Analítica de Datos

Caso Hollywood

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Hollywood Rules

1. Todo lo que hagamos hoy, escríbanlo en un script con anotaciones.
2. Guarden el script.
3. Enviénmelo al correo con el nombre: nombre_apellido.R

Tengan un estilo para su script

```
## ---------------------------
##
## Script name:
##
## Purpose of script:
##
## Author: Carlos Cardona
##
## Date Created: `r paste(Sys.Date())`
##
## Email: ccardonaa@gmail.com
##
## ---------------------------
##
## Notes:
##
##
## ---------------------------

```

Importemos los datos

```
# Recuerden instalar los paquetes primero!!
# Este lo hemos usado siempre así que no hay lío
library(tidyverse)

# Estos dos son nuevos:
# install.packages("readxl")
# install.paclages("janitor")
# install.paclages("Hmisc")

library(readxl)
library(janitor)
library(Hmisc)


# Establecemos el directorio de trabajo

setwd("C:/Users/ccard/Downloads")

```

¿Qué hay en nuestros datos?

```
  1  glimpse(data)
```

```
Rows: 75
Columns: 18
$ Movie                  <chr> "16 Blocks", "Accepted", "Apocalypto", "Arthur ~
$ `Opening Gross`        <dbl> 11855260, 10023835, 15005604, 4294936, 11554404~
$ `Total U.S. Gross`     <dbl> 36895141, 36323505, 50866635, 15132763, 2117056~
$ `Total Non-U.S. Gross` <dbl> 65664721, 2146261, 69309076, 97854413, 0, 10102~
$ Budget                 <dbl> 4.50e+07, 2.30e+07, 4.00e+07, 8.60e+07, 2.00e+0~
$ `Opening Theatres`     <dbl> 2706, 2914, 2465, 2247, 1602, 1251, 3311, 3261,~
$ `Known Story`          <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0,~
$ Sequel                 <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0,~
$ `Origin_United States` <dbl> 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1,~
$ Genre                  <chr> "Action", "Comedy", "Adventure", "Animation", "~
$ Summer                 <dbl> 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0,~
$ Holiday                <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0,~
$ Christmas              <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0,~
$ MPAA                   <chr> "PG-13", "PG-13", "R", "PG", "PG-13", "R", "PG"
```

Limpiemos los nombres usando janitor

```
1 data <- data %>%
2   clean_names()
3 glimpse(data)
```

```
Rows: 75
Columns: 18
$ movie                <chr> "16 Blocks", "Accepted", "Apocalypto", "Arthur an~
$ opening_gross        <dbl> 11855260, 10023835, 15005604, 4294936, 11554404, ~
$ total_u_s_gross      <dbl> 36895141, 36323505, 50866635, 15132763, 21170563,~
$ total_non_u_s_gross  <dbl> 65664721, 2146261, 69309076, 97854413, 0, 1010273~
$ budget               <dbl> 4.50e+07, 2.30e+07, 4.00e+07, 8.60e+07, 2.00e+07,~
$ opening_theatres     <dbl> 2706, 2914, 2465, 2247, 1602, 1251, 3311, 3261, 1~
$ known_story          <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 0, 0, 0, 1~
$ sequel               <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0~
$ origin_united_states <dbl> 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1~
$ genre                <chr> "Action", "Comedy", "Adventure", "Animation", "Dr~
$ summer               <dbl> 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0~
$ holiday              <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 1~
$ christmas            <dbl> 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0~
$ mpaa                 <chr> "PG-13", "PG-13", "R", "PG", "PG-13", "R", "PG"
```

Estadísticas Descriptivas

```r
# Cambiemos los nombres de estas variables!
data <- data %>% rename(us_gross = total_u_s_gross)
data <- data %>% rename(non_us_gross = total_non_u_s_gross)

# Usamos summary para ver la distribución de las variables de interés
summary(data$opening_gross)
```

```
   Min.  1st Qu.   Median     Mean  3rd Qu.     Max. 
4120497 10014865 14503650 17468466 21569368 68033544 
```

```r
summary(data$us_gross)
```

```
    Min.   1st Qu.    Median      Mean   3rd Qu.      Max. 
13090630  33880974  52330111  59620651  74345586 198000317 
```

```r
summary(data$non_us_gross)
```

