

# Analyse de données de Panel

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## clear data & close graphs

```
rm(list=ls())  
graphics.off()
```

## Définition du répertoire de travail

```
setwd("~/Cours M2 MAS/Econometrie_Panel/Projet")
```

## les packages

```
library(magrittr)  
library(RColorBrewer)  
library(hrbrthemes)
```

NOTE: Either Arial Narrow or Roboto Condensed fonts are required to use these themes.

Please use `hrbrthemes::import_roboto_condensed()` to install Roboto Condensed and

if Arial Narrow is not on your system, please see <https://bit.ly/arialnarrow>

```
library(rgdal)
```

Le chargement a nécessité le package : sp

Please note that `rgdal` will be retired by the end of 2023,  
plan transition to `sf/stars/terra` functions using `GDAL` and `PROJ`  
at your earliest convenience.

```
rgdal: version: 1.5-32, (SVN revision 1176)  
Geospatial Data Abstraction Library extensions to R successfully loaded  
Loaded GDAL runtime: GDAL 3.4.3, released 2022/04/22  
Path to GDAL shared files: C:/Users/Paqua/AppData/Local/R/win-library/4.2/rgdal/gdal  
GDAL binary built with GEOS: TRUE  
Loaded PROJ runtime: Rel. 7.2.1, January 1st, 2021, [PJ_VERSION: 721]  
Path to PROJ shared files: C:/Users/Paqua/AppData/Local/R/win-library/4.2/rgdal/proj  
PROJ CDN enabled: FALSE  
Linking to sp version:1.5-0  
To mute warnings of possible GDAL/OSR exportToProj4() degradation,  
use options("rgdal_show_exportToProj4_warnings"="none") before loading sp or rgdal.
```

```
library(dplyr)
```

Attachement du package : 'dplyr'

Les objets suivants sont masqués depuis 'package:stats':

```
filter, lag
```

Les objets suivants sont masqués depuis 'package:base':

```
intersect, setdiff, setequal, union
```

```
library(plm)
```

Attachement du package : 'plm'

Les objets suivants sont masqués depuis 'package:dplyr':

```
between, lag, lead
```

```
library(ggplot2)
```

```
library(corrplot)
```

corrplot 0.92 loaded

## Importation des données

```
data <- readxl::read_excel("df.xlsx")
```

## Statistique descriptive

### Visulation avec des boxplots

```
gplots::plotmeans(taux_chomage ~ label, main="Evolution du taux de chômage par  
département ", data=data)
```

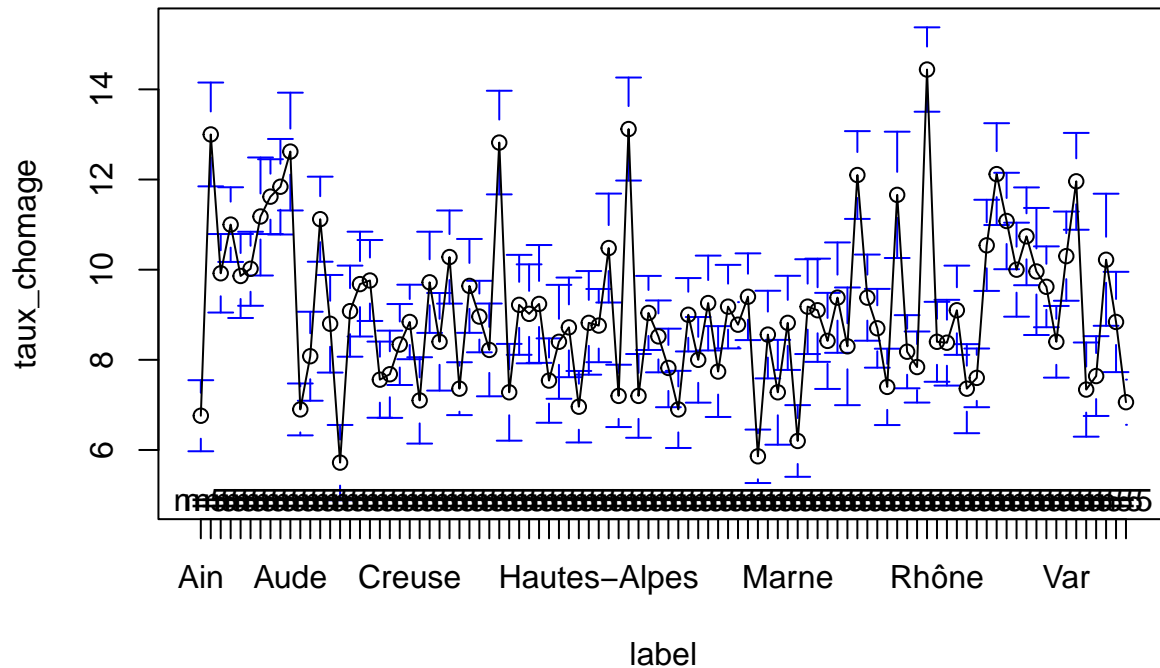
Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, :  
zero-length arrow is of indeterminate angle and so skipped

Warning in arrows(x, li, x, pmax(y - gap, li), col = barcol, lwd = lwd, :  
zero-length arrow is of indeterminate angle and so skipped

Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, :  
zero-length arrow is of indeterminate angle and so skipped

Warning in arrows(x, ui, x, pmin(y + gap, ui), col = barcol, lwd = lwd, :  
zero-length arrow is of indeterminate angle and so skipped

## Evolution du taux de chômage par département



Carte par département de la variable taux de chômage, de la part de la population au RSA et du taux de natalité

```
france <- raster::getData("GADM", country = "FRA", level = 2)
```

Warning in raster::getData("GADM", country = "FRA", level = 2): getData will be removed in a future version. Please use the geodata package instead

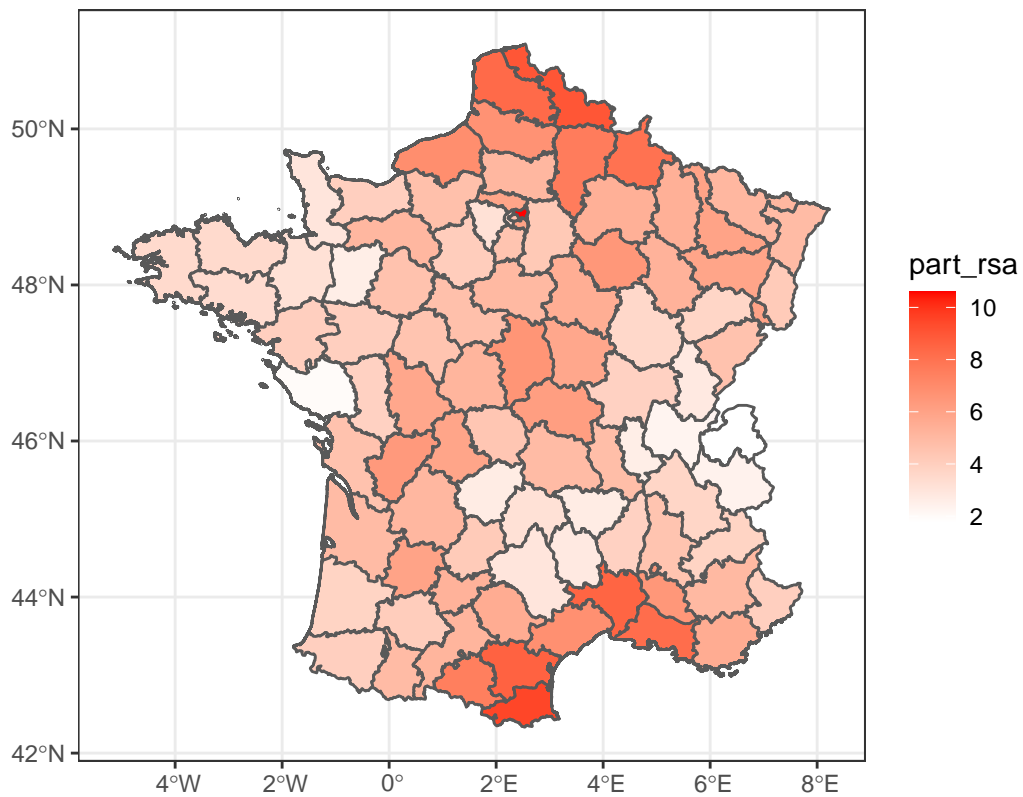
```
france <- sf::st_as_sf(france)
```

```
df_2019 <- data %>% filter(annee == 2019)
```

```
france <- inner_join(france, df_2019, by = c("NAME_2" = "label"))
```

