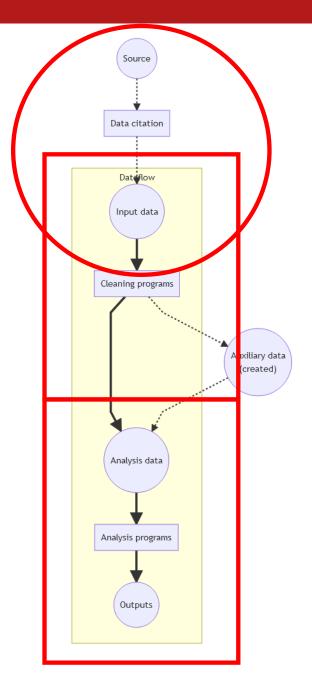
- Leave code where it is when appropriate
- Leave data where it is almost always
- Display that information

# Data provenance



# Simplified model

- Basic data-oriented flow
- Historically: analysis data
- More recently: input data, too
- But where does it come from? ("provenance")





### Poor citation practices

#### Macrodata:

"We use data downloaded from the Bureau of Economic Analysis..."

#### Microdata:

"... this paper uses data from the Current Population Survey..."



An analogy...

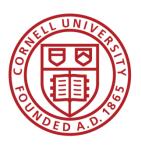


# Would you buy a car from this guy?





- Does the sales person have a good record?
- •Where does the car come from?
- •What do we know about the car?



# You don't want end up like this



Source: Adri Marie from Pixabay (Pixabay License)



