Capitalized Title Here

by Author One and Author Two

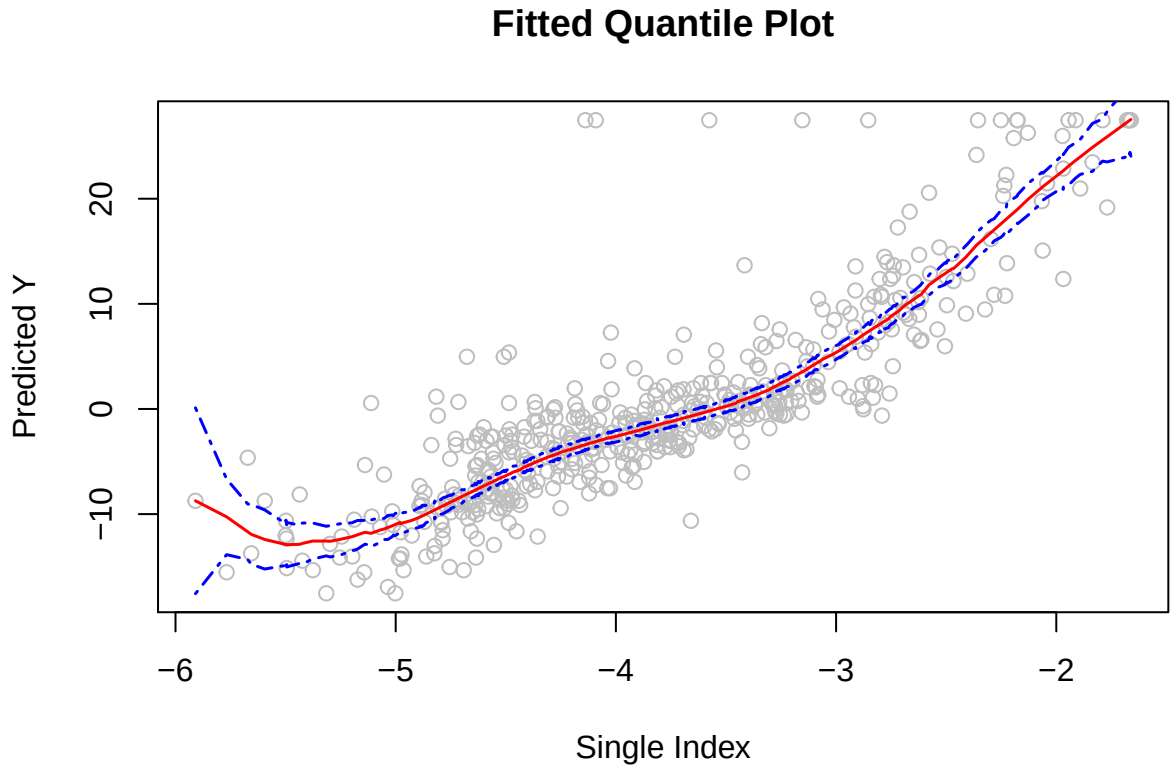
Abstract An abstract of less than 150 words.

