

Regression

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In our basic model we want to see what is the relationship between youth unemployment and voter turnout in General Election in Spain. For this we use the following equation:

$$Turnout_{it} = \beta_0 + \beta_1 Youth\ Unemployment\ Rate_{it} + \epsilon_{it}$$

where i represents each of the 17 regions plus two Autonomous cities of Spain and t represents each of the years we have data for $t = 2004, 2008, 2011, 2015$

```
plot(Reg1, which=1)
```

```
Call: lm(formula = Turnout ~ Unempl_rate_less25, data = Spain_data)
```

```
Residuals: Min 1Q Median 3Q Max -0.16960 -0.03690 0.01063 0.04226 0.09288
```

```
Coefficients: Estimate Std. Error t value Pr(>|t|)
```

```
(Intercept) 0.7992339 0.0171272 46.665 < 2e-16 Unempl_rate_less25 -0.0022214 0.0004454 -4.988  
3.92e-06 — Signif. codes: 0 ‘’ 0.001 ’’ 0.01 ’’ 0.05 ‘.’ 0.1 ‘.’ 1
```

```
Residual standard error: 0.05698 on 74 degrees of freedom Multiple R-squared: 0.2516, Adjusted R-squared:  
0.2415 F-statistic: 24.88 on 1 and 74 DF, p-value: 3.916e-06
```

```
% Table created by stargazer v.5.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvard.edu  
% Date and time: do., nov. 27, 2016 - 18:09:27
```

Table 1: Basic Regression

	<i>Dependent variable:</i>
	Voter Turnout in General Elections
Youth Unemployment	-0.002*** (0.0004)
Constant	0.799*** (0.017)
Observations	76
R ²	0.252
Adjusted R ²	0.241
Residual Std. Error	0.057 (df = 74)
F Statistic	24.877*** (df = 1; 74)
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

Our analysis can also go one step further and include regional fixed effects

$$Turnout_{it} = \beta_0 + \beta_1 Youth\ Unemployment\ Rate_{it} + \delta_i + \epsilon_{it}$$

```
Reg2 <- lm(Turnout ~ Unempl_rate_less25 + Region, data = Spain_data)
```

```
summary(Reg2)
```

```
##
## Call:
## lm(formula = Turnout ~ Unempl_rate_less25 + Region, data = Spain_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.070112 -0.008874 -0.000297  0.008067  0.057838
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      0.770601   0.013073   58.945 < 2e-16 ***
## Unempl_rate_less25 -0.001099   0.000187  -5.879 2.39e-07 ***
## RegionAragon        0.011345   0.014922    0.760 0.450292
## RegionAsturias     -0.021044   0.014765   -1.425 0.159627
## RegionBalears     -0.075798   0.014822   -5.114 3.98e-06 ***
## RegionCanarias    -0.071002   0.014701   -4.830 1.10e-05 ***
## RegionCantabria     0.025146   0.014866    1.692 0.096287 .
## RegionCastilla_La_Mancha 0.051866   0.014745    3.518 0.000872 ***
## RegionCastilla_y_Leon  0.031933   0.014800    2.158 0.035262 *
## RegionCatalunya    -0.025340   0.014830   -1.709 0.093046 .
## RegionCeuta        -0.115844   0.014845   -7.804 1.63e-10 ***
## RegionComunitat_Valenciana 0.041221   0.014737    2.797 0.007055 **
## RegionExtremadura    0.036837   0.014701    2.506 0.015154 *
## RegionGalicia       -0.019814   0.014826   -1.336 0.186822
## RegionLa_Rioja       0.040443   0.014875    2.719 0.008708 **
## RegionMadrid        0.042142   0.014869    2.834 0.006377 **
## RegionMelilla       -0.149735   0.014800  -10.117 2.99e-14 ***
## RegionMurcia         0.030969   0.014760    2.098 0.040414 *
## RegionNavarra       -0.008258   0.015049   -0.549 0.585357
## RegionPais_Vasco    -0.038778   0.014889   -2.604 0.011763 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.02079 on 56 degrees of freedom
## Multiple R-squared:  0.9246, Adjusted R-squared:  0.8991
## F-statistic: 36.16 on 19 and 56 DF,  p-value: < 2.2e-16
```

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```
Reg3 <- lm(Turnout ~ Unempl_rate_less25 + eight + eleven + fifteen, data = Spain_data)
```

```
summary(Reg3)
```

```
##
## Call:
## lm(formula = Turnout ~ Unempl_rate_less25 + eight + eleven +
##      fifteen, data = Spain_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.132415 -0.036335  0.007654  0.037552  0.090087
##
```

Table 2:

	<i>Dependent variable:</i>	
	Turnout	
	(1)	(2)
Unempl_rate_less25	−0.002*** (0.0004)	−0.001*** (0.0002)
RegionAragon		0.011 (0.015)
RegionAsturias		−0.021 (0.015)
RegionBalears		−0.076*** (0.015)
RegionCanarias		−0.071*** (0.015)
RegionCantabria		0.025* (0.015)
RegionCastilla_La_Mancha		0.052*** (0.015)
RegionCastilla_y_Leon		0.032** (0.015)
RegionCatalunya		−0.025* (0.015)
RegionCeuta		−0.116*** (0.015)
RegionComunitat_Valenciana		0.041*** (0.015)
RegionExtremadura		0.037** (0.015)
RegionGalicia		−0.020 (0.015)
RegionLa_Rioja		0.040*** (0.015)
RegionMadrid		0.042*** (0.015)
RegionMelilla		−0.150*** (0.015)
RegionMurcia		0.031** (0.015)
RegionNavarra		−0.008 (0.015)