# Translating into the data world

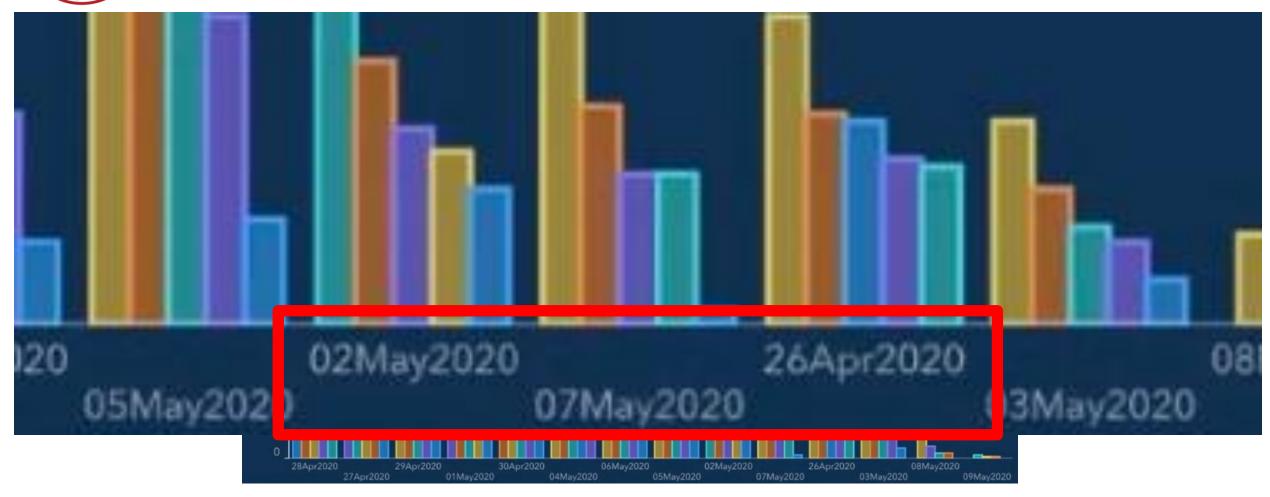


## Would you use this data?

```
0000000 cfd0 e011 b1a1 e11a 0000 0000 0000 0000
0000010 0000 0000 0000 0000 003e 0003 fffe 0009
0000030 008f 0000 0000 0000 1000 0000 fffe ffff
0000050 008c 0000 008d 0000 008e 0000 ffff
0000200 0809 0010 0600 0005 209a 07cd c0c9 0000
0000210 0306 0000 00el 0002 04b0 00cl 0002 0000
0000220 00e2 0000 005c 0070 0001 4c00 2020 2020
0000290 2020 2020 2020 2020 0042 0002 04b0 0161
00002a0 0002 0000 013d 0002 0001 009c 0002 000e
00002b0 0019 0002 0000 0012 0002 0000 0013 0002
00002c0 0000 01af 0002 0000 01bc 0002 0000 003d
00002d0 0012 0000 000f 3f1b 27f6 0038 0000 0000
00002e0 0001 0258 0040 0002 0000 008d 0002 0000
00002f0 0022 0002 0000 000e 0002 0001 01b7 0002
```



# Or would you trust this data?





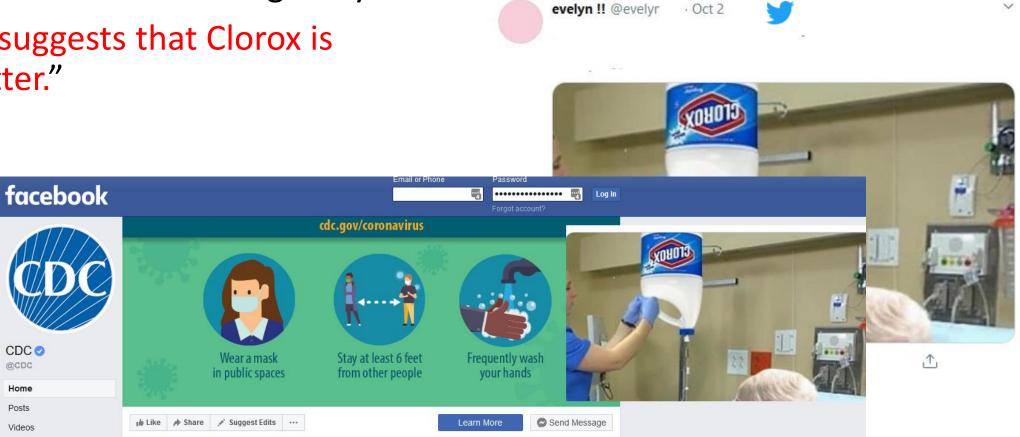
- •Does the provider have a good record?
- •Where do the data come from?
- •What do we know about the data?

# Metadata!



### Provenance!

- "CDC warns not to ingest Lysol."
- "It suggests that Clorox is better."



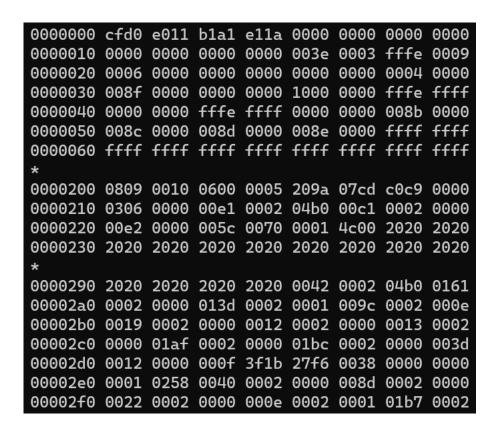


### Find the source!





### "It's a file called stockmarket.xlsx"







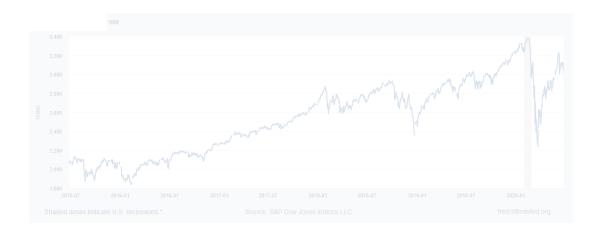
# "It's a file called SP500.xlsx"

