

Homework for 4

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Figure 3

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

Figure 3

```
load(file = "C:/Users/Alex/Desktop/hw4/crix.RData")
load(file = "C:/Users/Alex/Desktop/hw4/ecrix.RData")
load(file = "C:/Users/Alex/Desktop/hw4/efcrix.RData")

# plot of crix
# plot(as.xts(crix), type="l", auto.grid=FALSE, main = NA)
plot(crix1, ylab = NA, xlab = NA)
```

Figure 3



Figure 3&4

```
# plot of crix return  
ret = diff(log(crix1))  
# plot(as.xts(ret), type="l", auto.grid=FALSE, main = NA)  
plot(ret, ylab = NA, xlab = NA)
```

Figure 4

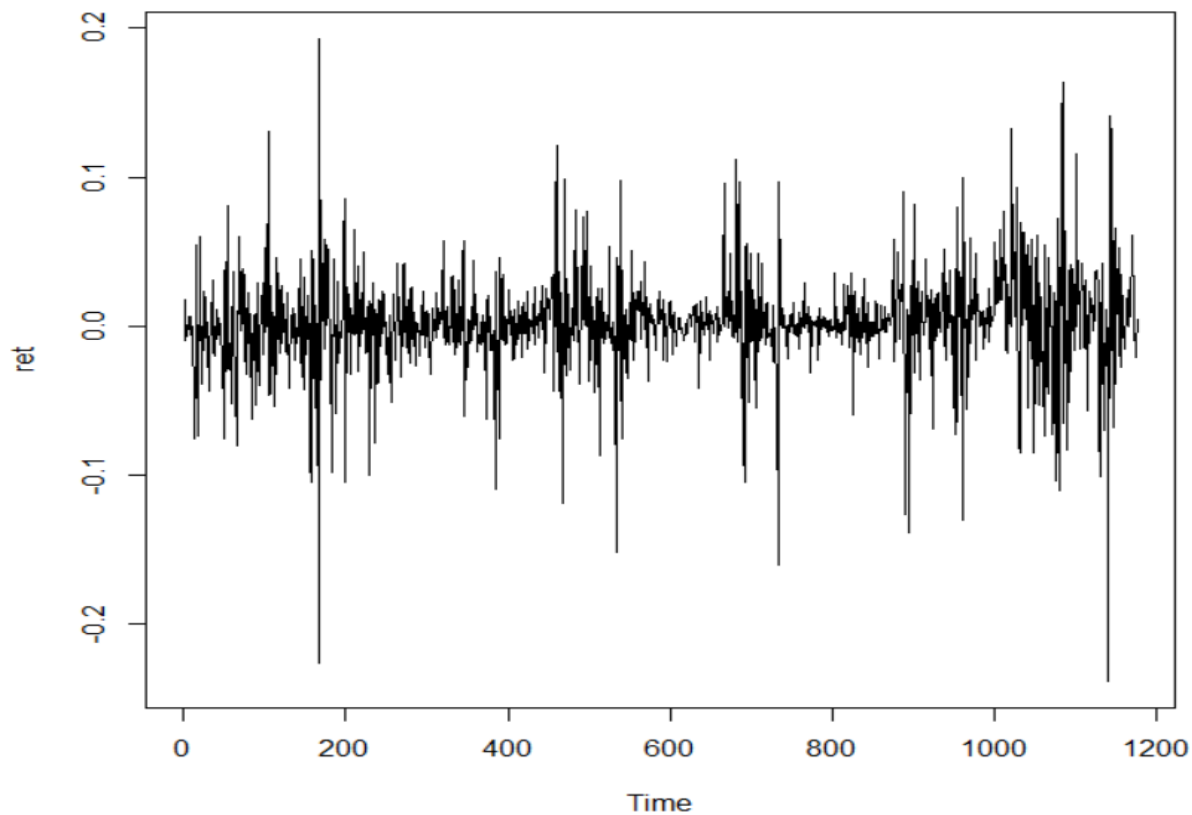


Figure 5

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

