

Using Quarto for Stata dynamic documents

Let us consider an example where we study the **mpg** and **weight** variables in **auto.dta**. In this example, all code used to construct the desired output will be displayed as fenced block code, followed by the output it produces. This is done using the option `*|echo: fenced`. This option, however, doesn't seem to work well with jupyter notebooks.

We first use the **sysuse** command to load the dataset and then describe the data using the **describe** command.

```
```{stata}
sysuse auto, clear
describe
```
```

(1978 automobile data)

```
Contains data from C:\Program Files\Stata17\ado\base/a/auto.dta
Observations:      74      1978 automobile data
Variables:         12      13 Apr 2020 17:45
                        (_dta has notes)
```

| Variable
name | Storage
type | Display
format | Value
label | Variable label |
|------------------|-----------------|-------------------|----------------|----------------|
| make | str18 | %-18s | | Make and model |
| price | int | %8.0gc | | Price |
| mpg | int | %8.0g | | Mileage (mpg) |

| | | | | |
|--------------|-------|--------|--------|------------------------|
| rep78 | int | %8.0g | | Repair record 1978 |
| headroom | float | %6.1f | | Headroom (in.) |
| trunk | int | %8.0g | | Trunk space (cu. ft.) |
| weight | int | %8.0gc | | Weight (lbs.) |
| length | int | %8.0g | | Length (in.) |
| turn | int | %8.0g | | Turn circle (ft.) |
| displacement | int | %8.0g | | Displacement (cu. in.) |
| gear_ratio | float | %6.2f | | Gear ratio |
| foreign | byte | %8.0g | origin | Car origin |

Sorted by: foreign

Now, we want to check if **mpg** is always greater than 0 and less than 100. We use the **assert** command to perform the check. In this case, we do not want to include any output in the target HTML file, so we use the **quietly** attribute to modify the behavior of the **dd_do** Stata dynamic tag.

```
```{stata}
 assert mpg > 0 & mpg < 100
```
```

If the data do not satisfy the conditions, **quatro** will fail with an error message, which will occur if we run the same **assert** command in a do-file.

Next, we want to summarize the **weight** variable:

```
```{stata}
 summarize weight
```
```

| Variable | Obs | Mean | Std. dev. | Min | Max |
|----------|-----|----------|-----------|------|------|
| weight | 74 | 3019.459 | 777.1936 | 1760 | 4840 |

We want to use the minimum and maximum values of **weight** in a sentence. Instead of copying and pasting the numbers from the **summarize** output, we can use the **display** Stata to show

r(min) and **r(max)** stored results. We will also use the options `*| output: asis` to obtain text that follows markdown formatting.

```
```{stata}
*| output: asis
display "The variable weight has minimum value " %4.2f `r(min)' " and " ///
 "has maximum value " %4.2f `r(max)' "."
```
```

The variable weight has minimum value 1760.00 and has maximum value 4840.00.

In other words, if one wants to use dynamic tags, its possible to do so by simply using `display`, with the corresponding locals, so Stata evaluates the expressions as normal. `*| output: asis` is used so the output can still be interpreted using markdown syntax.

As with **dyndoc**, `display` can also be used as a calculator. For example, if we want to include the $range = max - min$ in a sentence, instead of calculating the number and then copying and pasting it, we can use

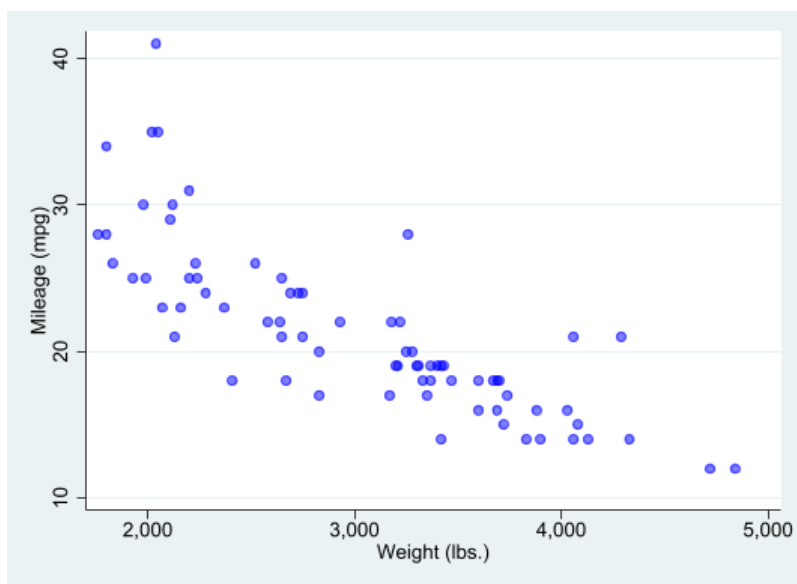
```
```{stata}
*| output: asis
display "The variable weight has range " %4.2f `r(max)' - `r(min)' "."
```
```

The variable weight has range 3080.00.