SP500

S&P 500, Index, Daily, Not Seasonally Adjusted

Frequency: Daily, Close

r roquorioy. Daily, Globo	
observation_date SP500	
2015-06-26	2101.49
2015-06-29	2057.64
2015-06-30	2063.11
2015-07-01	2077.42
2015-07-02	2076.78
2015-07-03	0
2015-07-06	2068.76
2015-07-07	2081.34
2015-07-08	2046.68
2015-07-09	2051.31
2015-07-10	2076.62
2015-07-13	2099.60
2015-07-14	2108.95
2015-07-15	2107.40
2015-07-16	2124.29
2015-07-17	2126.64
2015-07-20	2128.28





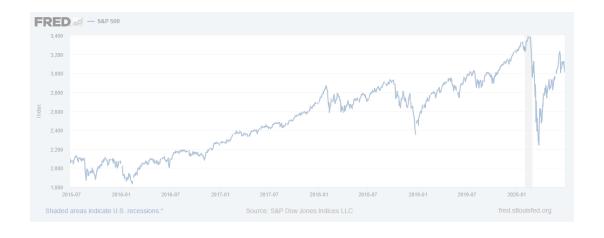
# "It's a file called SP500.xlsx, downloaded from FRED."

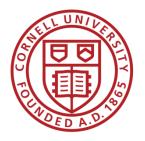
SP500

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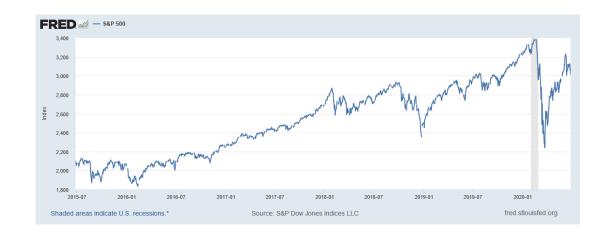
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2015-07-10	2076.62	
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2015-07-14	2108.95	
2015-07-15	2107.40	
2015-07-16	2124.29	
2015-07-17	2126.64	
2015-07-20	2128.28	

S&P Dow Jones Indices LLC. 2020. "S&P 500 [SP500] [dataset]", retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500, June 26, 2020.





We're all set then.



# "SP500.xlsx, from S&P (2020). Not provided as part of replication package because © S&P."

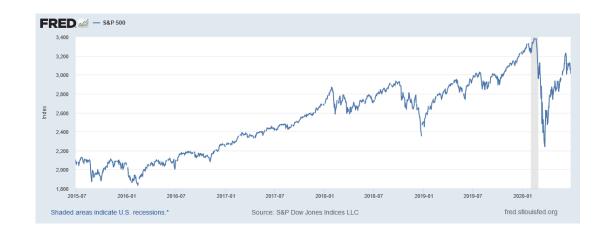
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Frequency: Daily, Close

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observation_date SI	P500
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2015-07-10	2076.62
2015-07-13	2099.60
2015-07-14	2108.95
2015-07-15	2107.40
2015-07-16	2124.29
2015-07-17	2126.64
2015-07-20	2128.28

S&P Dow Jones Indices LLC. 2020. "S&P 500 [SP500] [dataset]", retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500, June 26, 2020.





### Data Availability Statements

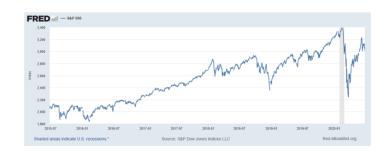


"SP500.xlsx, from S&P (2020). Not provided as part of replication package because © S&P."

S&P 500, Index, Daily, Not Seasonally Adjusted

Describes data file, where to get it, how to get it, and any conditions of obtaining it

2015-07-15 2107.40 2015-07-16 2124.29 2015-07-17 2126.64 2015-07-20 2128.28 S&P Dow Jones Indices LLC. 2020. "S&P 500 [SP500] [dataset]", retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500, June 26, 2020.





### Data Citation



"SP500.xlsx, from S&P (2020). Not provided as part of replication package because © S&P."

