

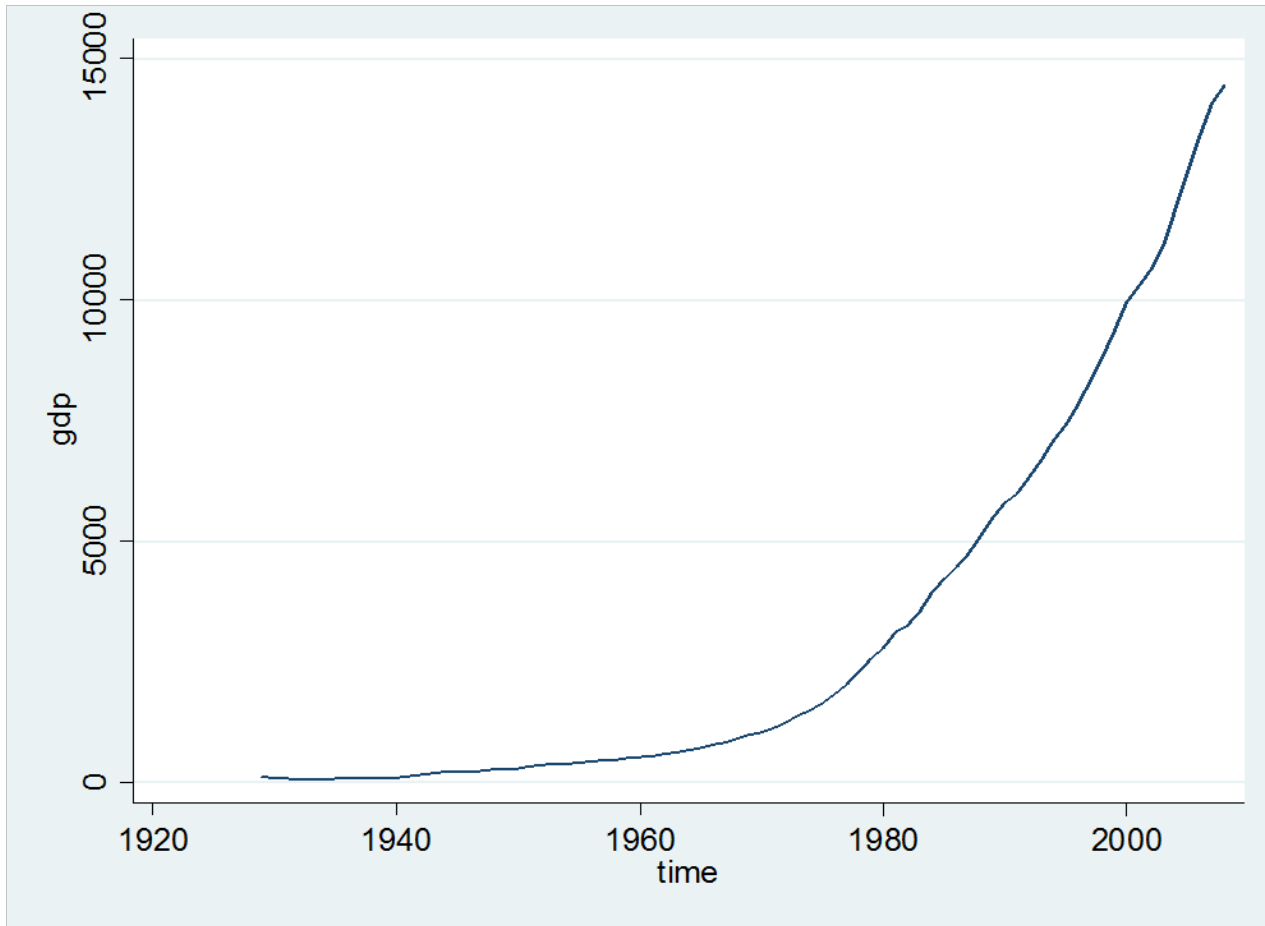
# Graphs

- With time series data, graphs are very useful.
- The place to start is a time-series plot.
  - A plot of the values of the series against time.
- Let's demonstrate by plotting U.S. GDP

