Resultados

Descripcion de las variables

A continuacion se presenta datos descriptivos de las variables las cuales estaran sujertas a la constrastacion de hipotesis y son motivo de investigacion de este trabajo.

```
library(tidyverse)
```

```
## -- Attaching packages ---------------------------------------------------------------------- tidyvers
```

```
## v ggplot2 3.3.2     v purrr   0.3.4
## v tibble  3.0.1     v dplyr   1.0.0
## v tidyr   1.1.0     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## -- Conflicts ------------------------------------------------------------------------- tidyverse_con
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(here)
```

```
## here() starts at C:/Users/Jhon/Documents/Temp/zcon1
```

```
library(GGally)
```

```
## Warning: package 'GGally' was built under R version 4.0.2
```

```
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg   ggplot2
```

```
library(kableExtra)
```

```
## Warning: package 'kableExtra' was built under R version 4.0.2
```

```
##
## Attaching package: 'kableExtra'
```

```
## The following object is masked from 'package:dplyr':
##
##     group_rows
```

```
library(broom)

serie <- read_rds(here('rdatos' , 'desestacionalizado.rds'))
data <- read_rds(here('rdatos', '03est.rds')) %>%
  dplyr::select(-tcons)

data1 <- data %>% as_tibble() %>%
  mutate(comsumo = log(comsumo))

serie %>% as_tibble() %>%
  rename("PIB per capita" = 1, "Consumo per capita" = 2) %>%
  gather(variable, v1) %>%
  group_by(variable) %>%
  summarise(n = n(),
            Minimo = min(v1),
            Maximo = max(v1),
            Suma = sum(v1),
```

```
            Promedio = mean(v1),
            SD = sd(v1),
            Curtosis = e1071::kurtosis(v1)) %>% kable()
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

variable	n	Minimo	Maximo	Suma	Promedio	SD	Curtosis
Consumo per capita	120	9.812235	10.26690	1209.895	10.082461	0.1303928	-1.1790417
PIB per capita	120	9.290566	9.59707	1137.222	9.476849	0.0823945	-0.7674905

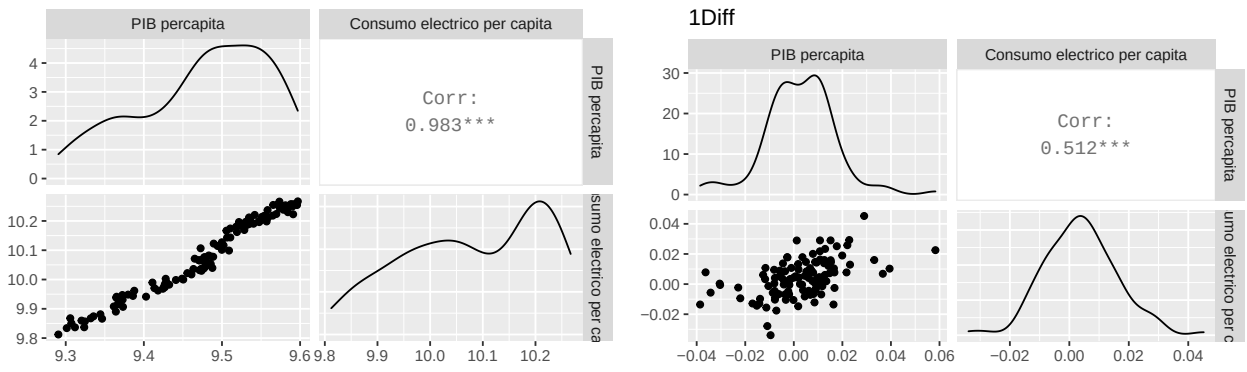
En la anterior tabla se mostro lo principales datos estadisticos descriptivos de las variables que se han usado para la constrastacion de las hipotesis, en estas variables se encuantra el consumo electrico percapita(Consumo), luego los indices de precios(ipc), y por ultimo la tasa de crecimiento del pib (tcpib),

Correlaciones

Niveles

