The Tax Free Threshold

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Introduction

I am writting a Tax Primer on the Tax Free Threshold (TFT) to provide a high level overview of the policy along with some broad conclusions about the desirability of its role in a future tax system. The current policy settings where implemented[1] in the context of the the Gillard Government's Carbon Polultion Reduction Scheme. has two key goals:

1. eliminate the necessity for some interactions with the tax system where tax payer incomes are very low; and
2. provide

I was interested to explore the varous facets of the TFT as concretely as I could so the most recent release of Taxation Statistics by the Australian Taxation Office (ATO) seemed an obvious place to start. While there remains a question about the extent to which the data has been modified to comply with the taxpayer secrecy provisions (primarily to be found in Div 355 *Taxation Administration Act* 1953) what follows will hopefully provide some useful estimates of: 1. the distribution of the benefit

[1] Item 1 of Schedule 1 amends subsection 3(1) to define the term 'tax-free threshold', which is set to equal $18 200 for 2012–13. Consequential amendments to the current nominal tax-free threshold of $6000 are made by items 2, 3, 4 and 5 that substitute references to '$6000' with the term 'the tax-free threshold', thereby lifting the nominal tax-free threshold from $6000 to $18 200.

### This note is about the cost of Tax Free Threshold

This note uses the most recent release of Taxation Statistics by the Australian Taxation Office. Taxation statistics is an annual publication that presents an overview of the statistics relating to the different taxes administered by the Australian Taxation Office (ATO). The relates to data collected on the 2016–17 income year for individuals, companies, superannuation funds, partnerships and trusts.

We support *italic* aka *em* and **strong** annotations for text, as well as `code` snippets.

The package name is a standard package naming recursion: *tint is not tufte*.

The remainder of the tufte skeleton document follows as is, with only marginal changes to refer to this package for code.
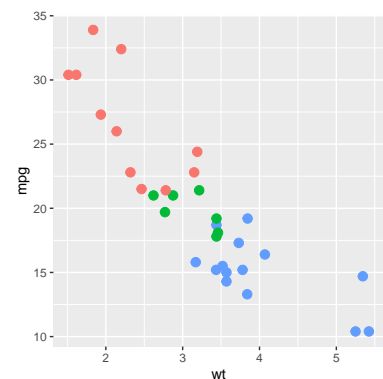
Introduction

The Tufte handout style is a style that Edward Tufte uses in his books and handouts. Tufte's style is known for its extensive use of sidenotes, tight integration of graphics with text, and well-set typography. This style has been

implemented in LaTeX and HTML/CSS[2], respectively. We have ported both implementations into the **tufte** package. If you want LaTeX/PDF output, you may use the `tufte_handout` format for handouts, and `tufte_book` for books. For HTML output, use `tufte_html`. These formats can be either specified in the YAML metadata at the beginning of an R Markdown document (see an example below), or passed to the `rmarkdown::render()` function. See Allaire et al. [2018] for more information about **rmarkdown**.

```
---
title: "An Example Using the Tufte Style"
author: "John Smith"
output:
  tufte::tufte_handout: default
  tufte::tufte_html: default
---
```

There are two goals of this package:

1. To produce both PDF and HTML output with similar styles from the same R Markdown document;
2. To provide simple syntax to write elements of the Tufte style such as side notes and margin figures, e.g. when you want a margin figure, all you need to do is the chunk option `fig.margin = TRUE`, and we will take care of the deails for you, so you never need to think about `\begin{marginfigure}` `\end{marginfigure}` or `<span class="marginfigure"> </span>`; the LaTeX and HTML code under the hood may be complicated, but you never need to learn or write such code.

If you have any feature requests or find bugs in **tufte**, please do not hesitate to file them to `https://github.com/rstudio/tufte/issues`. For general questions, you may ask them on StackOverflow: `http://stackoverflow.com/tags/rmarkdown`.

Headings

This style provides first and second-level headings (that is, # and ##), demonstrated in the next section. You may get unexpected output if you try to use ### and smaller headings.

IN HIS LATER BOOKS[3], Tufte starts each section with a bit of vertical space, a non-indented paragraph, and sets the first few words of the sentence in small caps. To accomplish this using this style, call the `newthought()` function in **tufte** in an *inline R expression* `` `r ` `` as demonstrated at the beginning of this paragraph.[4]

[3] Beautiful Evidence

[4] Note you should not assume **tufte** has been attached to your R session. You should either `library(tufte)` in your R Markdown document before you call `newthought()`, or use `tint::newthought()`.

