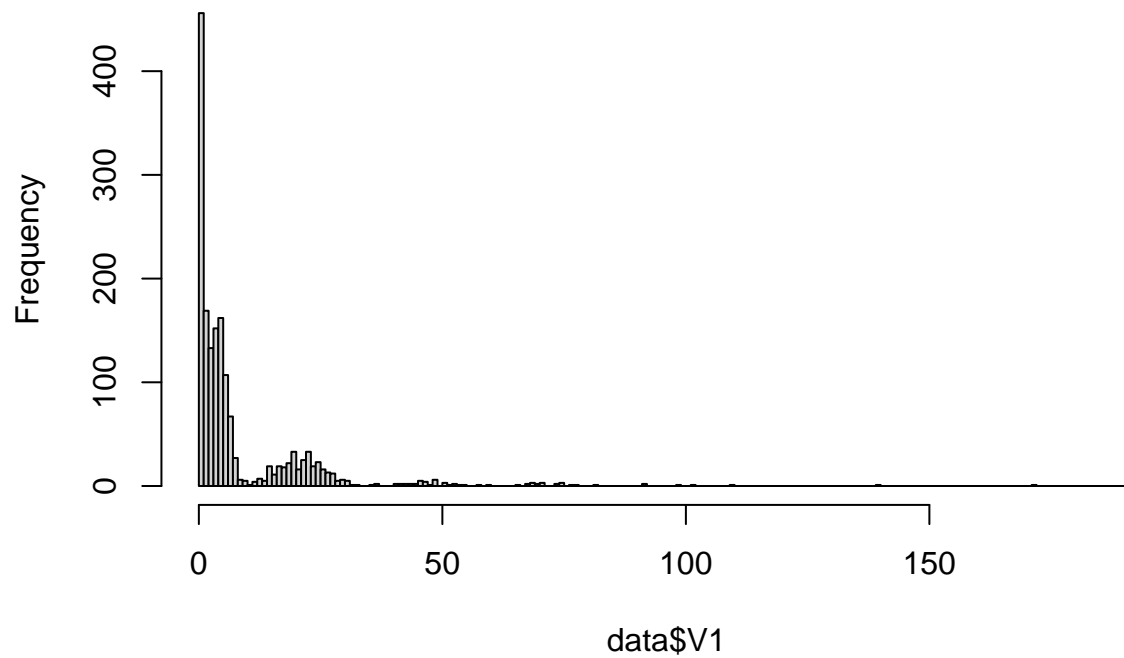# 8_1_ILEC.R

ricar

2023-11-27

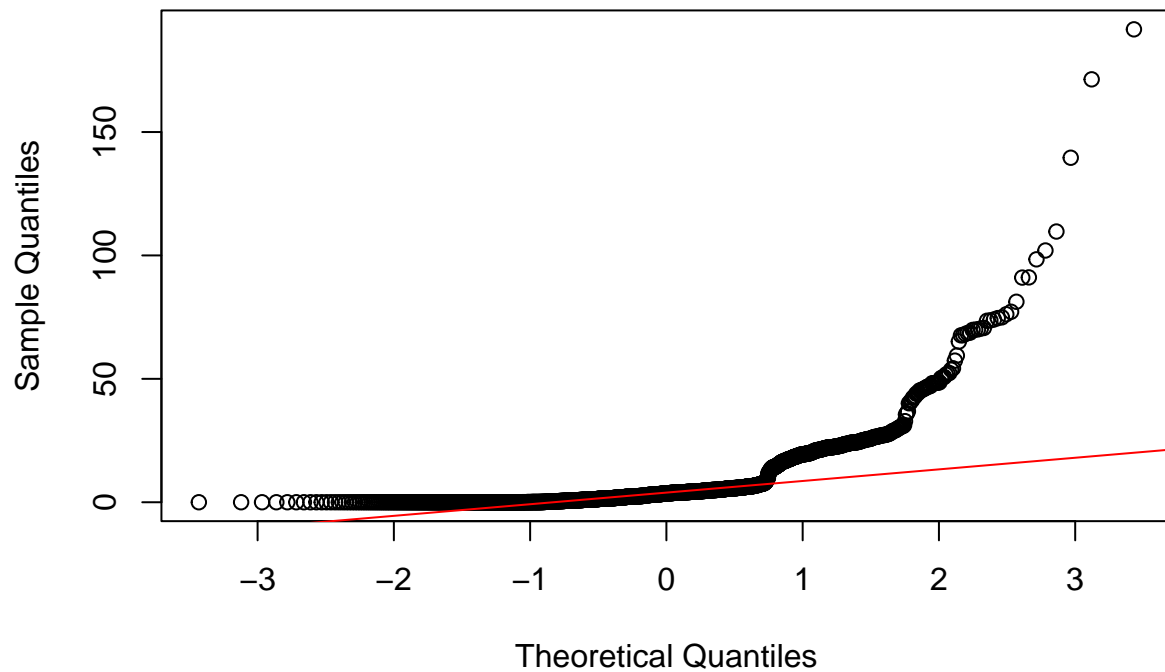```r
data = read.table("C:\\Users\\ricar\\OneDrive - FCT NOVA\\ISEG\\Risk Models\\bootstrap files\\Verizon1_
hist(data$V1, breaks = 150)
```

## Histogram of data$V1



