

HOMEWORK4

QIN ZHEN

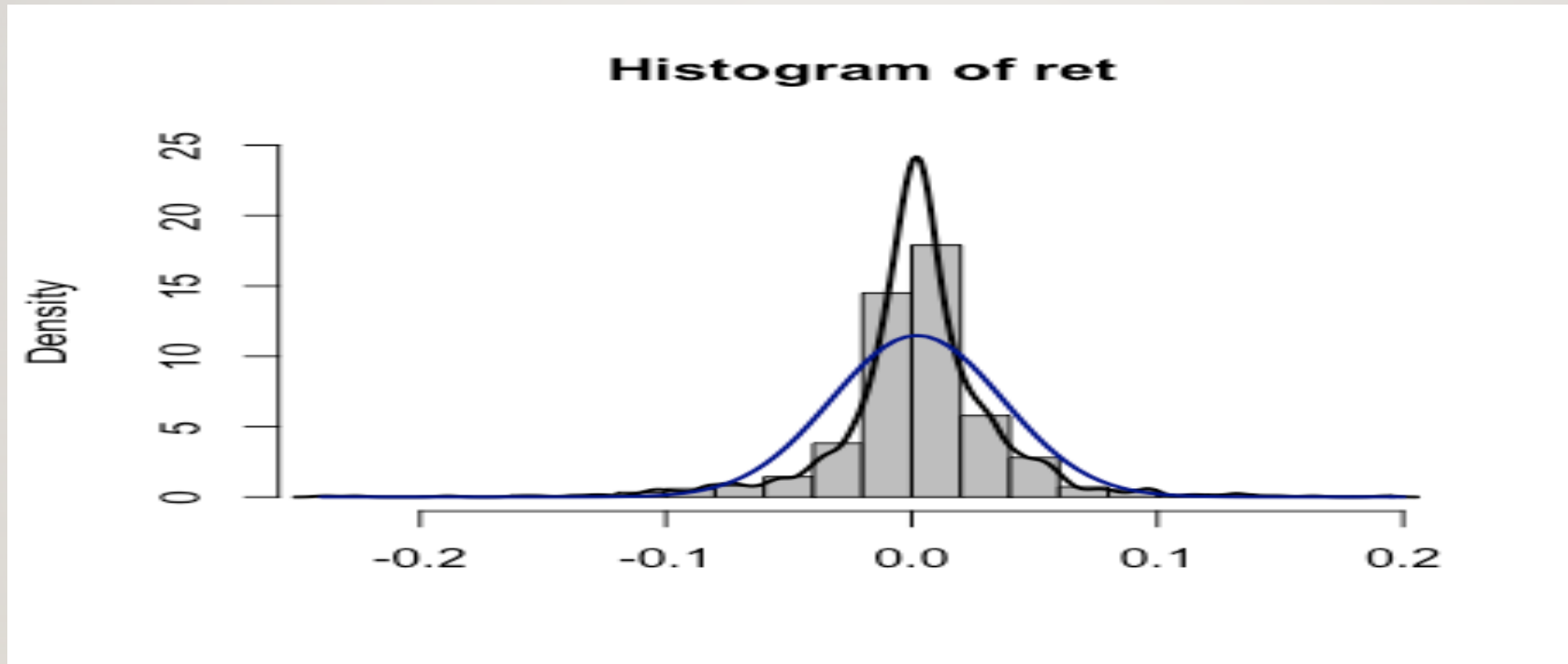
MAKE EXCELLENT GRAPHICS THAT FOLLOW FIG 3,4,5,6 OF THE „ECONOMETRICS OF CRIX“ PAPER.

