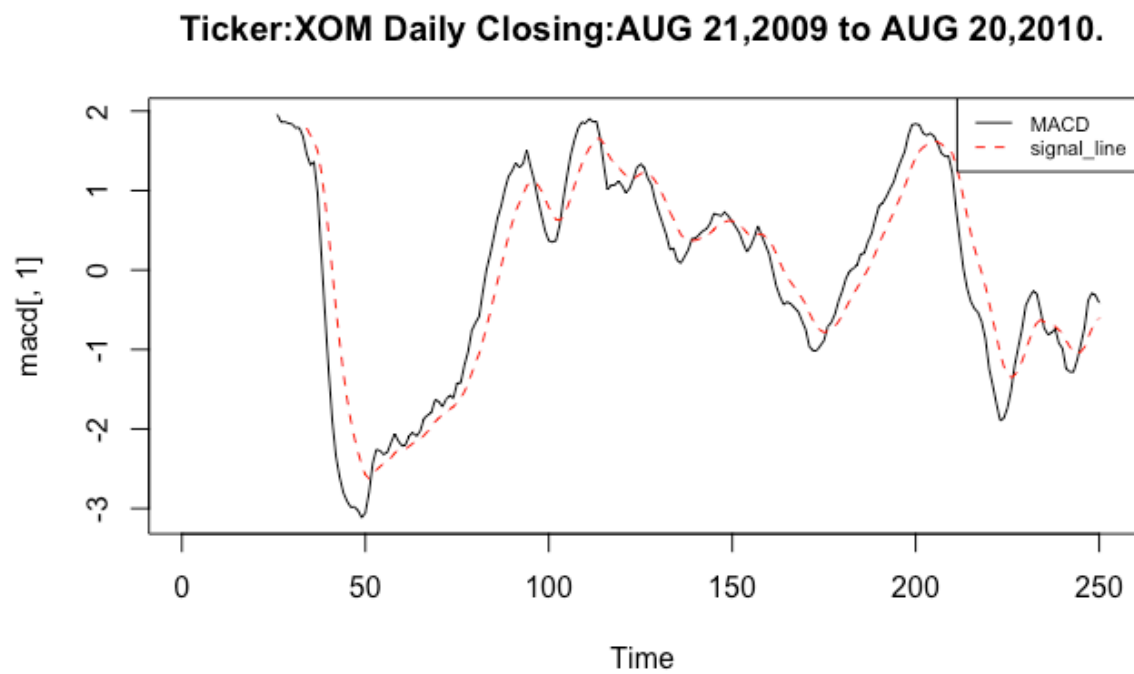


Yifu He

Q1:

Firstly,

Draw the picture of the MACD and singal_line:



Then, find the signal and calculate its return.

	date	open	high	low	close	Adj.Close	volume	signal	profit	logr	acmprofit
52	2018-02-26	77.74	78.93	77.56	78.84	76.47682	16940400	buy	0.00	0.000000	0.00
97	2018-05-01	77.26	77.26	75.98	76.95	74.64348	16231000	sell	9695.70	4.994155	9695.70
104	2018-05-10	80.64	81.79	80.50	81.72	79.27050	17710300	buy	0.00	0.000000	0.00
115	2018-05-25	79.28	79.33	78.09	78.71	77.12461	14562000	sell	9366.49	5.533084	19062.19
124	2018-06-08	83.11	83.66	82.50	83.60	81.91611	14350400	buy	0.00	0.000000	0.00
127	2018-06-13	82.44	82.60	81.47	81.51	79.86821	12049300	sell	9129.12	5.423084	28191.31
139	2018-06-29	82.45	83.54	82.29	82.73	81.06364	17323200	buy	0.00	0.000000	0.00
150	2018-07-17	82.26	82.75	82.04	82.31	80.65209	7373300	sell	9054.10	4.880296	37245.41
157	2018-07-26	83.83	84.40	83.37	84.24	82.54322	13210100	buy	0.00	0.000000	0.00
158	2018-07-27	80.97	82.38	80.81	81.92	80.26995	18220800	sell	8847.36	5.853248	46092.77
176	2018-08-22	79.11	80.05	79.02	79.96	79.15756	10098200	buy	0.00	0.000000	0.00
206	2018-10-04	85.50	86.08	85.25	85.58	84.72116	10204600	sell	9413.80	4.811316	55506.57
227	2018-11-02	81.76	82.45	80.23	81.95	81.12759	19350400	buy	0.00	0.000000	0.00
235	2018-11-14	78.86	79.09	76.75	77.39	77.39000	18552100	sell	8899.85	4.899855	64406.42
245	2018-11-29	78.22	79.53	78.19	79.06	79.06000	10255200	buy	0.00	0.000000	0.00