```r
n<-length(data$V1)

qqnorm(data$V1)
qqline(data, col='red')
```

Normal Q-Q Plot


```r
sim = 1000

means = c(rep(NA,sim))

for (i in 1:sim){
  b_sample <- sample(data$V1, n, replace = TRUE)
  means[i] = mean(b_sample)
}

mean(means)
```

```
## [1] 8.420328
```

```r
mean(data$V1)
```

```
## [1] 8.411611
```

```r
sd(data$V1)/sqrt(n)
```

```
## [1] 0.3601192
```

```r
sd(means)
```
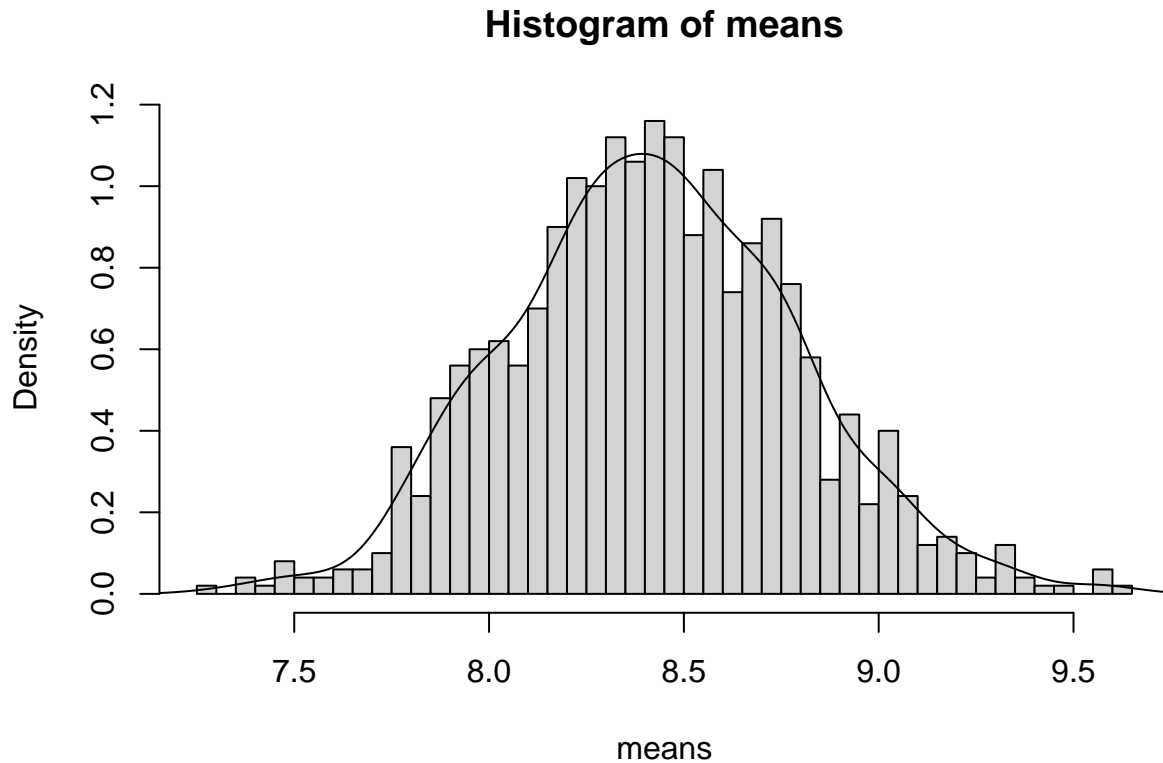
```
## [1] 0.3693129
```

```r
library(moments)
skewness(means) #near zero
```

```
## [1] 0.1195642
```

```
kurtosis(means) #near three
```

```
## [1] 3.073198
```

```
hist(means,50,probability = TRUE)
lines(density(means))
```

Histogram of means


```
# Using library boot
library(boot)
means_2 = function(x,i){
  data = x[i];
  return(mean(data))
}
boot_from_boot = boot(data$V1, means_2, R=1001)
boot_from_boot
```

```
##
## ORDINARY NONPARAMETRIC BOOTSTRAP
##
##
## Call:
## boot(data = data$V1, statistic = means_2, R = 1001)
##
##
## Bootstrap Statistics :
##     original      bias     std. error
## t1* 8.411611 -0.005043274   0.3571119
```