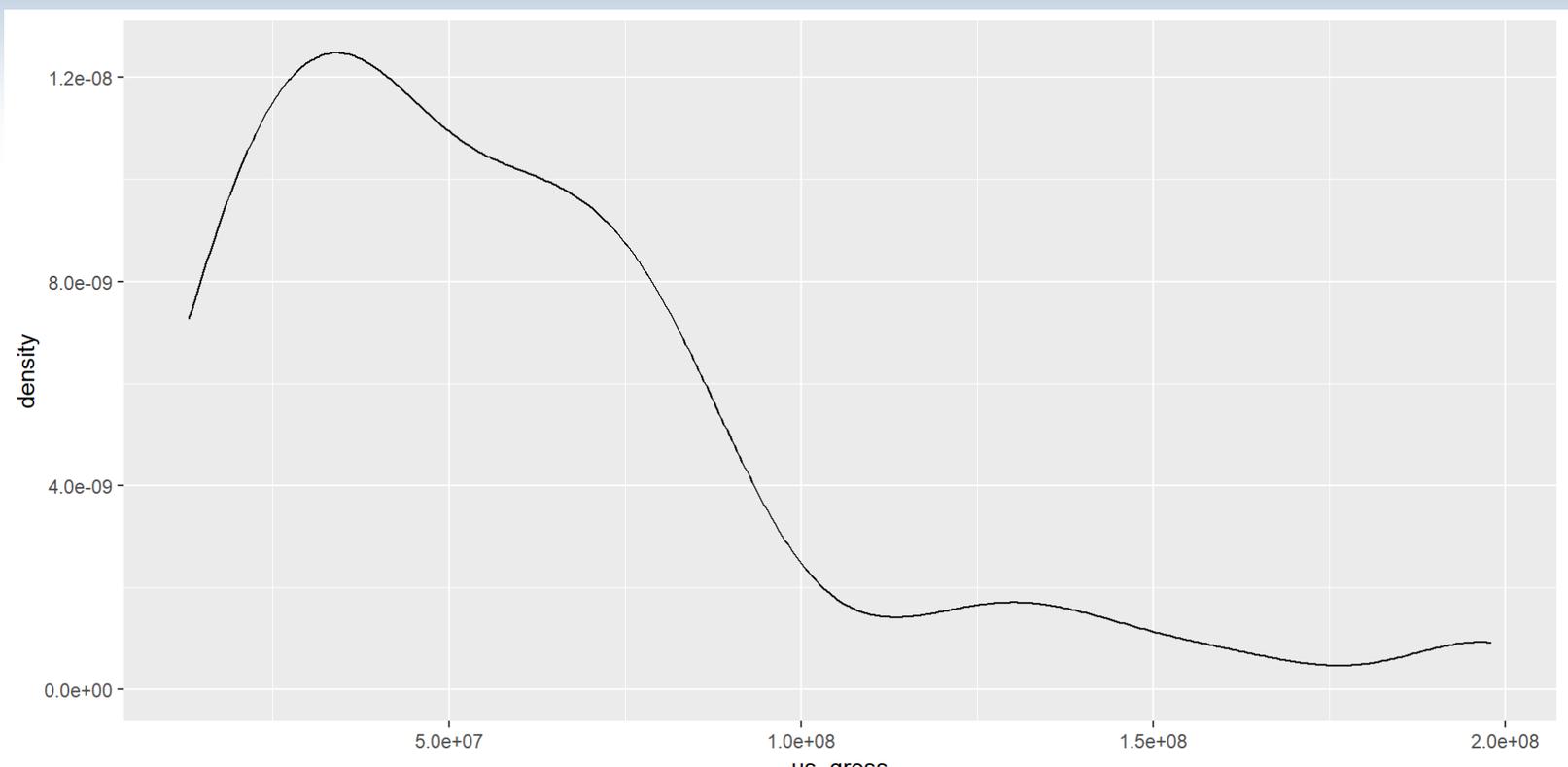
```
    Min.   1st Qu.    Median      Mean   3rd Qu.      Max. 
       0  15433097  42950069  59560983  75985298 456235122 
```

```r
summary(data$opening_theatres)
```

```
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max. 
   852    2490    2880    2766    3209    3964 
```