```
serie %>% as_tibble() %>%
  rename("PIB percapita" = 1, 'Consumo electrico per capita' = 2) %>%
   ggpairs()

serie %>% diff %>%
  as_tibble() %>%
  rename("PIB percapita" = 1, 'Consumo electrico per capita' = 2) %>%
  ggpairs() + labs(title = '1Diff')
```



(a) Niveles

(b) Priera diferencias

Figure 1: Correlaciones

Raiz unitaria

```
read_rds(here('rdatos', 'raiz.rds')) %>%
  kable(caption = 'Augmented Dickey-Fuller - Prueba de raiz unitaria ')
```

VAR(p)

Escoger el orden p mediante los criterios mediante AIC

Table 1: Augmented Dickey–Fuller - Prueba de raiz unitaria

variable	t_estadistico	p_valor
PIB percapita - log	-2.269296	0.4647268
Consumo Percapita - log	-1.680836	0.7091292
PIB percapita - log	-7.521871	0.0100000
Consumo Percapita - log	-5.470550	0.0100000

```
library(magrittr)
```

```
##
## Attaching package: 'magrittr'
```

```
## The following object is masked from 'package:purrr':
##
##     set_names
```

```
## The following object is masked from 'package:tidyr':
##
##     extract
```

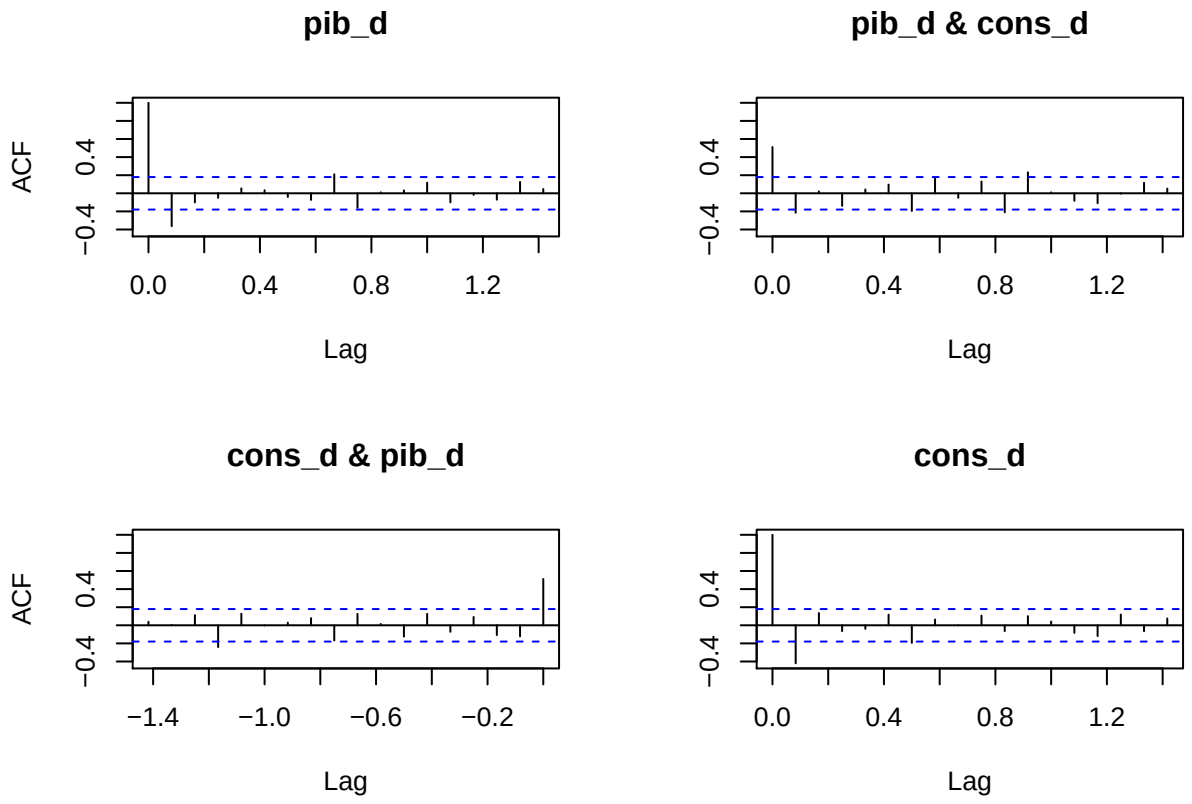
```
orden_p <- serie %>%  diff %>%  vars::VARselect(lag.max = 12)# %$% #%$% criteria  %>% glimpse()
tibble(criterio = c("AIC", "HQ", "SC", "FPE"),
  "Orden p" = c(3, 1 ,1 ,3)) %>% kable
```

criterio	Orden p
AIC	3
HQ	1
SC	1
FPE	3

Estimaciones

VAR

