Populism On The Rise
Micro Analysis of Italian Election Results (2018 - 2019)

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Statistical Learning and Large Data I, II

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Motivation and Background
The Rise of Populism in Italy

- National and European elections results (2018 - 2019) [1]
- Fragility index dataset [2] $\rightarrow$ socio-economic features
- Exploring Root Causes for the Success of Populist Parties

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[1] **https://elezioni.interno.gov.it/**
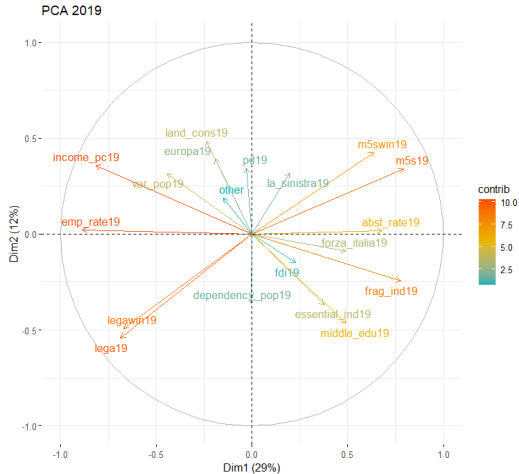[2] **https://www.istat.it/**

Data and Pre-processing

- 7903 observations $\rightarrow$ harmonizing for recent unions of municipalities
- Main Variables
  1. Fragility Index:synthetic measure of the level of fragility of the municipalities
  2. Employment Rate
  3. Income per capita
  4. Middle Education
  5. Abstention Rate
- Main Parties
  1. Winning Parties $\rightarrow$ Lega and M5S
  2. Controls $\rightarrow$ Forza Italia, Fratelli d'Italia, PD and Other

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Principal Component Analysis (PCA)

Dimension Reduction and Exploratory Data Analysis

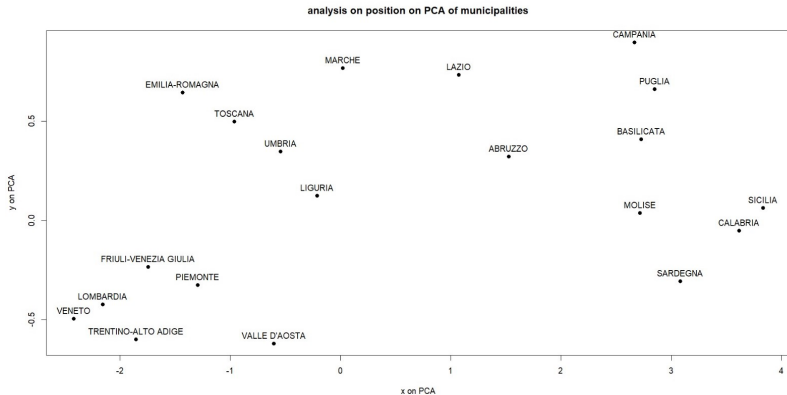# PCA on subsamples by fragility index
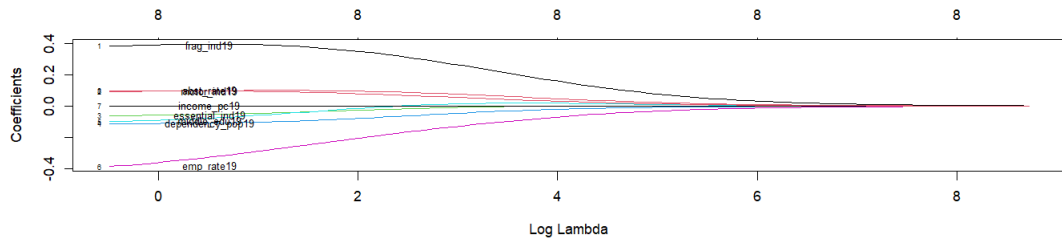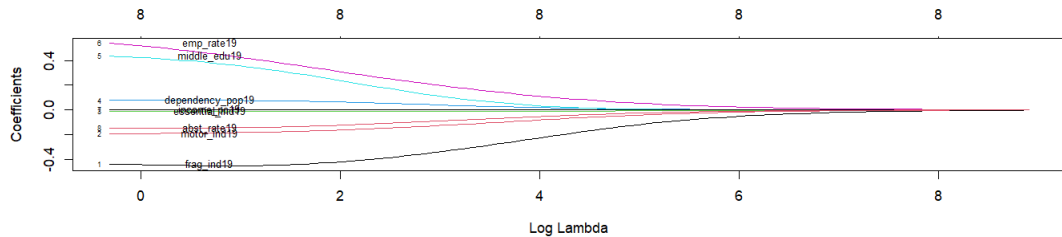

