R solution to hw2

October 24, 2018

The first figure
method 1:

```
> # set working directory
> rm(list = ls())
> setwd("C:/Users/mignayng/Desktop/TA/hw/hw2/sweave")
> data1 <- read.csv("CMTS_annual.csv")
> ## figure 1
> # filter data
> tsdata  <- data1[which(data1['yr_dates_data']>1997
+                        & data1['yr_dates_data']<2015),]
> attach(tsdata)
> X <- yr_dates_data
> Y <- (NominalHHC/ NominalGDP)*100
> Z <- (NominalBusGFCF/ NominalGDP)*100
> # Save original parameters of par
> opar <- par(no.readonly = T)
> par(mar = c(5,5,5,5)) # set the margin
> # plot the first curve
> plot(X,Y,type = 'l',axes = FALSE,
+      xlab = "", ylab = "C/Y(persent)", main = "",
+      xlim = c(1998, 2014), ylim = c(34,48), lwd=1)
> mtext('I/Y(persent)', side = 4, line = 2)
> # add axis
> axis(side = 1, at = c(seq(1998,2014,by=2)), lab = c(seq(1998,2014,by=2)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(34,48,by=2)), lab = c(seq(34,48,by=2)),
+      las = 2, cex.axis = 1, tck = 0.02)
> par(new=TRUE) # reserve the first image
> # plot the other curve
> plot(X,Z,type='c',axes=FALSE, lty = 4,
+      lwd = 2, xlab = "", ylab = "",
+      main = "", ylim = c(24,38))
> box()
> axis(side = 4, at = c(seq(24,38,by=2)), lab = c(seq(24,38,by=2)),
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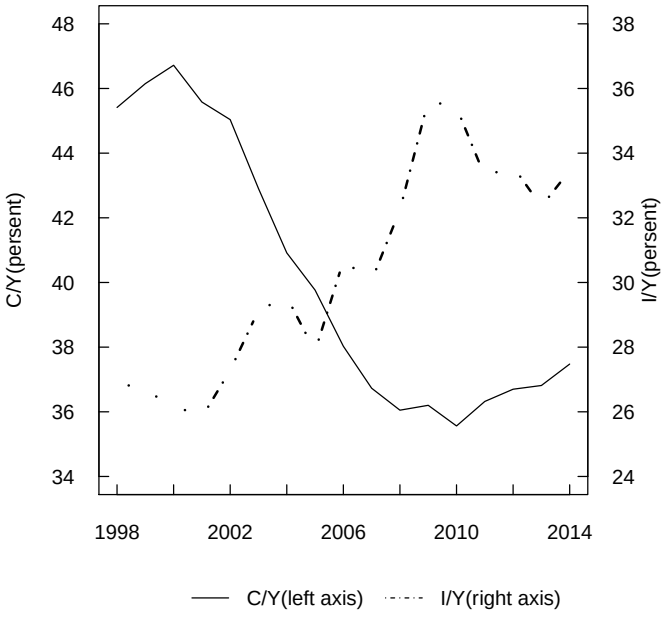
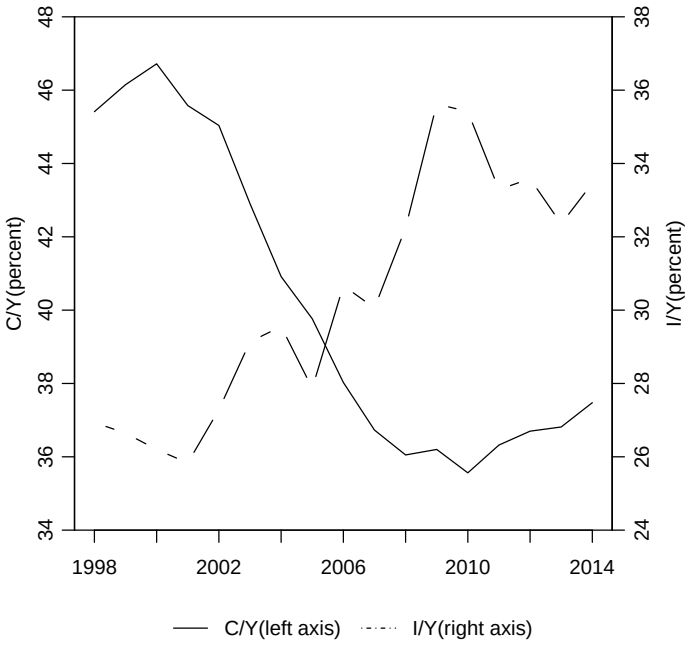
+      las = 2, cex.axis = 1, tck = 0.02)
> # add legend
> legend(x = 2000, y = 21, legend = c("C/Y(left axis)", 'I/Y(right axis)'),
+        lty = c(1, 4), xpd = TRUE,  horiz = TRUE, bty = "n")
> # detach data
> detach(tsdata)
> # method 2 - not recommended
> # install.packages("plotrix")
> library(plotrix)
> twoord.plot(X, Y , X, Z, ylab = 'C/Y(percent)', rylab = 'I/Y(percent)',
+             xlim = c(1998,2014),lylim = c(34,48), rylim = c(24,38),
+             rcol = 'black', type = c('l','c'),
+             xtickpos = c(seq(1998,2014,by=2)), xticklab = c(seq(1998,2014,by=2)))
> legend(x = 2000, y = 32, legend = c("C/Y(left axis)", 'I/Y(right axis)'),
+        lty = c(1, 4), xpd = TRUE,  horiz = TRUE, bty = "n")
```



method 2 - not recommended

```
> library(plotrix)