```
### Seleccion de retardos
acf(serie %>% diff)
```




```
m1 <- serie %>% diff %>% vars::VAR(., p = 1,  season = NULL)
m3 <- serie %>% diff %>% vars::VAR(., p = 3,  season = NULL)

stargazer::stargazer(m1$varresult$pib_d,
m1$varresult$cons_d,
m3$varresult$cons_d,
m3$varresult$pib_d)
```

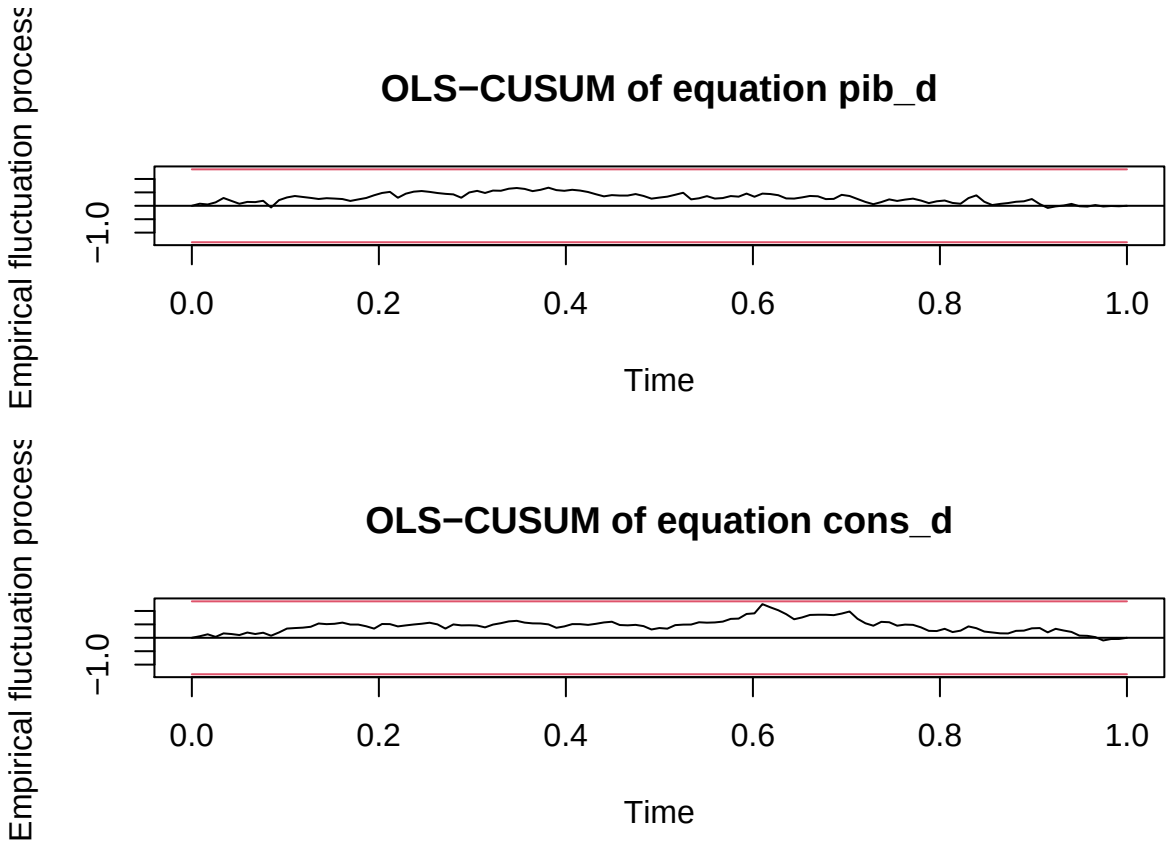
```
##
## % Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harva
## % Date and time: Thu, Jul 09, 2020 - 10:07:31 PM
## \begin{table}[!htbp] \centering
##   \caption{}
##   \label{}
## \begin{tabular}{@{\extracolsep{5pt}}lcccc}
## \\[-1.8ex]\hline
## \hline \\[-1.8ex]
##  & \multicolumn{4}{c}{\textit{Dependent variable:}} \\
## \cline{2-5}
## \\[-1.8ex] & \multicolumn{4}{c}{y} \\
## \\[-1.8ex] & (1) & (2) & (3) & (4)\\
## \hline \\[-1.8ex]
##  pib\_d.l1 & $-$0.344$^{***}$ & 0.105 & 0.046 & $-$0.530$^{***}$ \\
##   & (0.101) & (0.081) & (0.093) & (0.108) \\
##   & & & & \\
##  cons\_d.l1 & $-$0.047 & $-$0.485$^{***}$ & $-$0.466$^{***}$ & 0.014 \\
```

