



Data Citations with FRED[®]

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GLOSSARY

Citation (of data): A short description of data, including their author, title, distributor, date, and persistent identifier.

Digital object identifier (DOI): An internet address that allows the reader of a data citation to access the data directly from the source.

Metadata: Information describing a data series.

Open data: Data exempt from U.S. copyright laws and free for everyone to use without restriction.

Persistent identifier (of data): Internet address where data can be viewed or downloaded.

Proprietary data: Data subject to U.S. copyright laws; the author can restrict the distribution of the data.

Release: A publication of data that does not include analysis or commentary, usually organized in tables that can be read by computers and built into databases.

Universal resource locator (URL): An internet address allowing the reader of a data citation to access the data directly from a website.

Compelling Question

How should we cite data?

Description

FRED[®] (Federal Reserve Economic Data) provides access to a wide range of time-series data from more than 100 sources. When using FRED[®] to write reports or do statistical research, it is important to cite the source of the data you use: A complete data citation helps the reader find the data you use or reference. This article describes best data citation practices for new data users and serves as a reference for advanced data users.

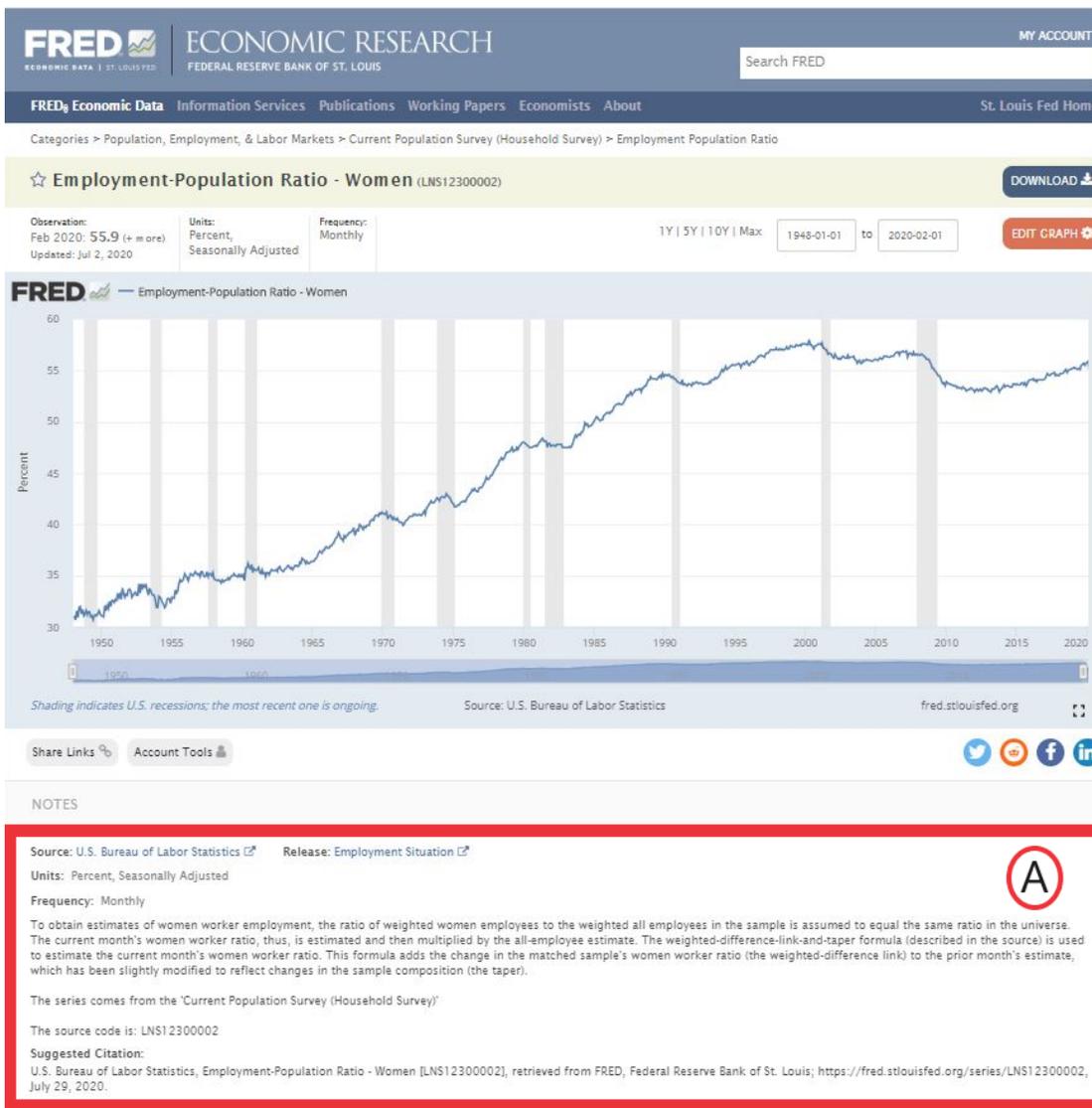
Introduction

