MATH2270 Assignment 2

Visualising Open Data

Student Details

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Data Source

- Australian Bureau of Statistics. (2018). *5609.0 - Housing Finance, Australia, July 2018*. Available from http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5609.0July%202018?OpenDocument

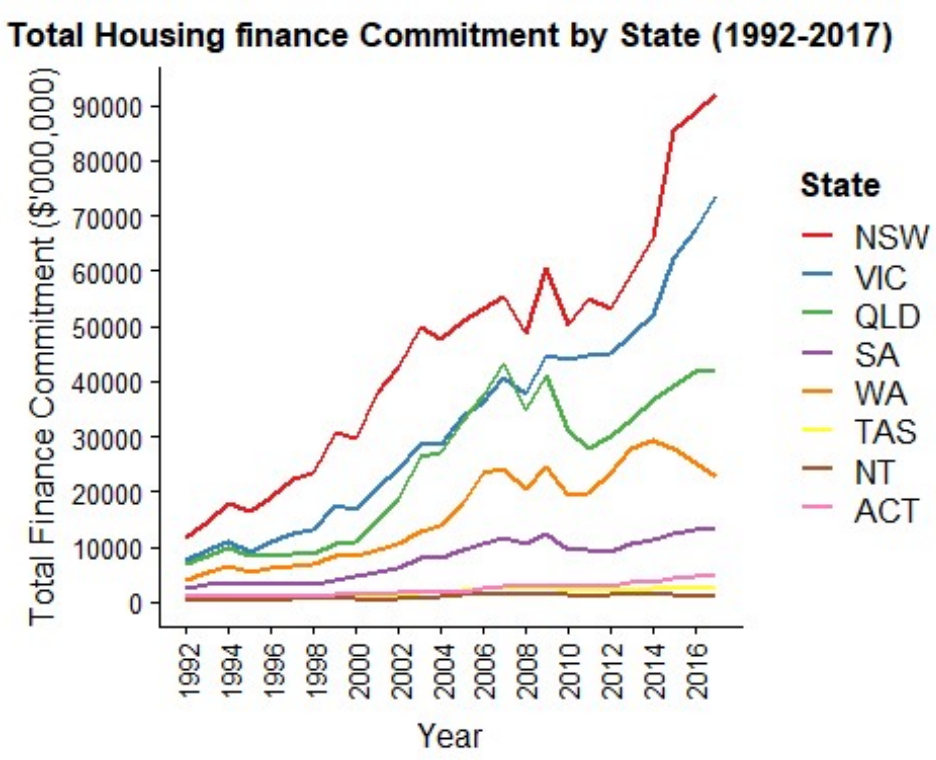
Video Presentation URL

- https://drive.google.com/file/d/1PKSnehrGQl6yKEkVDdGMl3Mn72uT0reV/view?usp=sharing

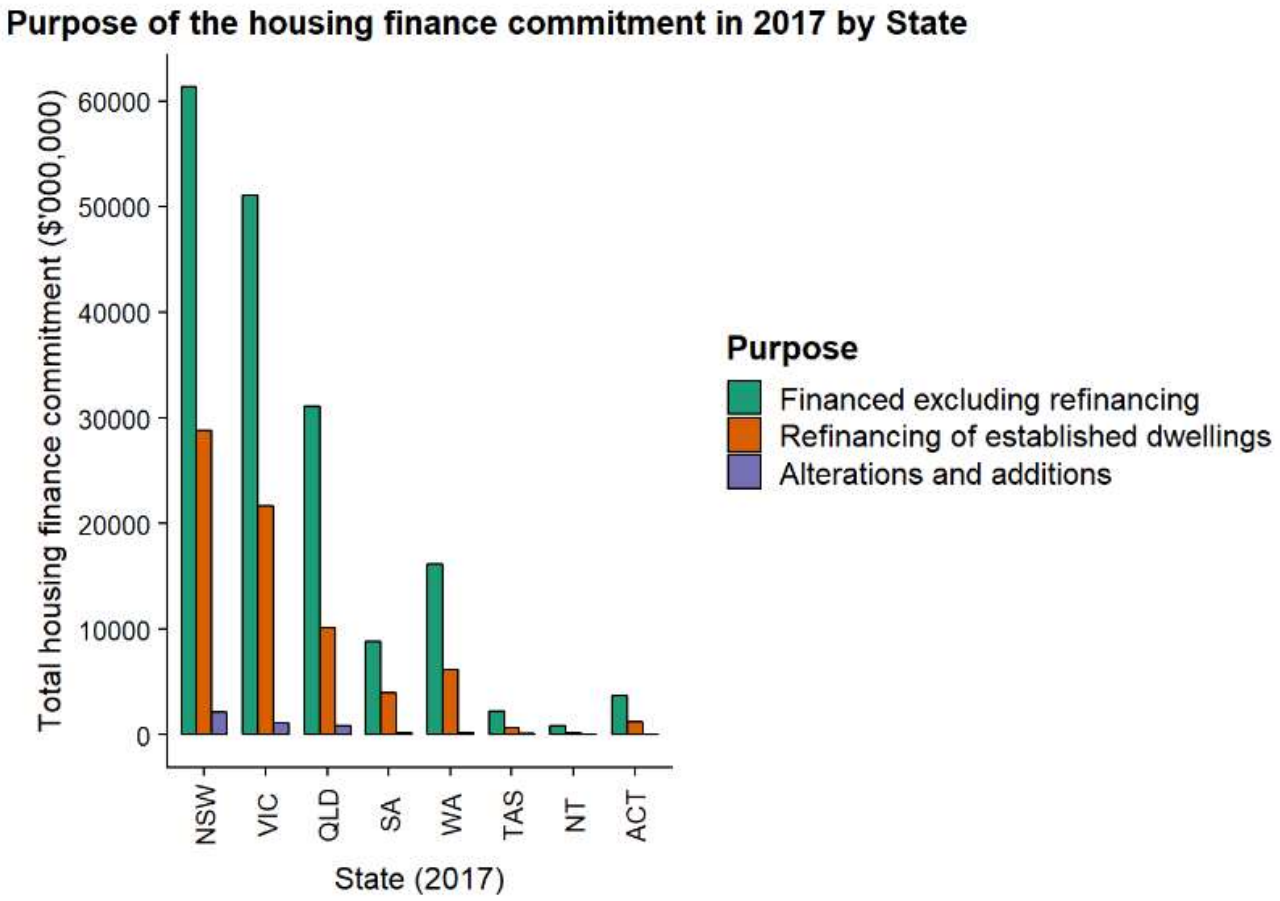
Code

```
# Load packages

library(ggplot2)  # Simple, verstile plots
library(tidyr)    # Restructuring original datasets (from wide to long format)
library(dplyr)    # Data manipulation (factor levels, labels etc.)
library(cowplot)  # Grids for output layout
library(RColorBrewer)  # Colour-blind friendly palettes
library(xlsx)   # Data loading

#Load data
housing_commitments <- read.xlsx("housing_commitments.xlsx",sheetIndex = 2)
housing_commitments$State <- factor(housing_commitments$State,
                                    levels =c("NSW","VIC","QLD","SA","WA","TAS",
"NT","ACT"),
                                    ordered = TRUE)

# **First plot: line plot of summed total housing finance commitment in each sta
te during 1992-2017**

# Data preparation
housing <- housing_commitments %>% filter(Year<2018 , Year>1991)

# Create plot object with relevant variables
plot1 <- ggplot(housing, aes(x=Year, y=TOTAL,group=State,stat="identity"))



# Specify plot type
plot1 <- plot1 + geom_line(aes(color=State),size=1.0)

# Add title, caption, x & Y axis labels
plot1 <- plot1 + labs(x="Year",
                      y="Total Finance Commitment ($'000,000)",
                      title="Total Housing finance Commitment by State (1992-201
7)")
```

```
# Selecting x axis limits
plot1 <- plot1 +scale_x_continuous(breaks=seq(1992,2017,2))

# Selecting y axis limits
plot1 <- plot1 +scale_y_continuous(breaks=seq(0,100000,10000))

# Update main title, caption, subtitle and legend properties for better clarity
plot1<- plot1 + theme(plot.title = element_text(lineheight=1.5, face="bold",size