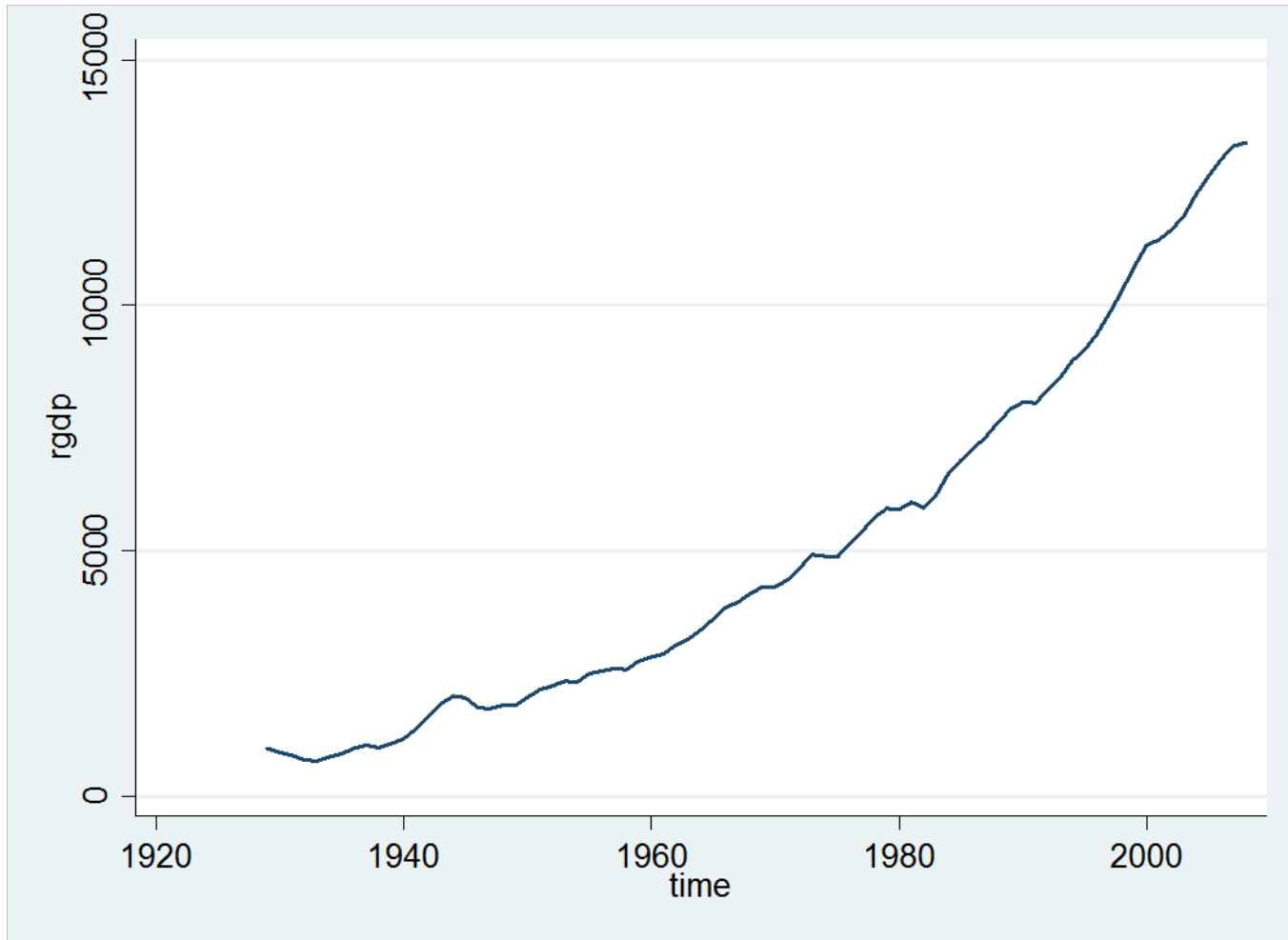
# Plotting GDP

- Go to [www.bea.gov](http://www.bea.gov)
- GDP/Current-dollar and real GDP (excel)
- Change format to numeric
- Copy entries for annual data
- Open STATA
- Data/Data Editor/Data Editor (Edit)
- Paste Entries into Data Editor, and close
- Right click on variables and rename
  - “time”, “gdp”, and “rgdp”
- Declare the time variable
  - `tsset time`
- Plot series
  - `tsline gdp`
  - `tsline rgdp`