Figures

Margin Figures

Images and graphics play an integral role in Tufte's work. To place figures in the margin you can use the **knitr** chunk option `fig.margin = TRUE`. For example:

```r
library(ggplot2)
mtcars2 <- mtcars
mtcars2$am <- factor(
  mtcars$am, labels = c('automatic', 'manual')
)
ggplot(mtcars2, aes(hp, mpg, color = am)) +
  geom_point() + geom_smooth() +
  theme(legend.position = 'bottom')
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

Note the use of the `fig.cap` chunk option to provide a figure caption. You can adjust the proportions of figures using the `fig.width` and `fig.height` chunk options. These are specified in inches, and will be automatically scaled down to fit within the handout margin.

Arbitrary Margin Content

In fact, you can include anything in the margin using the **knitr** engine named `marginfigure`. Unlike R code chunks ```` ```{r} ````, you write a chunk starting with ```` ```{marginfigure} ```` instead, then put the content in the chunk. See an example on the right about the first fundamental theorem of calculus.

For the sake of portability between LaTeX and HTML, you should keep the margin content as simple as possible (syntax-wise) in the `marginfigure` blocks. You may use simple Markdown syntax like `**bold**` and `_italic_` text, but please refrain from using footnotes, citations, or block-level elements (e.g. blockquotes and lists) there.

Full Width Figures

You can arrange for figures to span across the entire page by using the chunk option `fig.fullwidth = TRUE`.

```r
ggplot(diamonds, aes(carat, price)) + geom_smooth() +
  facet_grid(~ cut)
```

```
## 'geom_smooth()' using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```
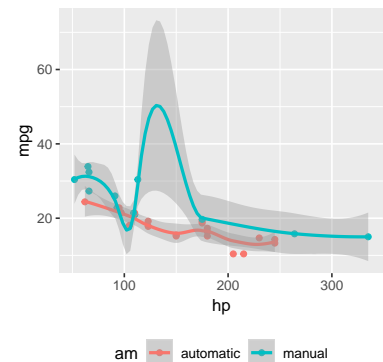

Figure 1: MPG vs horsepower, colored by transmission.

We know from *the first fundamental theorem of calculus* that for x in $[a, b]$:

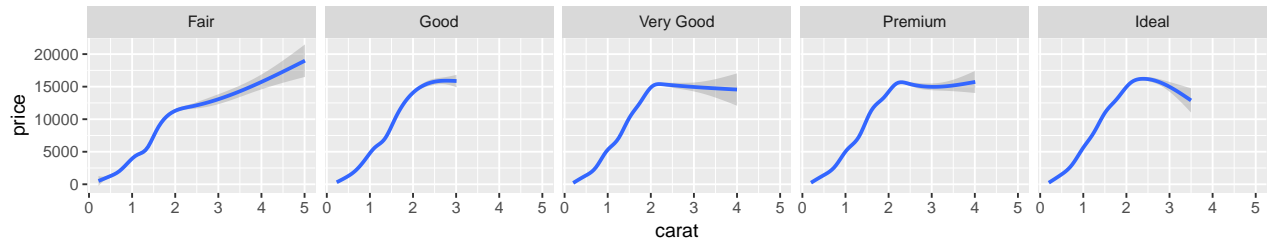$$\frac{d}{dx}\left(\int_a^x f(u)\, du\right) = f(x).$$

Figure 2: A full width figure.

Other chunk options related to figures can still be used, such as `fig.width`, `fig.cap`, `out.width`, and so on. For full width figures, usually `fig.width` is large and `fig.height` is small. In the above example, the plot size is 10×2.

Main Column Figures

Besides margin and full width figures, you can of course also include figures constrained to the main column. This is the default type of figures in the La-TeX/HTML output.

```
ggplot(diamonds, aes(cut, price)) + geom_boxplot()
```
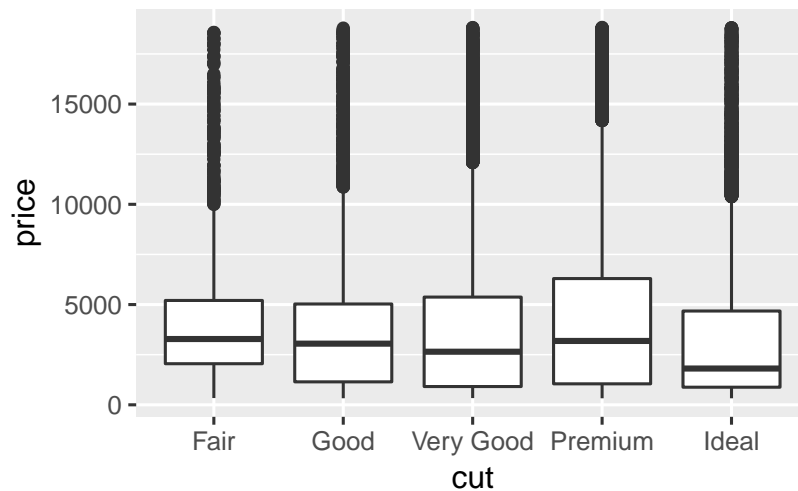
Figure 3: A figure in the main column.

