

Study of French labour market and inequalities

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SNS

— *Midterm results* —

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Objectives

- Structure of French labour market
- Inequalities (in terms of salary):
 - ages
 - gender
 - job categories
 - spatial distribution
- Firms' distribution
- Exploratory analyses

Methodology

INSEE data

- Population: age, sex and cohabitation mode
- Salary: job categories, age and sex (mean net salary per hour in €)
- Firms: number of firms for each size
- Geography: GPS location

for different geographical levels (communes, departments, towns) in 2014

What has been done so far . . .

Pre-processing phase



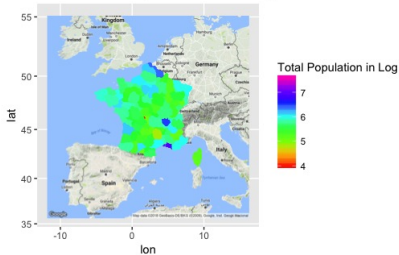
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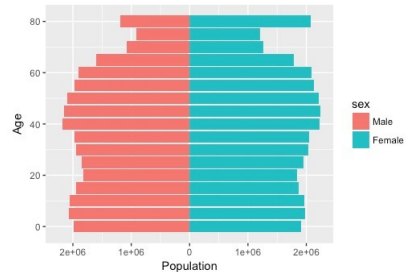
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Demographic profiles

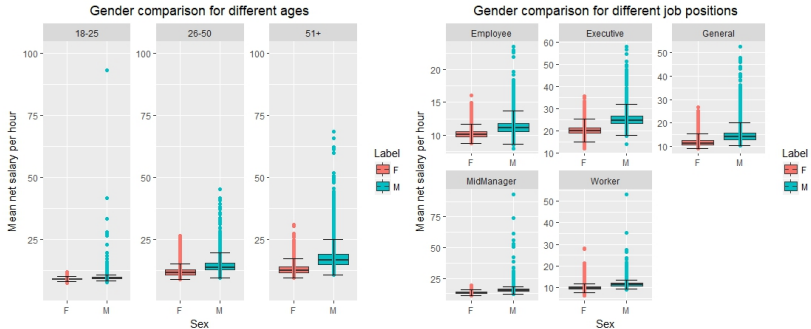
Distribution of Population for each department



Pyramid of Population

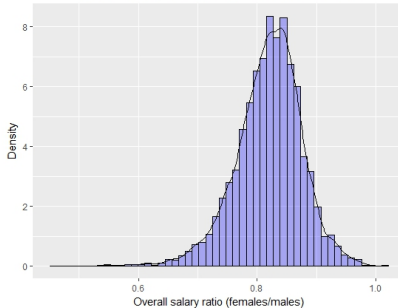


Inequality of salary

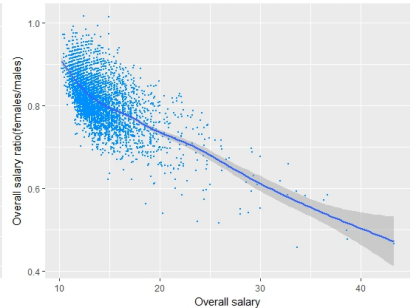


Inequality of salary

Overall salary ratio between females and males

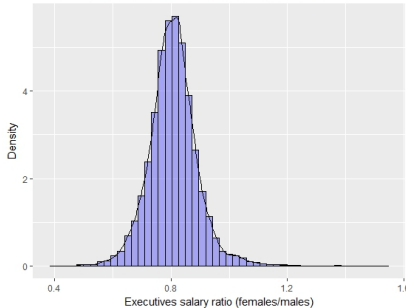


Overall salary ratio between females and males vs. overall salary



Inequality of salary

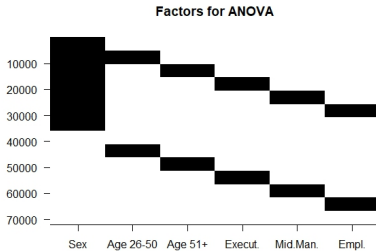
Executives salary ratio between females and males