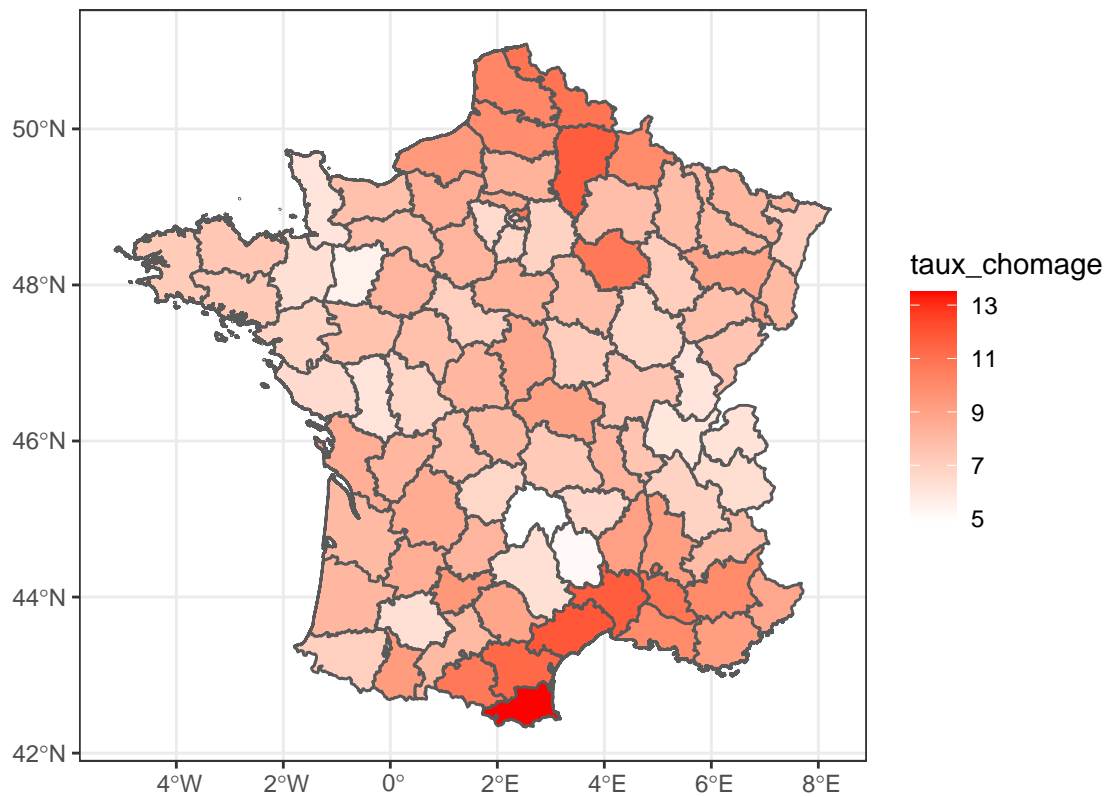
```
ggplot() +
  geom_sf(data = france, aes(fill = part_rsa)) +
  scale_fill_gradient(low = "white", high = "red") +
  ggtitle("Proportion de la population au RSA par département en France") +
  theme_bw()
```

## Proportion de la population au RSA par département en France



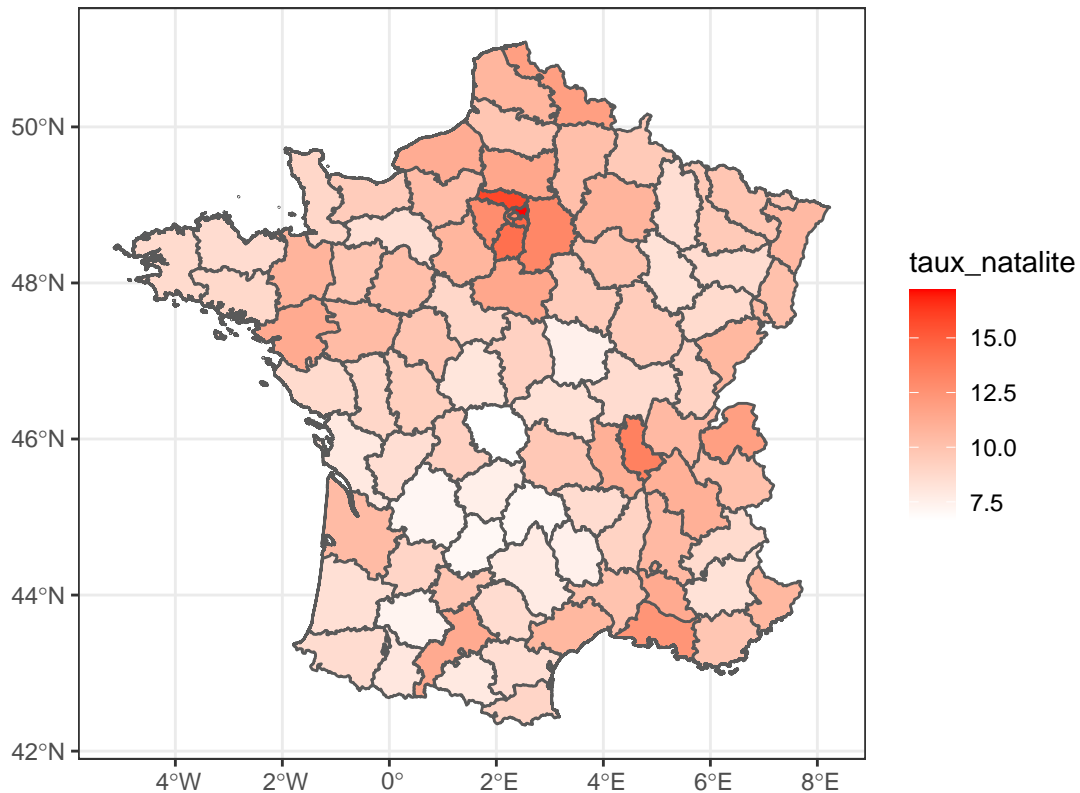
```
ggplot() +  
  geom_sf(data = france, aes(fill = taux_chomage)) +  
  scale_fill_gradient(low = "white", high = "red") +  
  ggtitle("Taux de chômage par département en France") +  
  theme_bw()
```

## Taux de chômage par département en France



```
ggplot() +  
  geom_sf(data = france, aes(fill = taux_chomage)) +  
  scale_fill_gradient(low = "white", high = "red") +  
  ggtitle("Taux de chômage par département en France") +  
  theme_bw()
```

## Taux de natalité par département en France



Transformation de la base, en base de données de Panel

```
data_p <- pdata.frame(data, index = c("id", "annee"), drop.index = TRUE, row.names = TRUE)
```

*#Données sur le nombre d'individu et la période*

```
pdim(data_p, 25)
```

Balanced Panel: n = 94, T = 5, N = 470

*# En tête de la base de données*

```
head(data_p)
```

	label	densite	taux_natalite	taux_mortalite	taux_chomage	part_rsa
1-2015	Ain	110.23100	11.0	7.6	7.4	4.1
1-2016	Ain	111.22666	11.1	7.5	7.4	2.4
1-2017	Ain	112.02569	10.8	7.8	6.7	2.4
1-2018	Ain	112.85092	10.9	7.7	6.3	2.3
1-2019	Ain	113.74245	10.5	7.6	6.0	2.3
2-2015	Aisne	72.92672	11.7	10.7	14.0	10.9

## decomposition de la variance

### Taux de chômage

```
vartot_chomage=sum((data_p$taux_chomage-mean(data_p$taux_chomage))^2)
cat("variabilité totale est :", vartot_chomage, "\n")
```

variabilité totale est : 1617.399

```
var_withinChomage = sum(Within(data_p$taux_chomage)^2)
#cat("variabilité Intra est : ", var_withinChomage)
cat("La part de la variance intra dans la variance totale est : ",
    var_withinChomage/vartot_chomage*100, "%", "\n")
```

