24.13

```r
library(pacman)
p_load(haven, quantreg)

data <- read_dta("cps09mar.dta")
data <- subset(data, education >= 11, female = 0)
```

```
## Warning: In subset.data.frame(data, education >= 11, female = 0) :
##   extra argument 'female' will be disregarded
```

```r
data$wage <- data$earnings / (data$hours * data$week)
data$lwage <- log(data$wage)

taus <- c(.05, .1, .25, .5, .75, .9, .95)
res <- rq(data$lwage~data$education, tau=taus)
summary(res)
```

```
##
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
##
## tau: [1] 0.05
##
## Coefficients:
##                 Value     Std. Error t value   Pr(>|t|)
## (Intercept)     0.54023   0.03645    14.82086  0.00000
## data$education  0.10770   0.00230    46.86972  0.00000
##
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
##
## tau: [1] 0.1
##
## Coefficients:
##                 Value     Std. Error t value   Pr(>|t|)
## (Intercept)     0.69615   0.02224    31.30338  0.00000
## data$education  0.11302   0.00146    77.44038  0.00000
##
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
##
## tau: [1] 0.25
##
## Coefficients:
##                 Value     Std. Error t value   Pr(>|t|)
## (Intercept)     1.05896   0.01715    61.74269  0.00000
## data$education  0.11149   0.00117    94.99647  0.00000
##
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
##
## tau: [1] 0.5
```

```
## 
## Coefficients:
##               Value      Std. Error t value   Pr(>|t|)
## (Intercept)     1.33225    0.01634    81.51439   0.00000
## data$education  0.11546    0.00111   104.10786   0.00000
## 
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
## 
## tau: [1] 0.75
## 
## Coefficients:
##               Value      Std. Error t value   Pr(>|t|)
## (Intercept)     1.59426  0.01983    80.38574  0.00000
## data$education  0.12195  0.00144    84.69803  0.00000
## 
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
## 
## tau: [1] 0.9
## 
## Coefficients:
##               Value      Std. Error t value  Pr(>|t|)
## (Intercept)     1.82950  0.02578    70.97848  0.00000
## data$education  0.12771  0.00184    69.28891  0.00000
## 
## Call: rq(formula = data$lwage ~ data$education, tau = taus)
## 
## tau: [1] 0.95
## 
## Coefficients:
##               Value      Std. Error t value  Pr(>|t|)
## (Intercept)     1.70607  0.04588    37.18189  0.00000
## data$education  0.15234  0.00352    43.32065  0.00000
```

```r
plot(summary(rq(data$lwage~data$education, tau=taus)))
```

(Intercept)
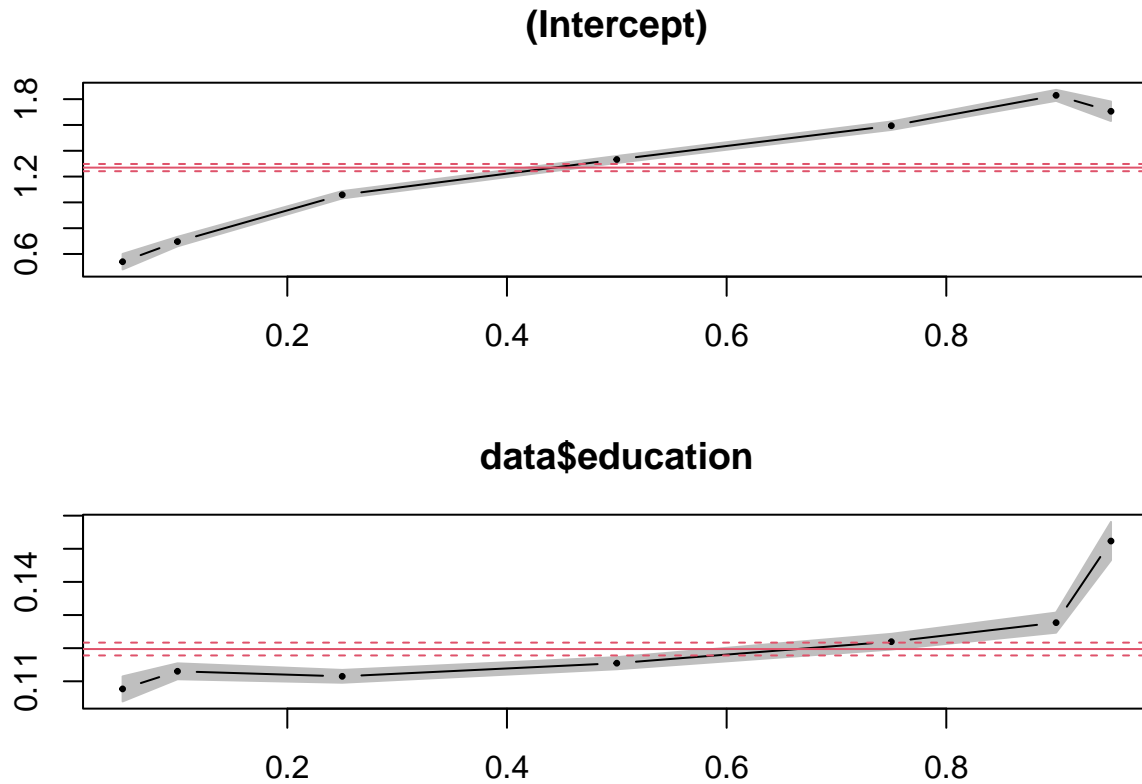
data$education


```
plot(data$education, data$lwage, xlab = "Education (years)", ylab = "Log Wage",
main = "Quantile Regression on Wage Data", col = "lightblue", pch = 19, cex = 0.5)

xx <- seq(min(data$education), max(data$education), length.out = 100)
q_fits <- rq(lwage~ education, tau = taus, data = data)
q_coefs <- coef(q_fits)
yy <- cbind(1, xx) %*% q_coefs
for (i in 1:length(taus)) {
lines(xx, yy[, i], col = "darkgray")
}
ols_fit <- lm(lwage~ education, data = data)
abline(ols_fit, col = "red", lty = 2, lwd = 2)
abline(rq(lwage~ education, tau = .5, data = data), col = "blue", lwd = 2)
legend("bottomleft",
legend = c("Mean (OLS) Fit", "Median (QR) Fit", "Other Quantiles"),
col = c("red", "blue", "darkgray"),
lty = c(2, 1, 1),
lwd = c(2, 2, 1))
```

Quantile Regression on Wage Data

Log Wage (y-axis)

Education (years) (x-axis)

Legend:
- – – Mean (OLS) Fit
- —— Median (QR) Fit
- —— Other Quantiles