Now, we want to graph **mpg** and **weight** using a scatterplot. There are at least two ways to do this.

First, one can simply create the scatterplot using the same procedure as before:

```
```{stata}
scatter mpg weight, mcolor(blue%50)
```
```



which generates a scatterplot of **mpg** and **weight** with 50% opacity color markers.

Now, we want to export the graph to a file and include an image link to the file.

```
```{stata}
qui:graph export fig1.png, width(1600) replace
```
```

This produces a graph of 1600 pixels width.

It is possible, however, to combine figure creation using quarto tags and directives. Here, however, you need to make sure all figures are named:

```
```{stata}
*| label: fig-cost
*| fig-cap: Price vs MPG
*| fig-subcap:
*| - Foreign Cars
*| - Domestic Cars
*| layout-ncol: 2
*| column: page
```
```

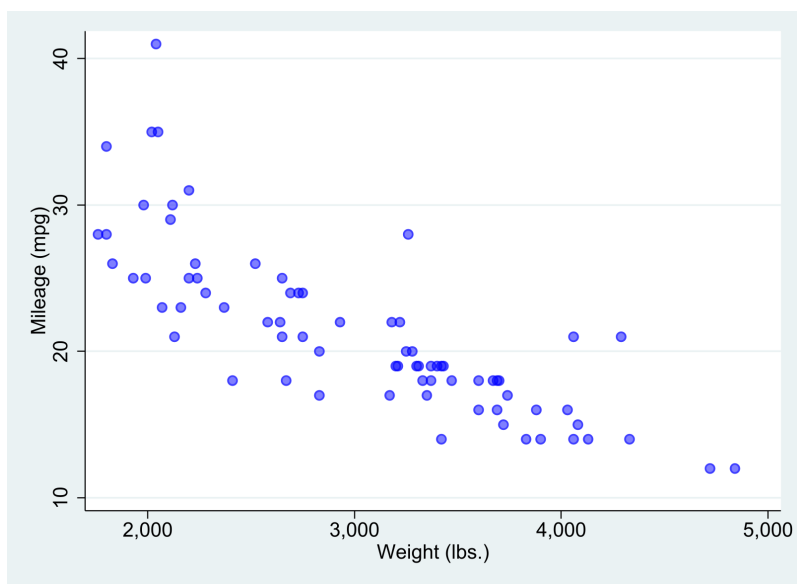


Figure 1: scatter

```
scatter price mpg if foreign==1, name(m1, replace) ylabel(0(4000)16000)
qui:graph export fig2a.png, width(1600) replace
scatter price mpg if foreign==0, name(m2, replace) ylabel(0(4000)16000)
qui:graph export fig2b.png, width(1600) replace
```

```

And of course, we can now use the figure tags to link it to the text:

Figure 2 provides a simple scatter between prices and MPG for foreign and domestic cars. While there seems to be a strong negative relationship between these variables among foreign cars (see Figure 2a), the relationship among domestic cars is much weaker, when looking at cars with a fuel efficiency larger than 15mpg (see Figure 2b).

The last approach, however, may not work with PDF format, or jupyter-notebook format, unless the figures are saved. But it does seem to work with HTML and docx.

Nevertheless, one could also do the following:

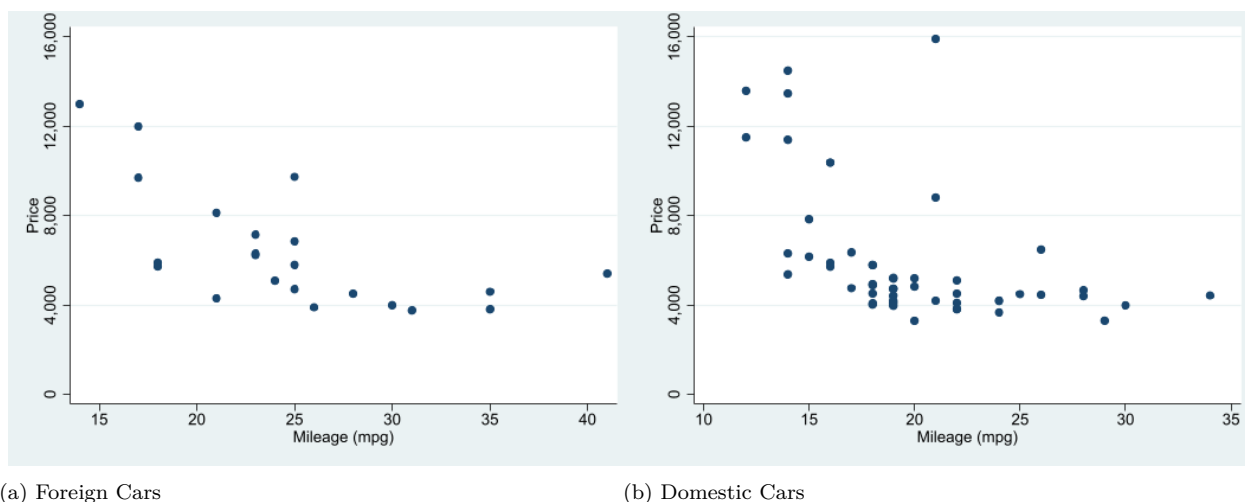


Figure 2: Price vs MPG

```

::: {#fig-mpgprice layout-ncol=2 .column-page }

! [foreign] (fig2a.png) {#fig-mpgprice-1}

! [domestic] (fig2b.png) {#fig-mpgprice-2}

Price vs MPG
:::

```

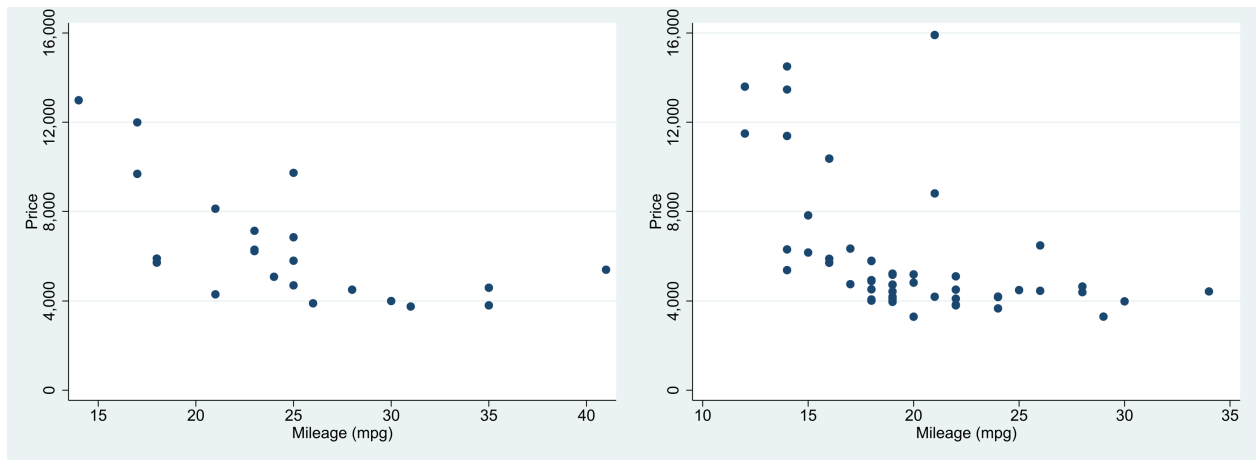
to produce

As plot in Figure 3 provides a simple scatter between prices and MPG for foreign and domestic cars. While there seems to be a strong negative relationship between these variables among foreign cars (see Figure 3a), the relationship among domestic cars is much weaker, when looking at cars with a fuel efficiency larger than 15mpg (see Figure 3b).

If using VScode, to render all formats at once, you need to type `quarto render filename.qmd` in the terminal.

Just for fun, I also when rendering this with quarto, i used the following formats

---



(a) foreign

(b) domestic

Figure 3: Price vs MPG

```
format:
 html: default
 pdf: default
 docx: default
 odt: default
 epub: default
 jupyter: nbstata

```