> twoord.plot(X, Y , X, Z, ylab = 'C/Y(percent)', rylab = 'I/Y(percent)',
+             xlim = c(1998,2014),lylim = c(34,48), rylim = c(24,38),
+             rcol = 'black', type = c('l','c'),
+             xtickpos = c(seq(1998,2014,by=2)), xticklab = c(seq(1998,2014,by=2)))
```

```
> legend(x = 2000, y = 32, legend = c("C/Y(left axis)", 'I/Y(right axis)'),
+        lty = c(1, 4), xpd = TRUE,  horiz = TRUE, bty = "n")
```



The second figure:

```
> ## figure 2
> par(opar) # initialize parameters
> par(mfrow = c(3,2))
> # filter data
> temp_data  <- data1[which(data1['yr_dates_data']>=1979
+                           & data1['yr_dates_data']<2013),]
> attach(temp_data)
> x <- yr_dates_data[-1]
> # sub-figure 1
> RealGDP <- NominalGDP/GDPDeflator
> RealGDPva <- NominalGDPva/GDPDeflator
> y11 <- (RealGDP[-1] / RealGDP[-length(RealGDP)] - 1) * 100
> y12 <- (RealGDPva[-1] / RealGDPva[-length(RealGDPva)] - 1) *100
> plot(x, y11, type = 'l', xlab = "", ylab = "Real GDP growth (%)",
+      xlim = c(1980, 2014), ylim = c(2, 16), axes = FALSE)
> par(new = TRUE)
> plot(x, y12, type = 'l', lty = 2, xlab = "", ylab = "",
+      xlim = c(1980, 2014), ylim = c(2, 16), axes = FALSE)
```

```
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(2,16,by=2)), lab = c(seq(2,16,by=2)),
+      las = 2, cex.axis = 1, tck = 0.02)
> # sub-figure 2
> y2 <- (GDPDeflator[-1] / GDPDeflator[-length(GDPDeflator)] -1) * 100
> plot(x, y2, type = 'l', xlab = "", ylab = "GDP deflator (%)",
+      xlim = c(1980, 2014), ylim = c(-5, 20), axes = FALSE)
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(-5,20,by=5)), lab = c(seq(-5,20,by=5)),
+      las = 2, cex.axis = 1, tck = 0.02)
> # sub-figure 3
> y31 <- (NominalHHC / NominalGDP) * 100
> y32 <- (NominalHHC / NominalGDPva) * 100
> plot(x, y31[-1], type = 'l', xlab = "", ylab = "Consumption (% of GDP)",
+      xlim = c(1980, 2014), ylim = c(30, 55), axes = FALSE)
> par(new = TRUE)
> plot(x, y32[-1], type = 'l', lty = 2, xlab = "", ylab = "",
+      xlim = c(1980, 2014), ylim = c(30, 55), axes = FALSE)
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(30,55,by=5)), lab = c(seq(30,55,by=5)),
+      las = 2, cex.axis = 1, tck = 0.02)