La part de la variance intra dans la variance totale est : 14.92619 %

```
var_betweenChomage = sum((Between(data_p$taux_chomage)-mean(data_p$taux_chomage))^2)
#cat("variabilité Inter est : ", var_betweenChomage)
cat("La part de la variance inter dans la variance totale est : ",
    var_betweenChomage/vartot_chomage*100, "%", "\n")
```

La part de la variance inter dans la variance totale est : 85.07381 %

## Part RSA

```
vartot_partRSA = sum((data_p$part_rsa-mean(data_p$part_rsa))^2)
cat("variabilité totale est : ", vartot_partRSA, "\n")
```

variabilité totale est : 2035.946

```
var_withinRSA = sum(Within(data_p$part_rsa)^2)
cat("La part de la variance intra dans la variance totale est : ",
    var_withinRSA/vartot_partRSA*100, "%", "\n")
```

La part de la variance intra dans la variance totale est : 23.9747 %

```
var_betweenRSA = sum((Between(data_p$part_rsa)-mean(data_p$part_rsa))^2)
cat("La part de la variance inter dans la variance totale est : ",
    var_betweenRSA/vartot_partRSA*100, "%", "\n")
```

La part de la variance inter dans la variance totale est : 76.0253 %

## Taux natalité

```
vartot_natalite = sum((data_p$taux_natalite-mean(data_p$taux_natalite))^2)
cat("variabilité totale est : ", vartot_natalite, "\n")
```

variabilité totale est : 1766.326

```
var_withinNatalite = sum(Within(data_p$taux_natalite)^2)
cat("La part de la variance intra dans la variance totale est : ",
    var_withinNatalite/vartot_natalite*100, "%", "\n")
```

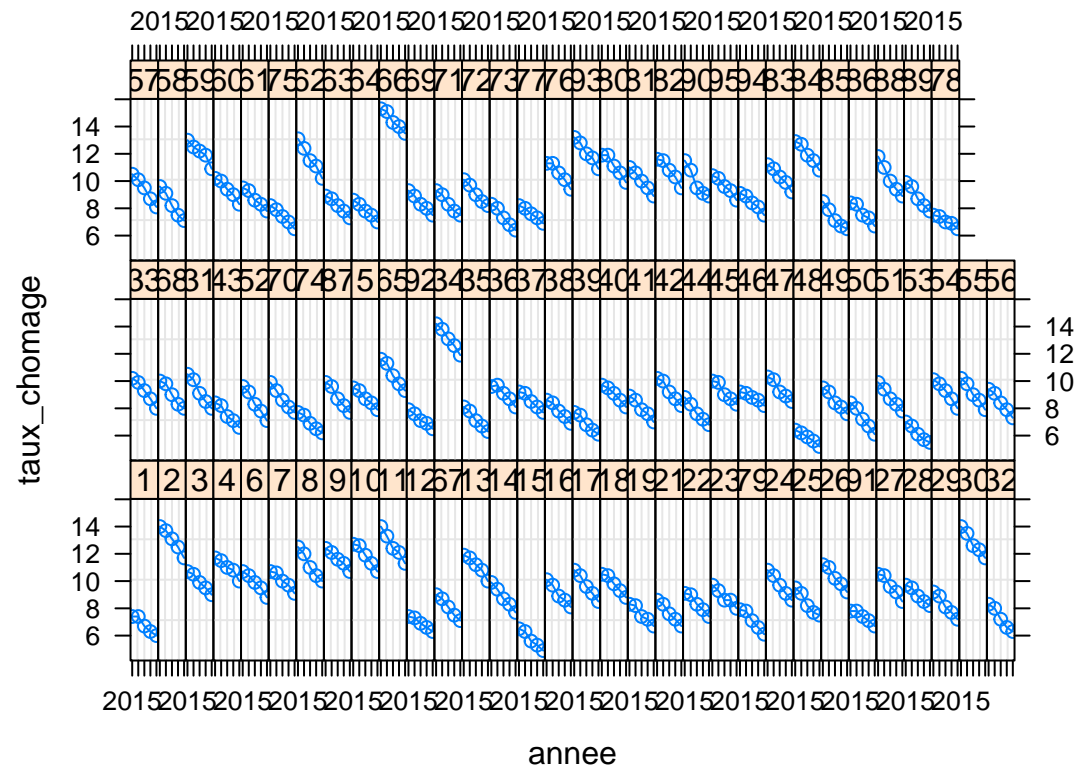
La part de la variance intra dans la variance totale est : 3.308563 %

```
var_betweenNatalite = sum((Between(data_p$taux_natalite)-mean(data_p$taux_natalite))^2)
cat("La part de la variance inter dans la variance totale est : ",
    var_betweenNatalite/vartot_natalite*100, "%", "\n")
```

La part de la variance inter dans la variance totale est : 96.69144 %

## Visulation des évolutions

```
data_id_chom <- nlme::groupedData(taux_chomage ~ annee|id, data,
                                outer = ~ label)
plot(data_id_chom)
```



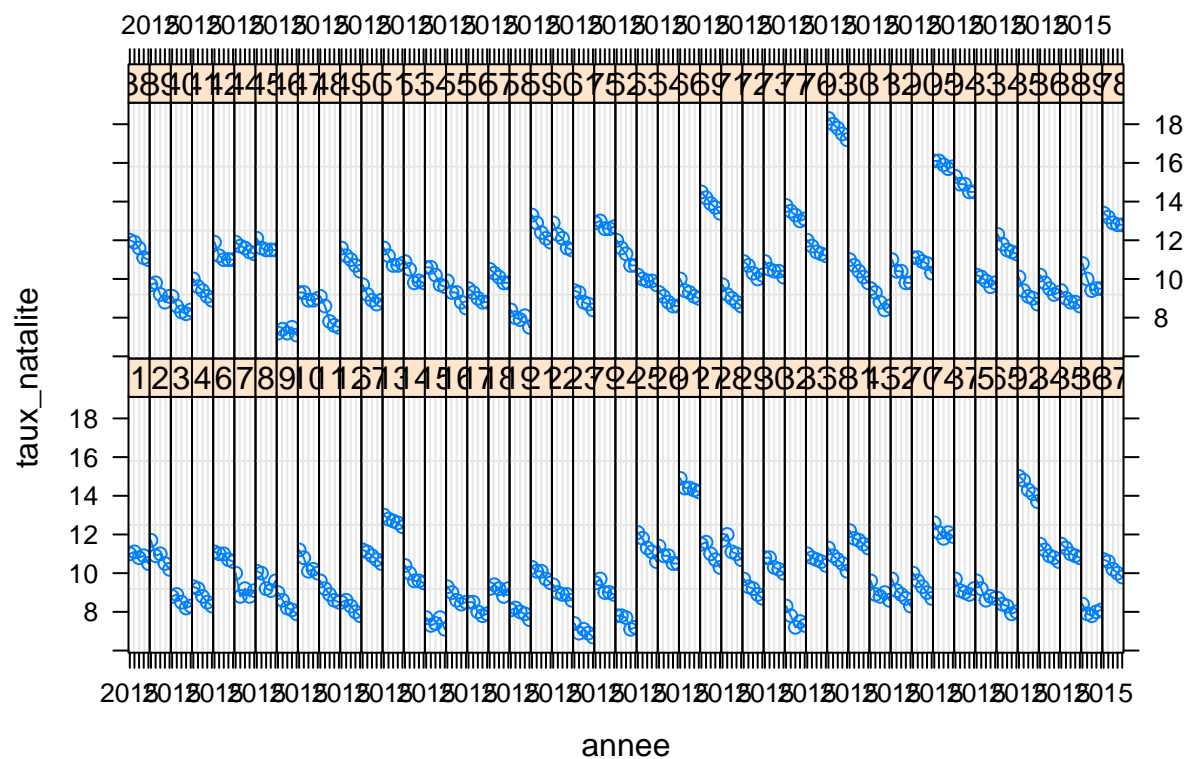
Taux de chomage

```
rm(data_id_chom)
```

```
data_id_partRSA <- nlme::groupedData(part_rsa ~ annee|id, data, outer = ~ label)
plot(data_id_partRSA)
```