The data accessible through FRED[®] have many different sources. Federal government departments such as the U.S. Treasury or private corporations such as Standard and Poor's (S&P) produce some of the data. In most cases, the Federal Reserve Bank of St. Louis presents the data produced by organizations and individuals in the format used by those sources. Describing the source of the data used in a presentation, a written report, or a research project with a citation makes that work more thorough and easier to replicate. This document describes best practices to create **citations** for data accessible through FRED[®].

Why Cite the Data?

There are two main reasons for citing the data you use in a presentation or written report. First, citing the data shows that you researched the topic. The citation helps to document your background work searching for quantitative information. A complete data citation makes your final work more thorough and solid. Second, it allows the person attending your presentation or reading your report to track down the resources you used. The citation helps others replicate or reuse your work. A good data citation makes your final work more useful.

Figure 1
FRED® Data Series Page (Metadata in Box A)



Elements of a FRED® Data Citation

A good data citation includes all the information needed to identify the data series (i.e., author and title) and details about where, when, and how (i.e., distributor, date, and persistent identifier) the data series were accessed. The five key items of a data citation include the following:

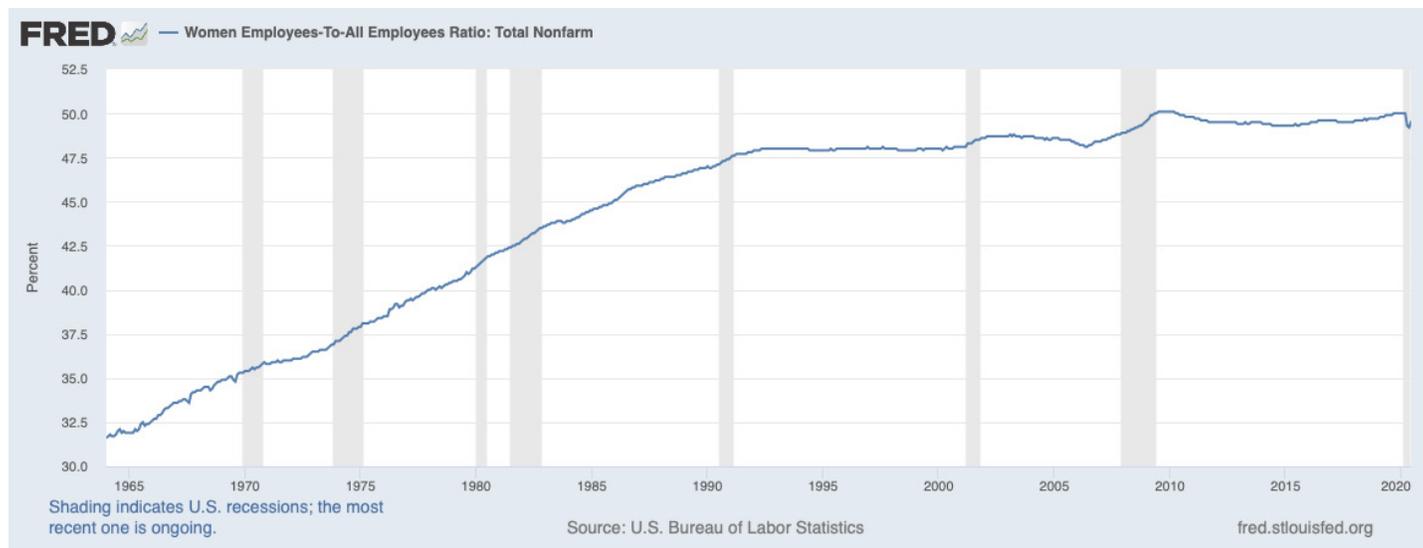
- **Author:** The organization or individual creating the data
- **Title:** The name of the data series
- **Distributor:** The organization from which the data were obtained