```
##   & (0.120) & (0.097) & (0.112) & (0.131) \\
##   & & & & \\
##  pib\_d.l2 &  &  & $-$0.132 & $-$0.417$^{***}$ \\
##   &  &  & (0.101) & (0.118) \\
##   & & & & \\
##  cons\_d.l2 &  &  & 0.006 & 0.077 \\
##   &  &  & (0.124) & (0.144) \\
##   & & & & \\
##  pib\_d.l3 &  &  & 0.009 & $-$0.200$^{*}$ \\
##   &  &  & (0.094) & (0.110) \\
##   & & & & \\
##  cons\_d.l3 &  &  & $-$0.042 & $-$0.108 \\
##   &  &  & (0.111) & (0.130) \\
##   & & & & \\
##  const & 0.004$^{***}$ & 0.005$^{***}$ & 0.006$^{***}$ & 0.005$^{***}$ \\
##   & (0.001) & (0.001) & (0.001) & (0.002) \\
##   & & & & \\
## \hline \\[-1.8ex]
## Observations & 118 & 118 & 116 & 116 \\
## R$^{2}$ & 0.134 & 0.192 & 0.215 & 0.258 \\
## Adjusted R$^{2}$ & 0.119 & 0.178 & 0.172 & 0.217 \\
## Residual Std. Error & 0.014 (df = 115) & 0.011 (df = 115) & 0.011 (df = 109) & 0.013 (df = 109) \\
## F Statistic & 8.900$^{***}$ (df = 2; 115) & 13.665$^{***}$ (df = 2; 115) & 4.989$^{***}$ (df = 6; 10
## \hline
## \hline \\[-1.8ex]
## \textit{Note:}  & \multicolumn{4}{r}{$^{*}$p$<$0.1; $^{**}$p$<$0.05; $^{***}$p$<$0.01} \\
## \end{tabular}
## \end{table}
```

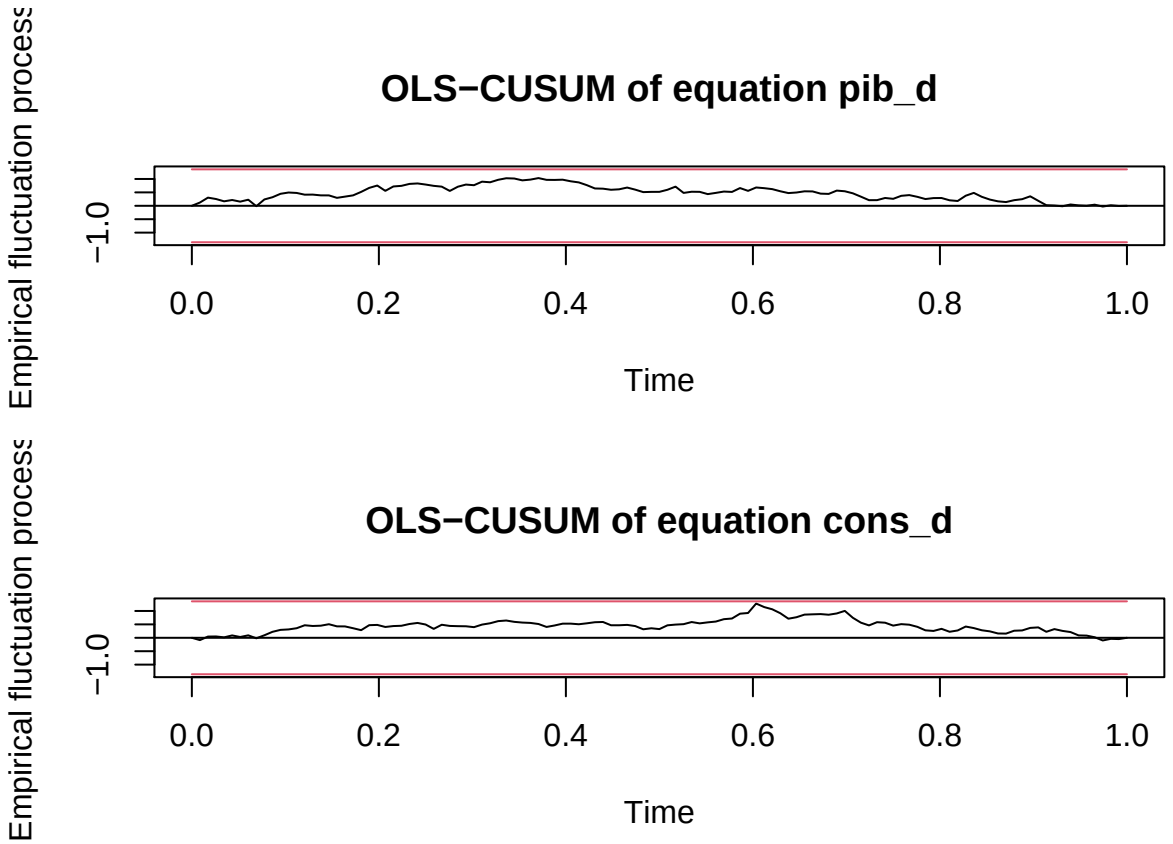
```
#vars::causality(m1, cause =  'pib_d')#, vcov. = vcovHC(m1))
#vars::causality(m1, cause =  'cons_d')
#vars::causality(m3, cause =  'pib_d')
#vars::causality(m3, cause =  'cons_d')
```

