Data Download Guide

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Methods for Time Series
CEMFI

Introduction

This guide provides step-by-step instructions for downloading all the time series data needed for the empirical applications in the "Methods for Time Series" course at CEMFI.

All data should be saved in the `data/raw/` folder of your project. Once downloaded, the data will be processed and cleaned by the course scripts before being saved to `data/processed/`.

Important: Most data is available for automatic download from free online sources (FRED, Yahoo Finance, etc.), but some series require manual downloads. We provide detailed instructions for both.

Quick Reference: Data Summary

You will need to download approximately 30 CSV files from three main sources:

- **FRED (Federal Reserve Economic Data):** 17 files for US economic and financial data

- **Yahoo Finance:** 4 files for European stock market indices

- **OECD/FRED:** 7 files for European sovereign bond yields

All files should be CSV format and saved to the `data/raw/` folder.

Part 1: US Financial and Economic Data (from FRED)

FRED is the Federal Reserve Economic Data portal maintained by the Federal Reserve Bank of St. Louis. All data is free to access and download without registration.

Downloading from FRED

1. Go to `https://fred.stlouisfed.org/`

2. In the search box, type the Series ID (listed below)

3. Click on the series from the search results

4. On the series page, click the "Download" button (typically at the top right)

5. Select "Download as CSV" and choose the download option

6. The file will be named with the Series ID (e.g., `GS10.csv`)

7. Save it to `data/raw/`

US Macroeconomic Data

Download the following files from FRED:

File Name	Series ID	Description	Frequency
GDPC1.csv	GDPC1	Real Gross Domestic Product	Quarterly
CPIAUCSL.csv	CPIAUCSL	Consumer Price Index (All Urban)	Monthly
FEDFUNDS.csv	FEDFUNDS	Federal Funds Effective Rate	Monthly
UNRATE.csv	UNRATE	Unemployment Rate (National)	Monthly

US Treasury Yields

Download the following Treasury yield series from FRED:

File Name	Series ID	Description	Frequency
GS10.csv	GS10	10-Year Treasury Constant Maturity Rate	Daily
DGS2.csv	DGS2	2-Year Treasury Constant Maturity Rate	Daily
DGS5.csv	DGS5	5-Year Treasury Constant Maturity Rate	Daily
DGS30.csv	DGS30	30-Year Treasury Constant Maturity Rate	Daily

US Financial Market Data

Download the following financial market data from FRED:

File Name	Series ID	Description	Frequency
VIXCLS.csv	VIXCLS	CBOE Volatility Index (VIX)	Daily
DEXUSEU.csv	DEXUSEU	US Dollar to Euro Exchange Rate	Daily

US State Unemployment Rates

Download the following state unemployment rates from FRED:

File Name	Series ID	Description	Frequency
CAUR.csv	CAUR	California Unemployment Rate	Monthly
TXUR.csv	TXUR	Texas Unemployment Rate	Monthly

Note: These US state unemployment rates are used as substitutes for Spanish regional data (Madrid and Catalonia) in some empirical applications.

Part 2: European Stock Market Indices (from Yahoo Finance)

European stock market data is available from Yahoo Finance without registration. These files have a specific header structure that needs to be preserved.

Downloading from Yahoo Finance

1. Go to https://finance.yahoo.com/

2. In the search box, type the ticker symbol (listed below)

3. Click on the ticker from the search results

4. Click on the "Historical Data" tab

5. Set the date range to your desired period (or use default "Max")

6. Click "Download" at the bottom of the data table

7. The file will download with a default name (e.g., ÎBEX.csv)

8. **Important:** Rename it according to the table below and save to `data/raw/`

European Stock Indices

Download and rename the following files from Yahoo Finance:

File Name	Ticker	Description	Country
IBEX35.csv	ÎBEX	IBEX 35	Spain
CAC40.csv	F̂CHI	CAC 40	France
DAX.csv	ĜDAXI	DAX	Germany
FTSEMIB.csv	FTSEMIB.MI	FTSE MIB	Italy

Important: Yahoo Finance files have a special header format with multiple rows before the actual data. The processing scripts expect this format with:

- Row 1: Column names (Date, Open, High, Low, Close, Adj Close, Volume)

- Rows 2-3: Additional header information

- Row 4+: Actual data starting with dates

Do NOT modify the file headers when you download them. The scripts will automatically handle the special format using `rowrange(4)` in Stata.