> # sub-figure 4
> y41 <- (NomalGFCF / NominalGDP) * 100
> y42 <- (NomalGFCF / NominalGDPva) * 100
> plot(x, y41[-1], type = 'l', xlab = "", ylab = "GFCF (% of GDP)",
+      xlim = c(1980, 2014), ylim = c(20, 50), axes = FALSE)
> par(new = TRUE)
> plot(x, y42[-1], type = 'l', lty = 2, xlab = "", ylab = "",
+      xlim = c(1980, 2014), ylim = c(20, 50), axes = FALSE)
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(20,50,by=5)), lab = c(seq(20,50,by=5)),
+      las = 2, cex.axis = 1, tck = 0.02)
> # sub-figure 5
> y51 <- (NominalRetailGoodsC / NominalGDP) * 100
> y52 <- (NominalRetailGoodsC / NominalGDPva) * 100
> plot(x, y51[-1], type = 'l', xlab = "", ylab = "RSCG (% of GDP)",
+      xlim = c(1980, 2014), ylim = c(30, 50), axes = FALSE)
> par(new = TRUE)
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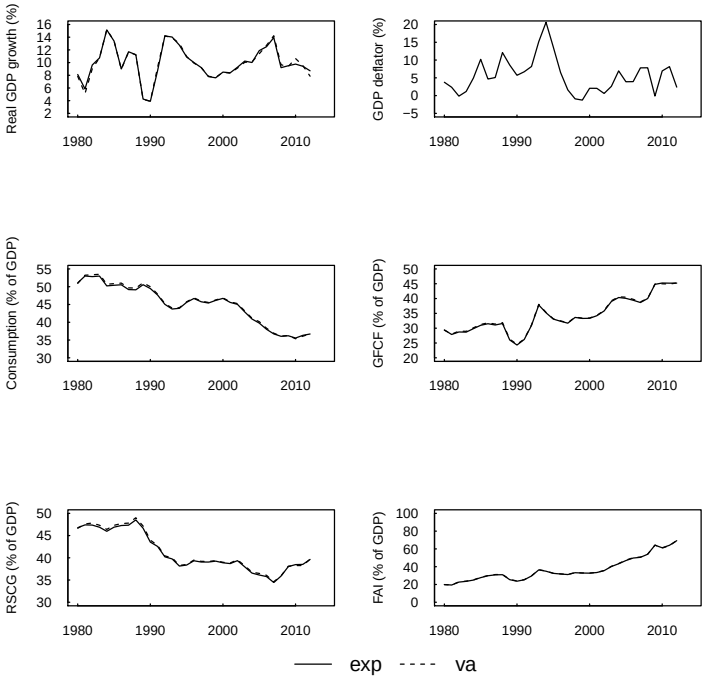
```
> plot(x, y52[-1], type = 'l', lty = 2, xlab = "", ylab = "",
+      xlim = c(1980, 2014), ylim = c(30, 50), axes = FALSE)
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(30,50,by=5)), lab = c(seq(30,50,by=5)),
+      las = 2, cex.axis = 1, tck = 0.02)
> # sub-figure 6
> y61 <- (NominalFAI / NominalGDP) * 100
> y62 <- (NominalFAI / NominalGDPva) * 100
> plot(x, y61[-1], type = 'l', xlab = "", ylab = "FAI (% of GDP)",
+      xlim = c(1980, 2014), ylim = c(0, 100), axes = FALSE)
> par(new = TRUE)
> plot(x, y62[-1], type = 'l', lty = 2, xlab = "", ylab = "",
+      xlim = c(1980, 2014), ylim = c(0, 100), axes = FALSE)
> box()
> axis(side = 1, at = c(seq(1980,2010,by=10)), lab = c(seq(1980,2010,by=10)),
+      cex.axis = 1, tck = 0.02)
> axis(side = 2, at = c(seq(0,100,by=20)), lab = c(seq(0,100,by=20)),
+      las = 2, cex.axis = 1, tck = 0.02)
> par(new = TRUE)
> # add legend
> par(opar)
> legend(x = 0.3, y = -0.15, legend = c("exp", 'va'),
+        lty = c(1, 2), xpd = TRUE,  horiz = TRUE, bty = "n")
> # detach data
> detach(temp_data)
```


Real GDP growth (%)
16
14
12
10
8
6
4
2
1980
1990
2000
2010
GDP deflator (%)
20
15
10
5
0
−5
Consumption (% of GDP)
55
50
45
40
35
30
GFCF (% of GDP)
50
45
40
35
30
25
20
RSCG (% of GDP)
FAI (% of GDP)
100
80
60
40
20
0
exp
va