Real Rata and Simulations

Boston Housing data

```
# install.packages("quantreg","KernSmooth")
# install.packages(pkgs= "https://github.com/zzz1990771/siqr/raw/master/siqr_0.1.0.zip", repos = NULL, type =
library(siqr)

#> Loading required package: quantreg

#> Loading required package: SparseM

#>
#> Attaching package: 'SparseM'

#> The following object is masked from 'package:base':
#>
#>     backsolve

#> Loading required package: KernSmooth

#> KernSmooth 2.23 loaded
#> Copyright M. P. Wand 1997-2009

#load data from MASS
library(MASS)
#help(Boston)
medv<- Boston$medv
RM <- Boston$rm
logTAX <- log(Boston$tax)
PTRATIO <- Boston$ptratio
logLSTAT <- log(Boston$lstat)

X <- cbind(RM,logTAX,PTRATIO,logLSTAT)
y0<-medv - mean(medv)

beta0 <- NULL
tau.vec <- c(0.25,0.5,0.75)
est.coefficient <- matrix(NA, nrow = length(tau.vec), ncol = 5)
est.coefficient[,1] <- tau.vec
for (i in 1:length(tau.vec)){
  est <- siqr(y0,X,beta.initial = beta0, tau=tau.vec[i],maxiter = 20,tol = 1e-6)
  est.coefficient[i,2:5] <- est$beta
}
colnames(est.coefficient) <- c("quantile tau",colnames(X))
est.coefficient

#>      quantile tau        RM     logTAX     PTRATIO   logLSTAT
#> [1,]         0.25 0.3365972 -0.5237661 -0.06832911 -0.7795528
#> [2,]         0.50 0.3108555 -0.4282412 -0.06633865 -0.8459181
#> [3,]         0.75 0.2427424 -0.1999916 -0.07720527 -0.9461072

est.tau25 <- siqr(y0,X,beta.initial = NULL, tau=0.25)
plot.siqr(est.tau25,bootstrap.interval = TRUE)
```


```
est.tau50 <- siqr(y0,X,beta.initial = NULL, tau=0.5)
plot.siqr(est.tau50,bootstrap.interval = TRUE)
```



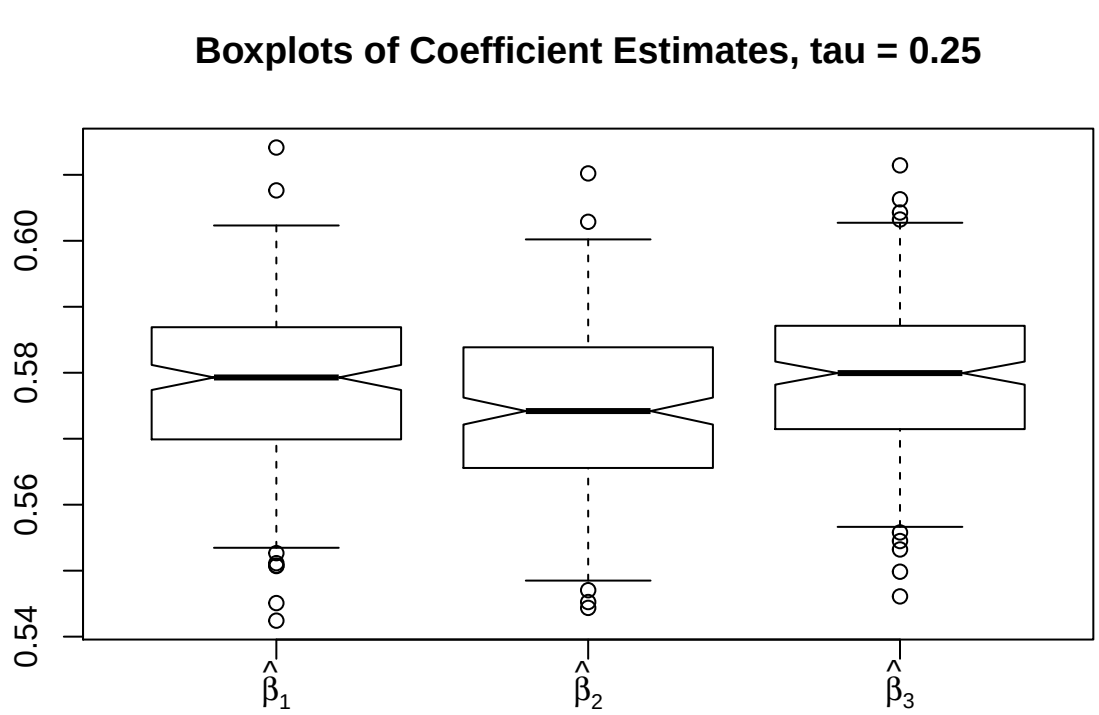
```
est.tau75 <- siqr(y0,X,beta.initial = NULL, tau=0.75)
plot.siqr(est.tau75,bootstrap.interval = TRUE)
```

