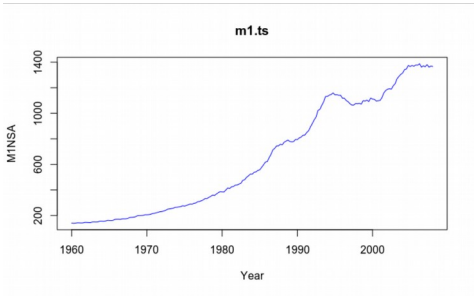
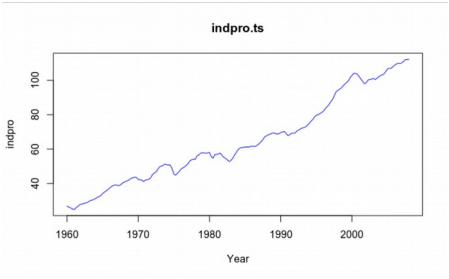
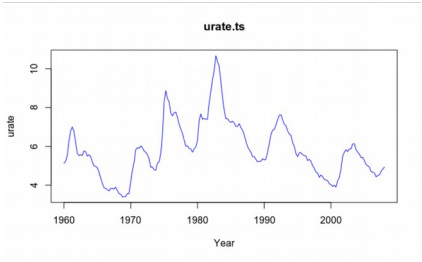
EC 513 Problem Set 5

CARTER YANCEY

1a. None appear stationary.







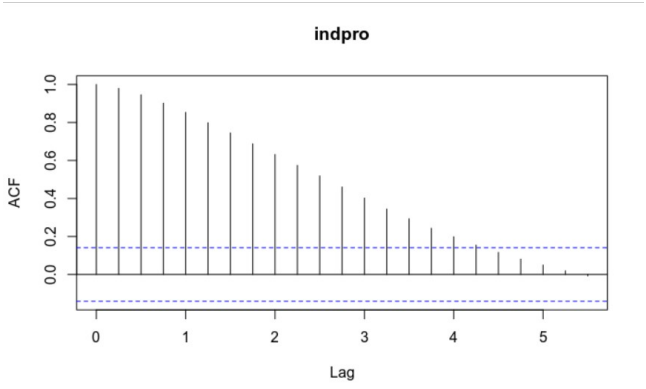
1b. Running adf.test() yields a high p-value; we fail to reject the null and conclude that the time series is not stationary because of the unit root.

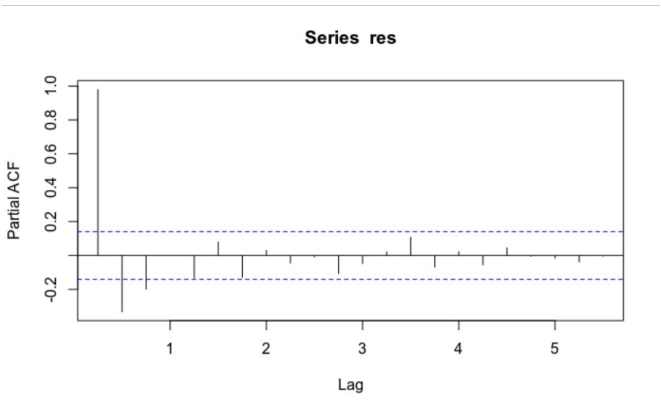
1c. Running adf.test() yields a high p-value; we fail to reject the null and conclude that the time series is not stationary because of the unit root.

1d.

```
Call:
lm(formula = indpro.ts ~ m1.ts)

Coefficients:
(Intercept)        m1.ts
   28.53710      0.05575
```