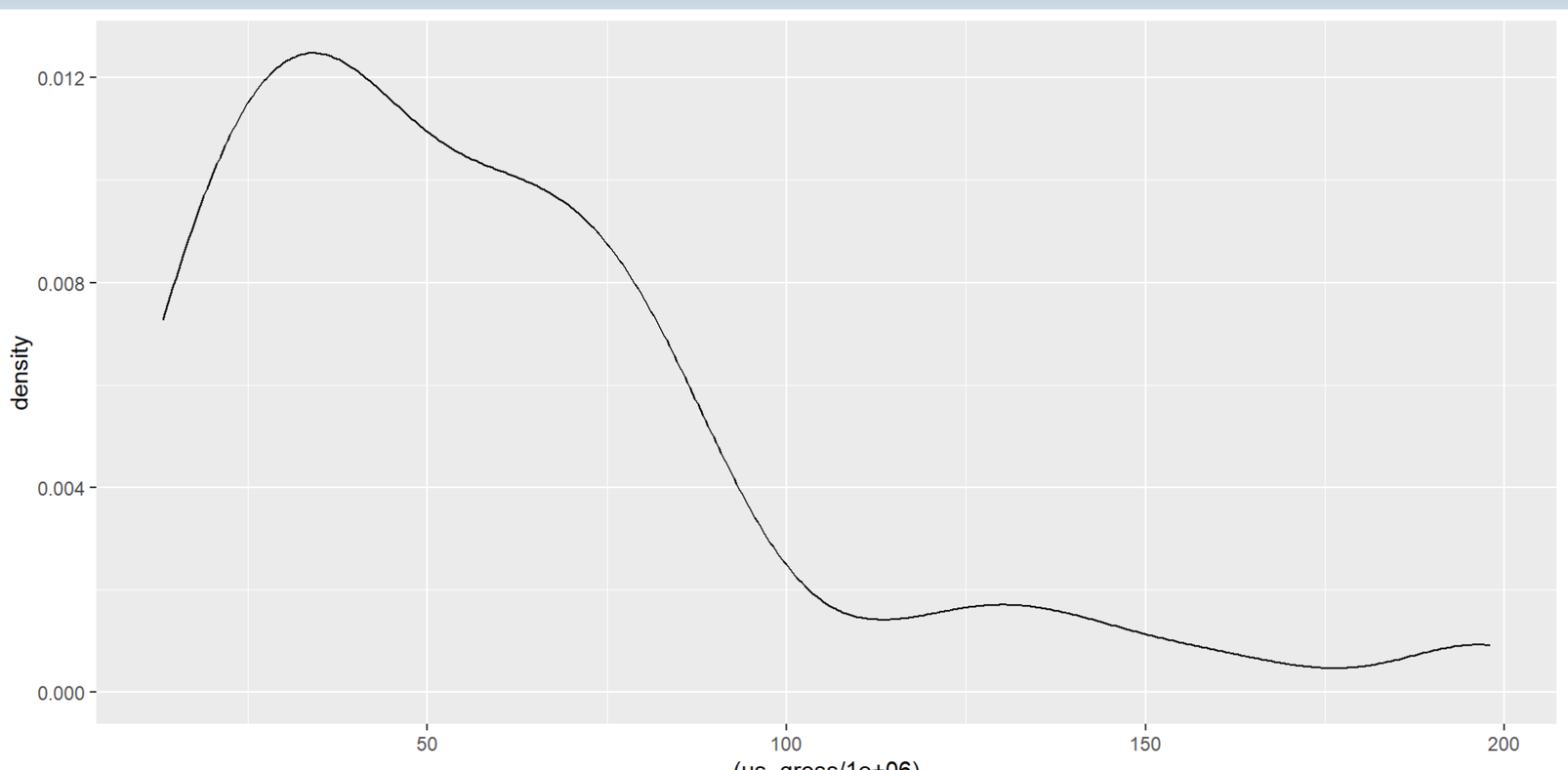
Exploremos el recaudo en US

```
1  # Qué tal es la distribución?
2
3  ggplot(data, aes(x=us_gross)) + geom_density()
```



