European Commission

June 2023

Problem with 'S.A.' node.

1 Model using hypergraphs or graphs?

1.1 Hpyergraph

Number of hyperedges : 11214
Number of entities (nodes): 4541
Number of edges in a bipartite graph 32501
Mean cardinality : 2.90
Std cardinality : 2.25

- Correlation between centralities of hyperedges.

	Betweenness	Closeness	Cardinality
Betweenness	1.000000	0.514992	0.732040
Closeness	0.514992	1.000000	0.397166
Cardinality	0.732040	0.397166	1.000000

⇒ big hyperedges have a high cardinality

1.2 Graph

Number of entities (nodes): 4541
Number of edges : 35139

2 Centralities

2.1 Degree

2.2 Betweenness

2.3 Eigenvector

3 Correlation between E.U. grant and centralities

restrict graph to organisation appearing the E.U. transparency register.
Number of nodes = 3637
The network still connected

	Members FTE	Eigenvector	Degree	Betweenness
E.U. Grants	0.002598	0.008545	0.028295	0.015429

⇒ No significant correlation

- problem when downloading the data. The seperator ',' appears in organization name

Category of registration	count	proportion
Companies and groups	1199	0.27
Non-governmental organisations, platforms and networks and similar	954	0.21
Trade and business associations	813	0.18
NaN	734	0.16
Trade unions and professional associations	237	0.05
Think tanks and research institutions	171	0.04
Professional consultancies	137	0.03
Other organisations, public or mixed entities	113	0.03
Academic institutions	79	0.02
Associations and networks of public authorities	42	0.01
Organisations representing churches and religious communities	15	0.00
Law firms	14	0.00
Self-employed individuals	9	0.00

Country	count	proportion
BELGIUM	953	0.210934
NaN	734	0.162461
GERMANY	420	0.092961
FRANCE	346	0.076583
NETHERLANDS	274	0.060646
UNITED STATES	255	0.056441
UNITED KINGDOM	229	0.050686
SPAIN	140	0.030987
ITALY	129	0.028552
FINLAND	114	0.025232
SWITZERLAND	94	0.020806
SWEDEN	84	0.018592
IRELAND	81	0.017928
AUSTRIA	78	0.017264
DENMARK	78	0.017264
POLAND	71	0.015715
CZECH REPUBLIC	39	0.008632
PORTUGAL	39	0.008632
LUXEMBOURG	38	0.008411
NORWAY	34	0.007525

4 Orbis data base

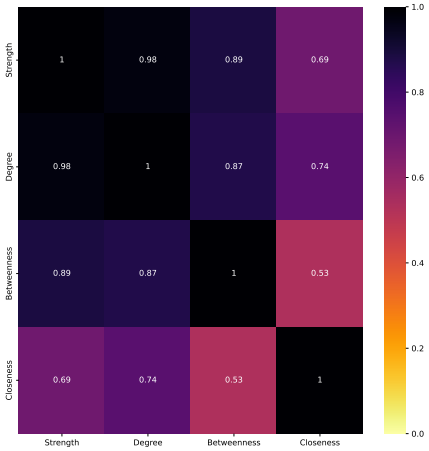
- Problem with separators solved by scraping eu web sites
- Add director general meetings. Need to specify a minimal date above which meeting should be taken into account (2019 beginning of the mandate)
- Match organization names with orbis detabase. Orbis keep the A scored matches + manual matching of the non-automatically matched.
- cleaning data :
  - in EU meeting, there are a few entities that have been mistyped. Use a dictionnary to search and replace these entities.
  - Names with double spacing or " are not let unchanged with the orbis matching. This concerns 22 organization names. Solved by manually restore the original names in the organization names files. Export organization names i.xlsx
  - drop duplicates in orbis data.
  - drop duplicates in transparency register
  - Problem with export for some french organizations. The information are well displayed in the orbis website but do not appear in the export excel datafile.
- How to consider the GUO? Issues :
  - Sometimes it is the state, so no financial data
  - should we collapse node the the hypergraph corresponding to the GUO, or just replace the financial data of the corresponding entities