money shares

52	66.16050	126
97	9761.86013	0
104	37.18001	119
115	9403.66989	0
124	40.47011	112
127	9169.59034	0
139	69.29001	110
150	9123.38979	0
157	25.47000	108
158	8872.82979	0
176	77.22990	110
206	9491.03012	0
227	66.78046	115
235	8966.63035	0
245	32.85057	113

>

Q2:

Calculate its sharpe ratio:

```
> sharp
[1] -1.666318
```

Q3:

7

> finalsignal

	Date	Open	High	Low	Close	Adj.Close	Volume	signalXOM	profit	logr	acmprofit
52	2018-02-26	77.74	78.93	77.56	78.84	76.47682	16940400	buy	0.00	0.000000	0.00
96	2018-04-30	77.91	78.56	77.74	77.75	75.41949	15028800	sell	9796.50	5.004428	9796.50
104	2018-05-10	80.64	81.79	80.50	81.72	79.27050	17710300	buy	0.00	0.000000	0.00
114	2018-05-24	81.35	81.36	79.95	80.27	78.65318	13360500	sell	9632.40	5.148721	19428.90
123	2018-06-07	82.73	83.29	82.56	82.88	81.21062	13502500	buy	0.00	0.000000	0.00
127	2018-06-13	82.44	82.60	81.47	81.51	79.86821	12049300	sell	9455.16	4.850295	28884.06
139	2018-06-29	82.45	83.54	82.29	82.73	81.06364	17323200	buy	0.00	0.000000	0.00
150	2018-07-17	82.26	82.75	82.04	82.31	80.65209	7373300	sell	9465.65	6.397698	38349.71
156	2018-07-25	83.01	83.74	82.51	83.59	81.90630	9523600	buy	0.00	0.000000	0.00
158	2018-07-27	80.97	82.38	80.81	81.92	80.26995	18220800	sell	9256.96	5.559865	47606.67
176	2018-08-22	79.11	80.05	79.02	79.96	79.15756	10098200	buy	0.00	0.000000	0.00
206	2018-10-04	85.50	86.08	85.25	85.58	84.72116	10204600	sell	9927.28	6.350024	57533.95
227	2018-11-02	81.76	82.45	80.23	81.95	81.12759	19350400	buy	0.00	0.000000	0.00
235	2018-11-14	78.86	79.09	76.75	77.39	77.39000	18552100	sell	9364.19	5.790778	66898.14
245	2018-11-29	78.22	79.53	78.19	79.06	79.06000	10255200	buy	0.00	0.000000	0.00

money shares

52	66.16050	126
96	9862.66050	0
104	56.26038	120
114	9688.66002	0
123	74.58037	116
127	9529.74060	0
139	15.79026	115
150	9481.44003	0
156	35.77048	113
158	9292.73026	0
176	17.37037	116
206	9944.65060	0
227	28.70097	121
235	9392.89084	0
245	63.81108	118