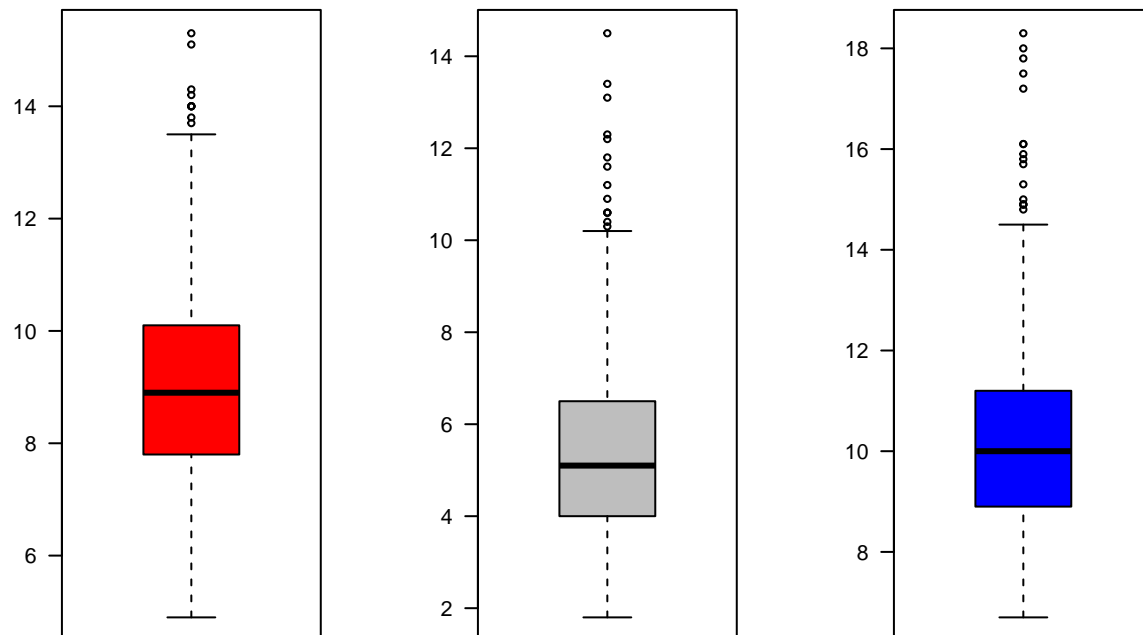


taux de natalité

```
rm(data_id_Natalite)
```

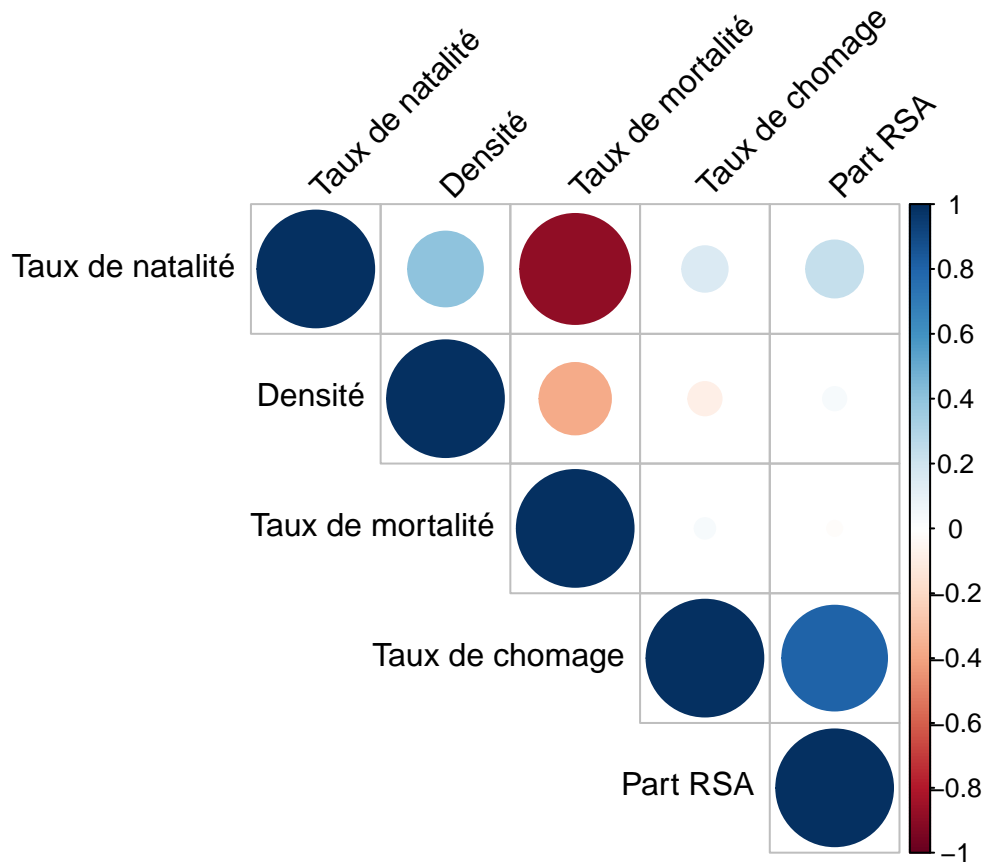
## Boxplots

```
par(mfrow=c(1,3))
boxplot(data_p$taux_chomage, las = 1, names = c("Taux de chômage"), col = c("red"))
boxplot(data_p$part_rsa, las = 1, names = c("Part au RSA"), col = c("gray"))
boxplot(data_p$taux_natalite, las = 1, names = c("Taux de natalité"), col = c("blue"))
```



## Statistique bivariée

```
matrixcorr<- cbind(data$taux_chomage, data$part_rsa, data$taux_natalite,
                    data$taux_mortalite, data$densite)
colnames(matrixcorr) <-c("Taux de chomage","Part RSA","Taux de natalité",
                        "Taux de mortalité", "Densité")
#matrixcorr
mcor<-cor(matrixcorr)
corrplot(mcor, type="upper", order="hclust", tl.col="black", tl.srt=45)
```



## Estimation des modèles

```
formule <- taux_chomage ~ part_rsa + taux_natalite + taux_mortalite + densite
```

Interprétation en terme d'augmentation de 1 point de pourcentage

## Modèle de pooled

```
reg_pooled = plm(formule , model="pooling", data=data_p)
summary(reg_pooled)
```

Pooling Model

Call:

```
plm(formula = formule, data = data_p, model = "pooling")
```

Balanced Panel: n = 94, T = 5, N = 470

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-2.697367	-0.735574	-0.062649	0.653238	3.544526

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
(Intercept)	4.5122e+00	1.1363e+00	3.9710	8.29e-05 ***

```

part_rsa      7.1321e-01  2.7533e-02 25.9041 < 2.2e-16 ***
taux_natalite 4.1464e-02  6.5121e-02  0.6367 0.5246210
taux_mortalite 3.3268e-02  5.5157e-02  0.6032 0.5466961
densite       -8.7433e-05  2.2386e-05 -3.9057 0.0001079 ***
---

```

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

```

Total Sum of Squares:    1617.4
Residual Sum of Squares: 547.46
R-Squared:               0.66152
Adj. R-Squared: 0.65861
F-statistic: 227.198 on 4 and 465 DF, p-value: < 2.22e-16

```

## Modèle within

```

reg_within = plm(formule , effect="individual", model="within", data=data_p)
summary(reg_within)

```

Oneway (individual) effect Within Model

```

Call:
plm(formula = formule, data = data_p, effect = "individual",
     model = "within")

```

Balanced Panel: n = 94, T = 5, N = 470

```

Residuals:
    Min.    1st Qu.    Median    3rd Qu.    Max.
-1.039960 -0.207339  0.020297  0.237592  1.284022

```

```

Coefficients:
              Estimate Std. Error t-value Pr(>|t|)
part_rsa      0.0501348  0.0251079  1.9968  0.04658 *
taux_natalite  1.4517668  0.0775376 18.7234 < 2.2e-16 ***
taux_mortalite -0.6686136  0.0959008 -6.9719 1.433e-11 ***
densite        0.0012181  0.0010619  1.1471  0.25208
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Total Sum of Squares:    241.42
Residual Sum of Squares: 58.021
R-Squared:               0.75967
Adj. R-Squared: 0.697
F-statistic: 293.96 on 4 and 372 DF, p-value: < 2.22e-16

```

## Choix du modèle

HO :  $\alpha(i) = \alpha$

```
pFtest(reg_within,reg_pooled)
```

F test for individual effects

data: formule

F = 33.742, df1 = 93, df2 = 372, p-value < 2.2e-16  
 alternative hypothesis: significant effects  
 p-value < 0.05 → on rejete l'hypothèse nul (donc modèle within)