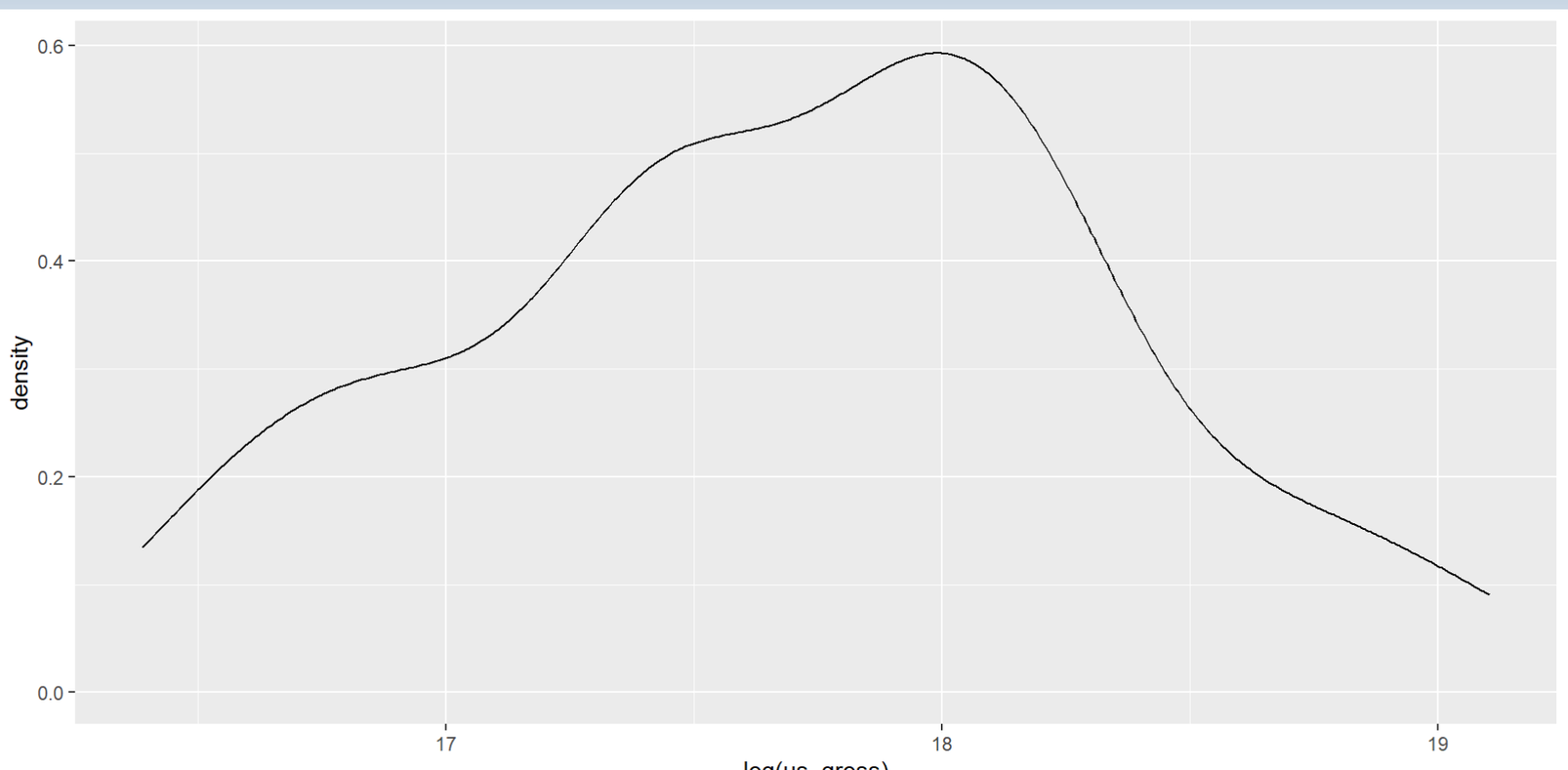
Exploremos el recaudo en US (en millones)

```
1  # Cambiemos los valores de los ejes
2
3  ggplot(data, aes(x=(us_gross/1000000))) + geom_density()
```