> sharp

[1] 8.832922

```
w## install the package of MACD
install.packages("quantmod")
install.packages("PerformanceAnalytics")
install.packages("xts")
install.packages("zoo")
install.packages("TTR")
require("TTR")
require("xts")
require("zoo")
require("quantmod")
require("PerformanceAnalytics")
```

```
## read the file
getwd()
setwd("/Users/yifuhe/Desktop")
```

```
File <-read.csv("XOM-1.csv")
```

```
###----- Question1
```

```
XOMclose <-unlist(File[6])
```

```
##get the plot of MACD
```

```
macd <-MACD(XOMclose,nFast=12,nSlow=26,nSig=9,maType="EMA",percent=TRUE)
```

```
macd
```

```
ts.plot(macd[,1],main="Ticker:XOM Daily Closing:AUG 21,2009 to AUG 20,2010.")
```

```
lines(macd[,2],col="red",lty=2)
```

```
legend("topright",c("MACD","signal_line"),col=c(1,2),lty=c(1,2),cex=0.7)
```

```
cal <- c(rep(0,33))
```

```
for (i in 34 : nrow(macd))
```

```
{
```

```
  if (macd[i,1] > macd[i,2]){cal[i] <- 1}
```

```
  else {cal[i] <- -1}
```

```
}
```

```
cal
```

```
signalXOM <- rep(0,250)
```

```
for(i in 34 : nrow(macd)) {
```

```
  if ((cal[i] - cal[i - 1]) == 2) {signalXOM[i] <- 'buy'}
```

```
  else if((cal[i] - cal[i - 1]) == -2) {signalXOM[i] <- 'sell'}
```

```
}
```

```
XOM <-cbind(File,signalXOM)
```

```
Finalsignal <- subset(XOM, signalXOM != 0)
```

```
Finalsignal
```

```
nrow(Finalsignal)
```

```
##
```

```
profit <-rep(0,15)
```

```
acmprofit<-rep(0,15)
```

```
logr <-rep(0,15)
```

```
shares <-rep(0,15)
```

```
money <-rep(0,15)
```

```
shares[1]=10000%/Finalsignal[1,5]
```

```
money[1]=10000-(shares[1]*Finalsignal[1,5])
```

```
shares
```

```
money
```

```
for (i in 1:15){
```

```
  if((i %% 2) ==1 & (i>2)){
```

```
    shares[i]=(money[i-1]) %/% (Finalsignal[i,5])
```

```
    money[i]=money[i-1]-Finalsignal[i,5]*shares[i]
```

```
  }
```

```

else if((i %% 2)==0){
  shares[i]=0
  money[i]=money[i-1]+shares[i-1]*Finalsignal[i,5]
  logr[i]=log(money[i])-log(money[i-1])
  profit[i]=money[i]-money[i-1]
  total=0
  for(j in 1:i){
    total=total+profit[j]

  }
  acmprofit[i]=total
}
}
Finalsignal <- cbind(Finalsignal,profit)
Finalsignal<-cbind(Finalsignal,logr)
Finalsignal<-cbind(Finalsignal, acmprofit)
Finalsignal <- cbind(Finalsignal,money)
Finalsignal <- cbind(Finalsignal,shares)
Finalsignal
###-----Question 2
calcu <- subset(Finalsignal, logr != 0)
calcu
ri<- mean(calcu[,10])
std<-sd(calcu[,10])
sharp <- (ri-0.0511)/std
sharp

###-----question3
macd <- MACD(XOMclose,nFast=12,nSlow=26,nSig=7,maType="EMA",percent=TRUE)
macd

ts.plot(macd[,1],main="Ticker:XOM Daily Closing:AUG 21,2009 to AUG 20,2010.")
lines(macd[,2],col="red",lty=2)
legend("topright",c("MACD","signal_line"),col=c(1,2),lty=c(1,2),cex=0.7)

cal <- c(rep(0,31))
for (i in 32 : nrow(macd))
{
  if (macd[i,1] > macd[i,2]){cal[i] <- 1}
  else {cal[i] <- -1}
}
cal
signalXOM <- rep(0,250)
for(i in 32 : nrow(macd)) {