## Pour aller plus loin : Effet du RSA par département

```
reg_within_dep = plm(taux_chomage~part_rsa:label+taux_natalite+taux_mortalite+densite,
                      effect="individual",model="within", data=data_p)
summary(reg_within_dep)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = taux_chomage ~ part_rsa:label + taux_natalite +
     taux_mortalite + densite, data = data_p, effect = "individual",
     model = "within")
```

Balanced Panel: n = 94, T = 5, N = 470

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-1.0118909	-0.1537590	0.0071136	0.1820422	0.8343485

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t )
taux_natalite	1.67344454	0.08797464	19.0219	< 2.2e-16
taux_mortalite	-0.66936954	0.10971607	-6.1009	3.511e-09
densite	0.00137111	0.00146779	0.9341	0.35104
part_rsa:labelAin	0.29098560	0.25232540	1.1532	0.24981
part_rsa:labelAisne	-0.16751572	0.12823790	-1.3063	0.19253
part_rsa:labelAllier	0.13154685	0.20289231	0.6484	0.51729
part_rsa:labelAlpes-de-Haute-Provence	-0.16715967	0.17455758	-0.9576	0.33908
part_rsa:labelAlpes-Maritimes	0.31642002	0.20922989	1.5123	0.13159
part_rsa:labelArdèche	-0.48354543	0.21426917	-2.2567	0.02480
part_rsa:labelArdennes	0.08200508	0.12055236	0.6802	0.49691
part_rsa:labelAriège	-0.30043876	0.16428329	-1.8288	0.06850
part_rsa:labelAube	-0.20363876	0.15875906	-1.2827	0.20067
part_rsa:labelAude	0.05062541	0.12893444	0.3926	0.69488
part_rsa:labelAveyron	0.09990159	0.33091335	0.3019	0.76296
part_rsa:labelBas-Rhin	0.16805414	0.17514511	0.9595	0.33813
part_rsa:labelBouches-du-Rhône	0.12275074	0.15020369	0.8172	0.41450
part_rsa:labelCalvados	0.00120068	0.17134197	0.0070	0.99441
part_rsa:labelCantal	-0.01231195	0.21082565	-0.0584	0.95347
part_rsa:labelCharente	0.01628459	0.16758480	0.0972	0.92266
part_rsa:labelCharente-Maritime	0.17125294	0.15688913	1.0916	0.27597
part_rsa:labelCher	0.17821995	0.17261695	1.0325	0.30275
part_rsa:labelCorrèze	0.25891966	0.19596768	1.3212	0.18751
part_rsa:labelCôte-d'Or	0.09946765	0.23750975	0.4188	0.67569
part_rsa:labelCôtes-d'Armor	-0.15825080	0.24014664	-0.6590	0.51045
part_rsa:labelCreuse	0.05428203	0.15246362	0.3560	0.72209
part_rsa:labelDeux-Sèvres	0.04383805	0.20451394	0.2144	0.83043
part_rsa:labelDordogne	0.19562969	0.18457353	1.0599	0.29011
part_rsa:labelDoubs	-0.16954969	0.21302898	-0.7959	0.42677

part_rsa:labelDrôme	-0.11716435	0.16529286	-0.7088	0.47902
part_rsa:labelEssonne	-0.27963096	0.23425052	-1.1937	0.23360
part_rsa:labelEure	-0.11063811	0.22218432	-0.4980	0.61891
part_rsa:labelEure-et-Loir	-0.12854802	0.21589718	-0.5954	0.55205
part_rsa:labelFinistère	-0.05798597	0.27376703	-0.2118	0.83241
part_rsa:labelGard	0.20280605	0.13957641	1.4530	0.14734
part_rsa:labelGers	-0.26150629	0.24772999	-1.0556	0.29206
part_rsa:labelGironde	0.29321569	0.19431146	1.5090	0.13243
part_rsa:labelHaut-Rhin	-0.02237845	0.16560881	-0.1351	0.89261
part_rsa:labelHaute-Garonne	0.20005296	0.18343205	1.0906	0.27639
part_rsa:labelHaute-Loire	0.02620091	0.24079138	0.1088	0.91343
part_rsa:labelHaute-Marne	-0.08557825	0.14913197	-0.5738	0.56654
part_rsa:labelHaute-Saône	-0.05317972	0.15983308	-0.3327	0.73960
part_rsa:labelHaute-Savoie	-0.05584260	0.38623401	-0.1446	0.88515
part_rsa:labelHaute-Vienne	0.15794398	0.17950748	0.8799	0.37968
part_rsa:labelHautes-Alpes	-0.27957317	0.23257280	-1.2021	0.23035
part_rsa:labelHautes-Pyrénées	0.19747704	0.20157151	0.9797	0.32809
part_rsa:labelHauts-de-Seine	-0.18997414	0.28324051	-0.6707	0.50296
part_rsa:labelHérault	0.06042596	0.13267874	0.4554	0.64915
part_rsa:labelIlle-et-Vilaine	0.09550033	0.22733752	0.4201	0.67475
part_rsa:labelIndre	-0.18277505	0.18621184	-0.9815	0.32718
part_rsa:labelIndre-et-Loire	-0.08461452	0.20890239	-0.4050	0.68576
part_rsa:labelIsère	-0.05654849	0.19687415	-0.2872	0.77415
part_rsa:labelJura	-0.03881542	0.21418432	-0.1812	0.85632
part_rsa:labelLandes	-0.24748985	0.23133712	-1.0698	0.28562
part_rsa:labelLoir-et-Cher	-0.12893058	0.18731055	-0.6883	0.49182
part_rsa:labelLoire	-0.11184237	0.19273042	-0.5803	0.56218
part_rsa:labelLoire-Atlantique	0.32388691	0.21127769	1.5330	0.12641
part_rsa:labelLoiret	0.02008014	0.18644920	0.1077	0.91431
part_rsa:labelLot	0.27267070	0.21236265	1.2840	0.20021
part_rsa:labelLot-et-Garonne	0.18414193	0.16699891	1.1027	0.27113
part_rsa:labelLozère	-0.73563094	0.25691575	-2.8633	0.00451
part_rsa:labelMaine-et-Loire	-0.07912092	0.18965211	-0.4172	0.67686
part_rsa:labelManche	-0.04865931	0.18965070	-0.2566	0.79770
part_rsa:labelMarne	0.02562125	0.21728638	0.1179	0.90622
part_rsa:labelMayenne	-0.31241725	0.24224825	-1.2897	0.19824
part_rsa:labelMeurthe-et-Moselle	0.03664719	0.17586910	0.2084	0.83509
part_rsa:labelMeuse	-0.08681348	0.15316435	-0.5668	0.57131
part_rsa:labelMorbihan	0.10030155	0.22476329	0.4463	0.65576
part_rsa:labelMoselle	0.15578869	0.16892743	0.9222	0.35721
part_rsa:labelNièvre	0.08684325	0.17221604	0.5043	0.61447
part_rsa:labelNord	-0.12512261	0.10768065	-1.1620	0.24624
part_rsa:labelOise	-0.33502875	0.19693726	-1.7012	0.09002
part_rsa:labelOrne	-0.18171061	0.16883439	-1.0763	0.28274
part_rsa:labelParis	0.19959806	0.30711423	0.6499	0.51628
part_rsa:labelPas-de-Calais	0.02515229	0.09644892	0.2608	0.79445
part_rsa:labelPuy-de-Dôme	0.11162643	0.19451437	0.5739	0.56652
part_rsa:labelPyrénées-Atlantiques	-0.01870971	0.20881019	-0.0896	0.92867
part_rsa:labelPyrénées-Orientales	-0.15768304	0.14522546	-1.0858	0.27851
part_rsa:labelRhône	0.00012692	0.09258191	0.0014	0.99891
part_rsa:labelSaône-et-Loire	-0.09216039	0.19863430	-0.4640	0.64303
part_rsa:labelSarthe	0.04732379	0.17729475	0.2669	0.78973
part_rsa:labelSavoie	0.18454799	0.30085319	0.6134	0.54010
part_rsa:labelSeine-et-Marne	-0.10454510	0.21131695	-0.4947	0.62118