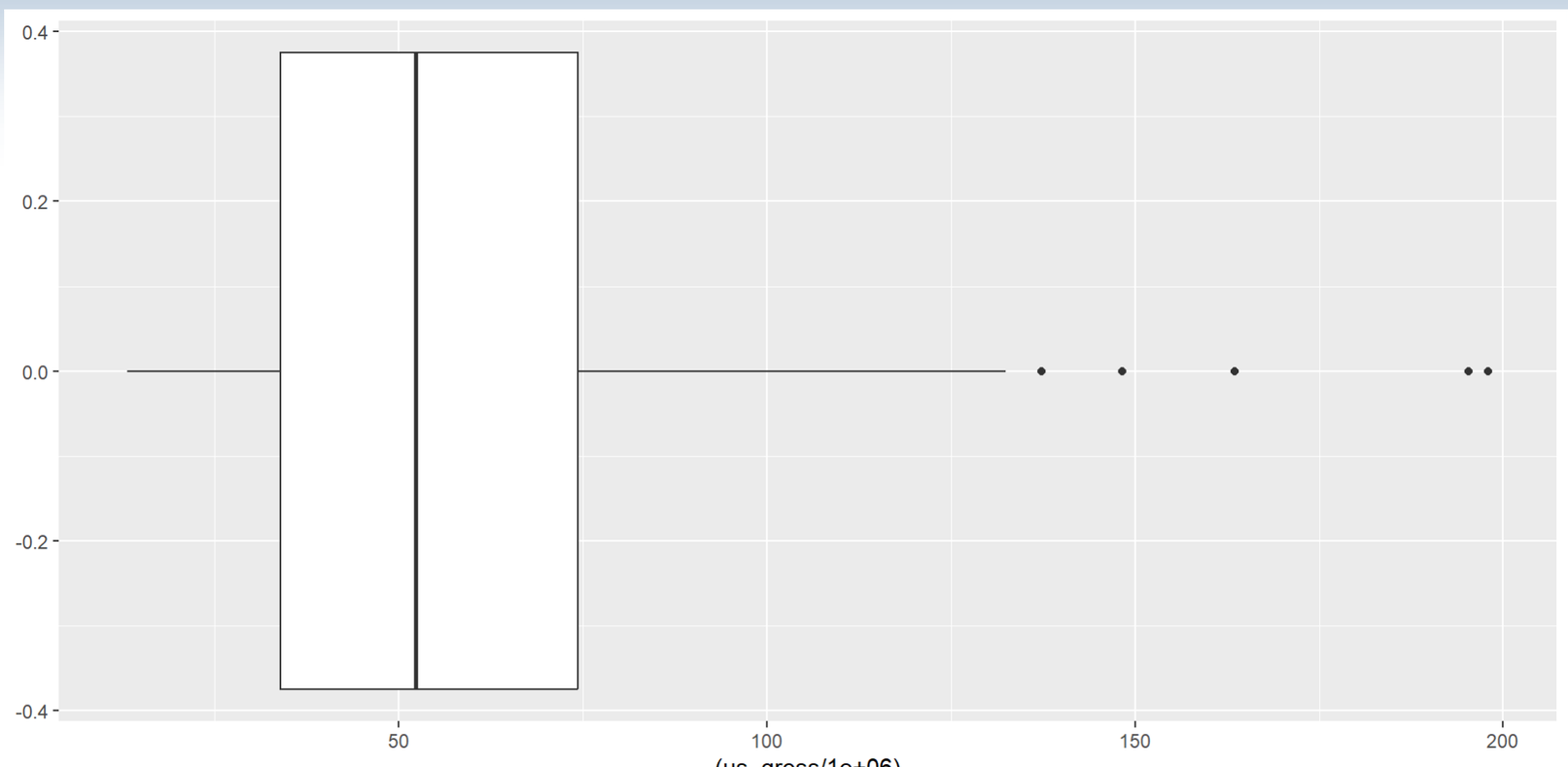
Exploremos el recaudo en US (en logs)

```
1  # Qué tal es la distribución?
2
3  ggplot(data, aes(x=log(us_gross))) + geom_density()
```