Executives salary ratio between females and males
vs. overall executives salary



ANOVA using sex, job, age and interaction effects



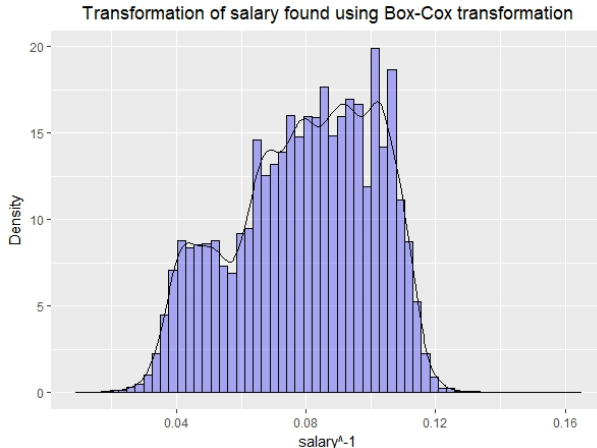
```
Call:
lm(formula = sal_y ~ sal_sex + sal_age + sal_job + sal_sex:sal_age +
    sal_sex:sal_job)

Residuals:
    Min       1q   Median       3q      Max
-0.084405 -0.004353  0.000683  0.005477  0.057842

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.061e-01  8.471e-05 1252.443 < 2e-16 ***
sal_sex      -1.097e-02  1.198e-04  -91.569 < 2e-16 ***
sal_age1     -2.160e-02  1.467e-04 -147.227 < 2e-16 ***
sal_age2     -2.838e-02  1.467e-04 -193.440 < 2e-16 ***
sal_job1     -5.601e-02  1.467e-04 -381.776 < 2e-16 ***
sal_job2     -3.036e-02  1.467e-04 -206.917 < 2e-16 ***
sal_job3     -8.621e-03  1.467e-04  -58.758 < 2e-16 ***
sal_sex:sal_age1 -2.502e-03  2.075e-04  -12.057 < 2e-16 ***
sal_sex:sal_age2 -7.572e-03  2.075e-04  -36.491 < 2e-16 ***
sal_sex:sal_job1  1.197e-03  2.075e-04   5.770 7.94e-09 ***
sal_sex:sal_job2  4.873e-04  2.075e-04   2.349  0.0188 *
sal_sex:sal_job3  3.059e-03  2.075e-04  14.742 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

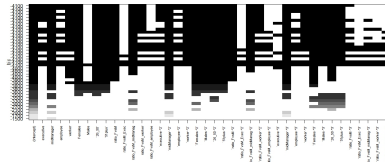
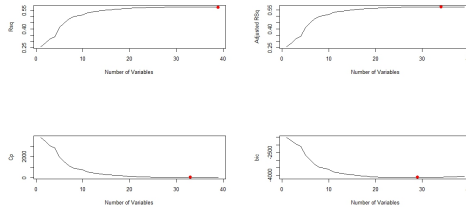
Residual standard error: 0.008585 on 71892 degrees of freedom
Multiple R-squared:  0.841,    Adjusted R-squared:  0.841
F-statistic: 3.458e+04 on 11 and 71892 DF,  p-value: < 2.2e-16
```

ANOVA using sex, job, age and interaction effects

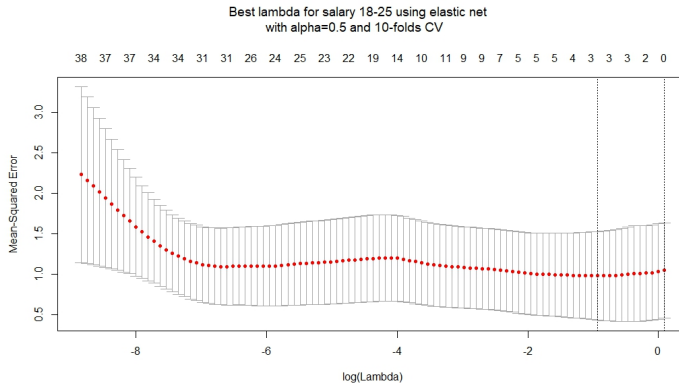


Prediction for young people using BSS

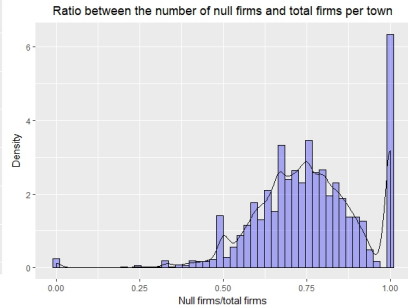
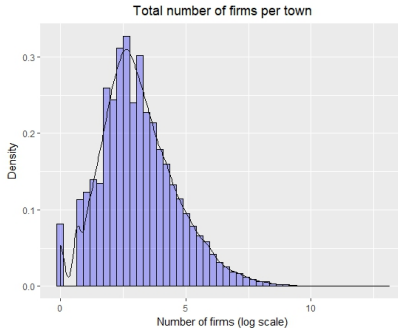
Best subset selection for salary 18-25