part_rsa:labelSeine-Maritime	-0.05346419	0.15713336	-0.3402	0.73393
part_rsa:labelSeine-Saint-Denis	0.13676011	0.12380196	1.1047	0.27026
part_rsa:labelSomme	-0.09322628	0.12664248	-0.7361	0.46227
part_rsa:labelTarn	-0.08910377	0.18595237	-0.4792	0.63219
part_rsa:labelTarn-et-Garonne	-0.13768157	0.13916337	-0.9894	0.32335
part_rsa:labelTerritoire de Belfort	0.61229230	0.15303547	4.0010	8.087e-05
part_rsa:labelVal-d'Oise	0.18222309	0.19312124	0.9436	0.34621
part_rsa:labelVal-de-Marne	-0.03299886	0.22389659	-0.1474	0.88294
part_rsa:labelVar	0.12315442	0.18458648	0.6672	0.50520
part_rsa:labelVaucluse	-0.09213255	0.16502389	-0.5583	0.57709
part_rsa:labelVendée	-0.24321315	0.20605520	-1.1803	0.23887
part_rsa:labelVienne	-0.19535140	0.17615109	-1.1090	0.26839
part_rsa:labelVosges	0.28164967	0.15057102	1.8705	0.06246
part_rsa:labelYonne	-0.27179988	0.15610642	-1.7411	0.08277
part_rsa:labelYvelines	-0.19066121	0.28262137	-0.6746	0.50048

taux_natalite	***
taux_mortalite	***
densite	

part_rsa:labelAin	
part_rsa:labelAisne	
part_rsa:labelAllier	
part_rsa:labelAlpes-de-Haute-Provence	
part_rsa:labelAlpes-Maritimes	
part_rsa:labelArdèche	*
part_rsa:labelArdennes	
part_rsa:labelAriège	.
part_rsa:labelAube	
part_rsa:labelAude	
part_rsa:labelAveyron	
part_rsa:labelBas-Rhin	
part_rsa:labelBouches-du-Rhône	
part_rsa:labelCalvados	
part_rsa:labelCantal	
part_rsa:labelCharente	
part_rsa:labelCharente-Maritime	
part_rsa:labelCher	
part_rsa:labelCorrèze	
part_rsa:labelCôte-d'Or	
part_rsa:labelCôtes-d'Armor	
part_rsa:labelCreuse	
part_rsa:labelDeux-Sèvres	
part_rsa:labelDordogne	
part_rsa:labelDoubs	
part_rsa:labelDrôme	
part_rsa:labelEssonne	
part_rsa:labelEure	
part_rsa:labelEure-et-Loir	
part_rsa:labelFinistère	
part_rsa:labelGard	
part_rsa:labelGers	
part_rsa:labelGironde	
part_rsa:labelHaut-Rhin	
part_rsa:labelHaute-Garonne	



part\_rsa:labelHaute-Loire  
 part\_rsa:labelHaute-Marne  
 part\_rsa:labelHaute-Saône  
 part\_rsa:labelHaute-Savoie  
 part\_rsa:labelHaute-Vienne  
 part\_rsa:labelHautes-Alpes  
 part\_rsa:labelHautes-Pyrénées  
 part\_rsa:labelHauts-de-Seine  
 part\_rsa:labelHérault  
 part\_rsa:labelIle-et-Vilaine  
 part\_rsa:labelIndre  
 part\_rsa:labelIndre-et-Loire  
 part\_rsa:labelIsère  
 part\_rsa:labelJura  
 part\_rsa:labelLandes  
 part\_rsa:labelLoir-et-Cher  
 part\_rsa:labelLoire  
 part\_rsa:labelLoire-Atlantique  
 part\_rsa:labelLoiret  
 part\_rsa:labelLot  
 part\_rsa:labelLot-et-Garonne  
 part\_rsa:labelLozère \*\*  
 part\_rsa:labelMaine-et-Loire  
 part\_rsa:labelManche  
 part\_rsa:labelMarne  
 part\_rsa:labelMayenne  
 part\_rsa:labelMeurthe-et-Moselle  
 part\_rsa:labelMeuse  
 part\_rsa:labelMorbihan  
 part\_rsa:labelMoselle  
 part\_rsa:labelNièvre  
 part\_rsa:labelNord  
 part\_rsa:labelOise .  
 part\_rsa:labelOrne  
 part\_rsa:labelParis  
 part\_rsa:labelPas-de-Calais  
 part\_rsa:labelPuy-de-Dôme  
 part\_rsa:labelPyrénées-Atlantiques  
 part\_rsa:labelPyrénées-Orientales  
 part\_rsa:labelRhône  
 part\_rsa:labelSaône-et-Loire  
 part\_rsa:labelSarthe  
 part\_rsa:labelSavoie  
 part\_rsa:labelSeine-et-Marne  
 part\_rsa:labelSeine-Maritime  
 part\_rsa:labelSeine-Saint-Denis  
 part\_rsa:labelSomme  
 part\_rsa:labelTarn  
 part\_rsa:labelTarn-et-Garonne  
 part\_rsa:labelTerritoire de Belfort \*\*\*  
 part\_rsa:labelVal-d'Oise  
 part\_rsa:labelVal-de-Marne  
 part\_rsa:labelVar  
 part\_rsa:labelVaucluse

```

part_rsa:labelVendée
part_rsa:labelVienne
part_rsa:labelVosges      .
part_rsa:labelYonne       .
part_rsa:labelYvelines
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Total Sum of Squares:    241.42
Residual Sum of Squares: 43.644
R-Squared:               0.81921
Adj. R-Squared:          0.6961
F-statistic: 13.0337 on 97 and 279 DF, p-value: < 2.22e-16

```

-> Pour prendre en compte le coefficient et la significativité par département

```

summary_table <- as.data.frame(summary(reg_within_dep)$coefficients)
summary_table <- summary_table[4:nrow(summary_table),]
row.names(summary_table) <- sub("part_rsa:label" , "", row.names(summary_table))

summary_table <- summary_table%>%
  select(c("Estimate", "Pr(>|t|)"))

colnames(summary_table) <- c("Coef", "Prob")
summary_table

```

	Coef	Prob
Ain	0.2909855984	2.498089e-01
Aisne	-0.1675157219	1.925303e-01
Allier	0.1315468505	5.172867e-01
Alpes-de-Haute-Provence	-0.1671596683	3.390839e-01
Alpes-Maritimes	0.3164200216	1.315874e-01
Ardèche	-0.4835454306	2.479943e-02
Ardennes	0.0820050771	4.969138e-01
Ariège	-0.3004387565	6.849932e-02
Aube	-0.2036387622	2.006651e-01
Aude	0.0506254148	6.948818e-01
Aveyron	0.0999015882	7.629559e-01
Bas-Rhin	0.1680541377	3.381308e-01
Bouches-du-Rhône	0.1227507421	4.144951e-01
Calvados	0.0012006840	9.944139e-01
Cantal	-0.0123119494	9.534728e-01
Charente	0.0162845880	9.226594e-01
Charente-Maritime	0.1712529376	2.759710e-01
Cher	0.1782199511	3.027512e-01
Corrèze	0.2589196614	1.875050e-01
Côte-d'Or	0.0994676516	6.756889e-01
Côtes-d'Armor	-0.1582508018	5.104549e-01
Creuse	0.0542820278	7.220852e-01
Deux-Sèvres	0.0438380464	8.304289e-01
Dordogne	0.1956296940	2.901063e-01
Doubs	-0.1695496883	4.267670e-01
Drôme	-0.1171643451	4.790225e-01
Essonne	-0.2796309591	2.335991e-01
Eure	-0.1106381149	6.189070e-01