Sidenotes

One of the most prominent and distinctive features of this style is the extensive use of sidenotes. There is a wide margin to provide ample room for sidenotes

and small figures. Any use of a footnote will automatically be converted to a sidenote. [5]

If you'd like to place ancillary information in the margin without the sidenote mark (the superscript number), you can use the `margin_note()` function from **tufte** in an inline R expression. This function does not process the text with Pandoc, so Markdown syntax will not work here. If you need to write anything in Markdown syntax, please use the `marginfigure` block described previously.

This is a margin note. Notice that there is no number preceding the note.

References

References can be displayed as margin notes for HTML output. For example, we can cite R here [R Core Team, 2019]. To enable this feature, you must set `link-citations: yes` in the YAML metadata, and the version of `pandoc-citeproc` should be at least 0.7.2. You can always install your own version of Pandoc from http://pandoc.org/installing.html if the version is not sufficient. To check the version of `pandoc-citeproc` in your system, you may run this in R:

```
system2('pandoc-citeproc', '--version')
```

If your version of `pandoc-citeproc` is too low, or you did not set `link-citations: yes` in YAML, references in the HTML output will be placed at the end of the output document.

Tables

You can use the `kable()` function from the **knitr** package to format tables that integrate well with the rest of the Tufte handout style. The table captions are placed in the margin like figures in the HTML output.

```
knitr::kable(
  mtcars[1:6, 1:6], caption = 'A subset of mtcars.'
)
```

Table 1: A subset of mtcars.

	mpg	cyl	disp	hp	drat	wt
Mazda RX4	21.0	6	160	110	3.90	2.620
Mazda RX4 Wag	21.0	6	160	110	3.90	2.875
Datsun 710	22.8	4	108	93	3.85	2.320
Hornet 4 Drive	21.4	6	258	110	3.08	3.215
Hornet Sportabout	18.7	8	360	175	3.15	3.440
Valiant	18.1	6	225	105	2.76	3.460

Block Quotes

We know from the Markdown syntax that paragraphs that start with > are converted to block quotes. If you want to add a right-aligned footer for the quote, you may use the function `quote_footer()` from **tufte** in an inline R expression. Here is an example:

> "If it weren't for my lawyer, I'd still be in prison. It went a lot faster with two people digging."
>
> — Joe Martin

Without using `quote_footer()`, it looks like this (the second line is just a normal paragraph):

> "Great people talk about ideas, average people talk about things, and small people talk about wine."
>
> — Fran Lebowitz

Responsiveness

The HTML page is responsive in the sense that when the page width is smaller than 760px, sidenotes and margin notes will be hidden by default. For side-notes, you can click their numbers (the superscripts) to toggle their visibility. For margin notes, you may click the circled plus signs to toggle visibility.

More Examples

The rest of this document consists of a few test cases to make sure everything still works well in slightly more complicated scenarios. First we generate two plots in one figure environment with the chunk option `fig.show = 'hold'`:

```r
p <- ggplot(mtcars2, aes(hp, mpg, color = am)) +
  geom_point()
p
p + geom_smooth()
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```

Then two plots in separate figure environments (the code is identical to the previous code chunk, but the chunk option is the default `fig.show = 'asis'` now):