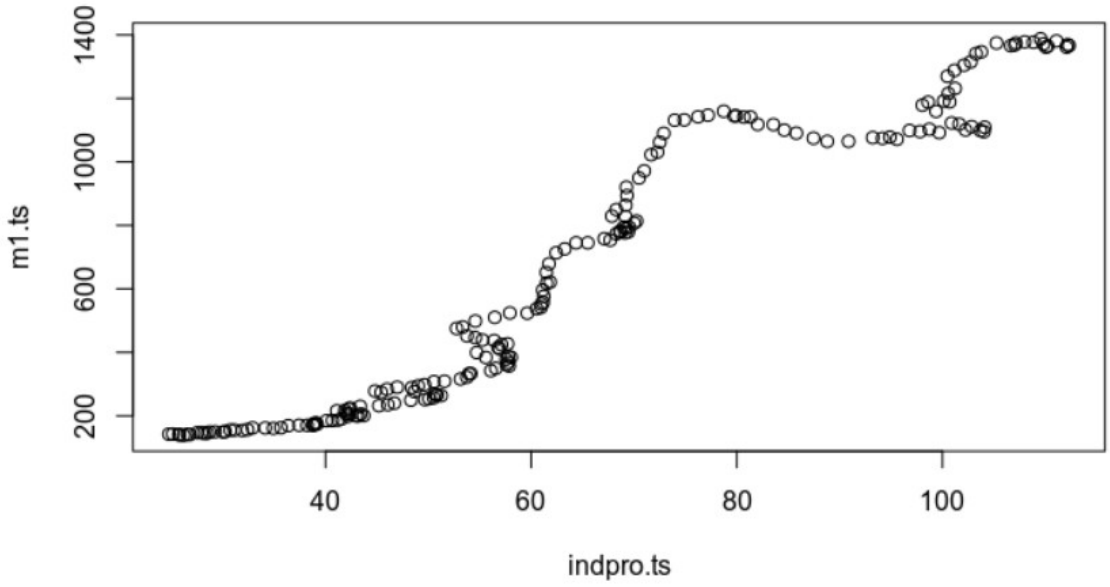
1e. Probably not stationary



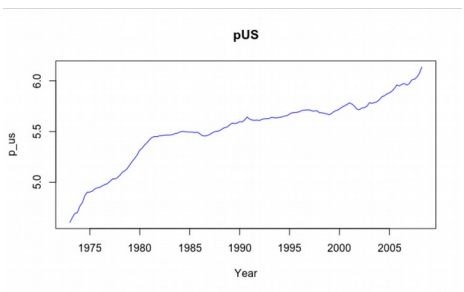


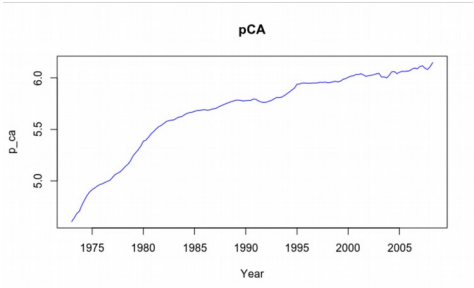
1f. In this case, adf.test() does not yield as high p-value before, but it is still significantly above 0.05; we fail to reject the null.

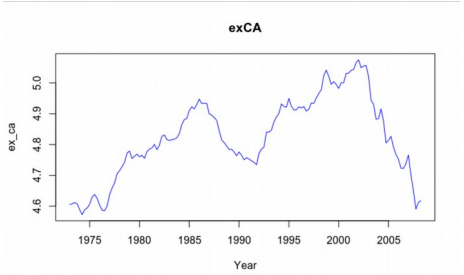
1g. The high R-squared value suggests a linear correlation. However, the fact that we failed to reject the null on the Dickey-Fuller for part (f) indicates that the residual is not stationary. The regression must be spurious.



2a. Definitely non-stationary.







2b. Running DF on the log timeseries for pUS and exCA yields p-values greater than 0.05, so we fail to reject the null. However, the DF test on the log of pCA less than 0.01, so we reject the null.

2c.