Eure-et-Loir	-0.1285480247	5.520500e-01
Finistère	-0.0579859733	8.324117e-01
Gard	0.2028060452	1.473445e-01
Gers	-0.2615062933	2.920596e-01
Gironde	0.2932156920	1.324308e-01
Haut-Rhin	-0.0223784464	8.926078e-01
Haute-Garonne	0.2000529556	2.763852e-01
Haute-Loire	0.0262009061	9.134301e-01
Haute-Marne	-0.0855782548	5.665367e-01
Haute-Saône	-0.0531797164	7.395953e-01
Haute-Savoie	-0.0558426026	8.851451e-01
Haute-Vienne	0.1579439830	3.796847e-01
Hautes-Alpes	-0.2795731669	2.303484e-01
Hautes-Pyrénées	0.1974770413	3.280893e-01
Hauts-de-Seine	-0.1899741411	5.029559e-01
Hérault	0.0604259606	6.491537e-01
Ille-et-Vilaine	0.0955003253	6.747491e-01
Indre	-0.1827750500	3.271751e-01
Indre-et-Loire	-0.0846145153	6.857561e-01
Isère	-0.0565484917	7.741482e-01
Jura	-0.0388154242	8.563230e-01
Landes	-0.2474898484	2.856235e-01
Loir-et-Cher	-0.1289305763	4.918199e-01
Loire	-0.1118423746	5.621775e-01
Loire-Atlantique	0.3238869053	1.264111e-01
Loiret	0.0200801429	9.143129e-01
Lot	0.2726706980	2.002121e-01
Lot-et-Garonne	0.1841419283	2.711279e-01
Lozère	-0.7356309368	4.510374e-03
Maine-et-Loire	-0.0791209164	6.768604e-01
Manche	-0.0486593051	7.976973e-01
Marne	0.0256212453	9.062201e-01
Mayenne	-0.3124172534	1.982377e-01
Meurthe-et-Moselle	0.0366471941	8.350861e-01
Meuse	-0.0868134838	5.713061e-01
Morbihan	0.1003015512	6.557598e-01
Moselle	0.1557886890	3.572093e-01
Nièvre	0.0868432470	6.144702e-01
Nord	-0.1251226130	2.462372e-01
Oise	-0.3350287541	9.002044e-02
Orne	-0.1817106139	2.827384e-01
Paris	0.1995980627	5.162820e-01
Pas-de-Calais	0.0251522942	7.944518e-01
Puy-de-Dôme	0.1116264285	5.665165e-01
Pyrénées-Atlantiques	-0.0187097057	9.286682e-01
Pyrénées-Orientales	-0.1576830440	2.785132e-01
Rhône	0.0001269229	9.989071e-01
Saône-et-Loire	-0.0921603908	6.430309e-01
Sarthe	0.0473237907	7.897267e-01
Savoie	0.1845479931	5.401014e-01
Seine-et-Marne	-0.1045451024	6.211792e-01
Seine-Maritime	-0.0534641901	7.339264e-01
Seine-Saint-Denis	0.1367601076	2.702551e-01
Somme	-0.0932262755	4.622655e-01

Tarn	-0.0891037659	6.321893e-01
Tarn-et-Garonne	-0.1376815721	3.233481e-01
Territoire de Belfort	0.6122923004	8.087469e-05
Val-d'Oise	0.1822230906	3.462066e-01
Val-de-Marne	-0.0329988588	8.829351e-01
Var	0.1231544168	5.052017e-01
Vaucluse	-0.0921325497	5.770885e-01
Vendée	-0.2432131480	2.388743e-01
Vienne	-0.1953513964	2.683856e-01
Vosges	0.2816496690	6.245522e-02
Yonne	-0.2717998758	8.276501e-02
Yvelines	-0.1906612057	5.004777e-01

-> Utilisation de if\_else pour récupérer les éléments...

```
summary_table$value <- if_else(
  summary_table$Prob>0.1, 1, if_else((summary_table$Prob < 0.05 & summary_table$Coef >0), 2, 3
)
```

summary\_table

	Coef	Prob	value
Ain	0.2909855984	2.498089e-01	1
Aisne	-0.1675157219	1.925303e-01	1
Allier	0.1315468505	5.172867e-01	1
Alpes-de-Haute-Provence	-0.1671596683	3.390839e-01	1
Alpes-Maritimes	0.3164200216	1.315874e-01	1
Ardèche	-0.4835454306	2.479943e-02	3
Ardennes	0.0820050771	4.969138e-01	1
Ariège	-0.3004387565	6.849932e-02	3
Aube	-0.2036387622	2.006651e-01	1
Aude	0.0506254148	6.948818e-01	1
Aveyron	0.0999015882	7.629559e-01	1
Bas-Rhin	0.1680541377	3.381308e-01	1
Bouches-du-Rhône	0.1227507421	4.144951e-01	1
Calvados	0.0012006840	9.944139e-01	1
Cantal	-0.0123119494	9.534728e-01	1
Charente	0.0162845880	9.226594e-01	1
Charente-Maritime	0.1712529376	2.759710e-01	1
Cher	0.1782199511	3.027512e-01	1
Corrèze	0.2589196614	1.875050e-01	1
Côte-d'Or	0.0994676516	6.756889e-01	1
Côtes-d'Armor	-0.1582508018	5.104549e-01	1
Creuse	0.0542820278	7.220852e-01	1
Deux-Sèvres	0.0438380464	8.304289e-01	1
Dordogne	0.1956296940	2.901063e-01	1
Doubs	-0.1695496883	4.267670e-01	1
Drôme	-0.1171643451	4.790225e-01	1
Essonne	-0.2796309591	2.335991e-01	1
Eure	-0.1106381149	6.189070e-01	1
Eure-et-Loir	-0.1285480247	5.520500e-01	1
Finistère	-0.0579859733	8.324117e-01	1
Gard	0.2028060452	1.473445e-01	1
Gers	-0.2615062933	2.920596e-01	1
Gironde	0.2932156920	1.324308e-01	1

Haut-Rhin	-0.0223784464	8.926078e-01	1
Haute-Garonne	0.2000529556	2.763852e-01	1
Haute-Loire	0.0262009061	9.134301e-01	1
Haute-Marne	-0.0855782548	5.665367e-01	1
Haute-Saône	-0.0531797164	7.395953e-01	1
Haute-Savoie	-0.0558426026	8.851451e-01	1
Haute-Vienne	0.1579439830	3.796847e-01	1
Hautes-Alpes	-0.2795731669	2.303484e-01	1
Hautes-Pyrénées	0.1974770413	3.280893e-01	1
Hauts-de-Seine	-0.1899741411	5.029559e-01	1
Hérault	0.0604259606	6.491537e-01	1
Ille-et-Vilaine	0.0955003253	6.747491e-01	1
Indre	-0.1827750500	3.271751e-01	1
Indre-et-Loire	-0.0846145153	6.857561e-01	1
Isère	-0.0565484917	7.741482e-01	1
Jura	-0.0388154242	8.563230e-01	1
Landes	-0.2474898484	2.856235e-01	1
Loir-et-Cher	-0.1289305763	4.918199e-01	1
Loire	-0.1118423746	5.621775e-01	1
Loire-Atlantique	0.3238869053	1.264111e-01	1
Loiret	0.0200801429	9.143129e-01	1
Lot	0.2726706980	2.002121e-01	1
Lot-et-Garonne	0.1841419283	2.711279e-01	1
Lozère	-0.7356309368	4.510374e-03	3
Maine-et-Loire	-0.0791209164	6.768604e-01	1
Manche	-0.0486593051	7.976973e-01	1
Marne	0.0256212453	9.062201e-01	1
Mayenne	-0.3124172534	1.982377e-01	1
Meurthe-et-Moselle	0.0366471941	8.350861e-01	1
Meuse	-0.0868134838	5.713061e-01	1
Morbihan	0.1003015512	6.557598e-01	1
Moselle	0.1557886890	3.572093e-01	1
Nièvre	0.0868432470	6.144702e-01	1
Nord	-0.1251226130	2.462372e-01	1
Oise	-0.3350287541	9.002044e-02	3
Orne	-0.1817106139	2.827384e-01	1
Paris	0.1995980627	5.162820e-01	1
Pas-de-Calais	0.0251522942	7.944518e-01	1
Puy-de-Dôme	0.1116264285	5.665165e-01	1
Pyrénées-Atlantiques	-0.0187097057	9.286682e-01	1
Pyrénées-Orientales	-0.1576830440	2.785132e-01	1
Rhône	0.0001269229	9.989071e-01	1
Saône-et-Loire	-0.0921603908	6.430309e-01	1
Sarthe	0.0473237907	7.897267e-01	1
Savoie	0.1845479931	5.401014e-01	1
Seine-et-Marne	-0.1045451024	6.211792e-01	1
Seine-Maritime	-0.0534641901	7.339264e-01	1
Seine-Saint-Denis	0.1367601076	2.702551e-01	1
Somme	-0.0932262755	4.622655e-01	1
Tarn	-0.0891037659	6.321893e-01	1
Tarn-et-Garonne	-0.1376815721	3.233481e-01	1
Territoire de Belfort	0.6122923004	8.087469e-05	2
Val-d'Oise	0.1822230906	3.462066e-01	1
Val-de-Marne	-0.0329988588	8.829351e-01	1