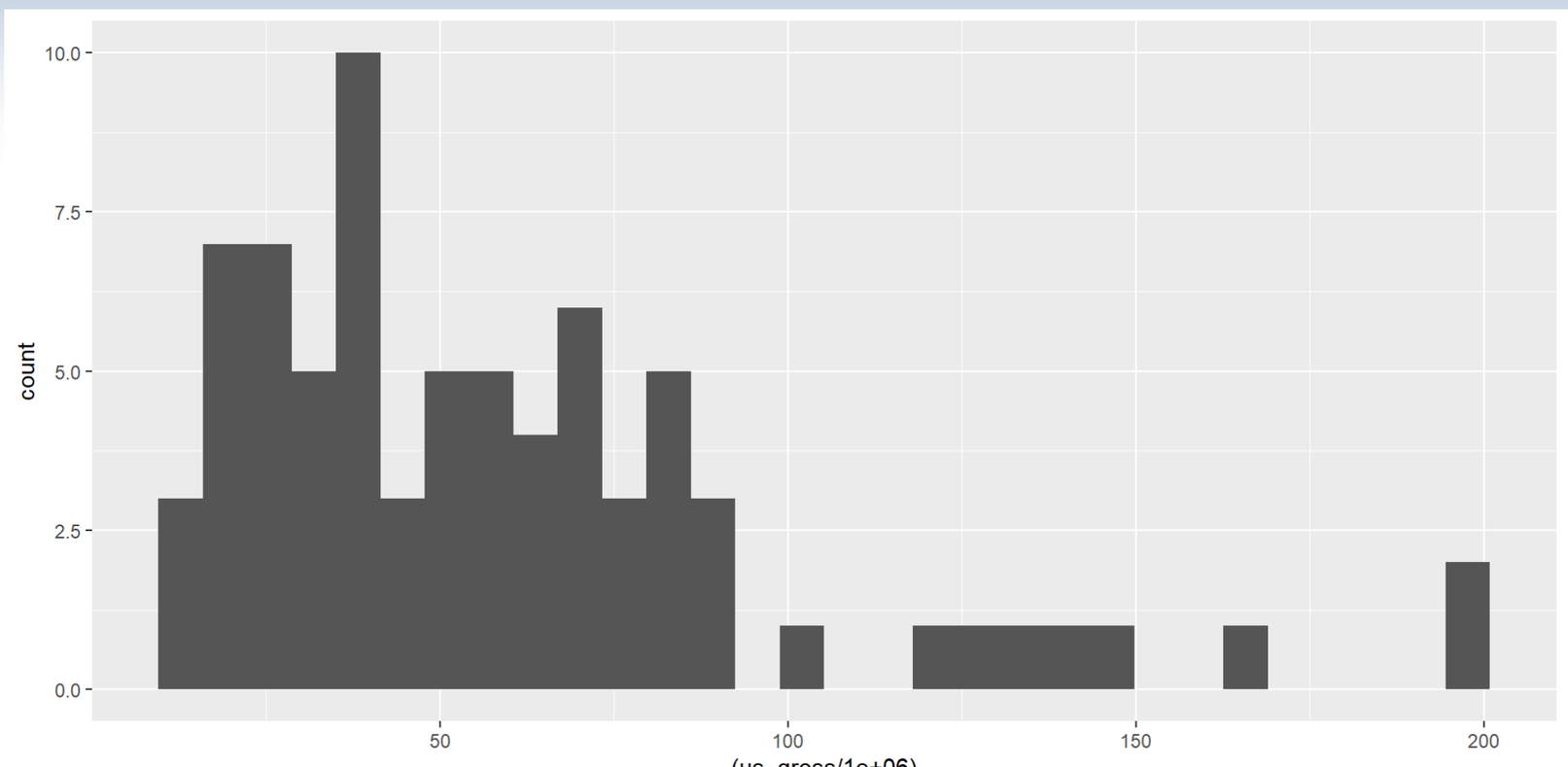
Exploremos el recaudo en US

```
1  # Qué tal es el diagrama de caja?
2
3  ggplot(data, aes(x=(us_gross/1000000))) + geom_boxplot()
```



Exploremos el recaudo en US

```
1  # Qué tal es el histograma?
2
3  ggplot(data, aes(x=(us_gross/1000000))) + geom_histogram()
```



Comedias y R-Rated

```
1  # Usamos la función xtabs
2  # ¿Cuántas comedias?
3  xtabs(~genre, data=data)
```

```
genre
   Action Adventure Animation    Comedy     Drama    Horror  Thriller
        8         2         8        23        19         9         6
```

```
1  # Y cuántas R-rated?
2  xtabs(~mpaa, data=data)
```