=13),
                      legend.title = element_text(lineheight=1,face="bold",size=
13),
                      plot.caption = element_text(size=9, hjust=0, margin=margin
(t=15)),
                      plot.subtitle = element_text(lineheight=1.5,face="bold",si
ze=9),
                      legend.text = element_text(lineheight=1,size=12),
                      axis.text = element_text(lineheight=1,size=10),
                      axis.title = element_text(lineheight=1,size=12),
                      axis.text.x = element_text(angle = 90, hjust = 0.5, vjust
= 0.5))

# Specify colour palette
plot1<- plot1 +scale_colour_brewer(type = "div", palette = "Set1")

# Print the plot
plot1
```

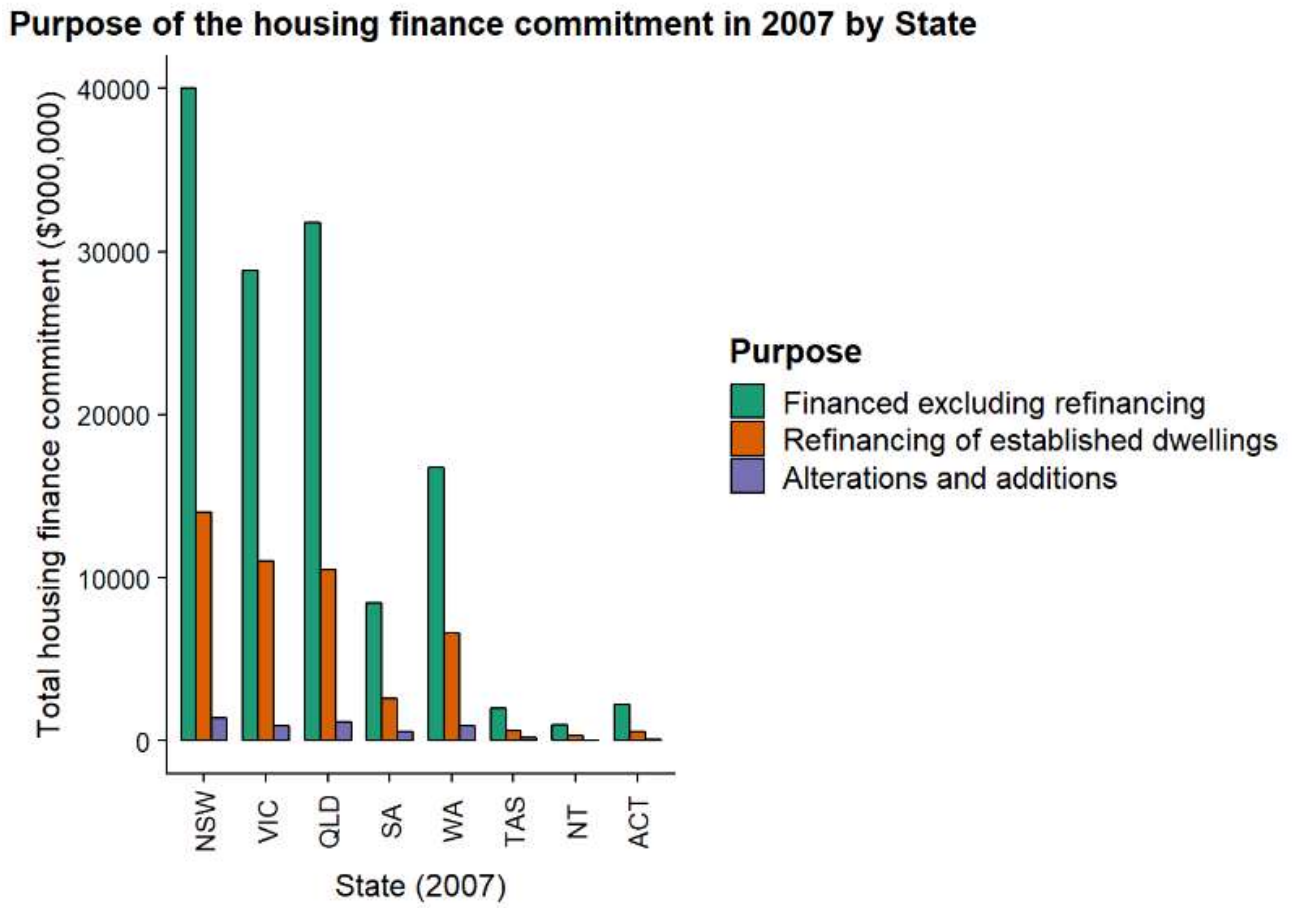


```r
# **Second plot: Purpose of the housing finance commitment in 2017 by State**

# Data preparation
housing1 <- housing %>% filter(Year==2017) %>% select(-(TOTAL))
housing1 <- housing1 %>% gather(key="Purpose", value ="value", 3:5)
housing1$Purpose <- factor(housing1$Purpose,
                           levels = c("financed_excluding_refinancing",
                                      "Refinancing_of_established_dwellings",
                                      "Alterations_and_additions"),
                           labels = c("Financed excluding refinancing",
                                      "Refinancing of established dwellings",
                                      "Alterations and additions"),
                           ordered = TRUE)

# Create plot object with relevant variables
plot2 <- ggplot(housing1, aes(x=State,y=value,fill=Purpose))

# Specify plot type
plot2 <- plot2 + geom_bar(position="dodge", colour="black",stat="identity",width
=0.75)

# Add title, caption, x & Y axis labels
plot2 <- plot2 + labs(x="State (2017)",
                      y="Total housing finance commitment ($'000,000)",
                      title="              Purpose of the housing finance commit
ment in 2017 by State")