Total number of organizations = 4517
Number of matched organizations in Orbis = 3646 (93.67 %)
Number of duplicated orga in Orbis = 63
Number of matched organizaiton in TR = 3784 (83.77 %)
Number of organization in TR but not in Orbis = 700
Number of organization matched in Orbis but not in TR = 562
Number of organization with known revenue = 2000 (44.28 %)
Number of organization with known nb employees = 2619 (57.98 %)
Number of organization with known assets = 2106 (46.62 %)

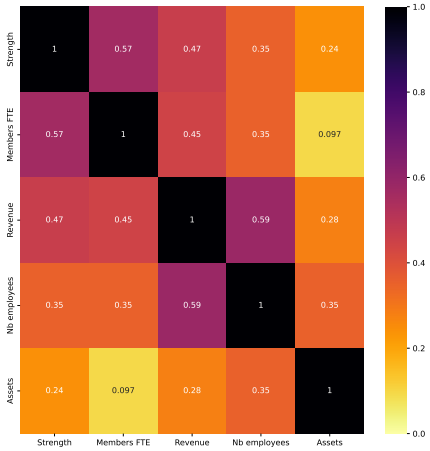
5 Analysis of companies

- Data = restrict entities to companies and groups.
- Goal = What companies feature explains the best their influence.
- Null hypothesis: companies influence should be proportional to their size and only depend on their size.

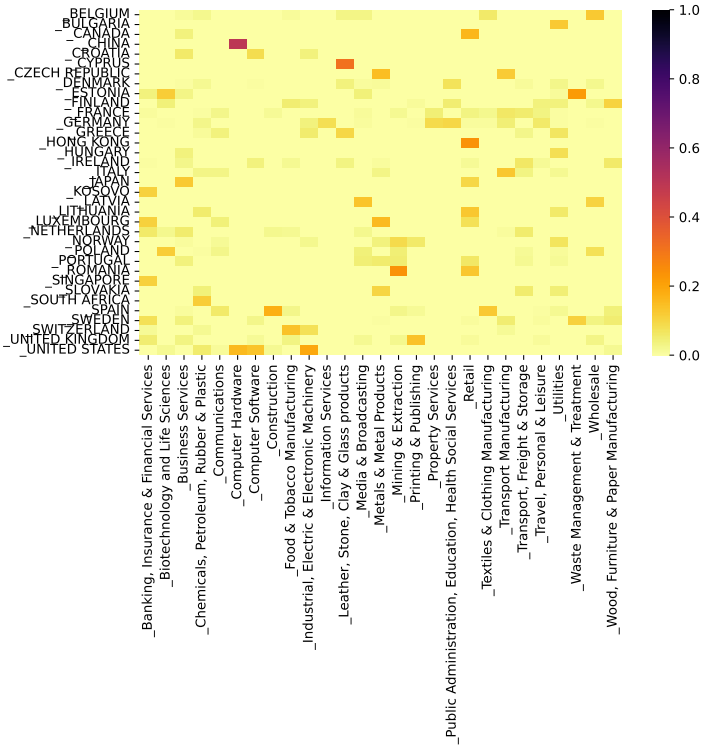
5.1 Correlation study



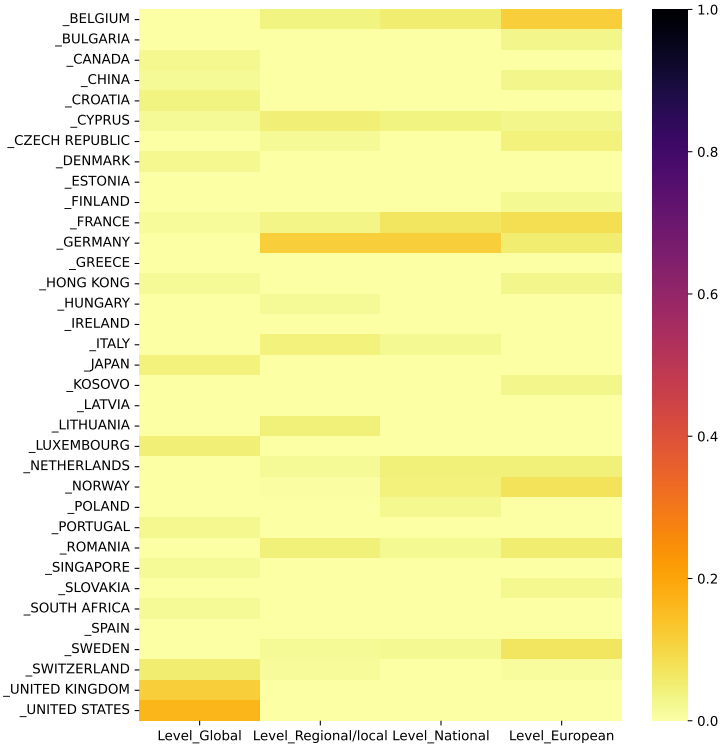
=> Strength, degree and betweenness are highly correlated. Focus on strength as dependent variable.