Part 3: European Sovereign Bond Yields (10-Year)

European sovereign bond yields are available from FRED/OECD data. These are monthly data on long-term government bond yields (10-year maturity).

Downloading from FRED

Follow the same procedure as for US data:

1. Go to `https://fred.stlouisfed.org/`

2. Search for the Series ID

3. Download as CSV and save to `data/raw/`

Government Bond Yields

Download the following 10-year sovereign bond yield files from FRED:

File Name	Series ID	Description	Country
BOND_10Y_DE.csv	IRLTLT01DEM156N	10-Year Bond Yield	Germany
BOND_10Y_FR.csv	IRLTLT01FRM156N	10-Year Bond Yield	France
BOND_10Y_IT.csv	IRLTLT01ITM156N	10-Year Bond Yield	Italy
BOND_10Y_ES.csv	IRLTLT01ESM156N	10-Year Bond Yield	Spain
BOND_10Y_PT.csv	IRLTLT01PTM156N	10-Year Bond Yield	Portugal
BOND_10Y_GR.csv	IRLTLT01GRM156N	10-Year Bond Yield	Greece
BOND_10Y_IE.csv	IRLTLT01IEM156N	10-Year Bond Yield	Ireland

Part 4: Spanish Macroeconomic Data

Spanish macroeconomic data is available from FRED/OECD sources.

Spanish Economic Indicators

Download the following Spanish data from FRED:

File Name	Series ID	Description	Frequency
ESP_GDP.csv	CPMNACSCAB1GQES	Spain Real GDP	Quarterly
ESP_CPI.csv	ESPCPIALLMINMEI	Spain CPI	Monthly
ESP_CREDIT.csv	QESN628BIS	Spain Credit (BIS)	Quarterly
ESP_UNEMP.csv	LRHUTTTTESQ156S	Spain Unemployment Rate	Quarterly

Part 5: Optional Data (Not Always Required)

The following data is present in the repository but not used in all exercises:

File Name	Series ID	Description	Status
SP500.csv	SP500	S&P 500 Index	Optional (not used in exercises)

Recommended Download Workflow

To efficiently download all required data, follow this step-by-step workflow:

Step 1: Prepare Your Workspace

1. Navigate to your project folder: `TA_Time_Series_Methods`
2. Verify that the folder `data/raw/` exists and is empty (or contains only old files)
3. Have a text editor open to track which files you've downloaded

Step 2: Download US Data from FRED (14 files)

1. Go to `https://fred.stlouisfed.org/`
2. Download these macroeconomic series first: `GDPC1.csv`, `CPIAUCSL.csv`, `FEDFUNDS.csv`, `UNRATE.csv`
3. Download Treasury yields: `GS10.csv`, `DGS2.csv`, `DGS5.csv`, `DGS30.csv`
4. Download financial data: `VIXCLS.csv`, `DEXUSEU.csv`
5. Download state unemployment: `CAUR.csv`, `TXUR.csv`
6. **Total: 12 FRED files for US data**

Step 3: Download European Stock Indices from Yahoo Finance (4 files)

1. Go to `https://finance.yahoo.com/`
2. Search for and download: $\hat{}$IBEX → rename to `IBEX35.csv`
3. Search for and download: $\hat{}$FCHI → rename to `CAC40.csv`
4. Search for and download: $\hat{}$GDAXI → rename to `DAX.csv`
5. Search for and download: `FTSEMIB.MI` → rename to `FTSEMIB.csv`
6. **Total: 4 Yahoo Finance files**

Step 4: Download European Bond Yields from FRED (7 files)

1. Go back to `https://fred.stlouisfed.org/`

2. Download the 10-year bond yields for each country: `BOND_10Y_DE.csv`, `BOND_10Y_FR.csv`, `BOND_10Y_IT.csv`, `BOND_10Y_ES.csv`, `BOND_10Y_PT.csv`, `BOND_10Y_GR.csv`, `BOND_10Y_IE.csv`

3. **Total: 7 FRED files for bond yields**

Step 5: Download Spanish Economic Data from FRED (4 files)

1. Continue at `https://fred.stlouisfed.org/`

2. Download Spanish data: `ESP_GDP.csv`, `ESP_CPI.csv`, `ESP_CREDIT.csv`, `ESP_UNEMP.csv`

3. **Total: 4 FRED files for Spanish data**

Step 6: Verify Your Downloads

1. Check that you have downloaded **27 files total**

2. Verify all files are in CSV format and located in `data/raw/`

3. Make sure file names match exactly the names listed above (case-sensitive on macOS/Linux)

4. Check that Yahoo Finance files have not been modified (keep the special header structure)

Troubleshooting Common Download Issues

Issue: FRED website layout has changed

Solution: Look for a "Download" button or link on the series page. Most FRED series have a download option prominently displayed. If you can't find it, try right-clicking on the data table and selecting "Export".