# Selecting y axis limits
plot2 <- plot2 +scale_y_continuous(breaks=seq(0,70000,10000))

# Update main title, caption, subtitle and legend properties for better clarity
plot2<- plot2 + theme(plot.title = element_text(lineheight=1.5, face="bold",size
=13),
                      legend.title = element_text(lineheight=1,face="bold",size=
13),
                      plot.caption = element_text(size=9, hjust=0, margin=margin
(t=15)),
                      plot.subtitle = element_text(lineheight=1.5,face="bold",si
ze=9),
                      legend.text = element_text(lineheight=1,size=12),
                      axis.text = element_text(lineheight=1,size=10),
                      axis.title = element_text(lineheight=1,size=12),
                      axis.text.x = element_text(angle = 90, hjust = 0.5, vjust
= 0.5))
# Specify colour palette
plot2 <- plot2 + scale_fill_brewer(palette="Dark2")

# Print the plot
plot2
```



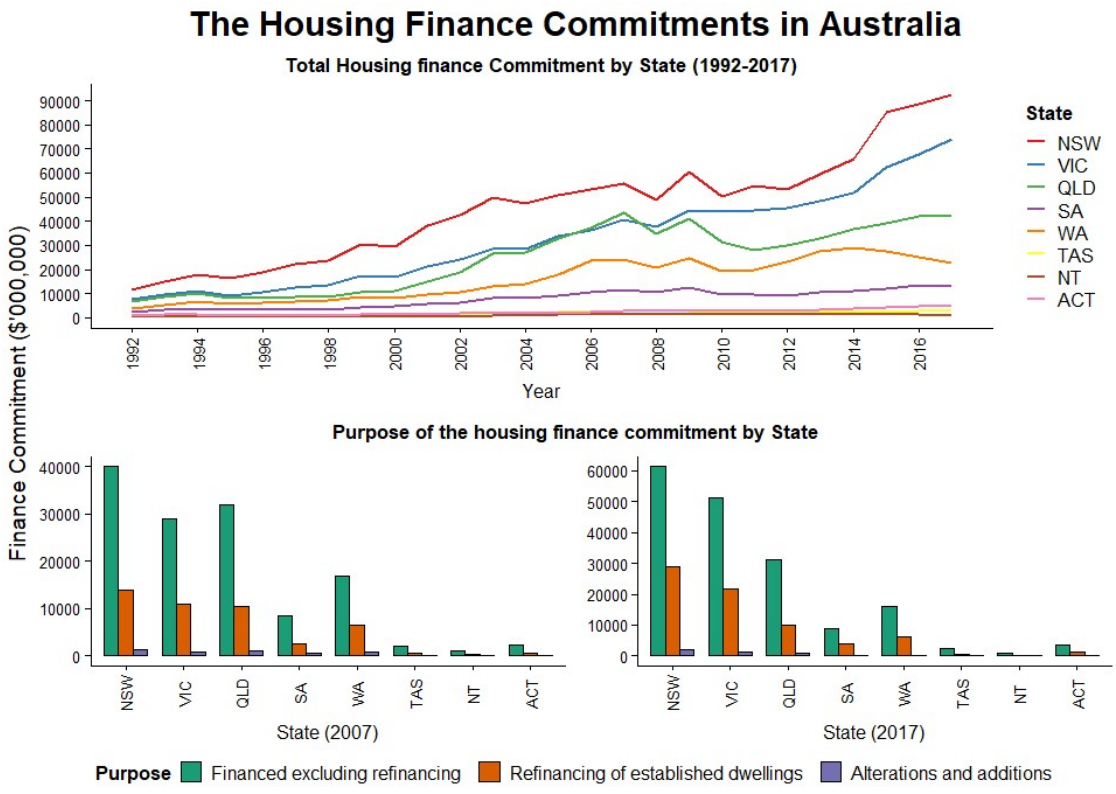

```
# **Third plot: Purpose of the housing finance commitment in 2007 by State**

# Data preparation
housing2 <- housing %>% filter(Year==2007) %>% select(-(TOTAL))
housing2 <- housing2 %>% gather(key="Purpose", value ="value", 3:5)
housing2$Purpose <- factor(housing2$Purpose,
                           levels = c("financed_excluding_refinancing",
                                      "Refinancing_of_established_dwellings",
                                      "Alterations_and_additions"),
                           labels = c("Financed excluding refinancing",
                                      "Refinancing of established dwellings",
                                      "Alterations and additions"),
                           ordered = TRUE)

# Ccreate plot object with relevant variables
plot3 <- ggplot(housing2, aes(x=State,y=value,fill=Purpose))

# Specify plot type
plot3 <- plot3 + geom_bar(position="dodge", colour="black",stat="identity",width
=0.75)

# Create box plots and add title, caption, x & Y axis labels
plot3 <- plot3 + labs(x="State (2007)",