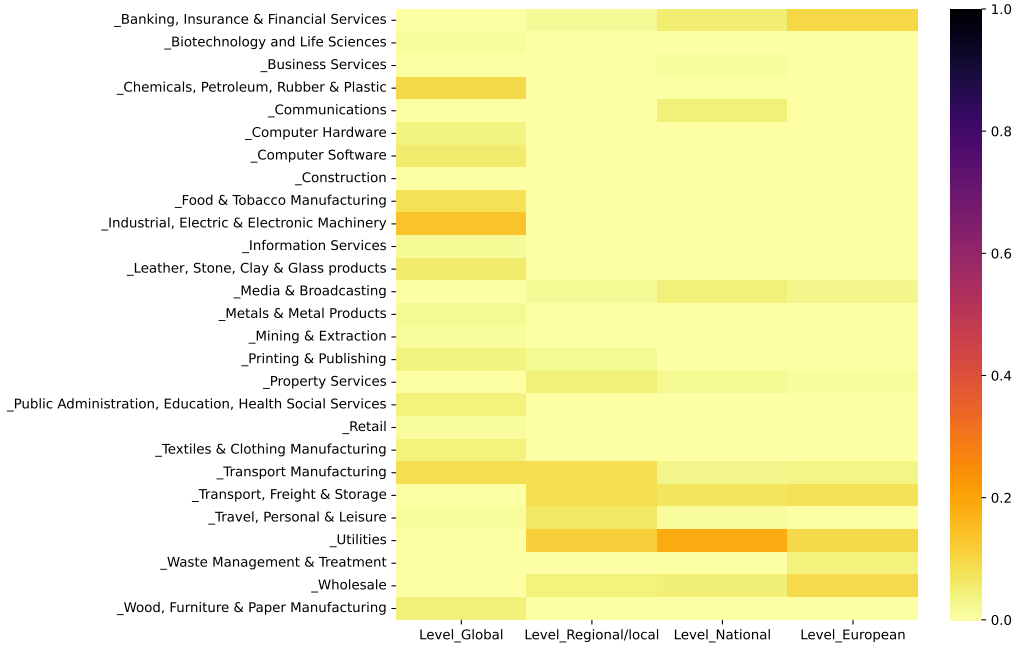


- Concerning financial data, revenue and number of employees are highly correlated correlated. Surprisingly, the assets are weakly correlated to revenue and number of employees.
- Strength is highly correlated to Members FTE (expected). Relatively good correlation between Strength and Revenue.