# U.S. GDP



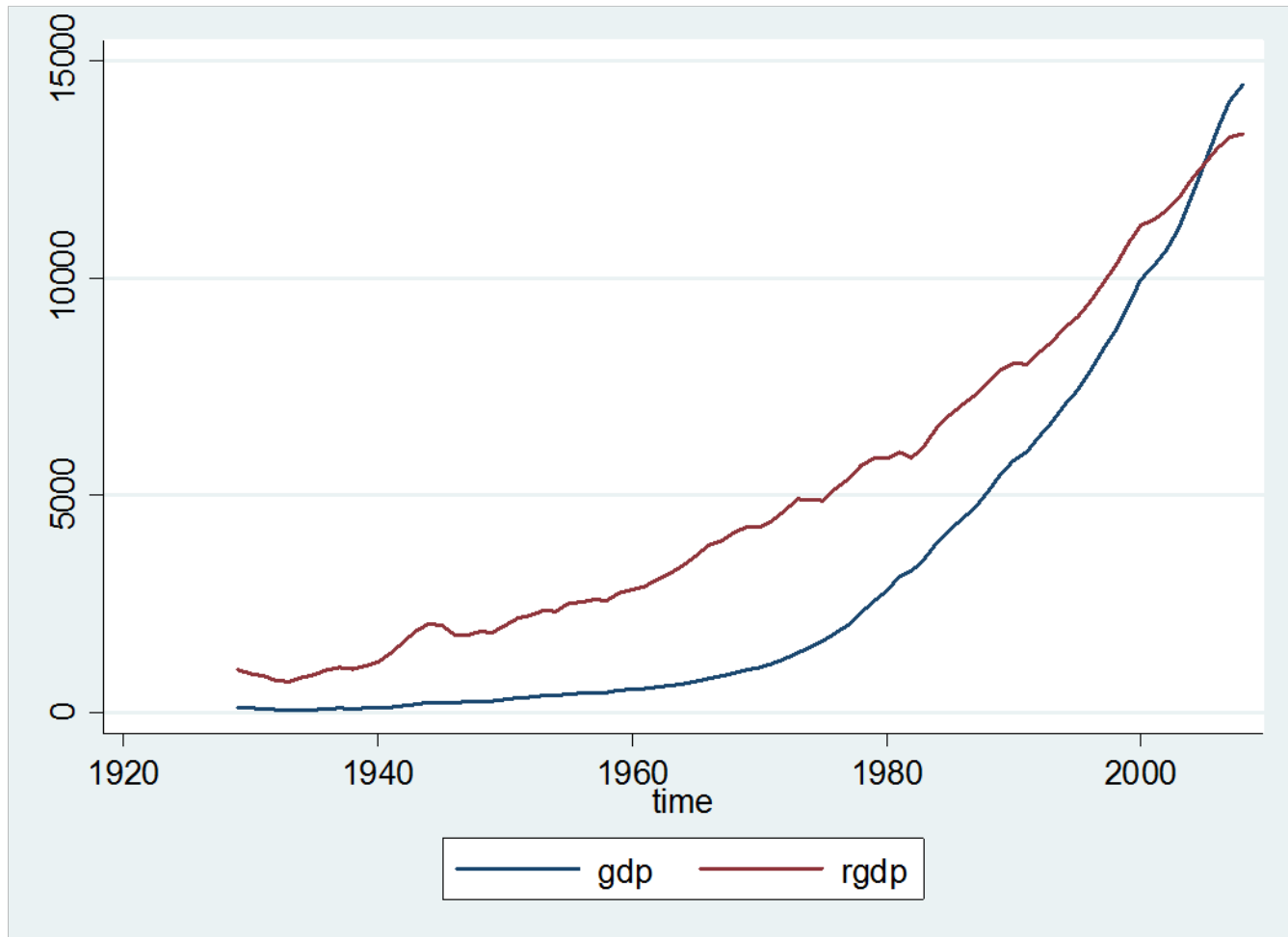
# Real GDP



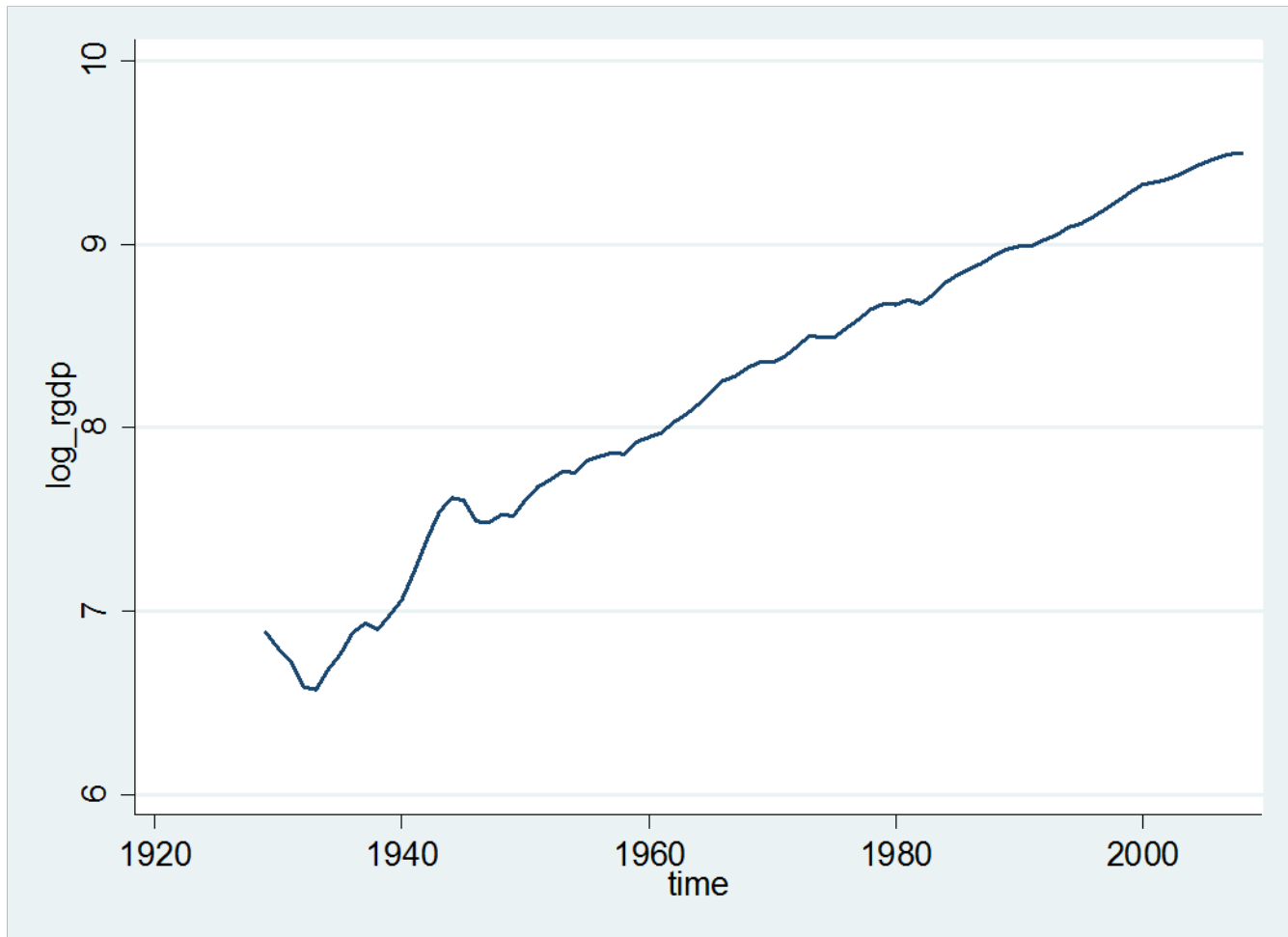
# Transformations

- Multiple Plots
  - `tsline gdp rgdp`
- Log transform
  - $\ln(y_t)$
  - generate `ln_rgdp=ln(rgdp)`
  - `tsline ln_rgdp`
- Differences
  - $\Delta y_t = y_t - y_{t-1}$
  - `tsline d.rgdp`
  - `tsline d.ln_rgdp`