Simulation

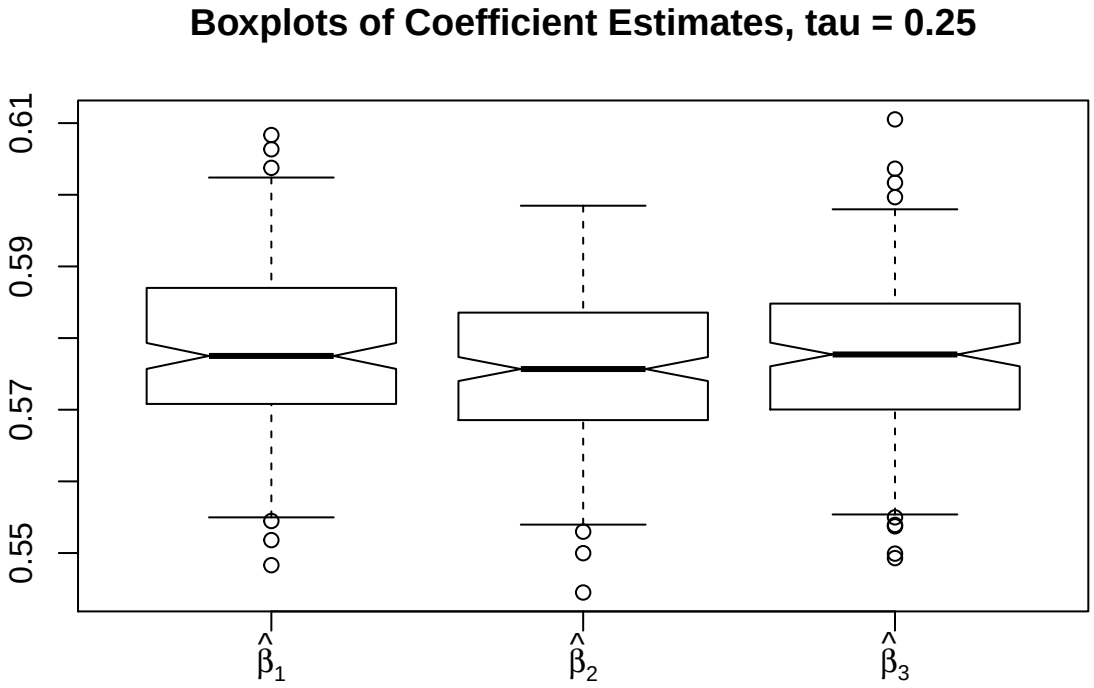
Setting 1

```
n <- 400
beta0 <- c(1, 1, 1)/sqrt(3)
n.sim <- 200
tau.vec <- c(0.25,0.5,0.75)
tau <- tau.vec[1]

data <- generate.data(n, true.theta=beta0, setting = "setting1",ncopy = n.sim)

#paralell
library(parallel)
library(foreach)
cl<- makeCluster(12)
doParallel::registerDoParallel(cl)
sim.results.50 <- foreach(m = 1:n.sim,.combine = "rbind") %dopar% {
  X <- data$X
  Y <- data$Y[[m]]
  est <- siqr(Y, X, beta.initial = c(2,1,0), tau=0.5,maxiter = 30,tol = 1e-8)
  if(est$flag.conv == 0){
    return(NULL)
  }else{
    return(est$beta)
  }
}
```