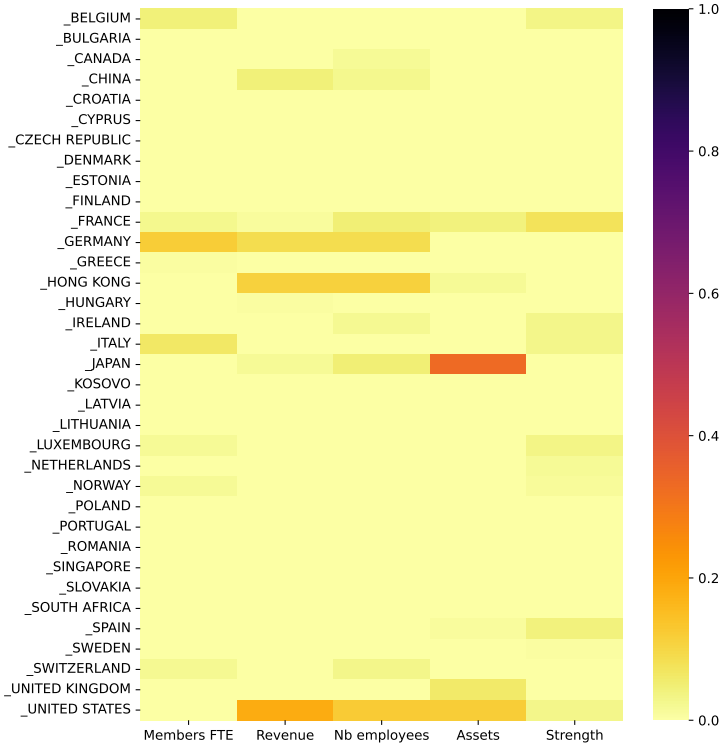


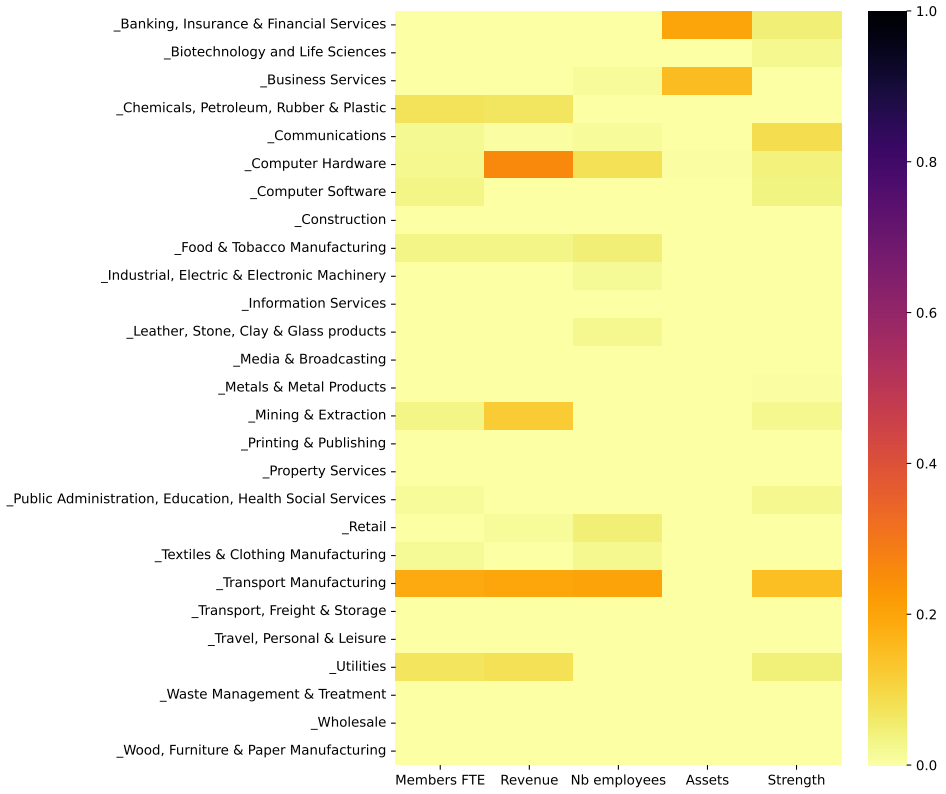
- High correlation between china and computer hardware. There is only one chinese company : Lenovo.
- No other significant correlation.