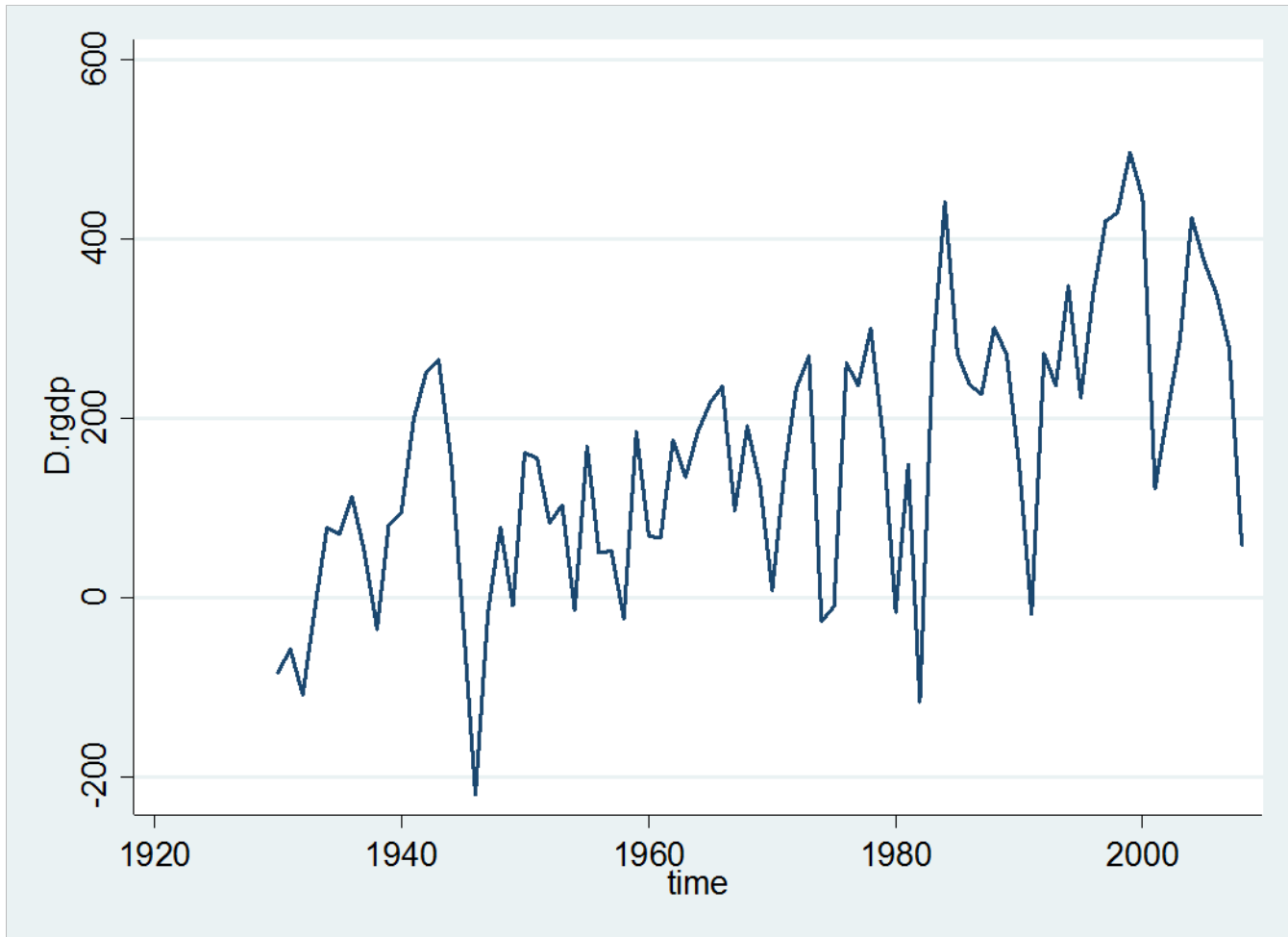
# GDP and Real GDP



# Ln(Real GDP)

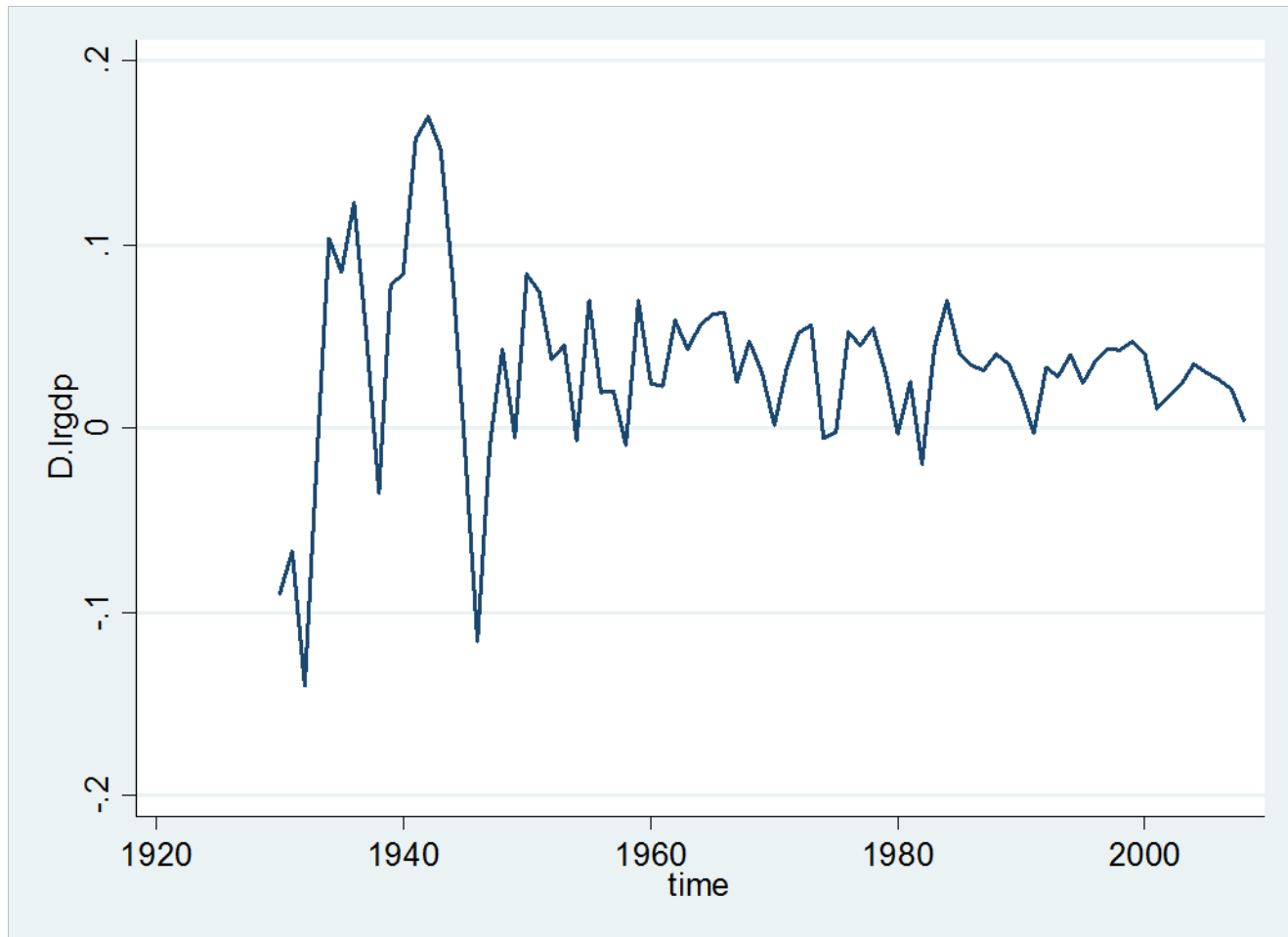


# Annual Real GDP Change (Differenced Real GDP)





# Annual Real GDP Growth Rate Differenced Ln(Real GDP)



# Creating a Dataset

- When done importing data, naming variables, setting the time index, and making transformations, save your file for future use.
- If you want to start over
  - Type **clear**

# Plotting Quarterly Data

- Go back to BEA GDP spreadsheet
- Highlight quarterly data
- Change format to numeric
- Copy, then paste in STATA's Data Editor
- Rename variables to qgdp and qrgdp
- Need to create a time variable
  - Stata does not translate the BEA's time index well

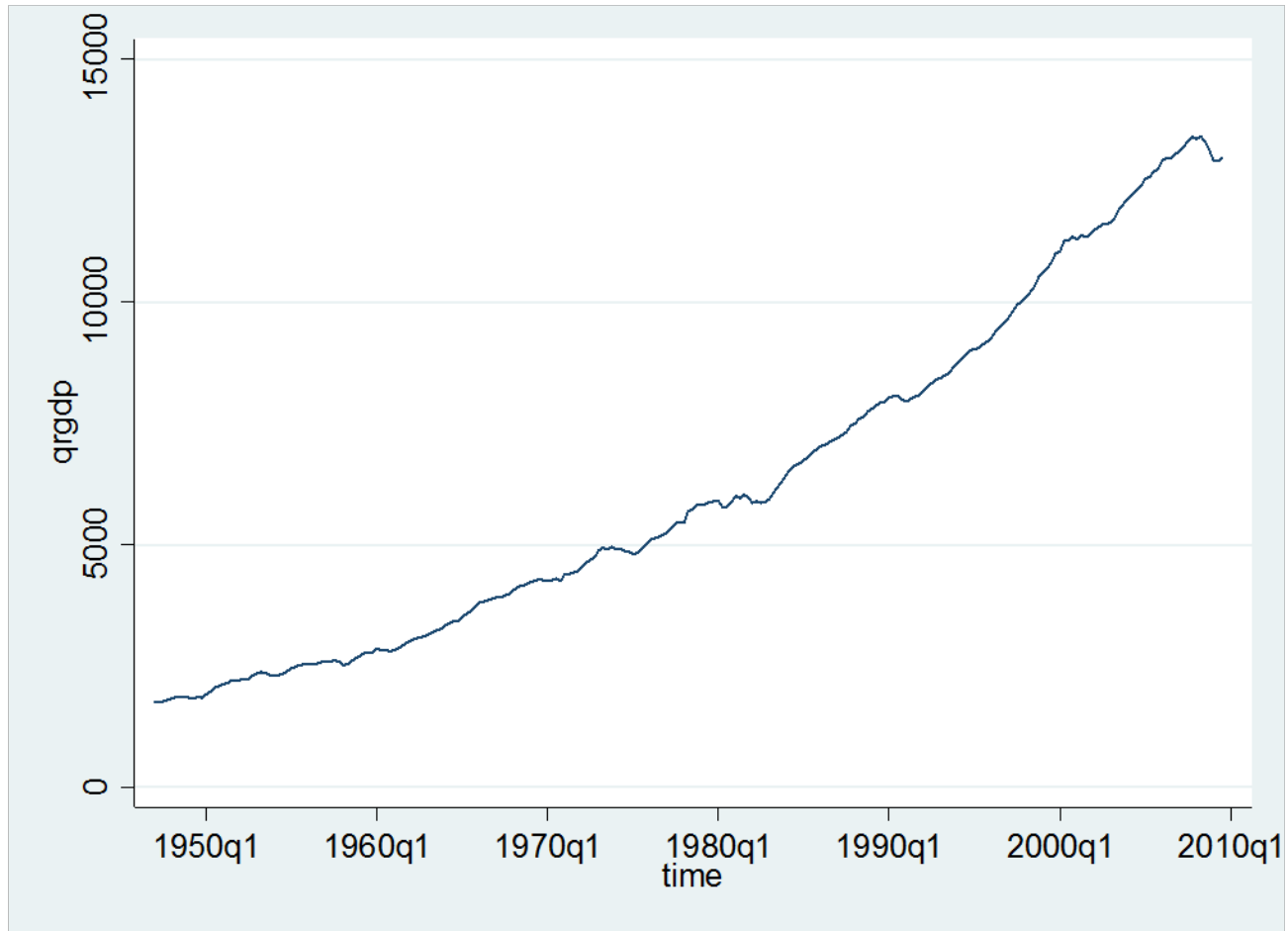
# tsmktim utility

- STATA commands are available from the web
- To install tsmktim in STATA
  - Help/SJ and User-written Programs/Search
  - Type **tsmktim**
  - Click on
    - dm81
    - [click here to install](#)
  - Now the command tsmktim has been installed on the computer you are working with.
- For some details, type **help tsmktim**