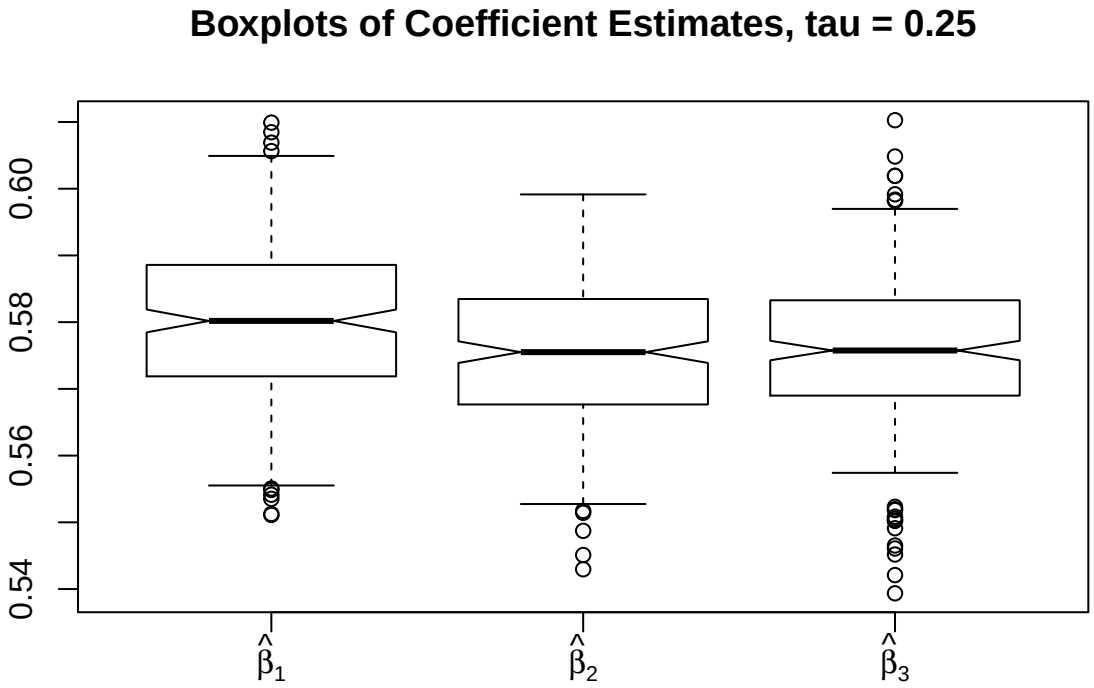
```
sim.results.25 <- foreach(m = 1:n.sim,.combine = "rbind") %dopar% {
  X <- data$X
  Y <- data$Y[[m]]
  est <- siqr(Y, X, beta.initial = c(2,1,0), tau=0.25,maxiter = 30,tol = 1e-8)
  if(est$flag.conv == 0){
    return(NULL)
  }else{
    return(est$beta)
  }
}
sim.results.75 <- foreach(m = 1:n.sim,.combine = "rbind") %dopar% {
  X <- data$X
  Y <- data$Y[[m]]
  est <- siqr(Y, X, beta.initial = c(2,1,0), tau=0.75,maxiter = 30,tol = 1e-8)
  if(est$flag.conv == 0){
    return(NULL)
  }else{
    return(est$beta)
  }
}
stopCluster(cl)

sim.results.25 <- readRDS("./sim1.results25.RDS")
sim.results.50 <- readRDS("./sim1.results50.RDS")
sim.results.75 <- readRDS("./sim1.results75.RDS")

boxplot(data.frame((sim.results.25)), outline=T,notch=T,range=1,main = "Boxplots of Coefficient Estimates, ta
names=c(expression(hat(beta)[1]),expression(hat(beta)[2]),expression(hat(beta)[3])))
```




```
boxplot(data.frame((sim.results.50)), outline=T,notch=T,range=1,main = "Boxplots of Coefficient Estimates, ta
names=c(expression(hat(beta)[1]),expression(hat(beta)[2]),expression(hat(beta)[3])))
```