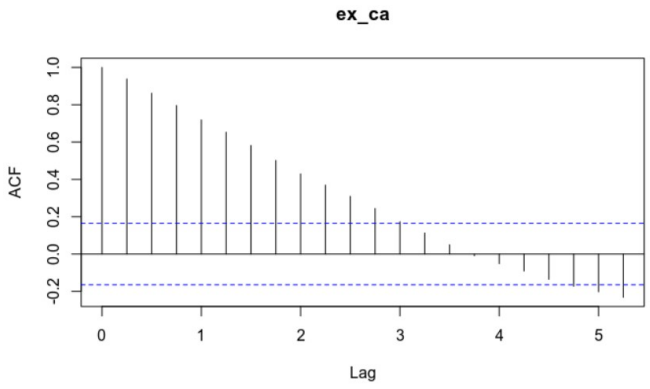
```
Call:
lm(formula = log(exCA.ts) ~ log(pUS.ts) + log(pCA.ts))

Coefficients:
(Intercept)  log(pUS.ts)  log(pCA.ts)
      4.766       -1.405        1.376
```

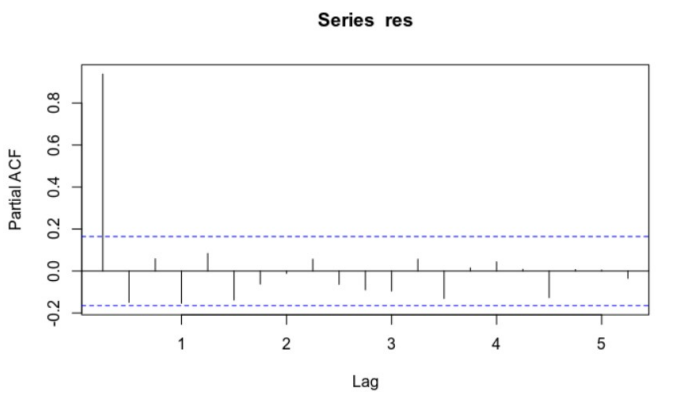
2d. For PPP to hold, we need

$$ex = a + B(p - p^*) + error, \quad B=1$$

where '*ex*' is exhange rate, *p* is log domestic price and *p** is log foreign price. Here, *B* is approximately 1.4, so PPP does not hold.

2e. Not white noise.






```
#Q1
data.df <- read.csv("~/Downloads/1607.csv",header=TRUE, sep=",")
indpro.ts <- ts(data=data.df[c("indpro")], frequency=4, start=c(1960,1), end=c(2008,1))
m1.ts <- ts(data=data.df[c("M1NSA")], frequency=4, start=c(1960,1), end=c(2008,1))
urate.ts <- ts(data=data.df[c("urate")], frequency=4, start=c(1960,1), end=c(2008,1))
#a
plot(indpro.ts, col="blue", main="indpro.ts", xlab="Year")
plot(m1.ts, col="blue", main="m1.ts", xlab="Year")
plot(urate.ts, col="blue", main="urate.ts", xlab="Year")
#b
adf.test(indpro.ts)
#c
adf.test(m1.ts)
#d
y <- lm(indpro.ts ~ m1.ts)
y
#e
res <- (indpro.ts-fitted(y))
acf(res)
pacf(res)
#f
adf.test(res)
#g
plot.zoo(indpro.ts, m1.ts)


#Q2
data.df <- read.csv("~/Downloads/1604.csv",header=TRUE, sep=",")
pUS.ts <- ts(data=data.df[c("p_us")], frequency=4, start=c(1973,1), end=c(2008,2))
pCA.ts <- ts(data=data.df[c("p_ca")], frequency=4, start=c(1973,1), end=c(2008,2))
exCA.ts <- ts(data=data.df[c("ex_ca")], frequency=4, start=c(1973,1), end=c(2008,2))
#a
plot(log(pUS.ts), col="blue", main="pUS", xlab="Year")
```

```
plot(log(pCA.ts), col="blue", main="pCA", xlab="Year")
plot(log(exCA.ts), col="blue", main="exCA", xlab="Year")
#b
adf.test(log(exCA.ts))
adf.test(log(pCA.ts),k=0)
adf.test(log(pUS.ts),k=1)
#c
y <- lm(log(exCA.ts) ~ log(pUS.ts) + log(pCA.ts))
y
#d
#e
res <- (log(exCA.ts) - fitted(y))
acf(res)
pacf(res)
```