SP50

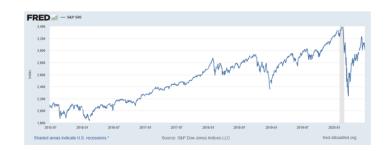
S&P 500, Index, Jaily, Not Seasonally djusted

2057.64

# Attributes the file to the proper source

	2000.7
	2081.3
2015-07-08	2046.6
2015-07-09	2051.3
2015-07-10	2076.6
2015-07-13	2099.6
2015-07-14	2108.9
2015-07-15	2107.4
2015-07-16	2124.2
2015-07-17	2126.6
2015-07-20	2128.2

S&P Dow Jones Indices LLC. 2020. "S&P 500 [SP500] [dataset]", retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500, June 26, 2020.







Search

**English** 

perceived criteria of importance.

#### 1. Importance

Data should be considered legitimate, citable products of research. Data should be accorded the same importance in the scholarly record as citat research objects, such as publications[1].

# ta at DC1 Data Citation Principles

#### 2. Credit and Attribution

Data citations should facilitate giving scholarly credit and normative and leattribution to all contributors to the data, recognizing that a single style or of attribution may not be applicable to all data[2].

#### 3. Evidence

In scholarly literature, whenever and wherever a claim relies upon data, the corresponding data should be cited[3].

#### 4. Unique Identification

A data citation should include a persistent method for identification that i actionable, globally unique, and widely used by a community[4].

#### 5. Access

Data citations should facilitate access to the data themselves and to such

Data Citation Synthesis Group: Joint Declaration of Data Citation Principles. Martone M. (ed.) San Diego CA: FORCE11; 2014 [https://www.force11.org/group/joint-declaration-data-citation-principles-final].



### Data Citations are Hard!



## At the AEA, every manuscript is checked

- What datasets are used
- Are they cited?
- Is there additional information on access?
- Is there license/ data use information?
  - → Should the author provide the data?
  - → Is the author <u>allowed</u> to provide data?



# Data Rights



## Example 2: Academic data publisher



Home

Methodology

Media

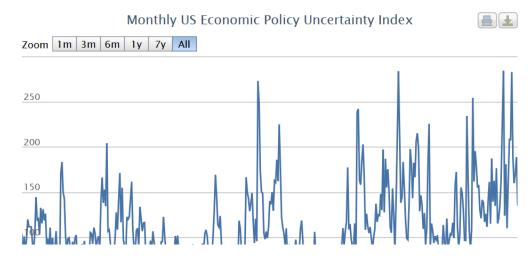
Research & Applications

About Us

#### **EPU Indices** All Country-Level Data <u>USA</u> Global <u>Australia</u> <u>Brazil</u> **Chile Canada** China Colombia Croatia New **France** Germany Greece <u>India</u> **Hong Kong** <u>Italy</u> Ireland South Korea <u>Japan</u>

#### Economic Policy Uncertainty Index

We develop indices of economic policy uncertainty for countries around the world.