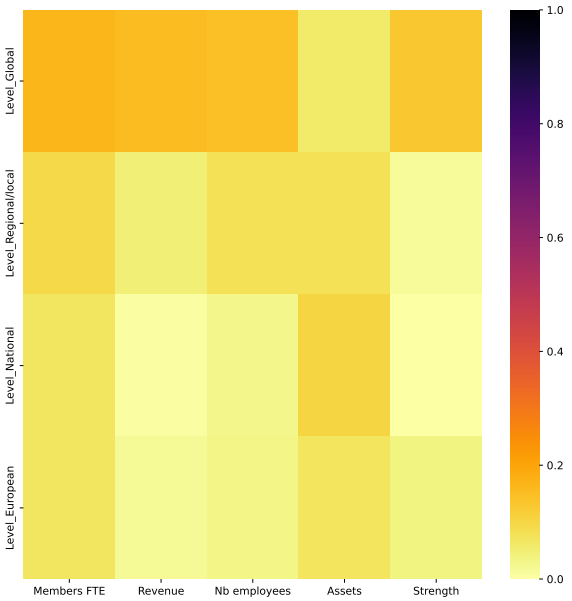




- No significant relation.




_Banking, Insurance & Financial Services
_Biotechnology and Life Sciences
_Business Services
_Chemicals, Petroleum, Rubber & Plastic
_Communications
_Computer Hardware
_Computer Software
_Construction
_Food & Tobacco Manufacturing
_Industrial, Electric & Electronic Machinery
_Information Services
_Leather, Stone, Clay & Glass products
_Media & Broadcasting
_Metals & Metal Products
_Mining & Extraction
_Printing & Publishing
_Property Services
_Public Administration, Education, Health Social Services
_Retail
_Textiles & Clothing Manufacturing
_Transport Manufacturing
_Transport, Freight & Storage
_Travel, Personal & Leisure
_Utilities
_Waste Management & Treatment
_Wholesale
_Wood, Furniture & Paper Manufacturing
Members FTE
Revenue
Nb employees
Assets
Strength
1.0
0.8
0.6
0.4
0.2
0.0

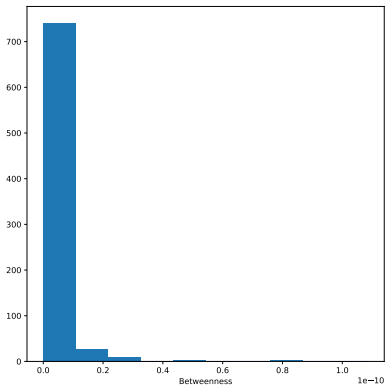

Level_Global
Level_Regional/local
Level_National
Level_European
Members FTE
Revenue
Nb employees
Assets
Strength
1.0
0.8
0.6
0.4
0.2
0.0

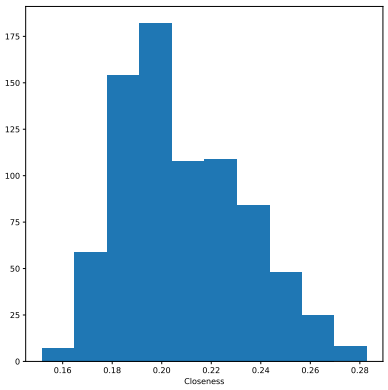
5.2 Clean data

5.2.1 Continuous

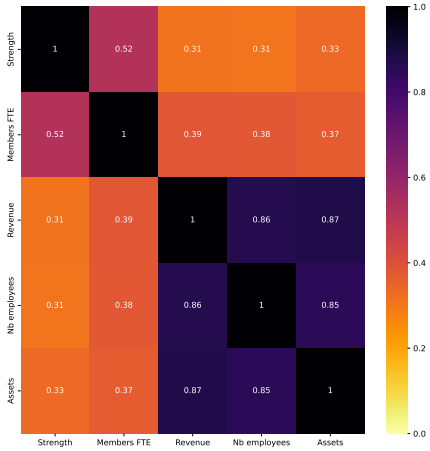
	Skew
Assets	6.833269
Nb employees	5.299134
Revenue	5.169145
Strength	4.095580
Degree	3.388787
Members FTE	3.032618
Closeness	0.495796
Betweenness	0.000000

- Numerical data are highly skewed.
- Closeness and Betweeneess seems to not be skewed. The plots shows that Betweenness is highly skewed. Should we normalize the centrality vector? This is surprising beacause, skeweness = $\mathbb{E}[(\frac{X-\mu}{\sigma})^3]$