                      y="Total housing finance commitment ($'000,000)",
                      title="                Purpose of the housing finance commi
tment in 2007 by State")

# Selecting y axis limits
plot3 <- plot3 +scale_y_continuous(breaks=seq(0,70000,10000))

# Update main title, caption, subtitle and legend properties for better clarity
```

```
plot3<- plot3 + theme(plot.title = element_text(lineheight=1.5, face="bold",size
=13),
                      legend.title = element_text(lineheight=1,face="bold",size=
13),
                      plot.caption = element_text(size=9, hjust=0, margin=margin
(t=15)),
                      plot.subtitle = element_text(lineheight=1.5,face="bold",si
ze=9),
                      legend.text = element_text(lineheight=1,size=12),
                      axis.text = element_text(lineheight=1,size=10),
                      axis.title = element_text(lineheight=1,size=12),
                      axis.text.x = element_text(angle = 90, hjust = 0.5, vjust
= 0.5))
# Specify colour palette
plot3 <- plot3 + scale_fill_brewer(palette="Dark2")

# Print the plot
plot3
```



```
# **Create a grid for plot2 & pot3**

# Create title object for combine visualisation for plot2 & pot3
title_main1 <- ggdraw() + draw_label("\nPurpose of the housing finance commitmen
t by State\n",
                                     fontface = "bold", size = 13)

# Create legend object for combine visualisation for plot2 & pot3
legend_main1 <- get_legend(plot2+
                             theme(legend.direction = "horizontal",
                                   legend.justification="center",
                                   legend.position = "bottom",
                                   legend.title =
                                     element_text(lineheight=1,face="bold",size=
12),
                                   legend.text = element_text(lineheight=1,size=
12)))

# Display plots together (horizontlly)
grid3<- plot_grid(
                  plot3 + theme(legend.text = element_blank(),