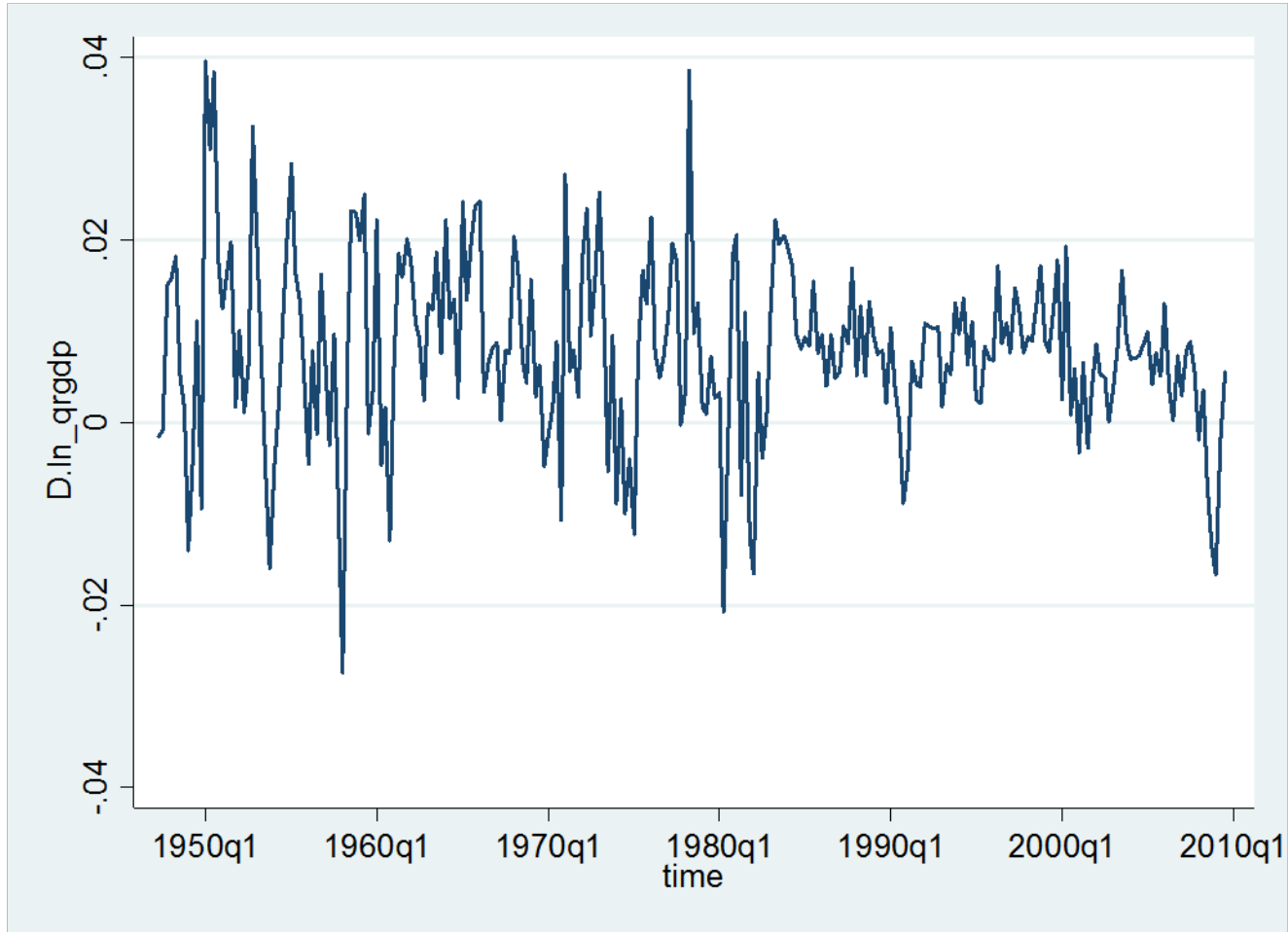
# tsmktime

- For annual data
  - `tsmktime time, start (1947)`
    - This creates an annual variable “time”, starting in 1947
- For quarterly data
  - `tsmktime time, start (1947q1)`
    - This creates a quarterly variable “time”, starting in the first quarter of 1947
- For monthly
  - `tsmktime time, start(1947m3)`
    - Starts in third month of 1947
- For our application,
  - `tsmktime time, start (1947q1)`
  - `tsset time`
  - `tsline qrgdp`
  - `generate ln_qrgdp=ln(qrgdp)`
  - `tsline d.ln_qrgdp`

# Quartely Real GDP



# Quarterly GDP Growth Rates



# Unemployment Rate Example

- Go to BLS
- Unemployment/National Unemployment Rate
  - CPS Databases
    - Labor Force Statistics – One Screen Data Search
- Select
  - Men and Women
  - Age: 20-24 years
  - Unemployment Rate
  - Seasonally Adjusted
  - Monthly
- Get Data