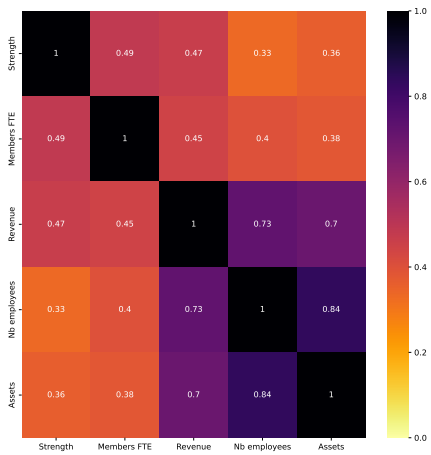




- To handle skewness of variables, transform data. Use log transform and yeojohnson transform. To use log transform, we have to add 1 to all values to handle null values. And there is a company with negative revenue (Airholding S.A.). For the log transform, it has been removed.
- log transform of independant variables.



- yeojohnson of independant variables



- Strengthen the correlation between financial data.
- Changes slightly the correlation between strength and the other variables. Except for assets which is considerably higher. The correlation between members FTE and assets also increases.

5.2.2 Categorical

Categorical data are also highly skewed, in the sense that there are some categories that embed a low proportion of companies. Possible ways to overcome the problem: Remove outliers, or form fewer and larger categories, for instance group of countries.

- Removing outliers: Define a frequency threshold under which the categories are considered to be very rare. All companies belonging to these categories are deleted.
  For thres =1%,
  removed category: ['LUXEMBOURG', 'JAPAN', 'SLOVAKIA', 'CROATIA', 'ROMANIA', 'LITHUANIA', 'HUNGARY', 'CZECH REPUBLIC', 'CANADA', 'LATVIA', 'CYPRUS', 'CHINA', 'KOSOVO', 'SOUTH AFRICA', 'SINGAPORE', 'BULGARIA', 'HONG KONG']
  number of outliers: 41
  removed category: ['Wood, Furniture and Paper Manufacturing', 'Biotechnology and Life Sciences', 'Construction', 'Public Administration, Education, Health Social Services', 'Textiles and Clothing Manufacturing', 'Agriculture, Horticulture and Livestock', 'Computer Hardware', 'Property Services', 'Waste Management and Treatment', 'Information Services']
  number of outliers: 41
- Group country per region : 'North America': ['CANADA', 'UNITED STATES'], 'North Europe': ['NORWAY', 'FINLAND', 'DENMARK', 'SWEDEN', 'LITHUANIA', 'LATVIA', 'ESTONIA', 'UNITED KINGDOM', 'IRELAND'], 'South Europe': ['ITALY', 'SPAIN', 'PORTUGAL', 'GREECE', 'CROATIA', 'CYPRUS'], 'East Europe': ['CZECH REPUBLIC', 'POLAND', 'ROMANIA', 'HUNGARY', 'BULGARIA', 'SLOVAKIA', 'KOSOVO'], 'West Europe': ['AUSTRIA', 'GERMANY', 'SWITZERLAND', 'BELGIUM', 'LUXEMBOURG', 'FRANCE', 'NETHERLANDS'], 'East Asia': ['JAPAN', 'CHINA', 'HONG KONG'], 'Other': ['SOUTH AFRICA', 'SINGAPORE']
  and remove outliers: removed category: ['East Asia', 'Other'] number of outliers: 9
  removed category: ['Construction', 'Biotechnology and Life Sciences', 'Wood, Furniture and Paper Manufacturing', 'Textiles and Clothing Manufacturing', 'Public Administration, Education, Health Social Services', 'Agriculture, Horticulture and Livestock', 'Computer Hardware', 'Property Services', 'Waste Management and Treatment', 'Information Services']
  number of outliers: 41

5.3 Regression

Dep. Variable:	Strength	**R-squared:**	0.287
Model:	OLS	**Adj. R-squared:**	0.285
Method:	Least Squares	**F-statistic:**	140.7
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	4.61e-52
Time:	11:27:28	**Log-Likelihood:**	-2582.7
No. Observations:	701	**AIC:**	5171.
Df Residuals:	698	**BIC:**	5185.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-7.2380	1.741	-4.157	0.000	-10.657	-3.819
Members FTE	9.1169	0.673	13.550	0.000	7.796	10.438
Revenue	0.4766	0.129	3.704	0.000	0.224	0.729