- **Date:** The day, month, and year the data were obtained
- **Persistent identifier:** The internet address where the data can be viewed or downloaded

Because some data are subject to revision, adding information about the version of the data being cited is also useful.¹

The information needed to cite FRED® data is provided in the notes below the FRED® graph of the data series (shown in Figure 1, Box A). These notes are also called the **metadata**.

Figure 2
Ratio of Women Employees to All Employees (Nonfarm)



SOURCE: FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?g=txp9>, accessed July 29, 2020.

The FRED® website provides the following suggested citation for the data in the Figure 2 graph:

U.S. Bureau of Labor Statistics, Employment-Population Ratio - Women [LNS12300002], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/LNS12300002>, July 29, 2020.

The following five key elements of a good citation are included:

- **Author:** The organization creating the data is the U.S. Bureau of Labor Statistics.
- **Title:** The name of the data series is Employment-Population Ratio - Women [LNS12300002].
- **Distributor:** The data were retrieved from FRED®, Federal Reserve Bank of St. Louis.
- **Date:** The data were retrieved on July 29, 2020.
- **Persistent identifier:** The data can be viewed and downloaded at <https://fred.stlouisfed.org/series/LNS12300002>.

Note that the suggested data citation includes the **universal resource locator** (URL) of the FRED® series as its persistent identifier. This internet address allows the reader of the citation to access the data directly from FRED®.

The U.S. Bureau of Labor Statistics (BLS) is an agency of the U.S. Department of Labor (DOL). Because the BLS and DOL are federal government organizations, the data they create are in the public domain (not copyrighted) and are free for everyone to use without restriction. This is called **open data**. If you were visiting an art museum, it would be akin to being allowed to take photographs of the paintings with your cellphone and share that picture on your social media.

Figure 3
Consumer Price Index in Japan



SOURCE: FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?g=txt5>, accessed July 29, 2020.

Reproducing Proprietary FRED® Data

Some of the data in FRED® are **proprietary data**, meaning the organizations providing the data retain legal rights about the distribution of the information. Let's review a couple of examples.

In the Figure 3 FRED® graph, the Organization for Economic Co-operation and Development (OECD) reports the consumer price index (CPI) in Japan as part of its Main Economic Indicators data **release**. The OECD does not produce the Japanese CPI data, but it includes them in that particular publication.