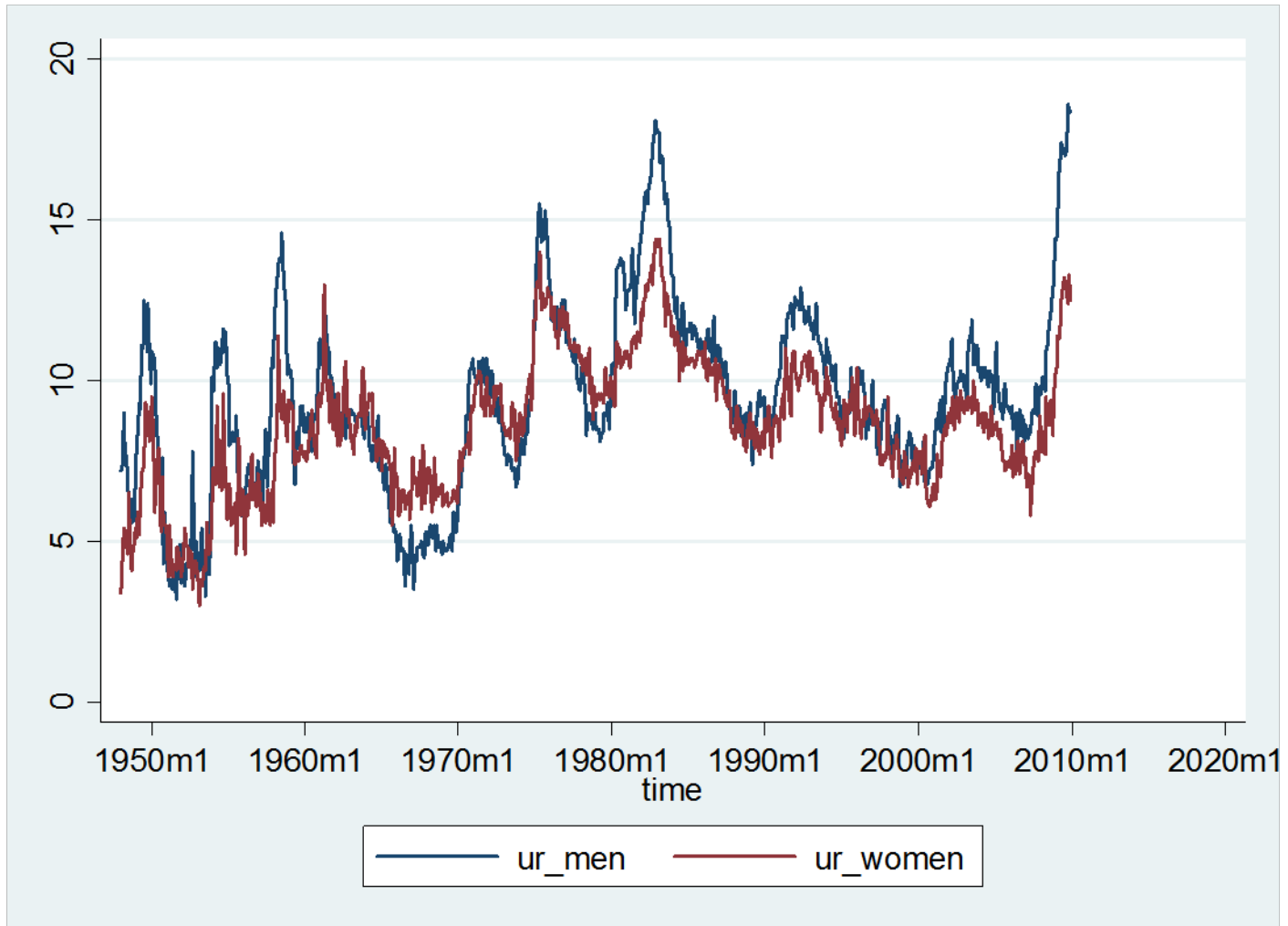
# Unemployment Rate Example

- In new screen, change start date to 1948 (earliest available)
- Go
- More Formatting Options
  - Column format
  - Text, tab delimited
  - Retrieve Data
- Data will be in columns
  - Some columns will be not useful
  - Delete these after pasting into STATA

# Monthly Unemployment Rates

- Paste data into STATA
- Rename variables `ur_men`, `ur_women`
- `tsmktime time, start(1948m1)`
- `tsset time`
- `tsline ur_men ur_women`

# U.S. Monthly Unemployment Rates, Men and Women, ages 20-24



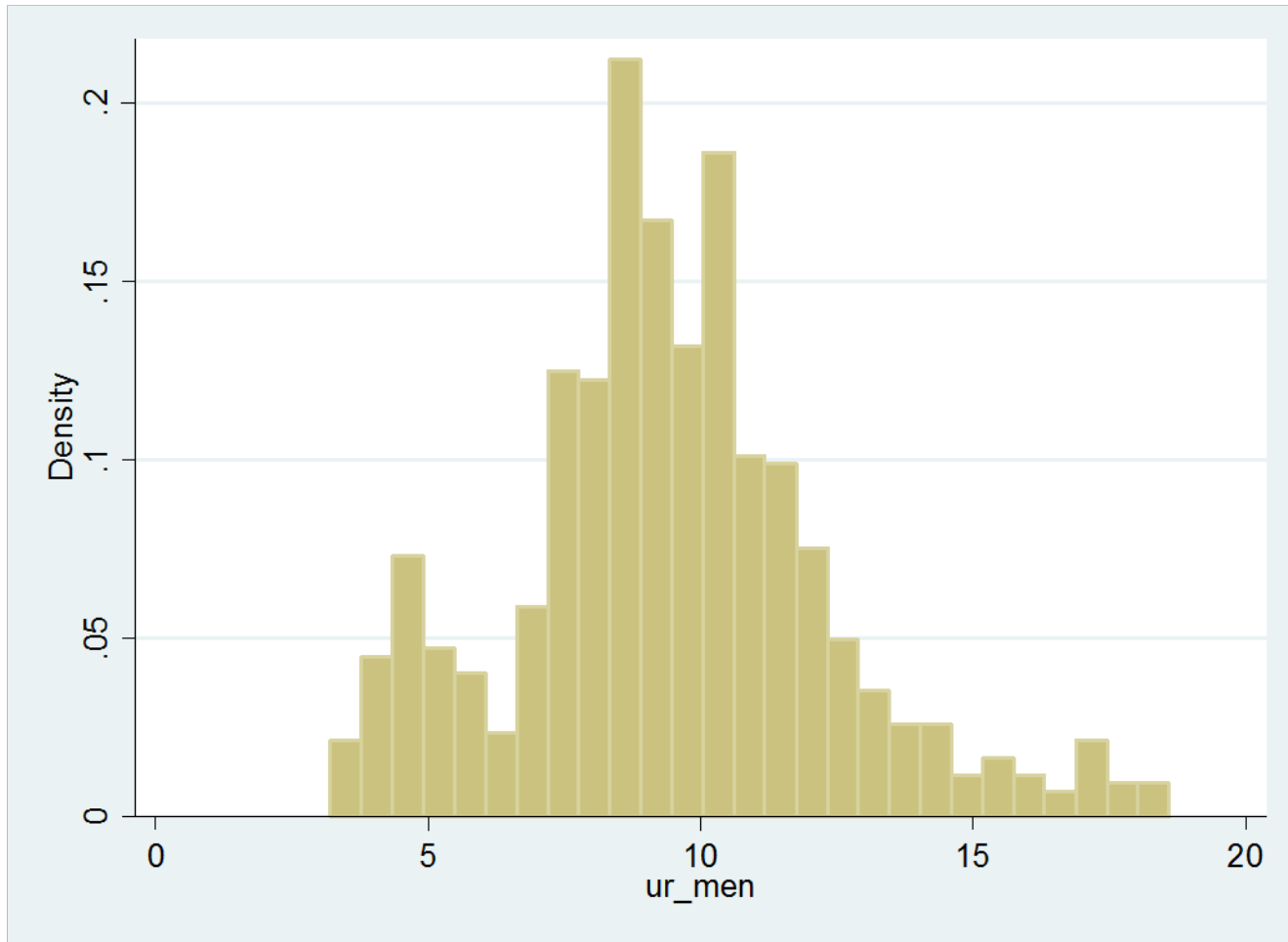
# Data Summary

- summarize
  - Number of observations
  - Mean, standard deviation, min and max
- summarize, detail
  - In addition:
    - Quantiles (labeled percentiles)
    - Skewness and kurtosis