```r
p <- ggplot(mtcars2, aes(hp, mpg, color = am)) +
  geom_point()
p
```
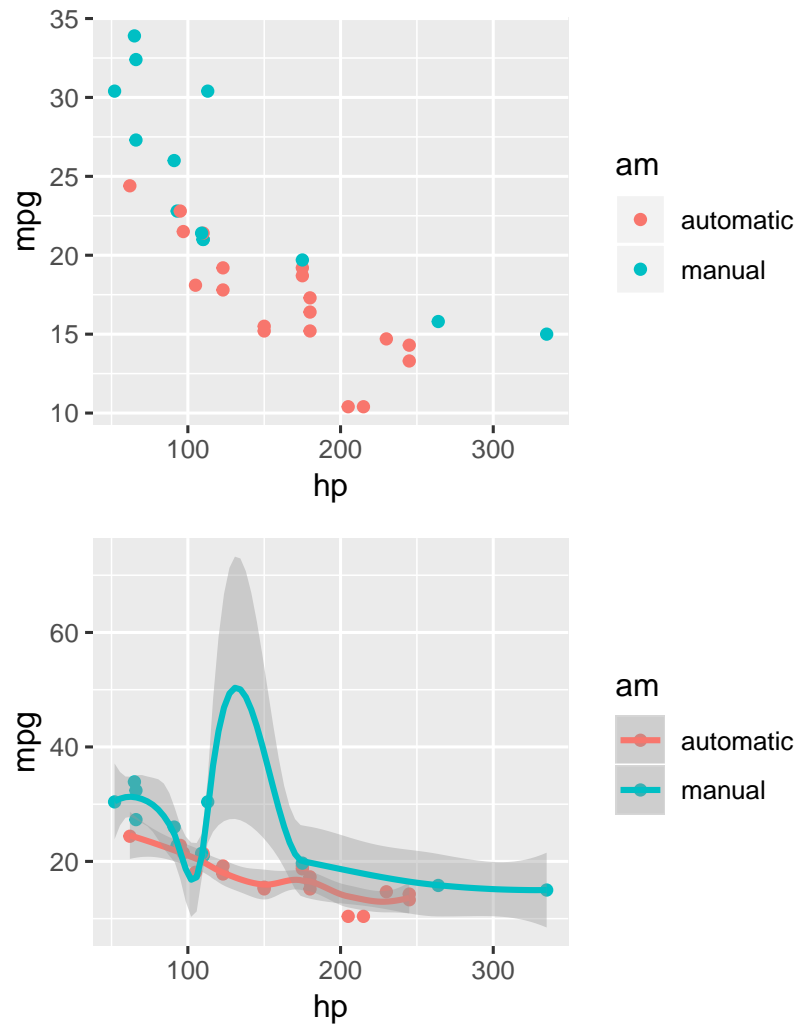
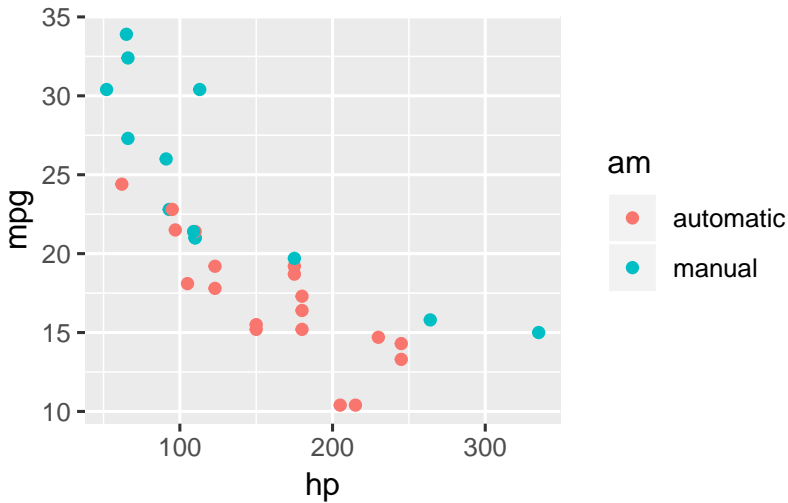Figure 4: Two plots in one figure environment.

Figure 5: Two plots in separate figure environments (the first plot).