Figure5

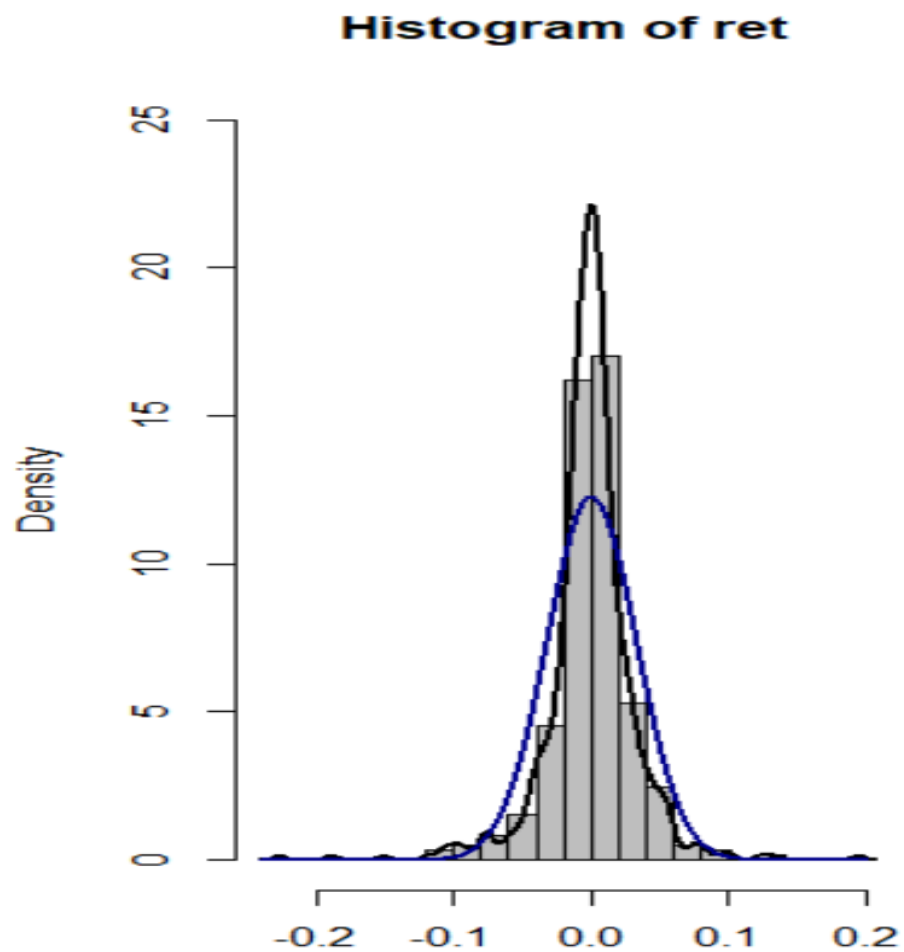


Figure5

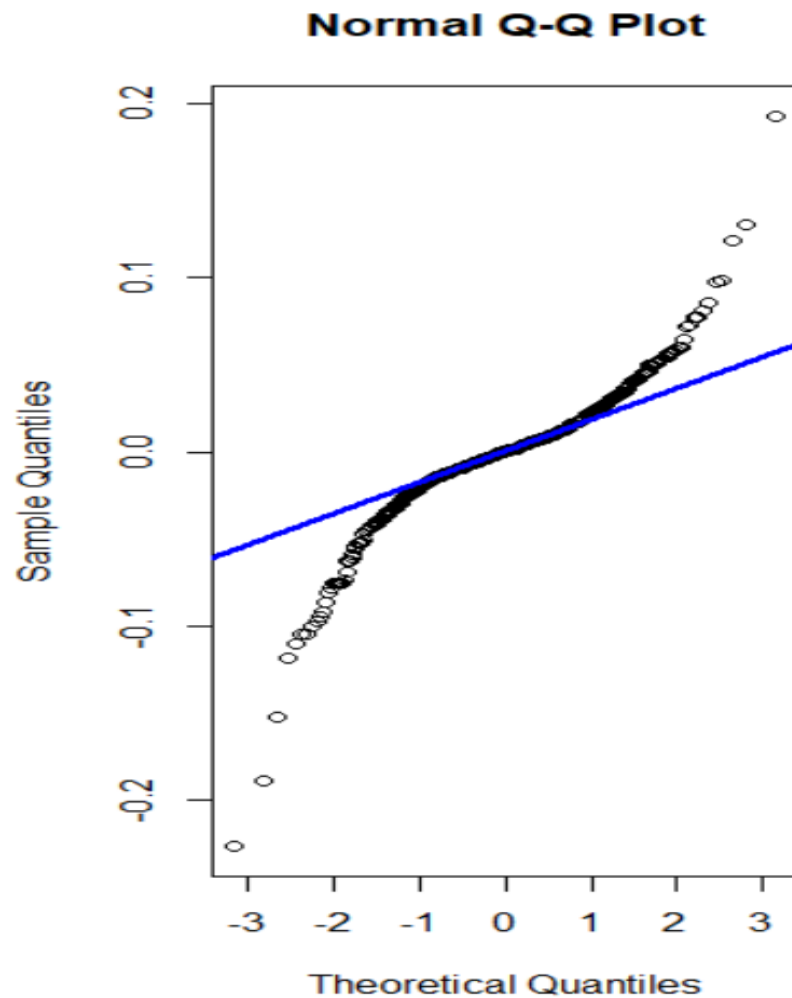


Figure 6

```
Box.test(crixreturn, type = "Ljung-Box", lag = 20)
adf.test(crixreturn, alternative = "stationary")
kpss.test(crixreturn, null = "Trend")
par(mfrow = c(1, 2))
autocorr = acf(crixreturn, lag.max = 20, ylab = "Sample Autocorrelation",
main = NA,
      lwd = 2, ylim = c(-0.3, 1))
print(cbind(autocorr$lag, autocorr$acf))
Box.test(crixreturn, type = "Ljung-Box", lag = 1, fitdf = 0)
Box.test(autocorr$acf, type = "Ljung-Box")
autopcorr = pacf(crixreturn, lag.max = 20, ylab = "Sample Partial
Autocorrelation",
      main = NA, ylim = c(-0.3, 0.3), lwd = 2)
```

Figure 6