# Histogram

- Sometimes a histogram is useful to view
- histogram ur\_men
- Using menus,
  - Graphics/Histogram
  - Select variable
  - OK

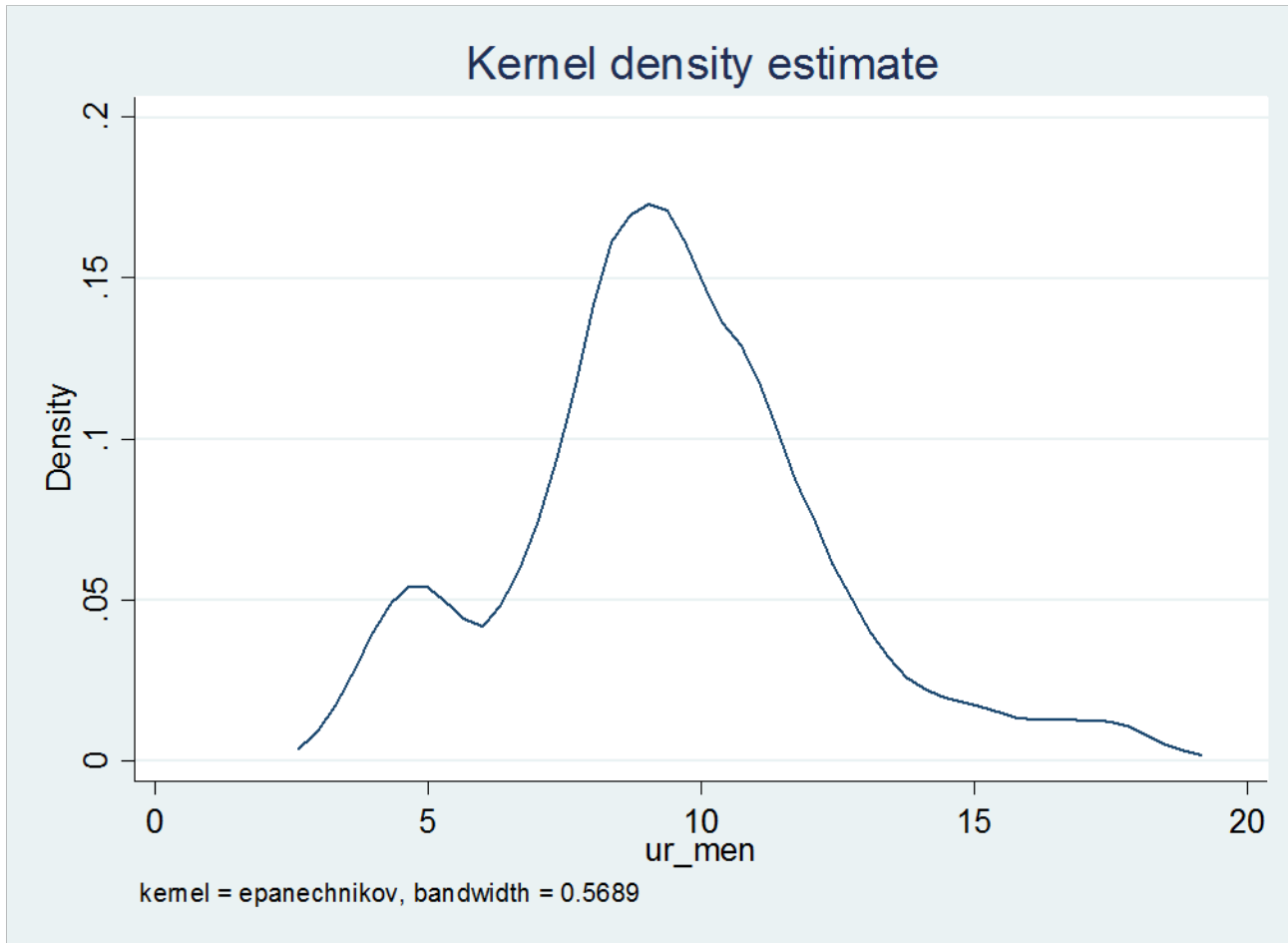
# Histogram –unemployment rate



# Density Estimate

- A density is a smoothed version of a histogram
- `kdensity ur_men`
- Using menus
  - Graphics/Smoothing and Densities/Kernel Density Estimation
  - Select Variable
  - OK