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- `#install.packages("rjson", repos="http://cran.us.r-project.org")`
 - `library("rjson")`
 - `json_file = "http://crix.hu-berlin.de/data/crix.json"`
 - `json_data = fromJSON(file=json_file)`
 - `crix_data_frame = as.data.frame(json_data)`
 - `n<-dim(crix_data_frame)`
 - `a<-seq(1,n[2],2)`
 - `b<-seq(2,n[2],2)`
 - `date<-t(crix_data_frame[,a])`
 - `price<-t(crix_data_frame[,b])`
 - `ts.plot(price)`
 - `ret<-diff(log(price))`
 - `plot(ret)`
 - `ts.plot(ret)`

HISTOGRAM

- `hist(ret, col = "grey", breaks = 20, freq = FALSE, ylim = c(0, 25), xlab = NA)`
- `lines(density(ret), lwd = 2)`
- `mu = mean(ret)`
- `sigma = sd(ret)`
- `x = seq(-4, 4, length = 100)`
- `curve(dnorm(x, mean = mean(ret), sd = sd(ret)), add = TRUE, col = "darkblue", lwd = 2)`

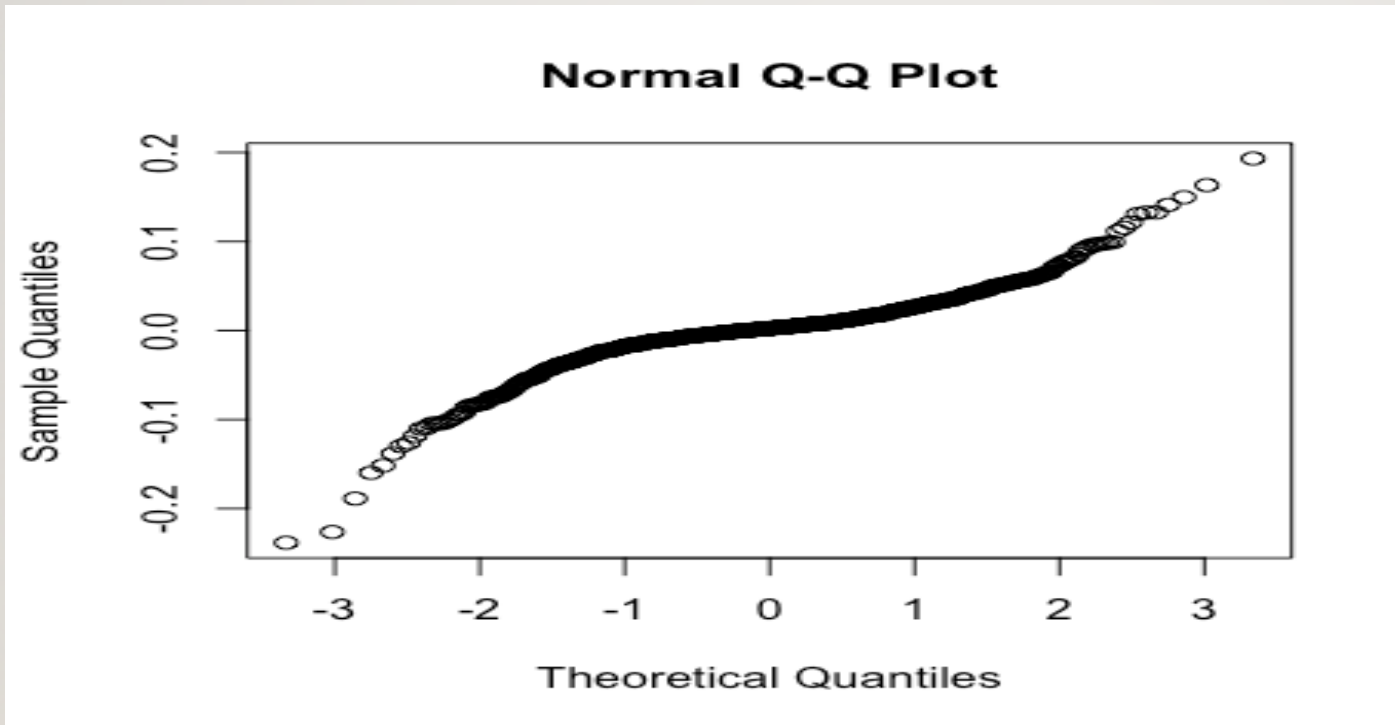
HISTOGRAM



QQ-PLOT

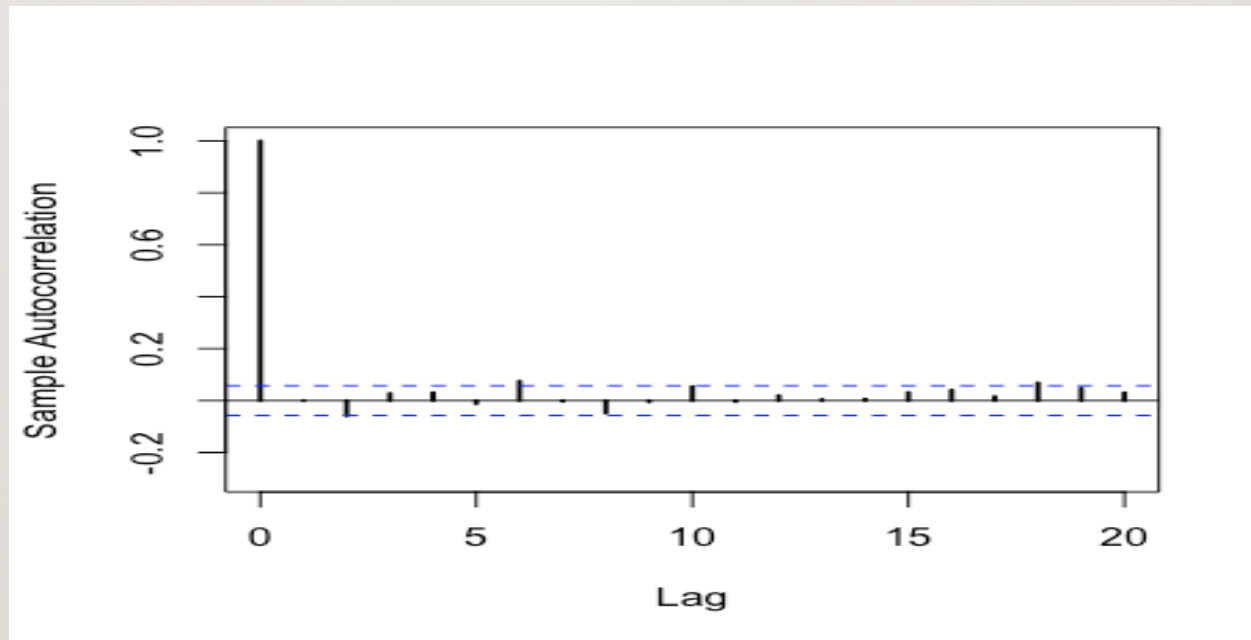
- `# qq-plot`
- `qqnorm(ret)`
- `qqline(ret, col = "blue", lwd = 3)`