                                legend.position="none",
                                axis.title.y=element_blank(),
                                plot.title = element_blank()),
                  plot2 + theme(legend.text = element_blank(),

                                axis.title.y=element_blank(),
                                legend.position="none",
                                plot.title = element_blank()))
grid3<-plot_grid(title_main1,grid3,legend_main1,ncol=1,rel_heights = c(0.1,1))


# Print the grid
grid3
```

```r
# **Create a grid for plot1 & grid3**

# Create title object for entire visualisation
title_main3 <- ggdraw() + draw_label("\nThe Housing Finance Commitments in Austr
alia\n", fontface = "bold", size = 22)

# Both plots to share centered y-axis label
title_yaxis <- ggdraw() + draw_label("Finance Commitment ($'000,000)", angle=90)

# Display plots together (vertically)
grid4 <- plot_grid(title_main3,
                   # hide existing y-axis labels
                   plot1 + theme(axis.title.y=element_blank()),
                                    ncol=1, align="v",
                   rel_heights = c(0.1,0.9,0.9),
                   grid3)
# Add title to juxtaposed plots
grid5 <- plot_grid(title_yaxis,
                    grid4,
                    ncol=2,
                    rel_widths = c(0.025,1))
# Print the grid
grid5
```



```r
# **Fourth plot: Purpose of the housing finance commitment 1992-2017**

# Data preparation
housing3 <- housing_commitments %>%  filter(Year<2018 , Year>1991)
housing3 <- housing3 %>% mutate(ave_financing=financed_excluding_refinancing/TOT
AL,
                                ave_refinancing=Refinancing_of_established_dwell
ings/TOTAL,
                                ave_addition=Alterations_and_additions/TOTAL)

housing3 <- housing3 %>% select(Year,ave_financing:ave_addition)

housing3 <- housing3 %>% gather(key="Purpose", value ="Ammount", 2:4)

housing3 <- housing3%>% group_by(Year,Purpose) %>%
  summarise(total=sum(Ammount,na.rm = TRUE)/7)
housing3$Purpose <- factor(housing3$Purpose,
