# ECONOMETRICS 1 - HOMEWORK

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## 1 The Basics

### 1.1

| var | median | mean | min | max | sd | NAs |
|---|---|---|---|---|---|---|
| agro_emp | 18.6 | 25.1 | 0.1 | 86.3 | 22.3 | 30 |
| bribery | 11.7 | 17.0 | 0.0 | 67.1 | 14.7 | 87 |
| gfce | 16.5 | 17.7 | 5.1 | 62.9 | 8.4 | 36 |
| literacy | 93.0 | 83.6 | 24.2 | 100.0 | 19.3 | 61 |
| log_gdp | 9.4 | 9.3 | 6.6 | 11.6 | 1.2 | 22 |
| pop_total | 6.2e+06 | 3.4e+07 | 1.1e+04 | 1.4e+09 | 1.4e+08 | 2 |
| self_emp | 35.0 | 40.9 | 0.4 | 94.8 | 27.0 | 30 |
| stocks | 6.4 | 28.8 | 0.0 | 538.7 | 66.8 | 131 |
| sample_size | 715.1 | 3.6e+03 | 120.1 | 1.4e+05 | 1.3e+04 | 2 |

Table 1: Descriptive statistics

### 1.2

#### (a)

Figure 1 shows a clear negative relationship between the share of self employment and gdp. The empirical correlation coefficient is equal to $-0.89$ which is very close to $-1$. The anticorrelation is very strong.

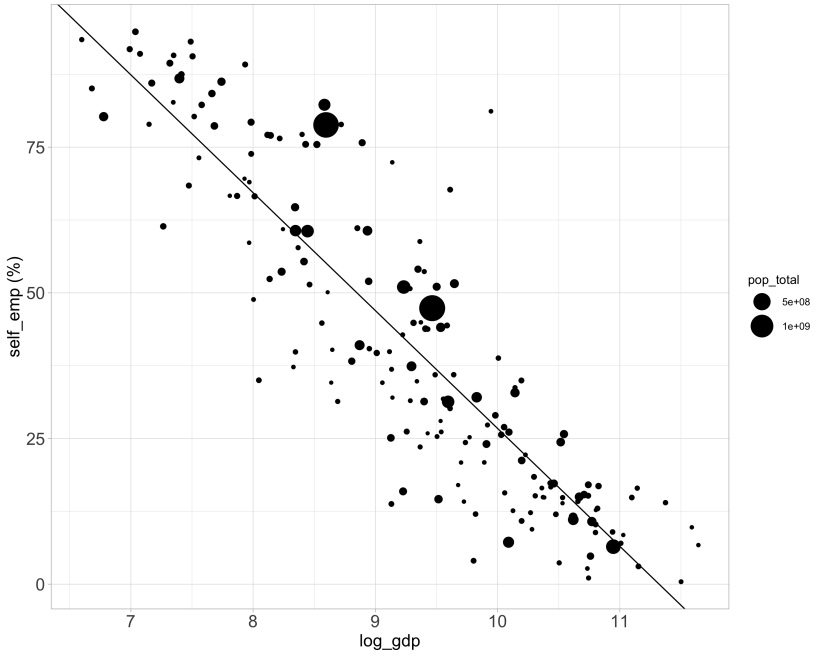


Figure 1: Self employment rate with respect to GDP

## (b)

As in the previous question, Figure 2 shows a clear positive relationship between the share of self employment and share of employment in the agricultural sector. The empirical correlation coefficient is equal to 0.91 which is very close to 1. The correlation is very strong.

## (c)

Figure 3 seems to demonstrate a negative relationship between the literacy category of the population and the self employment rate.

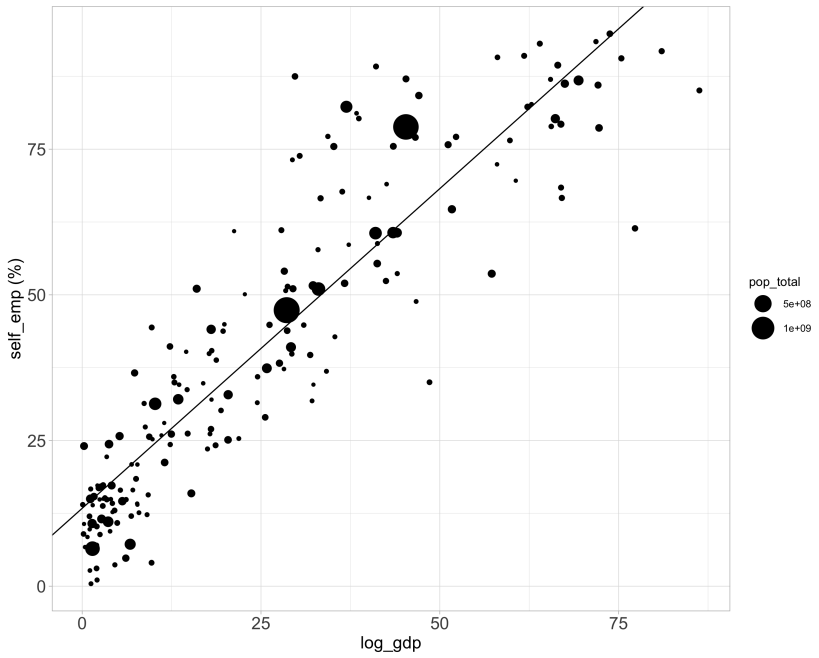


Figure 2: Self employment rate with respect to employment share in the agricultural sector