Var	0.1231544168	5.052017e-01	1
Vaucluse	-0.0921325497	5.770885e-01	1
Vendée	-0.2432131480	2.388743e-01	1
Vienne	-0.1953513964	2.683856e-01	1
Vosges	0.2816496690	6.245522e-02	3
Yonne	-0.2717998758	8.276501e-02	3
Yvelines	-0.1906612057	5.004777e-01	1

```
summary_table$departement <- row.names(summary_table)
```

```
summary_table%>%
  select(c("departement", "value"))
```

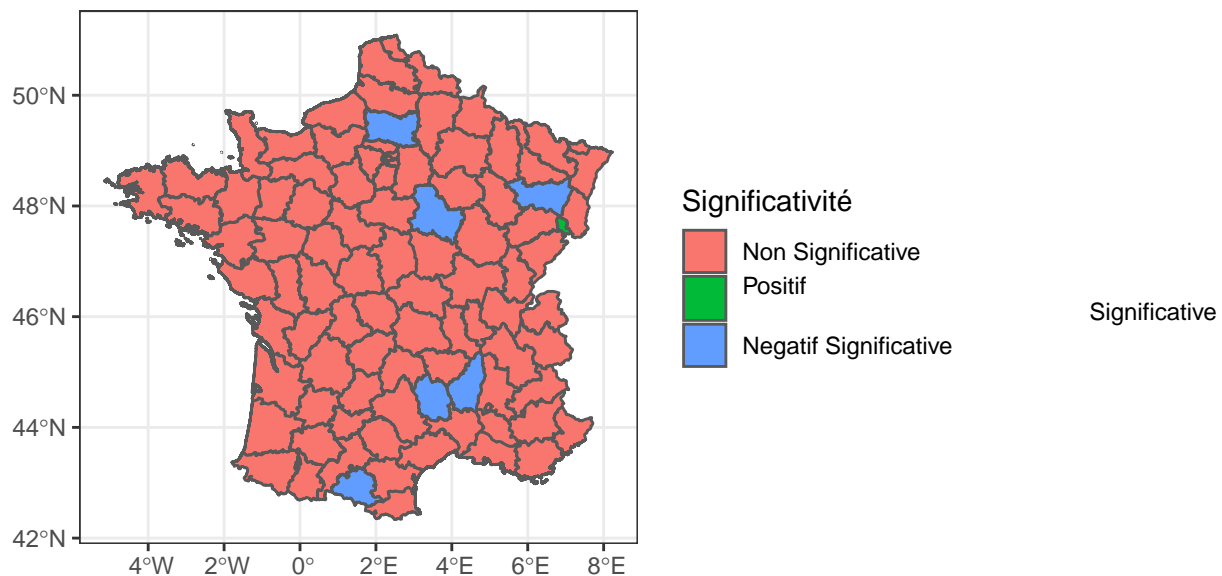
	departement	value
Ain	Ain	1
Aisne	Aisne	1
Allier	Allier	1
Alpes-de-Haute-Provence	Alpes-de-Haute-Provence	1
Alpes-Maritimes	Alpes-Maritimes	1
Ardèche	Ardèche	3
Ardenne	Ardenne	1
Ariège	Ariège	3
Aube	Aube	1
Aude	Aude	1
Aveyron	Aveyron	1
Bas-Rhin	Bas-Rhin	1
Bouches-du-Rhône	Bouches-du-Rhône	1
Calvados	Calvados	1
Cantal	Cantal	1
Charente	Charente	1
Charente-Maritime	Charente-Maritime	1
Cher	Cher	1
Corrèze	Corrèze	1
Côte-d'Or	Côte-d'Or	1
Côtes-d'Armor	Côtes-d'Armor	1
Creuse	Creuse	1
Deux-Sèvres	Deux-Sèvres	1
Dordogne	Dordogne	1
Doubs	Doubs	1
Drôme	Drôme	1
Essonne	Essonne	1
Eure	Eure	1
Eure-et-Loir	Eure-et-Loir	1
Finistère	Finistère	1
Gard	Gard	1
Gers	Gers	1
Gironde	Gironde	1
Haut-Rhin	Haut-Rhin	1
Haute-Garonne	Haute-Garonne	1
Haute-Loire	Haute-Loire	1
Haute-Marne	Haute-Marne	1
Haute-Saône	Haute-Saône	1
Haute-Savoie	Haute-Savoie	1
Haute-Vienne	Haute-Vienne	1
Hautes-Alpes	Hautes-Alpes	1

Hautes-Pyrénées	Hautes-Pyrénées	1
Hauts-de-Seine	Hauts-de-Seine	1
Hérault	Hérault	1
Ille-et-Vilaine	Ille-et-Vilaine	1
Indre	Indre	1
Indre-et-Loire	Indre-et-Loire	1
Isère	Isère	1
Jura	Jura	1
Landes	Landes	1
Loir-et-Cher	Loir-et-Cher	1
Loire	Loire	1
Loire-Atlantique	Loire-Atlantique	1
Loiret	Loiret	1
Lot	Lot	1
Lot-et-Garonne	Lot-et-Garonne	1
Lozère	Lozère	3
Maine-et-Loire	Maine-et-Loire	1
Manche	Manche	1
Marne	Marne	1
Mayenne	Mayenne	1
Meurthe-et-Moselle	Meurthe-et-Moselle	1
Meuse	Meuse	1
Morbihan	Morbihan	1
Moselle	Moselle	1
Nièvre	Nièvre	1
Nord	Nord	1
Oise	Oise	3
Orne	Orne	1
Paris	Paris	1
Pas-de-Calais	Pas-de-Calais	1
Puy-de-Dôme	Puy-de-Dôme	1
Pyrénées-Atlantiques	Pyrénées-Atlantiques	1
Pyrénées-Orientales	Pyrénées-Orientales	1
Rhône	Rhône	1
Saône-et-Loire	Saône-et-Loire	1
Sarthe	Sarthe	1
Savoie	Savoie	1
Seine-et-Marne	Seine-et-Marne	1
Seine-Maritime	Seine-Maritime	1
Seine-Saint-Denis	Seine-Saint-Denis	1
Somme	Somme	1
Tarn	Tarn	1
Tarn-et-Garonne	Tarn-et-Garonne	1
Territoire de Belfort	Territoire de Belfort	2
Val-d'Oise	Val-d'Oise	1
Val-de-Marne	Val-de-Marne	1
Var	Var	1
Vaucluse	Vaucluse	1
Vendée	Vendée	1
Vienne	Vienne	1
Vosges	Vosges	3
Yonne	Yonne	3
Yvelines	Yvelines	1

```
delvich <- inner_join(france, summary_table, by = c("NAME_2" = "departement"))
```

-> Part de la population au RSA sur le taux de chômage par département

```
ggplot() +
  geom_sf(data = delvich, aes(fill = cut(value, breaks = 3,
                                         labels = c("Non Significative", "Positif
                                                    Significative",
                                                    "Negatif Significative"))),
          show.legend = TRUE)+
  theme(panel.grid = element_blank()) +
  theme(axis.text = element_blank(),
        axis.ticks = element_blank()) +
  labs(fill = "Significativité") +
  ggtitle("") +
  theme_bw()
```



-> Quelques statistiques

Sur le modèle within

```
scr_within = sum(reg_within$residuals^2)
scr_within #meme scr que LSDV, R2 different
```

```
[1] 58.0207
```

```
ddl_within = reg_within$df.residual
ddl_within #meme ddl
```



```
[1] 372
```

Sur le within par département

```
scr_within_dep = sum(reg_within_dep$residuals^2)
scr_within_dep
```

```
[1] 43.64449
```

```
ddl_within_dep = reg_within_dep$df.residual
ddl_within_dep
```

```
[1] 279
```

```
F_PP4 = ((scr_within-scr_within_dep)/(ddl_within-ddl_within_dep))/(scr_within/ddl_within_dep)
F_PP4
```

```
[1] 0.7433316
```

```
pvalue_PP4 = pf(F_PP4,ddl_within-ddl_within_dep,ddl_within_dep,lower.tail=FALSE)
pvalue_PP4
```

```
[1] 0.9531666
```