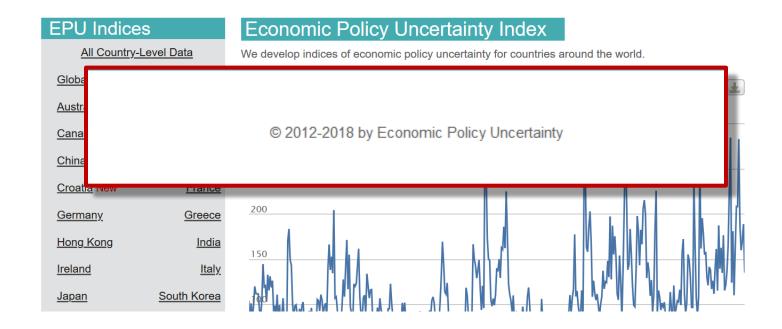




## Example 2: Academic data publisher



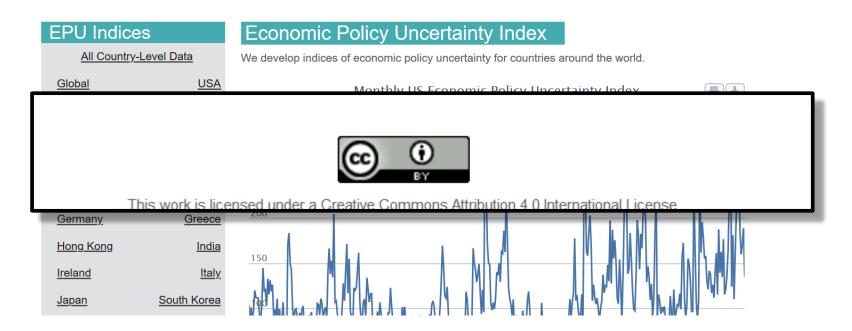






## Example 2: Academic data publisher-new!







## Rights to <u>use</u> data

- You browsed a website
- You purchased the data
- You signed a data use agreement
- You created the data (lab experiment)
- You had survey respondents consent to use (IRB approval!)



## Rights to distribute the data

- If you created the data, you decide.
- If you got it from somewhere else:

READ THE TERMS OF USE / DATA USE AGREEMENT / CLICK-THROUGH / ETC.



#### **Usage rights**

- You browsed a website
- You purchased the data
- You signed a data use agreement
- You created the data (lab experiment)
- You had survey respondents consent to use (IRB approval!)

#### **Redistribution rights**

- If you created the data, you decide.
- If you got it from somewhere else:

READ THE TERMS OF USE / DATA USE AGREEMENT / CLICK-THROUGH / ETC.



# "Well, I can't download the data, so I can't cite it."



## Wrong



### These are archives



Source: https://chiddicksfamilytree.com/2017/11/08/use-it-or-lose-it/



Source: https://www.archives.gov/publications/prologue/2008/spring/frc.html



 Typescript of short story Brothers and Sisters by Budge Wilson, 2000, MS-2-650.2013-070, Box 3, Folder 9, Budge Wilson fonds, Dalhousie University Archives, Halifax, Nova Scotia, Canada.



### Example 4: German Restricted-access



**Publications** 

FDZ Projects

RatSWD

Projects of FDZ users

Complaint point of the

Figures of the FDZ

Events

Home Newslotter John Contact Data Brivesy Imprint

	Home   Newslatter   John   Contact   Data Privacy   Imprint	_
Data Version	DOI (Link to Description of Data Version)	Availability (yyyy-mm-dd)
BHP 7518 v1 (current)	10.5164/IAB.BHP7518.de.en.v1	2020-01-13
BHP 7517 v1	10.5164/IAB.BHP7517.de.en.v1	2018-12-12
BHP 7516 v1	10.5164/IAB.BHP7516.de.en.v1	2018-04-11
External data	employees, both in total and broken down by gender, age, occupational status, qualific	ation and
Data Archive	nationality. Means and medians of wages for full-time employees are given, too. Additional datasets	
Data Access	providing information about (gross) worker flows and about foundations and closures of	f establishments
Campus Files	are available on request.	

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#### **Data Versions**

Old versions are only available for replication studies and only in justified exceptional cases for new Projects.

Data Version	DOI (Link to Description of Data Version)	Availability (yyyy-mm- dd)

BHP 7518 v1 (current)



### Example 4: German Restricted-access



**Publications** 

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BHP 7518 v1 (current)



### Example 4: German Restricted-access

#### Establishment History Panel (BHP) - Version 7518 v1

DOI: 10.5164/IAB.BHP7518.de.en.v1

Summary

Data source:

#### **Data Access**

The IAB Establishment Panel is available via the following ways of access:

- On-site use at the FDZ. Further information on Applying for on-site use.
- Remote data Access. Further information on Applying for remote data access.

nationality. Means and medians of wages for full-time employees are given, too. Additional datasets providing information about (gross) worker flows and about foundations and closures of establishments are available on request.

#### **Dataset Descriptions and Frequencies**

#### German

- DOI: 10.5164/IAB.FDZD.2001.de.v1
- FDZ-Datenreport 01/2020
- Fallzahlen und Labels

#### Enalish

DOI: 10.5164/IAB.FDZD.2001.en.v1



• <u>CMOS</u> notes (16<sup>th</sup> ed., 14.1)

"Regardless of the convention being followed, source citations must always provide sufficient information either to lead readers directly to the sources consulted or, for materials that may *not be readily available*, to enable readers to *positively identify* them, regardless of whether the sources are published or unpublished or in printed or electronic form."