Biplot PCA subsample 2019 by frag_ind
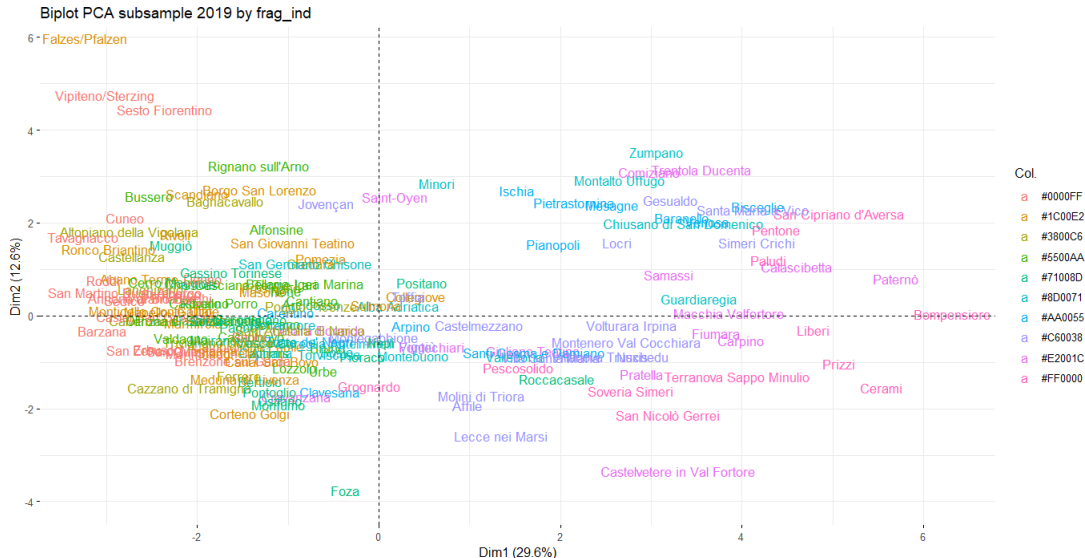
PCA subgroups by fragility index

analysis on position on PCA of municipalities

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Ridge Lega and M5S

Lasso Lega and M5S
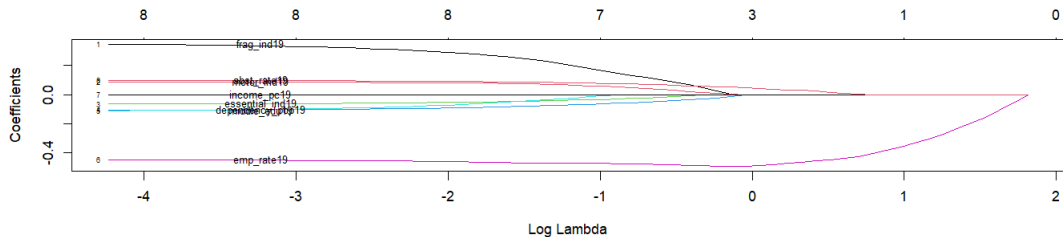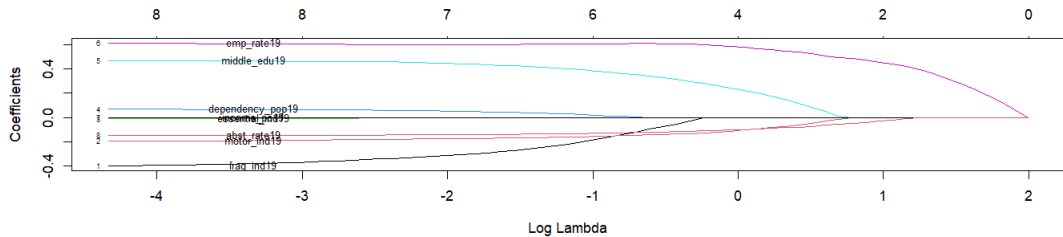
Feature Selection
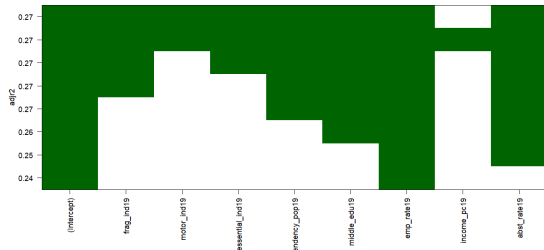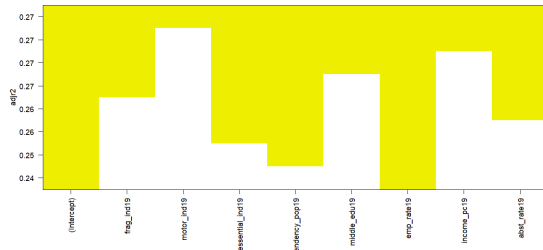
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Classification - Confusion Matrices