                        levels = c("ave_financing",
                                   "ave_refinancing",
                                   "ave_addition"),
                        labels = c("Financed excluding refinancing",
                                   "Refinancing of established dwellings",
                                   "Alterations and additions"),
                        ordered = TRUE)

# Create plot object with relevant variables
plot6 <- ggplot(housing3, aes(x=Year, y=total,group=Purpose,stat="identity"))

# Specify plot type
plot6 <- plot6 + geom_line(aes(color=Purpose),size=1.0)

# Create box plots and add title, caption, x & Y axis labels
plot6 <- plot6 + labs(x="Year",
                      y="Proportion of Finance Commitment",
                      title="Proportions of Housing finance in Australia (1992-2
017)")
# Selecting x axis limits
plot6 <- plot6 +scale_x_continuous(breaks=seq(1991,2017,2))

# Selecting y axis limits
plot6 <- plot6 +scale_y_continuous(breaks=seq(0,1,0.1))

# Update main title, caption, subtitle and legend properties for better clarity
plot6<- plot6 + theme(plot.title = element_text(lineheight=1.5, face="bold",size
=12),
                      legend.title = element_text(lineheight=1,face="bold",size=
12),
                      plot.caption = element_text(size=9, hjust=0, margin=margin
(t=12)),
                      plot.subtitle = element_text(lineheight=1.5,face="bold",si
ze=9),
                      legend.text = element_text(lineheight=1,size=12),
                      axis.text = element_text(lineheight=1,size=10),
                      axis.title = element_text(lineheight=1,size=12),
                      axis.text.x = element_text(angle = 90, hjust = 0.5, vjust
= 0.5),
                      legend.position = "bottom",
                      legend.direction = "vertical",
```

```
                        legend.justification="center")

# Specify colour palette
plot6<- plot6 +scale_colour_brewer(type = "div", palette = "Dark2")

# Print the plot
plot6
```