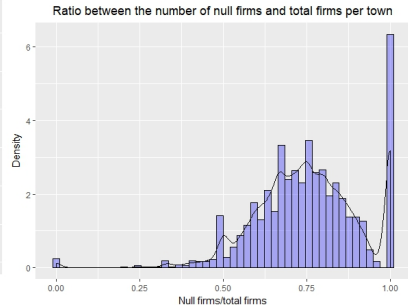
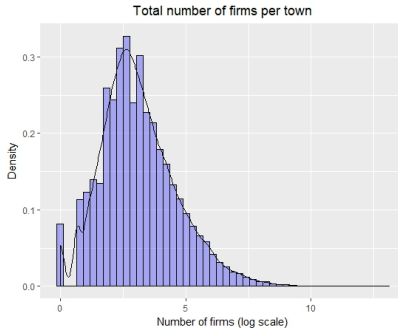
Elastic net and 10-folds CV



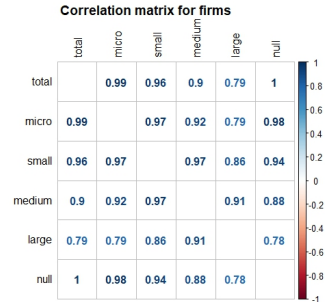
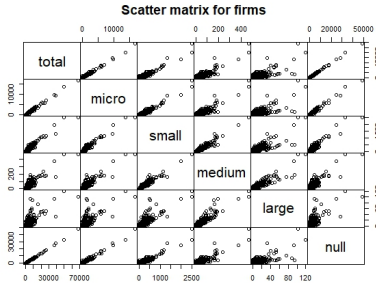
Distribution of firms per town



Distribution of firms per town

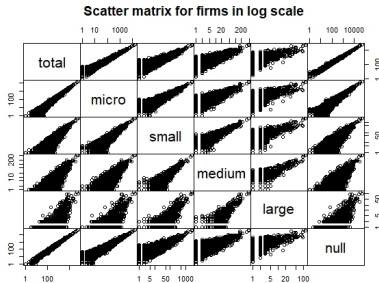


Bivariate relations



Excluding Paris

Bivariate relations



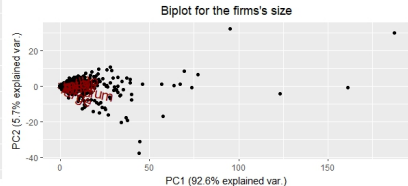
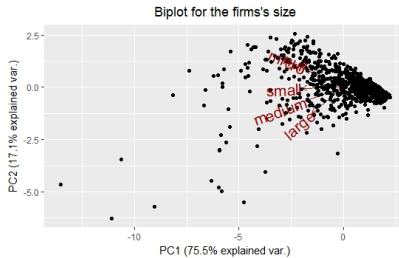
Correlation matrix for firms in log scale

	total	micro	small	medium	large	null
total		0.93	0.79	0.61	0.39	0.99
micro	0.93		0.83	0.64	0.41	0.9
small	0.79	0.83		0.8	0.54	0.76
medium	0.61	0.64	0.8		0.71	0.59
large	0.39	0.41	0.54	0.71		0.39
null	0.99	0.9	0.76	0.59	0.39	

Including Paris

PCA

Using original data scaled (not logs)
Most typical vs. Excluding just Paris



Issues

- A lot of NA in geo locations (retrieved from Google API)
- Unique code for salary data 1/7 of the total
- Missing additional information
- French DOM-TOM regions
- Outliers and spatial correlation
- Combine the separated datasets

Future works

- Create meaningful indicators
- Take correlation into account (especially spatial)
- Perform clustering techniques to identify geographical clusters
- Perform groupwise lasso to predict salary data
- Verification/improvement of the obtained results
- Compare the methodologies used with robust ones
- Find complementary datasets

– *Thank you* –