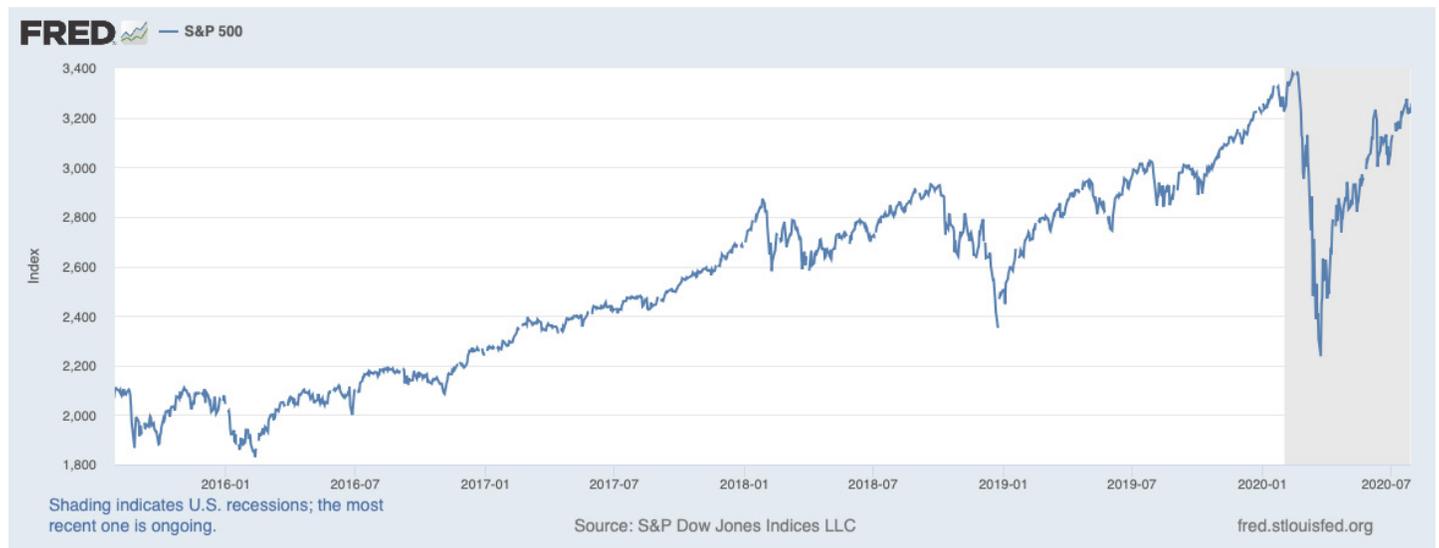
The citation suggested by FRED® for the series in the Figure 3 graph has all the elements discussed earlier in this article, and the FRED® metadata include the following note:

All OECD data should be cited as follows:

OECD (2010), "Main Economic Indicators - complete database," Main Economic Indicators (database), <http://dx.doi.org/10.1787/data-00052-en> (Accessed on date)

In this case, the author of the data series provides a persistent identifier in the form of a **digital object identifier** (DOI). The DOI is an internet address that allows the reader of the data citation to access the data directly from the source.

Figure 4
Standard and Poor's 500 Stock Price Index



SOURCE: FRED®, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/graph/?g=twV7>, accessed July 29, 2020.

In Figure 4, the FRED® metadata include the following notes:

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Permission to reproduce S&P 500 can be requested from index_services@spdji.com. More contact details are available from Standard and Poor's, including phone numbers for all of its regional offices.

In this case, the author of the data series retains the rights to reproduce the information, meaning a FRED® user is not legally allowed to make copies of the data and distribute them. If you were visiting an art museum, it would be akin to not being allowed to take photographs of the paintings with your cellphone and share it via social media.

Summary

A good citation makes final work based on data more thorough and easier to replicate or reuse. This article has described the key elements of a data citation and the differences between open data and proprietary data. ■

Additional Resources

American Economic Association (AEA). "Sample References: Styles of the AEA"; <https://www.aeaweb.org/journals/policies/sample-references>, accessed July 29, 2020.

Data Citation Synthesis Group: Joint Declaration of Data Citation Principles. Martone M. (ed.) San Diego CA: FORCE11, 2014; <https://doi.org/10.25490/a97FegyK>.

Vilhuber, Lars. "Data and Code Guidance by Data Editors: Guidance on Data Citations"; <https://social-science-data-editors.github.io/guidance/addtl-data-citation-guidance.html>, accessed July 29, 2020.

Notes

¹ To learn more about data revisions or to find data from a specific vintage, visit <https://alfred.stlouisfed.org/>.

Please visit our website and archives at <http://research.stlouisfed.org/publications/page1-econ/> for more information and resources.

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