Issue: Yahoo Finance ticker not found

Solution: Make sure you're searching with the exact ticker symbol (including any `^` or `.` characters):

```
1 ^IBEX     (IBEX 35, Spain)
2 ^FCHI     (CAC 40, France)
3 ^GDAXI    (DAX, Germany)
4 FTSEMIB.MI (FTSE MIB, Italy)
```

Issue: Downloaded file is not a CSV

Solution: Some browsers might download as .xlsx or .txt. You can either:

- Change the file extension to .csv

- Re-download and ensure you select "CSV" format if prompted

- Open the file, copy the data, and paste into a new .csv file

Issue: File shows 0 bytes or is corrupted

Solution:

- Delete the corrupted file

- Clear your browser cache (Cmd+Shift+Delete on most browsers)

- Try downloading again from a different browser

- Check your internet connection

Issue: Data is not available for the date range I need

Solution:

- Some series have limited historical data (e.g., BOND_10Y_IT starts in 1991)

- Download all available data; the processing scripts will handle different date ranges

- If a series is completely missing, check the Metadata document in `materials/instructions/metadata.md`

Data Organization After Download

Once all files are downloaded to `data/raw/`, the file structure should look like:

```
data/
  raw/
    GDPC1.csv
    CPIAUCSL.csv
    FEDFUNDS.csv
    UNRATE.csv
    GS10.csv
    DGS2.csv
    DGS5.csv
    DGS30.csv
    VIXCLS.csv
    DEXUSEU.csv
    CAUR.csv
    TXUR.csv
    IBEX35.csv
    CAC40.csv
    DAX.csv
    FTSEMIB.csv
    BOND_10Y_DE.csv
    BOND_10Y_FR.csv
    BOND_10Y_IT.csv
    BOND_10Y_ES.csv
    BOND_10Y_PT.csv
    BOND_10Y_GR.csv
    BOND_10Y_IE.csv
    ESP_GDP.csv
    ESP_CPI.csv
    ESP_CREDIT.csv
    ESP_UNEMP.csv
```

The data processing scripts will:

1. Read these CSV files from `data/raw/`

2. Clean and process them (handling different frequencies, missing values, etc.)

3. Save processed versions to `data/processed/` in Stata (.dta) format

4. These processed files are then used in the empirical applications

Next Steps

Once you've downloaded all the data:

1. Review the metadata document: `materials/instructions/metadata.md`

2. Check the empirical applications guide: `materials/instructions/empirical_applications.md`

3. Run the data processing scripts to create processed datasets

4. Open the course notebooks in `sessions/` to begin the empirical exercises

References and Data Sources

- **FRED:** Federal Reserve Economic Data
  `https://fred.stlouisfed.org/`

- **Yahoo Finance:** Historical stock prices and indices
  `https://finance.yahoo.com/`

- **CBOE:** Chicago Board Options Exchange (VIX)
  `https://www.cboe.com/`

- **OECD:** International economic statistics
  `https://stats.oecd.org/`

- **BIS:** Bank for International Settlements (credit data)
  `https://www.bis.org/statistics/`

FAQ

Q: Do I need to register to download data?
A: No. All the data sources used in this guide (FRED, Yahoo Finance) are free and don't require registration.

Q: Can I download all files at once?
A: Unfortunately, FRED and Yahoo Finance don't offer bulk download options. However, the process for each file is quick (2-3 minutes total if you're efficient). Estimated total time: 30-45 minutes for all 27 files.

Q: What if I already have some of these files?
A: You can skip downloading them and proceed to verify them. Just make sure the file names match exactly.

Q: Can I use my own data instead?
A: For learning purposes, it's recommended to use the standard data provided in this guide. However, you can substitute other time series if they cover similar concepts (stock returns, interest rates, etc.).

Q: Where can I find updates to this data?
A: All these data sources are continuously updated. You can download fresh data anytime by following the same steps. The course scripts are designed to work with any date range.

Q: What if the website layouts have changed?
A: The process may be slightly different, but both FRED and Yahoo Finance have prominent download options. Look for buttons labeled "Download", "Export", or similar. Most data portals follow a similar workflow.