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.

```r
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------------------------
## 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 -----------------------------------------------------------------
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```r
library(here)
```

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

```r
library(GGally)
```

```
## Warning: package 'GGally' was built under R version 4.0.2
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg   ggplot2
```

```r
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
```

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




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

data1 %>%
  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
comsumo	119	7.513218	7.964470	926.03315	7.7817912	0.1288087	-1.1883429
ipc	119	96.467552	124.178442	12875.26826	108.1955316	8.8124587	-1.5914846
tcpbi	119	-3.653397	3.777405	31.16539	0.2618941	1.2951486	0.5309812

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),
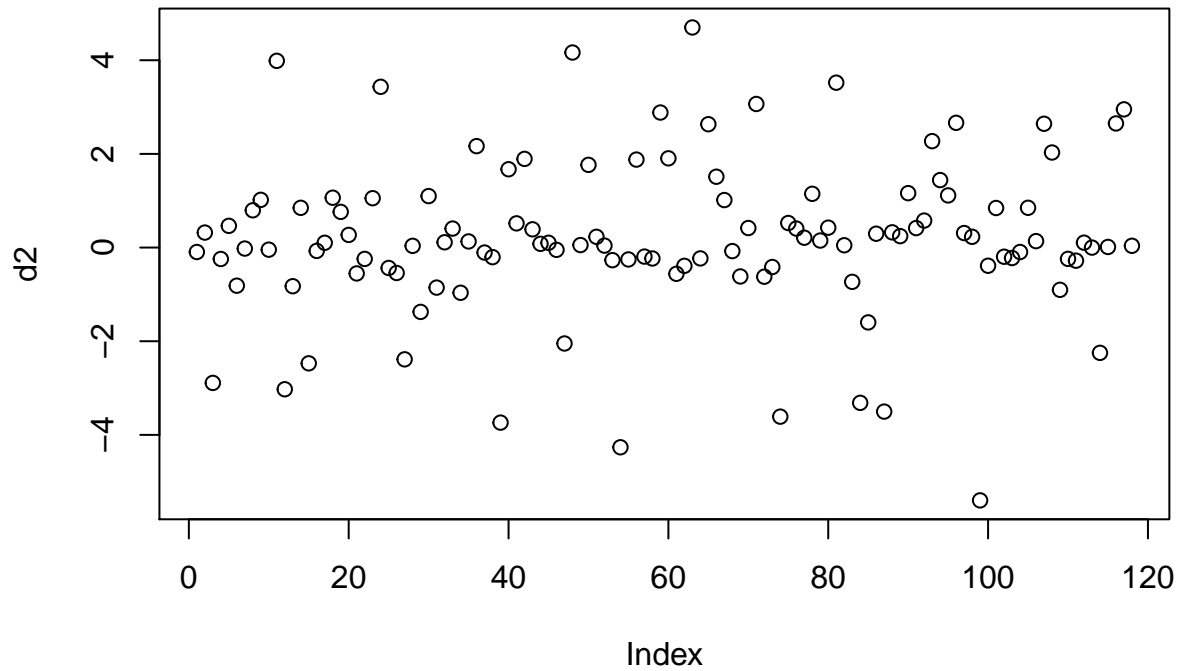
Correlaciones

```
data %>% as_tibble() %>%
  ggpairs()
```
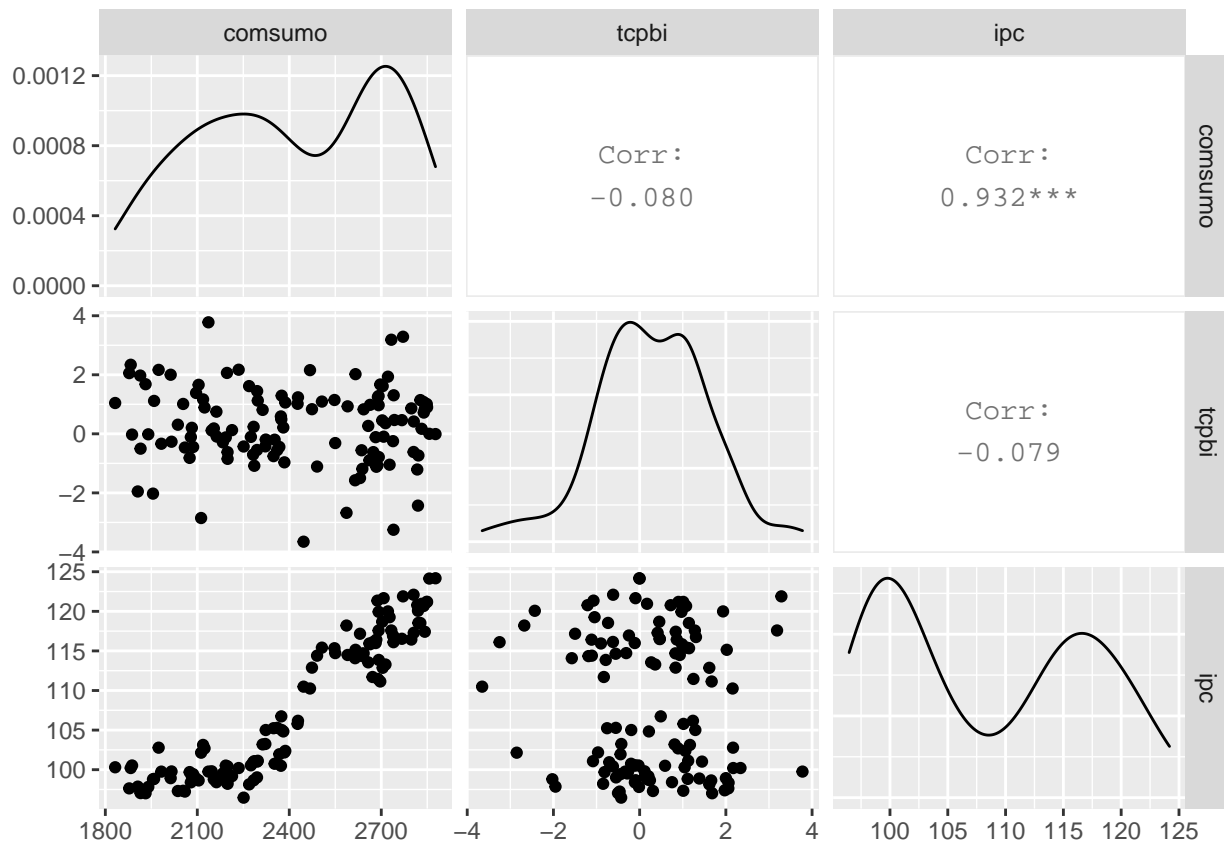


```
library(urca)
library(tseries)
```