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Confusion Matrix and Statistics

            Reference
Prediction   0    1
         0 971 269
         1 228 507

               Accuracy : 0.7484
                 95% CI : (0.7286, 0.7674)
    No Information Rate : 0.6071
    P-Value [Acc > NIR] : < 2e-16

                  Kappa : 0.4675

 Mcnemar's Test P-Value : 0.07277

            Sensitivity : 0.8098
            Specificity : 0.6534
         Pos Pred Value : 0.7831
         Neg Pred Value : 0.6898
             Prevalence : 0.6071
         Detection Rate : 0.4916
   Detection Prevalence : 0.6278
      Balanced Accuracy : 0.7316

       'Positive' Class : 0
```

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Confusion Matrix and Statistics

            Reference
Prediction   0    1
         0 822 284
         1 219 650

               Accuracy : 0.7453
                 95% CI : (0.7255, 0.7644)
    No Information Rate : 0.5271
    P-Value [Acc > NIR] : < 2.2e-16

                  Kappa : 0.4873

 Mcnemar's Test P-Value : 0.004322

            Sensitivity : 0.7896
            Specificity : 0.6959
         Pos Pred Value : 0.7432
         Neg Pred Value : 0.7480
             Prevalence : 0.5271
         Detection Rate : 0.4162
   Detection Prevalence : 0.5600
      Balanced Accuracy : 0.7428

       'Positive' Class : 0
```
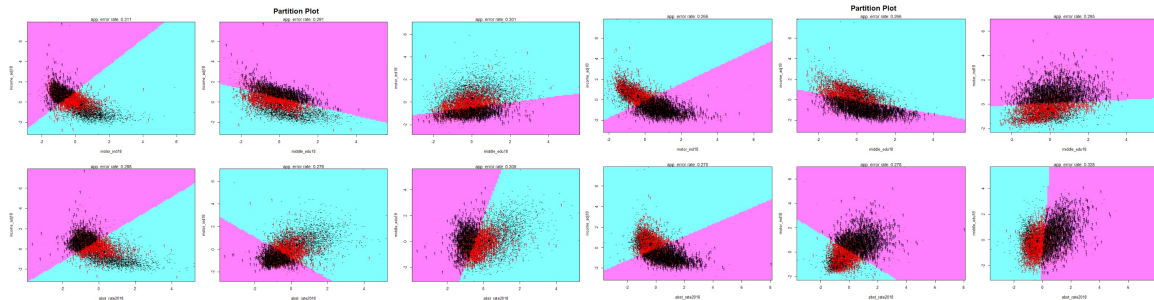
Confusion Matrices Lega and M5S

Classification

LDA Partimat Comparison Lega - M5S

OLS Model - Parties Percentage of Votes

Table 1: results for ols models parties 2018

| | Dependent variable: | |
| | lega18perc | m5s18perc |
	(1)	(2)
income_adj18	0.489*** (0.040)	−0.186*** (0.038)
emp_rate18	0.782*** (0.014)	−0.735*** (0.014)
middle_edu18	0.385*** (0.014)	−0.137*** (0.013)
Constant	−54.454*** (1.082)	83.404*** (1.029)
Observations	7,903	7,903
R^2	0.479	0.450
Adjusted R^2	0.479	0.450
Residual Std. Error (df = 7899)	8.490	8.080
F Statistic (df = 3; 7899)	2,422.504***	2,158.237***
Note:		$^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Table 2: results for abst.rate models 2018

| | Dependent variable: | |
| | lega18perc | m5s18perc |
	(1)	(2)
income_adj18	0.334*** (0.039)	−0.201*** (0.038)
emp_rate18	0.649*** (0.015)	−0.748*** (0.015)
middle_edu18	0.413*** (0.013)	−0.135*** (0.013)
abst_rate2018	−0.421*** (0.018)	−0.041** (0.017)
Constant	−33.148*** (1.377)	85.461*** (1.356)
Observations	7,903	7,903
R^2	0.514	0.451
Adjusted R^2	0.514	0.451
Residual Std. Error (df = 7898)	8.202	8.077
F Statistic (df = 4; 7898)	2,087.637***	1,620.943***
Note:		$^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