QQ-PLOT



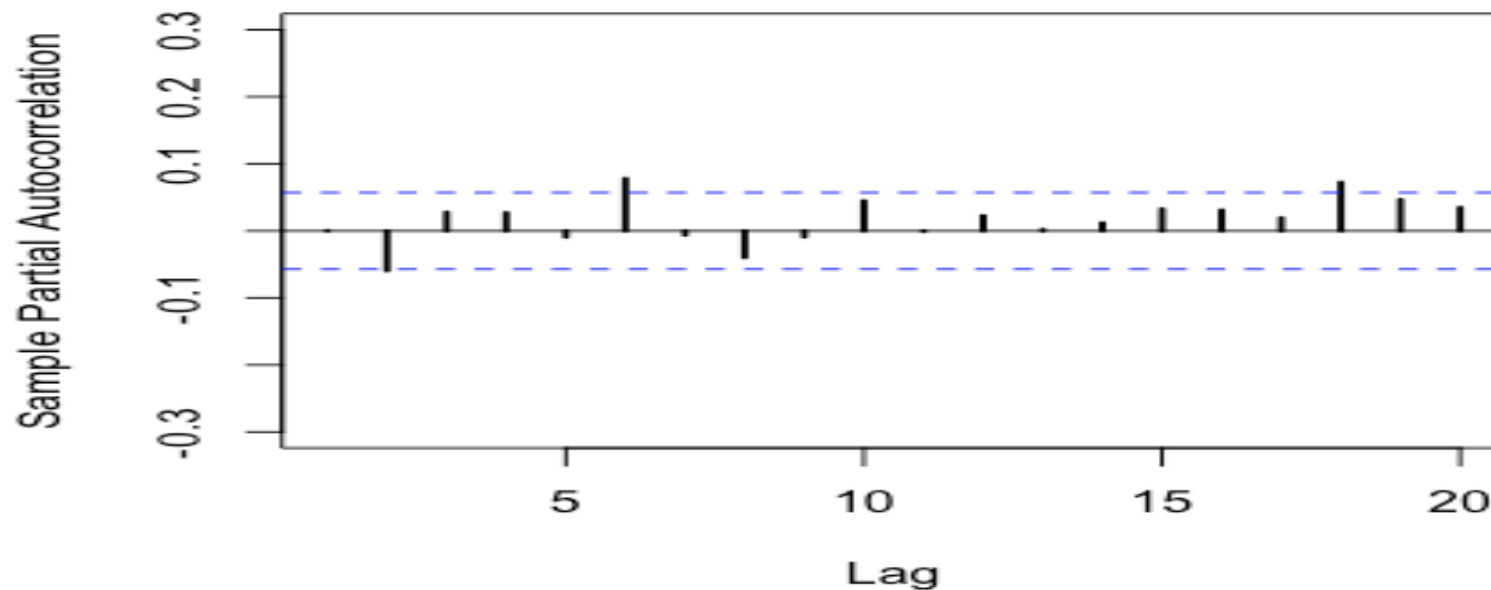
SAMPLE AUTOCORRELATION

- acf plot
- autocorr = acf(ret, lag.max = 20, ylab = "Sample Autocorrelation", main = NA, lwd = 2, ylim = c(-0.3, 1))



SAMPLE PARTIAL AUTOCORRELATION

- plot of pacf
- `autopcorr = pacf(ret, lag.max = 20, ylab = "Sample Partial Autocorrelation", main = NA, ylim = c(-0.3, 0.3), lwd = 2)`



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- select p and q order of ARIMA model
 - `fit4 = arima(ret, order = c(2, 0, 3))`
 - `tsdiag(fit4)`
 - `Box.test(fit4$residuals, lag = 1)`

 - `fitr4 = arima(ret, order = c(2, 1, 3))`
 - `tsdiag(fitr4)`
 - `Box.test(fitr4$residuals, lag = 1)`

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- # to conclude, 202 is better than 213
 - `fit202 = arima(ret, order = c(2, 0, 2))`
 - `tsdiag(fit202)`
 - `tsdiag(fit4)`
 - `tsdiag(fitr4)`

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- `# arima202 predict`
 - `fit202 = arima(ret, order = c(2, 0, 2))`
 - `crpre = predict(fit202, n.ahead = 30)`
 - `dates = seq(as.Date("02/08/2014", format = "%d/%m/%Y"), by = "days", length = length(ret))`
 - `plot(ret, type = "l", xlim = c(0, 644), ylab = "log return", xlab = "days", lwd = 1.5)`
 - `lines(crpre$pred, col = "red", lwd = 3)`
 - `lines(crpre$pred + 2 * crpre$se, col = "red", lty = 3, lwd = 3)`
 - `lines(crpre$pred - 2 * crpre$se, col = "red", lty = 3, lwd`