```
p + geom_smooth()
```

```
## 'geom_smooth()' using method = 'loess' and formula 'y ~ x'
```
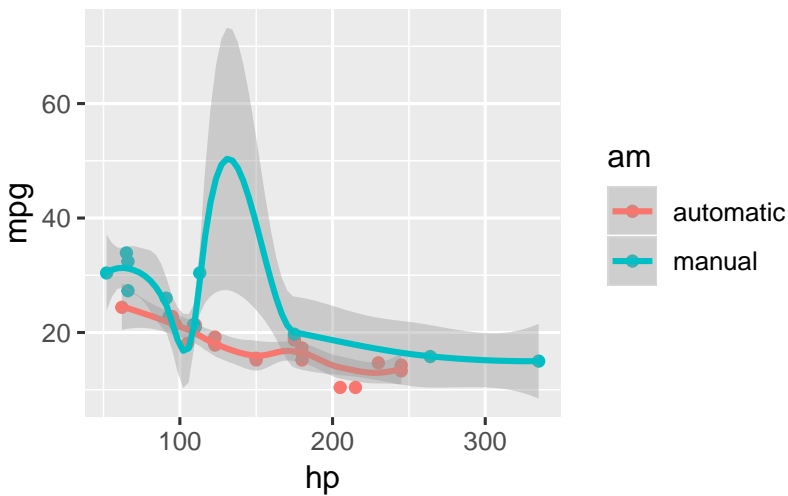

Figure 6: Two plots in separate figure environments (the second plot).

You may have noticed that the two figures have different captions, and that is because we used a character vector of length 2 for the chunk option `fig.cap` (something like `fig.cap = c('first plot', 'second plot')`).

Next we show multiple plots in margin figures. Similarly, two plots in the same figure environment in the margin:

```
p
p + geom_smooth(method = 'lm')
```

Then two plots from the same code chunk placed in different figure environments:

```
knitr::kable(head(iris, 15))
```

Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa
4.8	3.0	1.4	0.1	setosa
4.3	3.0	1.1	0.1	setosa
5.8	4.0	1.2	0.2	setosa

```
p
```

```
knitr::kable(head(iris, 12))
```

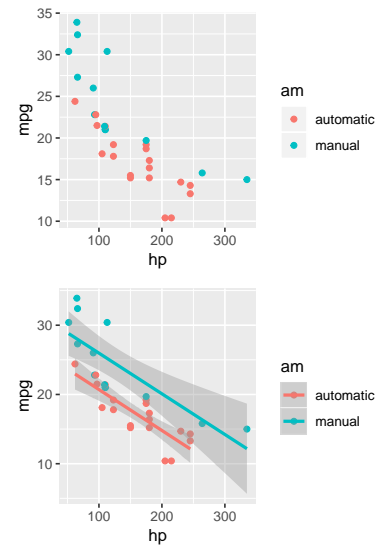| Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa
5.4	3.9	1.7	0.4	setosa
4.6	3.4	1.4	0.3	setosa
5.0	3.4	1.5	0.2	setosa
4.4	2.9	1.4	0.2	setosa
4.9	3.1	1.5	0.1	setosa
5.4	3.7	1.5	0.2	setosa
4.8	3.4	1.6	0.2	setosa

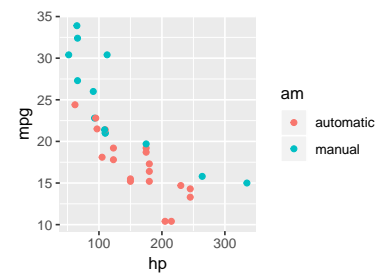Figure 7: Two plots in one figure environment in the margin.

Figure 8: Two plots in separate figure environments in the margin (the first plot).

```
p + geom_smooth(method = 'lm')
```

```
knitr::kable(head(iris, 5))
```

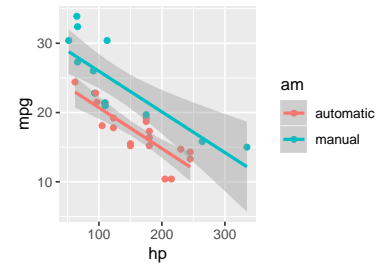| Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
5.1	3.5	1.4	0.2	setosa
4.9	3.0	1.4	0.2	setosa
4.7	3.2	1.3	0.2	setosa
4.6	3.1	1.5	0.2	setosa
5.0	3.6	1.4	0.2	setosa

Figure 9: Two plots in separate figure environments in the margin (the second plot).

We blended some tables in the above code chunk only as *placeholders* to make sure there is enough vertical space among the margin figures, otherwise they will be stacked tightly together. For a practical document, you should not insert too many margin figures consecutively and make the margin crowded.

You do not have to assign captions to figures. We show three figures with no captions below in the margin, in the main column, and in full width, respectively.