OLS Model - Parties Percentage of Votes by Fragility Index

Table 3: results for fragility models 2018

	Dependent variable:	
	lega18perc	m5s18perc
	(1)	(2)
income_adj18	0.266*** (0.040)	−0.142*** (0.040)
emp_rate18	0.593*** (0.016)	−0.716*** (0.016)
middle_edu18	0.423*** (0.014)	−0.145*** (0.014)
abst_rate2018	−0.398*** (0.018)	−0.040** (0.018)
frag_ind182	0.530 (0.413)	1.697*** (0.408)
frag_ind183	1.093*** (0.417)	1.300*** (0.412)
frag_ind184	0.508 (0.421)	1.826*** (0.416)
frag_ind185	−0.032 (0.426)	2.091*** (0.421)
frag_ind186	0.669 (0.434)	1.453*** (0.429)
frag_ind187	−0.783* (0.456)	2.262*** (0.451)
frag_ind188	−1.960*** (0.478)	2.805*** (0.473)
frag_ind189	−2.713*** (0.507)	3.408*** (0.500)
frag_ind1810	−2.390*** (0.555)	2.433*** (0.549)
Constant	−28.843*** (1.545)	80.877*** (1.526)
Observations	7,903	7,903
R^2	0.520	0.455
Adjusted R^2	0.519	0.454
Residual Std. Error (df = 7889)	8.154	8.053
F Statistic (df = 13; 7889)	657.951***	506.279***

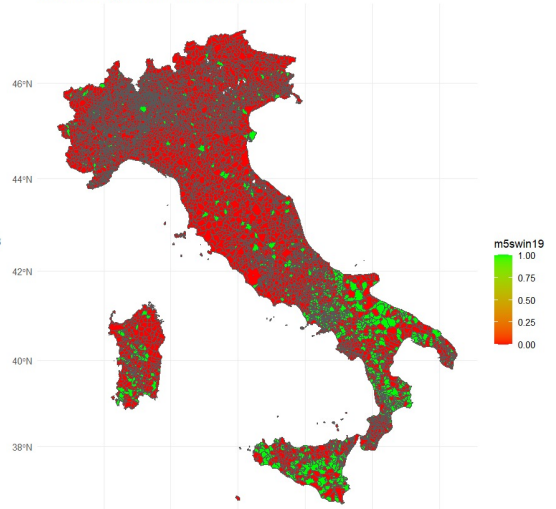*Note:* *p<0.1; **p<0.05; ***p<0.01

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Future Paths I

Italian Municipalities where M5S wins, 2018
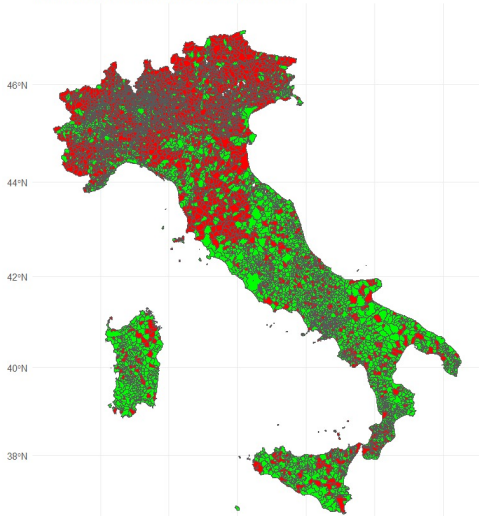
Italian Municipalities where M5S wins, 2019

Future Paths II

Italian Municipalities where FDI wins, 2018
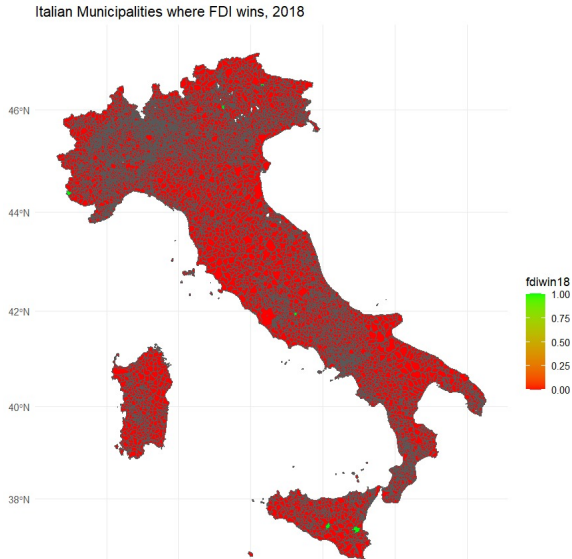
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