```
#vars::serial.test(m3, lags.pt = 12, type = 'PT.asymptotic')
#vars::arch.test(m1, lags.multi = 12, multivariate.only = T)
#vars::normality.test(m1, multivariate.only = T)

vars::stability(m1, type = 'OLS-CUSUM') %>% plot
```




```
vars::stability(m3, type = 'OLS-CUSUM') %>% plot
```



Granger

VAR(1)

```
vars::causality(m1, cause = 'pib_d')$Granger
```

```
##
##  Granger causality H0: pib_d do not Granger-cause cons_d
##
## data:  VAR object m1
## F-Test = 1.6685, df1 = 1, df2 = 230, p-value = 0.1978
```

Este resultado nos dice que no existe causalidad que va desde el crecimiento hacia el consumo electrico y precios

```
vars::causality(m1, cause = 'cons_d')$Granger
```

```
##
##  Granger causality H0: cons_d do not Granger-cause pib_d
##
## data:  VAR object m1
## F-Test = 0.1502, df1 = 1, df2 = 230, p-value = 0.6987
```

Este otro resultado menciona que hay relacion causal que va desde el consumo electrico haci el crecimiento economico y los precios.

VAR(3)

```
vars::causality(m3, cause = 'pib_d')$Granger
```

```
##
##  Granger causality H0: pib_d do not Granger-cause cons_d
##
## data:  VAR object m3
## F-Test = 1.2475, df1 = 3, df2 = 218, p-value = 0.2934
```