Table 2: Results

| | *Dependent variable:* | |
|---|---|---|
| | self_emp | |
| | (1) | (2) |
| log_gdp | −6.506*** | −5.520 |
| | (1.755) | (4.042) |
| literacy | −0.313*** | −0.358** |
| | (0.070) | (0.175) |
| agro_emp | 0.592*** | 0.628*** |
| | (0.080) | (0.176) |
| gfce | | −0.922** |
| | | (0.380) |
| stocks | | 0.110* |
| | | (0.061) |
| bribery | | −0.111 |
| | | (0.156) |
| Constant | 113.219*** | 121.953*** |
| | (16.361) | (41.265) |
| Observations | 143 | 49 |
| $R^2$ | 0.845 | 0.828 |
| Adjusted $R^2$ | 0.841 | 0.804 |
| Residual Std. Error | 10.574 (df = 139) | 9.262 (df = 42) |
| F Statistic | 252.152*** (df = 3; 139) | 33.720*** (df = 6; 42) |
| *Note:* | | *p<0.1; **p<0.05; ***p<0.01 |

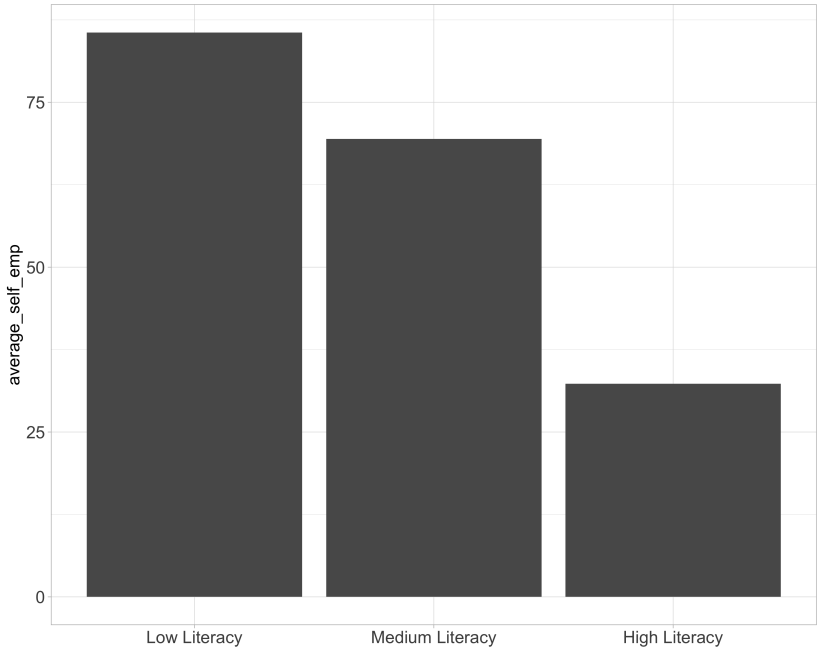


Figure 3: Average self employement rate as a function of the literacy category

### 1.3

# 2 Heteroskedasticity & Monte Carlo Simulations

# 3 Instrumental Variables

### 3.1

Table 3 shows the descriptive statistics of the table made of 900 hundred municipalities. First, the data is remarkably clean as their is no NA values in it.

| var | median | mean | min | max | sd | NAs |
|---|---|---|---|---|---|---|
| business_crea | 0.1 | 0.1 | 5.6e-02 | 0.3 | 3.1e-02 | 0 |
| nb_crimes | 73.0 | 149.8 | 9.0 | 1.0e+04 | 451.3 | 0 |
| nb_households | 9.8e+03 | 1.9e+04 | 3.7e+03 | 1.4e+06 | 5.3e+04 | 0 |
| pop | 2.0e+04 | 3.5e+04 | 1.0e+04 | 2.2e+06 | 8.8e+04 | 0 |
| income | 2.0 | 2.9 | 1.0 | 6.0 | 1.1 | 0 |
| crime_rate | 7.2e-03 | 7.9e-03 | 1.0e-03 | 3.0e-02 | 4.1e-03 | 0 |

Table 3: Descriptive statistics

Table 4: Results

| | *Dependent variable:* |
|---|---|
| | crime_rate |
| business_crea | 0.018*** |
| | (0.005) |
| log(pop) | 0.001*** |
| | (0.0002) |
| income | 0.00001 |
| | (0.0001) |
| com_typeC | −0.003*** |
| | (0.0003) |
| com_typeI | −0.002*** |
| | (0.001) |
| Constant | 0.001 |
| | (0.002) |
| Observations | 899 |
| $R^2$ | 0.150 |
| Adjusted $R^2$ | 0.145 |
| Residual Std. Error | 0.004 (df = 893) |
| F Statistic | 31.568*** (df = 5; 893) |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 |