```

```

if ((cal[i] - cal[i - 1]) == 2) {signalXOM[i] <- 'buy'}
else if((cal[i] - cal[i - 1]) == -2) {signalXOM[i] <- 'sell'}
}
XOM <- cbind(File, signalXOM)
Finalsignal <- subset(XOM, signalXOM != 0)
Finalsignal
nrow(Finalsignal)
##
profit <- rep(0, 15)
acmprofit <- rep(0, 15)
logr <- rep(0, 15)
shares <- rep(0, 15)
money <- rep(0, 15)
shares[1] = 10000 %/% Finalsignal[1, 5]
money[1] = 10000 - (shares[1] * Finalsignal[1, 5])
shares
money
for (i in 1:15){
  if((i %% 2) == 1 & (i > 2)){
    shares[i] = (money[i-1]) %/% (Finalsignal[i, 5])
    money[i] = money[i-1] - Finalsignal[i, 5] * shares[i]
  }
  else if((i %% 2) == 0){
    shares[i] = 0
    money[i] = money[i-1] + shares[i-1] * Finalsignal[i, 5]
    logr[i] = log(money[i]) - log(money[i-1])
    profit[i] = money[i] - money[i-1]
    total = 0
    for(j in 1:i){
      total = total + profit[j]
    }
    acmprofit[i] = total
  }
}
Finalsignal <- cbind(Finalsignal, profit)
Finalsignal <- cbind(Finalsignal, logr)
Finalsignal <- cbind(Finalsignal, acmprofit)
Finalsignal <- cbind(Finalsignal, money)
Finalsignal <- cbind(Finalsignal, shares)
Finalsignal
###-----Question 2
calcu <- subset(Finalsignal, logr != 0)
calcu
ri <- mean(calcu[, 10])
std <- sd(calcu[, 10])
sharp <- (ri - 0.0511) / std

```

sharp

###

```
macd <- MACD(XOMclose,nFast=12,nSlow=26,nSig=11,maType="EMA",percent=TRUE)
macd
```

```
ts.plot(macd[,1],main="Ticker:XOM Daily Closing:AUG 21,2009 to AUG 20,2010.")
lines(macd[,2],col="red",lty=2)
legend("topright",c("MACD","signal_line"),col=c(1,2),lty=c(1,2),cex=0.7)
```

```
cal <- c(rep(0,35))
for (i in 36 : nrow(macd))
{
  if (macd[i,1] > macd[i,2]){cal[i] <- 1}
  else {cal[i] <- -1}
}
cal
signalXOM <- rep(0,250)
for(i in 36 : nrow(macd)) {
  if ((cal[i] - cal[i - 1]) == 2) {signalXOM[i] <- 'buy'}
  else if((cal[i] - cal[i - 1]) == -2) {signalXOM[i] <- 'sell'}
}
XOM <- cbind(File,signalXOM)
Finalsignal <- subset(XOM, signalXOM != 0)
Finalsignal
nrow(Finalsignal)
##
profit <- rep(0,15)
acmprofit <- rep(0,15)
logr <- rep(0,15)
shares <- rep(0,15)
money <- rep(0,15)
shares[1]=10000/%Finalsignal[1,5]
money[1]=10000-(shares[1]*Finalsignal[1,5])
shares
money
for (i in 1:15){
  if((i %% 2) == 1 & (i>2)){
    shares[i]=(money[i-1]) %/% (Finalsignal[i,5])
    money[i]=money[i-1]-Finalsignal[i,5]*shares[i]
  }
  else if((i %% 2)==0){
    shares[i]=0
    money[i]=money[i-1]+shares[i-1]*Finalsignal[i,5]
    logr[i]=log(money[i])-log(money[i-1])
  }
}
```

```

profit[i]=money[i]-money[i-1]
total=0
for(j in 1:i){
  total=total+profit[j]

}
acmprofit[i]=total
}
}
Finalsignal <-cbind(Finalsignal,profit)
Finalsignal<-cbind(Finalsignal,logr)
Finalsignal<-cbind(Finalsignal, acmprofit)
Finalsignal <-cbind(Finalsignal,money)
Finalsignal <-cbind(Finalsignal,shares)
Finalsignal
###-----Question 2
calcu <- subset(Finalsignal, logr != 0)
calcu
ri<- mean(calcu[,10])
std<-sd(calcu[,10])
sharp <- (ri-0.0511)/std
sharp

```