Registered S3 method overwritten by 'quantmod':
method from
as.zoo.data.frame zoo

```
d <- diff(data$comsumo)
d2 <- diff(data$ipc)
plot(d2)
```



```
df1 <- adf.test(d, k = 0)
```

Warning in adf.test(d, k = 0): p-value smaller than printed p-value

```
df2 <- adf.test(data1$tcpbi, k = 1)
```

Warning in adf.test(data1$tcpbi, k = 1): p-value smaller than printed p-value

```
df3 <- adf.test(d2, k = 1)
```

Warning in adf.test(d2, k = 1): p-value smaller than printed p-value

```
tibble(
  lags = c(0,1, 1),
  raiz = c(df1$statistic, df2$statistic, df3$statistic)
  #p-value = c(df1$p.value[1], df2$p.value[1], df3$p.value[1])
  ) %>% kable()
```

lags	raiz
0	-15.956313
1	-11.676032
1	-7.393402

Estimaciones

Minimos cuadrados ordinarios

```
data %>% names
```

[1] "comsumo" "tcpbi" "ipc"

```
m1 <- lm(tcpbi ~ comsumo + ipc, data = data)

m1 %>% stargazer::stargazer()
```

% Table created by stargazer v.5.2.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvard.edu
% Date and time: Thu, Jul 02, 2020 - 9:22:10 PM

<div align="center">

Table 1:

	Dependent variable:
	tcpbi
comsumo	−0.0002
	(0.001)
ipc	−0.005
	(0.037)
Constant	1.294
	(1.876)
Observations	119
R^2	0.006
Adjusted R^2	−0.011
Residual Std. Error	1.302 (df = 116)
F Statistic	0.378 (df = 2; 116)
Note:	*p<0.1; **p<0.05; ***p<0.01

</div>

VAR

```
library(vars)
```

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

## Loading required package: MASS

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##     select

## Loading required package: strucchange

## Warning: package 'strucchange' was built under R version 4.0.2

## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

## Loading required package: sandwich

## Warning: package 'sandwich' was built under R version 4.0.2

##
## Attaching package: 'strucchange'

## The following object is masked from 'package:stringr':
##
##     boundary

## Loading required package: lmtest
```

```r
m1 <- VAR(data, p = 2, type = 'const', season = NULL)

#stargazer::stargazer(m1$varresult$comsumo, m1$varresult$ipc, m1$varresult$tcpbi)

m1 %>% summary()
```

```
##
## VAR Estimation Results:
## =========================
## Endogenous variables: comsumo, tcpbi, ipc
## Deterministic variables: const
## Sample size: 117
## Log Likelihood: -917.461
## Roots of the characteristic polynomial:
## 0.9946 0.8124 0.5214 0.5214 0.3874 0.1219
## Call:
## VAR(y = data, p = 2, type = "const")
##
##
## Estimation results for equation comsumo:
## =========================================
## comsumo = comsumo.l1 + tcpbi.l1 + ipc.l1 + comsumo.l2 + tcpbi.l2 + ipc.l2 + const
##
##             Estimate Std. Error t value Pr(>|t|)
## comsumo.l1    0.6080     0.1042   5.833 5.56e-08 ***
## tcpbi.l1     -1.6036     2.2470  -0.714 0.476957
## ipc.l1        3.8965     1.4543   2.679 0.008510 **
## comsumo.l2    0.3482     0.1024   3.401 0.000936 ***
## tcpbi.l2     -1.0488     1.9053  -0.550 0.583120
## ipc.l2       -2.6886     1.4630  -1.838 0.068799 .
## const       -13.0341    37.8234  -0.345 0.731050
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## Residual standard error: 24.88 on 110 degrees of freedom
## Multiple R-Squared: 0.9934,  Adjusted R-squared: 0.993
## F-statistic:  2757 on 6 and 110 DF,  p-value: < 2.2e-16
```

Table 2:

	(1)	(2)	(3)
		Dependent variable:	
		y	
comsumo.l1	0.608***	0.007	−0.001
	(0.104)	(0.007)	(0.005)
tcpbi.l1	−1.604	−0.118	−0.447***
	(2.247)	(0.149)	(0.106)
ipc.l1	3.896***	0.940***	0.058
	(1.454)	(0.097)	(0.069)
comsumo.l2	0.348***	−0.003	−0.002
	(0.102)	(0.007)	(0.005)
tcpbi.l2	−1.049	−0.060	−0.272***
	(1.905)	(0.126)	(0.090)
ipc.l2	−2.689*	−0.091	0.001
	(1.463)	(0.097)	(0.069)
const	−13.034	6.064**	−0.460
	(37.823)	(2.510)	(1.784)
Observations	117	117	117
R^2	0.993	0.967	0.215
Adjusted R^2	0.993	0.965	0.172
Residual Std. Error (df = 110)	24.882	1.651	1.173
F Statistic (df = 6; 110)	2,756.900***	533.881***	5.024***

Note: *p<0.1; **p<0.05; ***p<0.01