ICPSR notes that a citation should include the following items:

- Author
- Title
- Distributor
- Date
- Version
- Persistent identifier



# ICPSR notes that a citation should include the following items:

- Author
- Title
- Distributor
- Date
- Version
- Persistent identifier

#### **Suggested Citation:**

S&P Dow Jones Indices LLC, S&P 500 [SP500], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SP500, June 26, 2020.



## ICPSR notes that a citation should include the following items:

- Author
- Title
- Distributor
- Date
- Version
- Persistent identifier

#### **Constructed Citation:**

Institute for Employment Research (IAB), **Establishment History Panel** 1975-2018. Accessed via the Research Data Centre (FDZ) of the German Federal **Employment Agency DOI:** 10.5164/IAB.BHP7518.de.en. v1 June 26, 2020.



ICPSR notes that a citation should include the following items:

- Author
- Title
- Distributor
- Date
- Version
- Persistent identifier

#### **Constructed Citation:**

US Census Bureau, Longitudinal Business Database (LBD) 1975-2018. Last accessed via the Federal Statistical Research Data Centre (FSRDC) June 26, 2020.



### And we check them!

- If the URL does not work, we make a note.
- If the site requires registration, we try it out.
  - How long?
  - Any requirements?

#### What does the site say?

Please use the following citation when referring to this file in the different versions:

Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, M. Lagos, P. Norris, E. Ponarin & B. Puranen et al. (eds.). 2014. World Values Survey: Round Six - Country-Pooled Datafile Version:

www.worldvaluessurvey.org/WVSDocumentationWV6.jsp. Madrid: JD Systems Institute.

• Is that in the README / Paper/ Appendix?



### And we

#### CONDITIONS OF USE

In order to download the file you are as on the "Conditions of Use". Please read

#### PERSONAL DATA

Title (position):
Full name:

Company/Institution:

E-mail:

#### FILE USAGE

Project title:
Intended use:

Brief description of the purpose of applic

Restrictions

These data files are available without restrictions, provided

- a) that they are used for non-profit purposes; and
- b) correct citations are provided and sent to the World Values Survey Association for each publication of results based in part or entirely on these data files. This citation will be made freely available; and
- c) the data files themselves are not redistributed.

2. Correct citation

#### Madria. JD Systems motitute.

- Is that in the README / Paper/ Appendix?
- Are all the conditions met/described?

#### CONDITIONS OF USE

1. Restrictions

These data files are available without restrictions, provided

- a) that they are used for non-profit purposes; and
- b) correct citations are provided and sent to the World Values Survey Association for each and it agon or results based in part.
   catirely on these data files. This citation will be made freely available; and
- c) the data files themselves are not redistributed.

rrect citation





 A statement about where data supporting the results reported in a published article can be



#### A stateme available

- DOI assi
- But long

Provide data citations (in manuscript) and data availability statements (in README or appendix)

o publicly ated during

providing a

l restrictions,

- A statement about usage rights
  - Not every dataset is in the public domain
  - Not everybody knows that U.S. Government data are usually in the public domain

# Take-away



### Data: Citations, Access, Rights

- Any data can be cited even if you can't download it
- Any data that you accessed ... can have that access be described
  - But caution: It should be such that others can also repeat the access!
- Just because you "have" the data does not mean you can give it to others
  - Also: distinguish between "sharing" and "publishing"
  - Know your terms of use!



### Social science "guild"





https://
social-science
-data-editors.
github.io/
guidance/

# Thank you!

https://doi.org/10.5281/zenodo.4073995



### Some resources





https://aeadataeditor.github.io/aea-de-guidance/



- template README
- discussion of licensing
- data citation guidance
- German example:
  - Establishment History Panel (BHP) DOI: 10.5164/IAB.BHP7516.de.en.v1