```
vars::causality(m3, cause = 'cons_d')$Granger
```

```
##
##  Granger causality H0: cons_d do not Granger-cause pib_d
##
## data:  VAR object m3
## F-Test = 0.60483, df1 = 3, df2 = 218, p-value = 0.6125
```

Causalidad inmediata

VAR(1)

```
vars::causality(m1, cause = 'pib_d')$Instant
```

```
##
##  H0: No instantaneous causality between: pib_d and cons_d
##
## data:  VAR object m1
## Chi-squared = 26.544, df = 1, p-value = 2.576e-07
```

```
vars::causality(m1, cause = 'cons_d')$Instant
```

```
##
##  H0: No instantaneous causality between: cons_d and pib_d
##
## data:  VAR object m1
## Chi-squared = 26.544, df = 1, p-value = 2.576e-07
```

VAR(3)

```
vars::causality(m3, cause = 'pib_d')$Instant
```

```
##
##  H0: No instantaneous causality between: pib_d and cons_d
##
## data:  VAR object m3
## Chi-squared = 26.017, df = 1, p-value = 3.383e-07
```

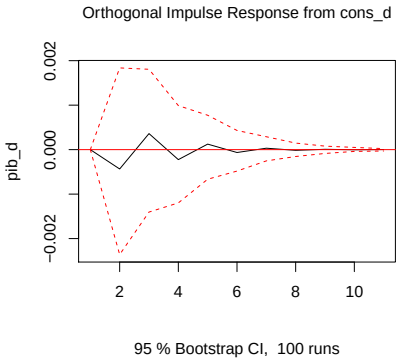
```
vars::causality(m3, cause = 'cons_d')$Instant
```

```
##
##  H0: No instantaneous causality between: cons_d and pib_d
##
## data:  VAR object m3
## Chi-squared = 26.017, df = 1, p-value = 3.383e-07
```

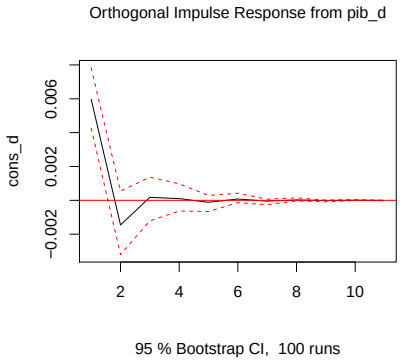
Impulso respuesta

VAR(1)

```
vars::irf(m1, impulse = 'cons_d', response = 'pib_d', n.ahead = 10, boot =T) %>% plot
vars::irf(m1, impulse = 'pib_d', response = 'cons_d', n.ahead = 10, boot =T) %>% plot
```



(a) Producto percapita

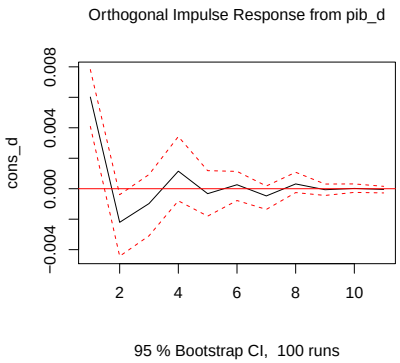


(b) Consumo percapita

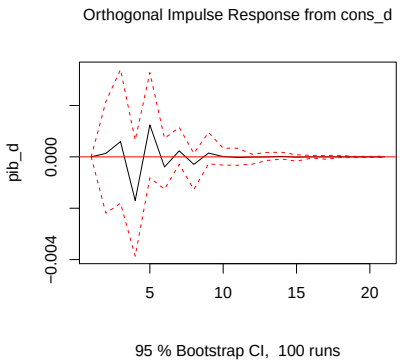
Figure 2: Impulso respuesta VAR(1)

VAR(3)

```
vars::irf(m3, impulse = 'pib_d', response = 'cons_d', n.ahead = 10, boot =T) %>% plot
vars::irf(m3, impulse = 'cons_d', response = 'pib_d', n.ahead = 20, boot =T) %>% plot
```



(a) Producto percapita



(b) Consumo percapita

Figure 3: Impulso respuesta VAR(3)