```
##
##
## Estimation results for equation tcpbi:
## =======================================
## tcpbi = comsumo.l1 + tcpbi.l1 + ipc.l1 + comsumo.l2 + tcpbi.l2 + ipc.l2 + const
##
##               Estimate Std. Error t value Pr(>|t|)
## comsumo.l1 -0.0006295  0.0049158  -0.128  0.89833
## tcpbi.l1   -0.4465067  0.1059606  -4.214 5.16e-05 ***
## ipc.l1      0.0578200  0.0685770   0.843  0.40098
## comsumo.l2 -0.0016418  0.0048268  -0.340  0.73441
## tcpbi.l2   -0.2722748  0.0898460  -3.030  0.00304 **
## ipc.l2      0.0010089  0.0689873   0.015  0.98836
## const      -0.4601756  1.7835853  -0.258  0.79688
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## Residual standard error: 1.173 on 110 degrees of freedom
## Multiple R-Squared: 0.2151,  Adjusted R-squared: 0.1723
## F-statistic: 5.024 on 6 and 110 DF,  p-value: 0.000138
##
##
## Estimation results for equation ipc:
## =======================================
## ipc = comsumo.l1 + tcpbi.l1 + ipc.l1 + comsumo.l2 + tcpbi.l2 + ipc.l2 + const
##
##             Estimate Std. Error t value Pr(>|t|)
## comsumo.l1  0.006846   0.006919   0.989   0.3246
## tcpbi.l1   -0.118364   0.149131  -0.794   0.4291
## ipc.l1      0.939912   0.096517   9.738   <2e-16 ***
## comsumo.l2 -0.002514   0.006793  -0.370   0.7121
## tcpbi.l2   -0.059687   0.126451  -0.472   0.6378
## ipc.l2     -0.090878   0.097094  -0.936   0.3513
## const       6.063574   2.510260   2.416   0.0174 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##
## Residual standard error: 1.651 on 110 degrees of freedom
## Multiple R-Squared: 0.9668,  Adjusted R-squared: 0.965
## F-statistic: 533.9 on 6 and 110 DF,  p-value: < 2.2e-16
##
##
##
## Covariance matrix of residuals:
##         comsumo   tcpbi     ipc
## comsumo 619.127 15.5900  3.6363
## tcpbi    15.590  1.3767 -0.2797
## ipc       3.636 -0.2797  2.7271
##
## Correlation matrix of residuals:
##         comsumo   tcpbi     ipc
## comsumo  1.0000  0.5340  0.0885
```