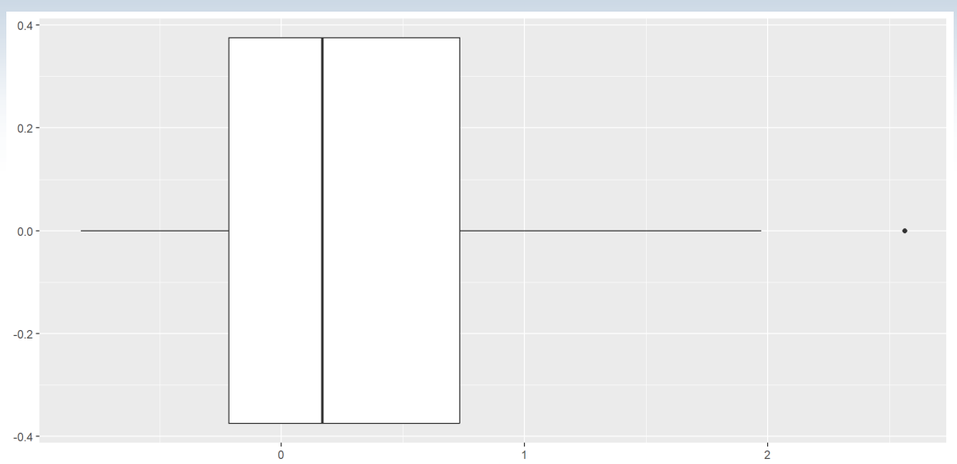
```
mpaa
    G    PG PG-13     R
    3    20    37    15
```

Calculemos el ROI

```r
# Calculamos ROI usando "mutate"
data <- data %>%
  mutate(roi=(us_gross-budget)/budget)

# Es 12%?
mean(data$roi)
```

```
[1] 0.2929317
```

```r
# Veamos su distribución
ggplot(data, aes(x=roi)) + geom_boxplot()
```



Calculemos un IC para ROI al 95%

```r
# Usamos el comando "t.test"
result <- t.test(data$roi, conf.level = 0.95)
result
```

```
    One Sample t-test

data:  data$roi
t = 3.6914, df = 74, p-value = 0.0004237
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
 0.1348149 0.4510486
sample estimates:
mean of x
0.2929317
```

```r
# En IC guardamos el intervalo
ic<- result$conf.int
ic
```

```
[1] 0.1348149 0.4510486
attr(,"conf.level")
[1] 0.95
```

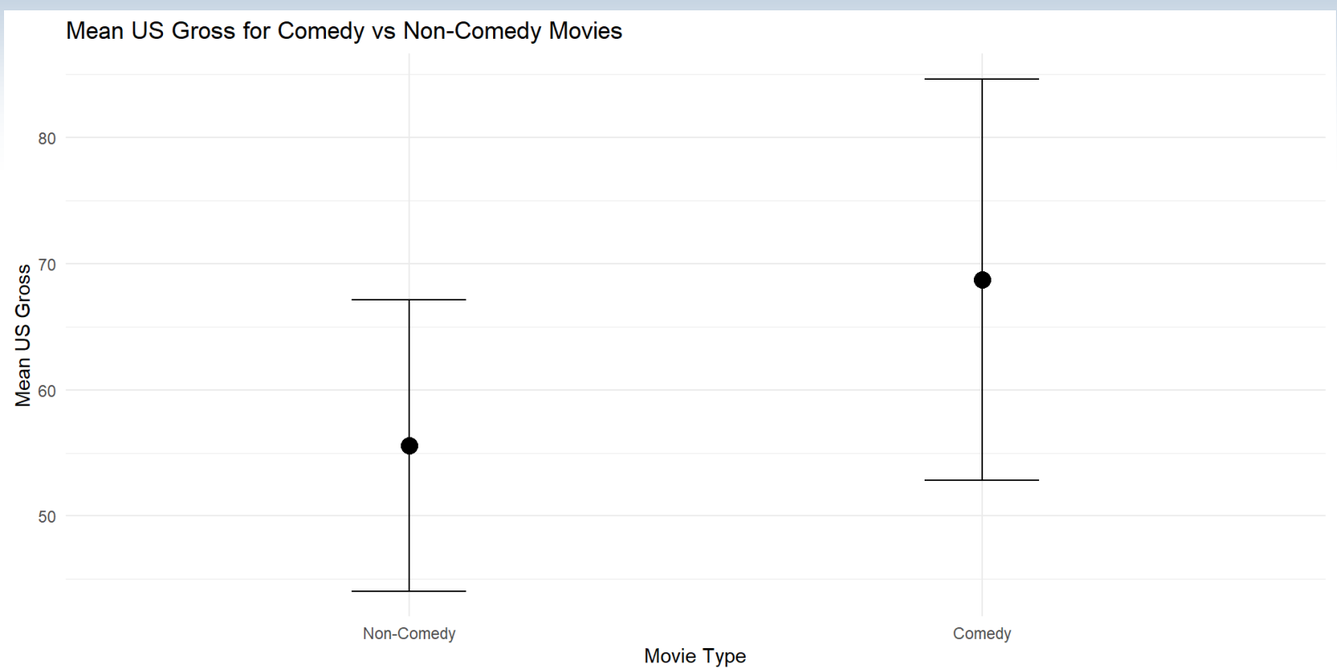
Comedy vs No Comedy

```r
# Construimos una variable indicando si es comedia o no
data <- data %>%
  mutate(comedy = ifelse(genre == "Comedy", TRUE, FALSE))

# Hacemos un test comparando 'us_gross' para comedias vs no comedias
t_test_result <- t.test(us_gross ~ comedy, data = data)

# ¿Cuál es el resultado?
t_test_result
```

```
    Welch Two Sample t-test

data:  us_gross by comedy
t = -1.3728, df = 47.176, p-value = 0.1763
alternative hypothesis: true difference in means between group FALSE and group TRUE is not equal to 0
95 percent confidence interval:
 -32437354   6122596
sample estimates:
mean in group FALSE  mean in group TRUE
           55585721             68743100
```