# Density Estimate

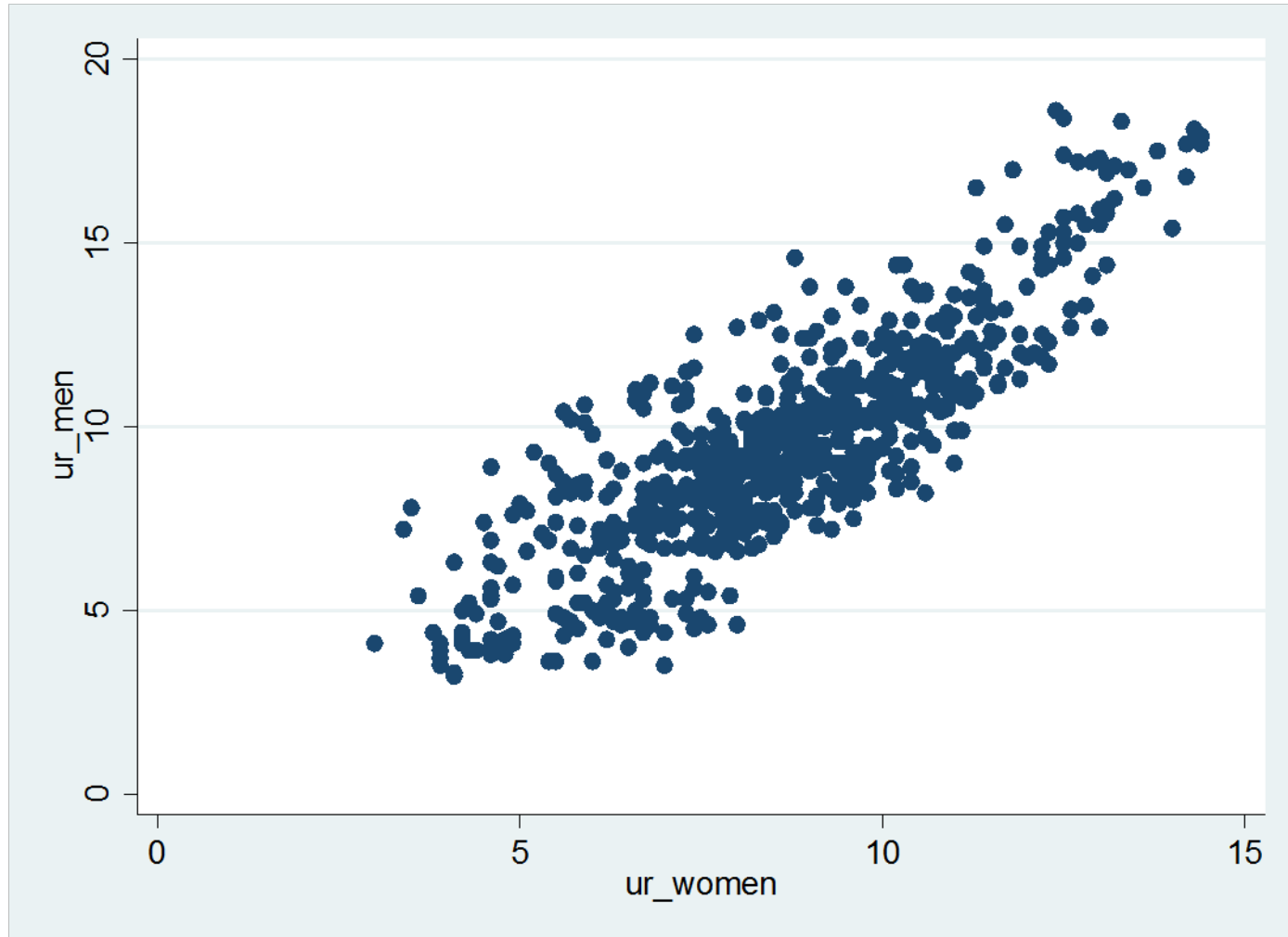




# Scatter Plot

- Sometimes a scatter plot can be insightful
- `twoway (scatter ur_men ur_women)`
- Using menus
  - Graphics/twoway graph
  - Create
  - Select y and x variables
  - Accept
  - OK

# Scatter plot of men and women unemployment rates



# Handling Data Organized as a Table

- Go back to BLS/Unemployment/National unemployment rates
- CPS Databases/Labor force statistics/one-screen data search
- Check/Get Data/More Formatting Options
- Table format, text, tab delimited
- Retrieve Data
- The data will appear in a table, each column corresponding to a different month
- The non-seasonally-adjusted data will also have an extra column for “annual” values

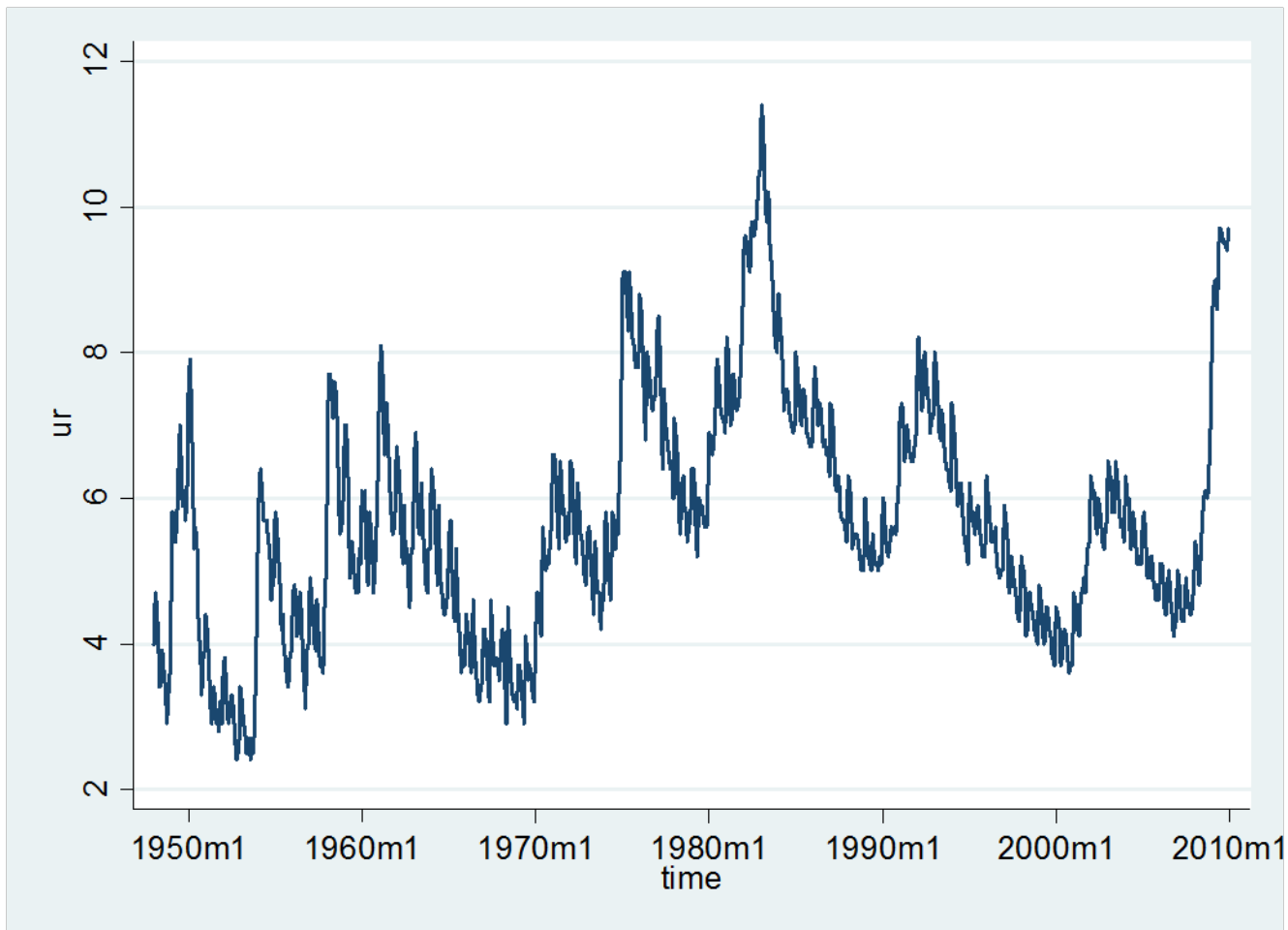
# Converting for use in Stata

- Copy and paste data table into Stata editor
- The data will be organized by year, with each month a different “variable”
- You can delete the final column – annual data
- `rename var1 year`
- Now you have the variables “year” and “var1”, “var2”, etc.
- `reshape long var, i(year) j(month)`
- This command reshapes the data. It looks for all the variables starting with “var” and combines them across “year”. The part of the variable name after “var” is put into the new variable “month”. You end up with the series “var”, “year” and “month”

# Cleaning up

- `rename var1 ur`
- Drop the variables `year` and `month` (optional)
  - `drop year - month`
- `tsmktime time, start(1948m1)`
  - Generates a monthly time index
- `tsset time`
  - Declares the data set a time series, and “time” the time index
- `tsline ur`
  - Plots time series

# Non-Seasonally Adjusted U.S. Unemployment Rate



# Handling Data with Extra Observations

- BLS/Unemployment/State and Local Unemployment Rates/LAU Databases
- LAUS/One-Screen Data Search
- Wisconsin/Statewide/Not Seasonally Adjusted
- Get Data/More Formatting Options
- Table/Text/Tabs/Retrieve Data
- Copy and Paste into STATA
  - Be careful above data marked for revision

- Every 13<sup>th</sup> observation has month="Annual"
  - We want to delete these
  - drop if var2=="Annual"
  - Stata uses "==" to test for equality
- rename var6 ur
- drop var1 var2 var3 var4 var5
- tsmktime time, start (1976m1)
- tsset time
- tslines ur



# Wisconsin Unemployment Rate Not Seasonally Adjusted