```
# a boxplot of weight vs transmission; this figure
# will be placed in the margin
ggplot(mtcars2, aes(am, wt)) + geom_boxplot() +
  coord_flip()
```
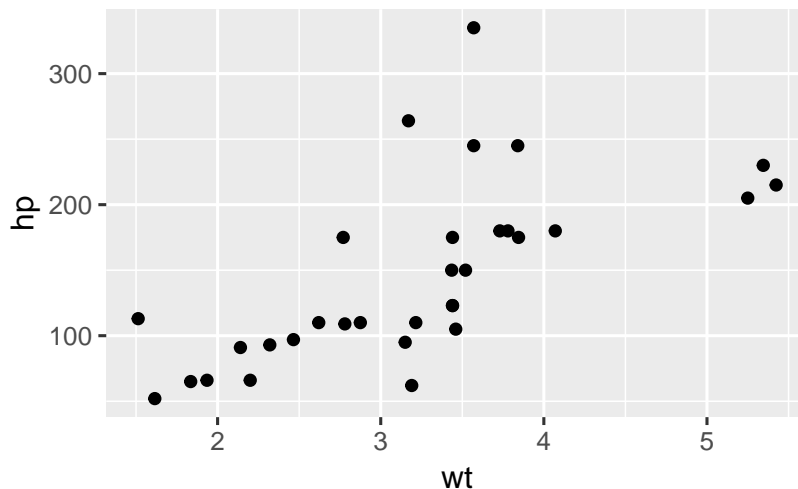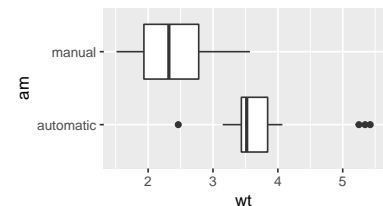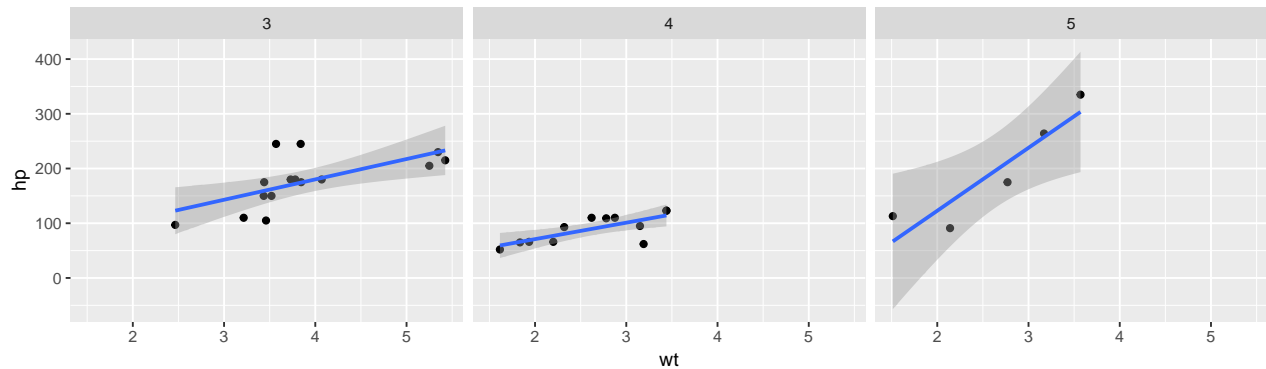
```
# a figure in the main column
p <- ggplot(mtcars, aes(wt, hp)) + geom_point()
p
```

```
# a fullwidth figure
p + geom_smooth(method = 'lm') + facet_grid(~ gear)
```


Some Notes on Tufte CSS

There are a few other things in Tufte CSS that we have not mentioned so far. If you prefer sans-serif fonts, use the function `sans_serif()` in **tufte**. For epigraphs, you may use a pair of underscores to make the paragraph italic in a block quote, e.g.

> *I can win an argument on any topic, against any opponent. People know this, and steer clear of me at parties. Often, as a sign of their great respect, they don't even invite me.*
>
> — Dave Barry

We hope you will enjoy the simplicity of R Markdown and this R package, and we sincerely thank the authors of the Tufte-CSS and Tufte-LaTeX projects for developing the beautiful CSS and LaTeX classes. Our **tufte** package would not have been possible without their heavy lifting.

To see the R Markdown source of this example document, you may follow this link to Github, use the wizard in RStudio IDE (`File -> New File -> R Markdown -> From Template`), or open the Rmd file in the package:

```
file.edit(
  tint:::template_resources(
    'tint', '..', 'skeleton', 'skeleton.Rmd'
  )
)
```

References

JJ Allaire, Yihui Xie, Jonathan McPherson, Javier Luraschi, Kevin Ushey, Aron Atkins, Hadley Wickham, Joe Cheng, Winston Chang, and Richard Iannone. *rmarkdown: Dynamic Documents for R*, 2018. URL https://CRAN.R-project.org/package=rmarkdown. R package version 1.11.

R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria, 2019. URL https://www.R-project.org/.