```
## tcpbi    0.5340  1.0000 -0.1444
## ipc      0.0885 -0.1444  1.0000
```

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

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


OLS–CUSUM of equation comsumo

OLS–CUSUM of equation tcpbi

OLS–CUSUM of equation ipc
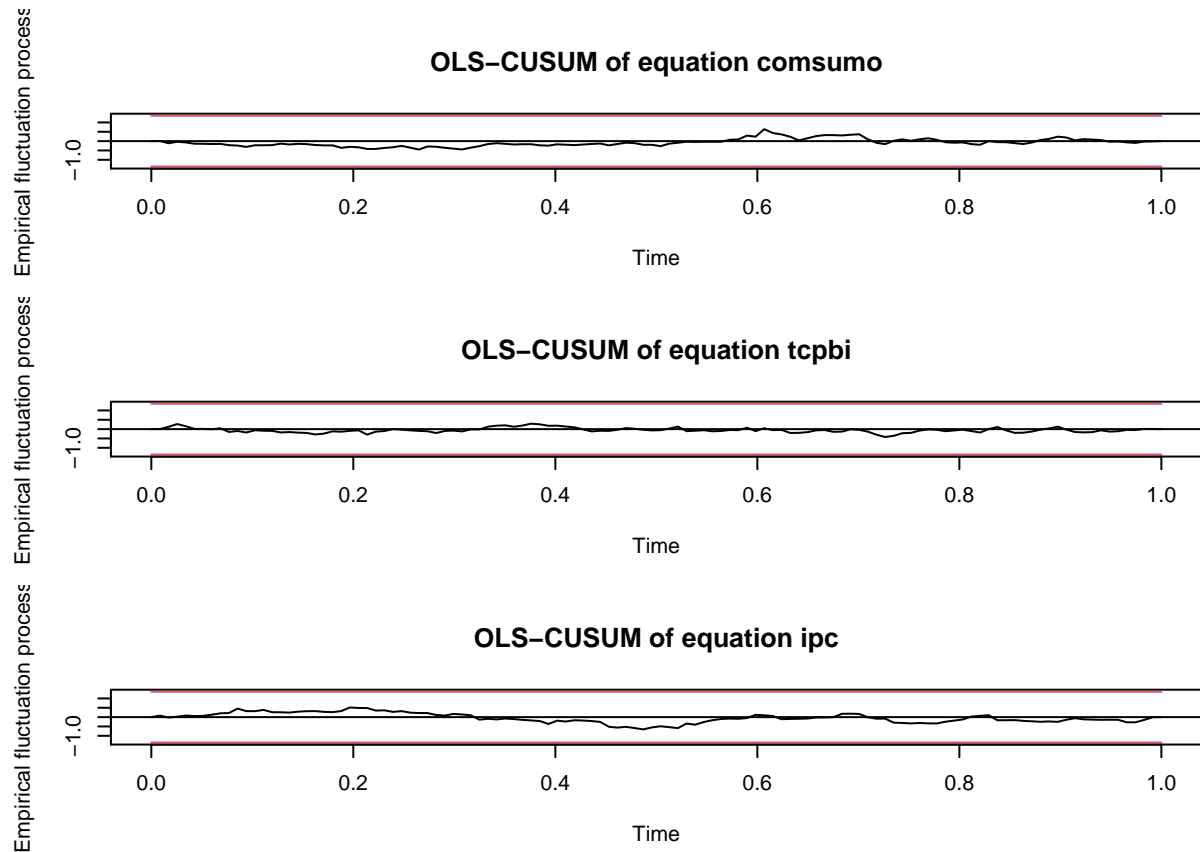
Granger

```
causality(m1, cause = 'tcpbi')$Granger
```

```
##
##  Granger causality H0: tcpbi do not Granger-cause comsumo ipc
##
## data:  VAR object m1
## F-Test = 0.31558, df1 = 4, df2 = 330, p-value = 0.8675
```

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

```
causality(m1, cause = 'comsumo')$Granger
```

```
##
##  Granger causality H0: comsumo do not Granger-cause tcpbi ipc
##
## data:  VAR object m1
```
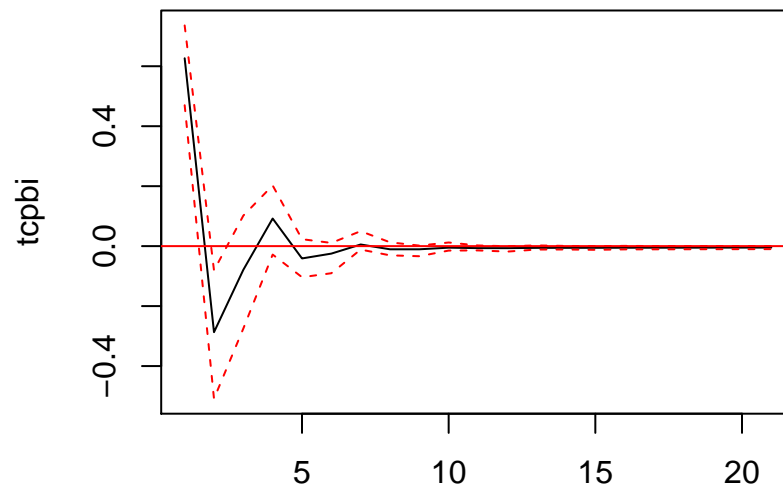
```
## F-Test = 2.9975, df1 = 4, df2 = 330, p-value = 0.0188
```

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

```
irf(m1, impulse = 'comsumo', response = 'tcpbi', n.ahead = 20, boot =T) %>% plot
```

Orthogonal Impulse Response from comsumo

95 % Bootstrap CI, 100 runs

-->