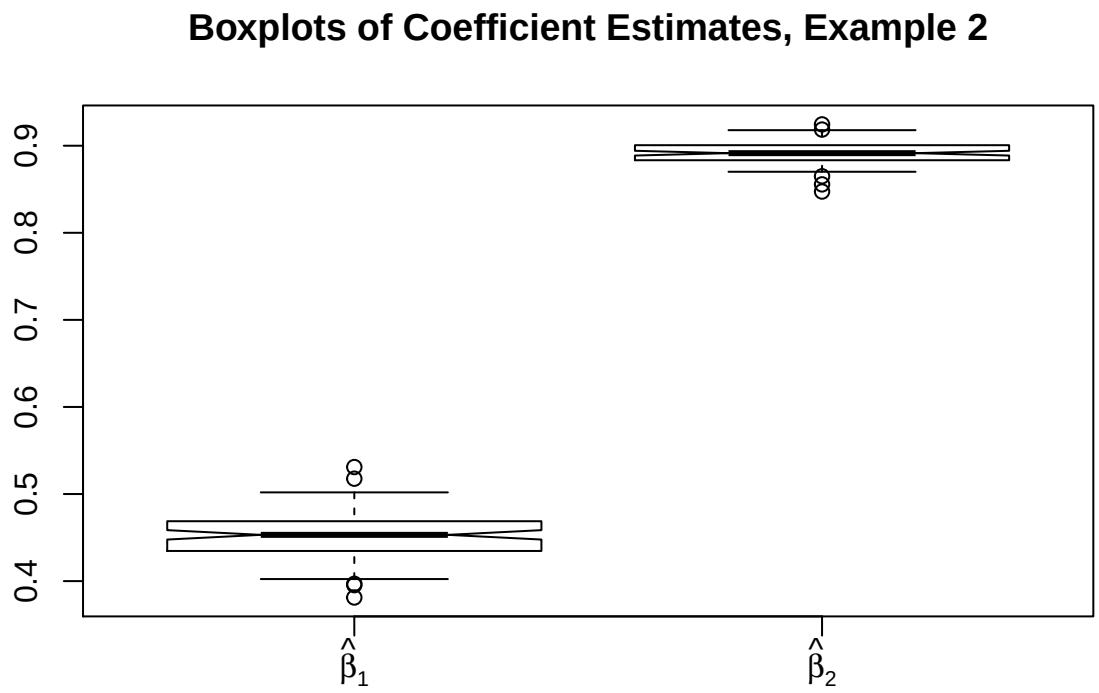

```
boxplot(data.frame((sim.results.75)), outline=T,notch=T,range=1,main = "Boxplots of Coefficient Estimates, ta
names=c(expression(hat(beta)[1]),expression(hat(beta)[2]),expression(hat(beta)[3])))
```