Comedy vs No Comedy

```r
ggplot(data, aes(x = factor(comedy, labels = c("Non-Comedy", "Comedy")),
                 y = (us_gross/1000000))) +
  stat_summary(fun = mean, geom = "point", size = 4) +  # Graficamos la media como puntos
  stat_summary(fun.data = mean_cl_normal, geom = "errorbar", width = 0.2) +  # Añadimos la barra de e
  labs(x = "Movie Type", y = "Mean US Gross", title = "Mean US Gross for Comedy vs Non-Comedy Movies"
  theme_minimal() # Esto es para que el fondo sea blanco y no gris
```



Comedy vs No Comedy (ROI)

```r
# Hacemos un test comparando 'roi' para comedias vs no comedias
t_test_roi <- t.test(roi ~ comedy, data = data)

# ¿Cuál es el resultado?
t_test_roi
```

```
    Welch Two Sample t-test

data:  roi by comedy
t = -2.0471, df = 38.965, p-value = 0.04743
alternative hypothesis: true difference in means between group FALSE and group TRUE is not equal to 0
95 percent confidence interval:
 -0.708944798 -0.004248791
sample estimates:
mean in group FALSE  mean in group TRUE
          0.1835754           0.5401722
```

R-Rated vs NonR-Rated

```r
# Creamos el indicador para R-rated movies
data <- data %>%
  mutate(r_rated = ifelse(mpaa == "R", TRUE, FALSE))

# Hacemos el test
t_test_rated <- t.test(us_gross ~ r_rated, data = data)

# Qué nos dice?
t_test_rated
```

```
    Welch Two Sample t-test

data:  us_gross by r_rated
t = 0.85686, df = 31.986, p-value = 0.3979
alternative hypothesis: true difference in means between group FALSE and group TRUE is not equal to 0
95 percent confidence interval:
 -10829257  26555104
sample estimates:
mean in group FALSE  mean in group TRUE
           61193236             53330312
```

R-Rated vs NonR-Rated

```
ggplot(data, aes(x = factor(r_rated, labels = c("NonR-Rated", "R-Rated")),
                 y = (us_gross/1000000))) +
  stat_summary(fun = mean, geom = "point", size = 4) +  # Graficamos la media como puntos
  stat_summary(fun.data = mean_cl_normal, geom = "errorbar", width = 0.2) +  # Añadimos la barra de e
  labs(x = "Movie Type", y = "Mean US Gross", title = "Mean US Gross for R-Rated vs NonR-Rated Movies
  theme_minimal() # Esto es para que el fondo sea blanco y no gris
```