```
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.8437398  0.0199905  42.207 < 2e-16 ***
## Unempl_rate_less25 -0.0047546  0.0007289  -6.523 8.69e-09 ***
## eight          0.0029997  0.0169314   0.177 0.859881
## eleven         0.0757919  0.0242326   3.128 0.002555 **
## fifteen        0.1033705  0.0260240   3.972 0.000169 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.05181 on 71 degrees of freedom
## Multiple R-squared:  0.4063, Adjusted R-squared:  0.3729
## F-statistic: 12.15 on 4 and 71 DF,  p-value: 1.411e-07
```

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Table 3:		
	<i>Dependent variable:</i>	
	Turnout	
	(1)	(2)
Unempl_rate_less25	-0.002*** (0.0004)	-0.005*** (0.001)
eight		0.003 (0.017)
eleven		0.076*** (0.024)
fifteen		0.103*** (0.026)
Constant	0.799*** (0.017)	0.844*** (0.020)
Observations	76	76
R ²	0.252	0.406
Adjusted R ²	0.241	0.373
Residual Std. Error	0.057 (df = 74)	0.052 (df = 71)
F Statistic	24.877*** (df = 1; 74)	12.148*** (df = 4; 71)

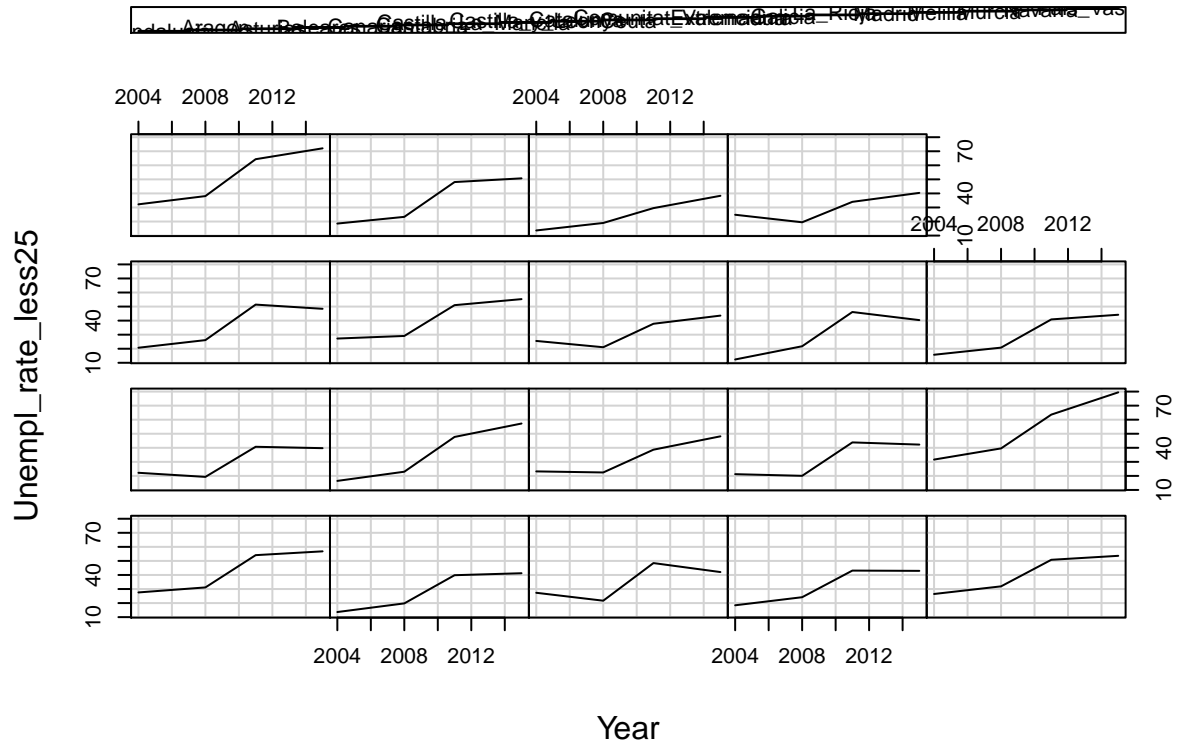
Note: *p<0.1; **p<0.05; ***p<0.01

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Table 4:

	<i>Dependent variable:</i>		
	Turnout		
	(1)	(2)	(3)
Unempl_rate_less25	−0.002*** (0.0004)	−0.001*** (0.0002)	−0.005*** (0.001)
RegionAragon		0.011 (0.015)	
RegionAsturias		−0.021 (0.015)	
RegionBalears		−0.076*** (0.015)	
RegionCanarias		−0.071*** (0.015)	
RegionCantabria		0.025* (0.015)	
RegionCastilla_La_Mancha		0.052*** (0.015)	
RegionCastilla_y_Leon		0.032** (0.015)	
RegionCatalunya		−0.025* (0.015)	
RegionCeuta		−0.116*** (0.015)	
RegionComunitat_Valenciana		0.041*** (0.015)	
RegionExtremadura		0.037** (0.015)	
RegionGalicia		−0.020 (0.015)	
RegionLa_Rioja		0.040*** (0.015)	
RegionMadrid		0.042*** (0.015)	
RegionMelilla		−0.150*** (0.015)	
RegionMurcia		0.031** (0.015)	
RegionNavarra		−0.008 (0.015)	

Given : Region



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