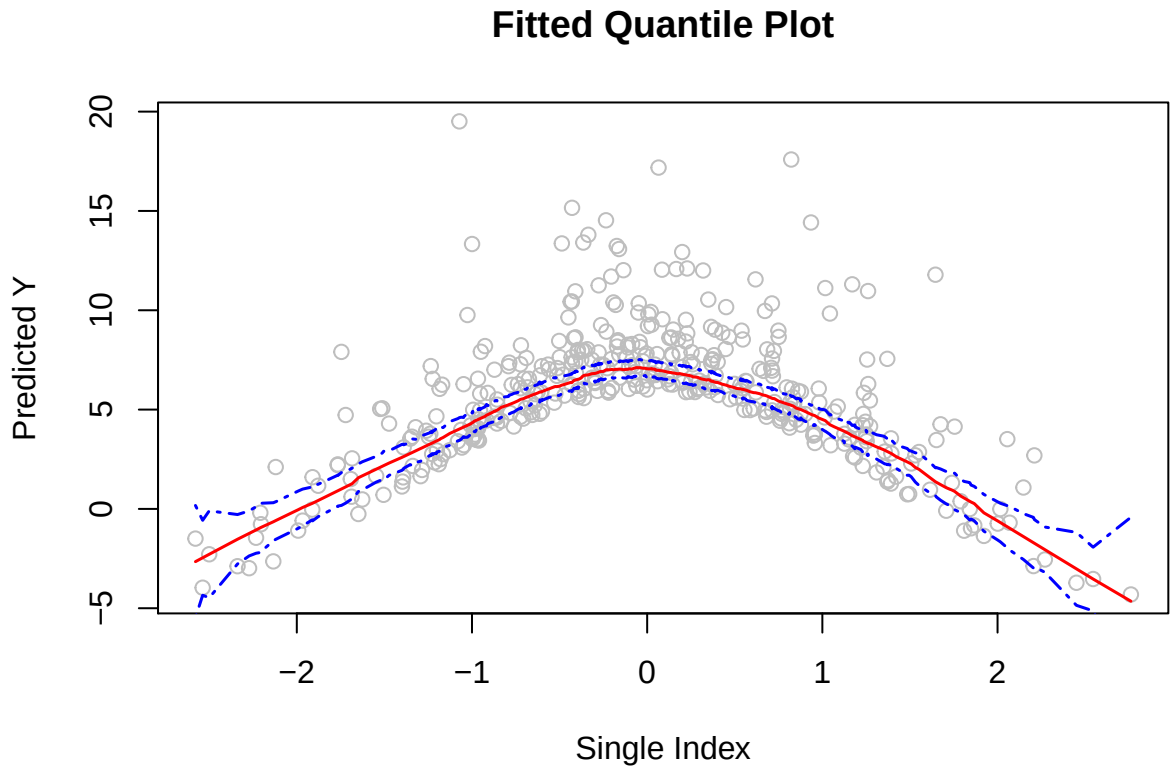
```
est.sim.05 <- siqr(data$Y[[1]],data$X,beta.initial = NULL, tau=0.5)
plot.siqr(est.sim.05,bootstrap.interval = TRUE)
```

Setting 3

```
n <- 400
beta0 <- c(1, 2)/sqrt(5)
n.sim <- 100
tau <- 0.5

data <- generate.data(n, true.theta=beta0, setting = "setting3",ncopy = n.sim)

#paralell
library(parallel)
library(foreach)
cl<- makeCluster(12)
doParallel::registerDoParallel(cl)
sim.results <- foreach(m = 1:n.sim,.combine = "rbind") %dopar% {
  X <- data$X
  Y <- data$Y[[m]]
  est <- siqr(Y, X, beta.initial = NULL, tau=tau,maxiter = 30,tol = 1e-8)
  est$beta
}

tau <- 0.5
sim.results <- readRDS("./sim.results.RDS")
est.mean <- c(tau,apply(sim.results,2,mean))
names(est.mean) <- c("tau","beta1.hat","beta2.hat")
est.mean

#>       tau beta1.hat beta2.hat
#> 0.5000000 0.4515909 0.8917233

est.se <- c(tau,apply(sim.results,2,sd))
names(est.se) <- c("tau","beta1.se.hat","beta1.se.hat")
est.se

#>          tau beta1.se.hat beta1.se.hat
#>   0.50000000   0.02682211   0.01359602

boxplot(data.frame((sim.results)), outline=T,notch=T,range=1,main = "Boxplots of Coefficient Estimates, Examp
names=c(expression(hat(beta)[1]),expression(hat(beta)[2])))
```




```
n <- 400
beta0 <- c(1, 2)/sqrt(5)
n.sim <- 100
tau <- 0.5
data <- generate.data(n, true.theta=beta0, setting = "setting3",ncopy = 2)
est.sim.05 <- siqr(data$Y[[1]],data$X,beta.initial = NULL, tau=0.5)
plot.siqr(est.sim.05,bootstrap.interval = TRUE)
```




```
Sys.sleep(100)
```

Bibliography

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