Omnibus:	617.203	**Durbin-Watson:**	2.019
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	22252.246
Skew:	3.801	**Prob(JB):**	0.00
Kurtosis:	29.534	**Cond. No.**	70.6

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.311
Model:	OLS	**Adj. R-squared:**	0.290
Method:	Least Squares	**F-statistic:**	15.32
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	6.51e-43
Time:	11:28:13	**Log-Likelihood:**	-2571.0
No. Observations:	701	**AIC:**	5184.
Df Residuals:	680	**BIC:**	5280.
Df Model:	20		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-10.2761	2.933	-3.504	0.000	-16.035	-4.517
Members FTE	9.2331	0.688	13.422	0.000	7.882	10.584
Revenue	0.4996	0.136	3.668	0.000	0.232	0.767
BELGIUM	2.8760	2.891	0.995	0.320	-2.801	8.553
DENMARK	0.4822	3.025	0.159	0.873	-5.457	6.422
ESTONIA	5.0852	4.393	1.158	0.247	-3.540	13.710
FINLAND	2.3868	2.801	0.852	0.394	-3.113	7.887
FRANCE	4.6145	2.582	1.787	0.074	-0.455	9.684
GERMANY	1.2260	2.511	0.488	0.626	-3.705	6.157
GREECE	-1.1554	4.134	-0.280	0.780	-9.272	6.961
IRELAND	6.8335	2.984	2.290	0.022	0.975	12.692
ITALY	2.0536	2.776	0.740	0.460	-3.398	7.505
NETHERLANDS	2.6211	2.621	1.000	0.318	-2.526	7.768
NORWAY	3.2760	3.477	0.942	0.346	-3.550	10.102
POLAND	-0.8174	3.966	-0.206	0.837	-8.605	6.970
PORTUGAL	1.8545	4.133	0.449	0.654	-6.261	9.970
SPAIN	5.5172	2.845	1.940	0.053	-0.068	11.102
SWEDEN	4.5191	2.875	1.572	0.116	-1.125	10.163
SWITZERLAND	0.8798	3.354	0.262	0.793	-5.705	7.465
UNITED KINGDOM	1.1134	2.600	0.428	0.669	-3.992	6.219
UNITED STATES	2.7759	2.617	1.061	0.289	-2.363	7.915

Omnibus:	615.500	**Durbin-Watson:**	2.040
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	22797.653
Skew:	3.771	**Prob(JB):**	0.00
Kurtosis:	29.900	**Cond. No.**	423.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.318
Model:	OLS	**Adj. R-squared:**	0.294
Method:	Least Squares	**F-statistic:**	13.16
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	3.82e-42
Time:	11:28:53	**Log-Likelihood:**	-2567.0
No. Observations:	701	**AIC:**	5184.
Df Residuals:	676	**BIC:**	5298.
Df Model:	24		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-11.0216	3.015	-3.655	0.000	-16.942	-5.101
Members FTE	9.0917	0.700	12.980	0.000	7.716	10.467
Revenue	0.5220	0.137	3.818	0.000	0.254	0.790
BELGIUM	2.6915	2.895	0.930	0.353	-2.993	8.376
DENMARK	0.3113	3.025	0.103	0.918	-5.628	6.251
ESTONIA	5.8645	4.402	1.332	0.183	-2.779	14.508
FINLAND	2.2054	2.797	0.788	0.431	-3.287	7.698
FRANCE	4.4594	2.584	1.726	0.085	-0.614	9.533
GERMANY	1.3168	2.511	0.524	0.600	-3.614	6.248
GREECE	-1.5470	4.127	-0.375	0.708	-9.651	6.557
IRELAND	6.6049	2.980	2.216	0.027	0.753	12.457
ITALY	2.1511	2.770	0.777	0.438	-3.288	7.590
NETHERLANDS	2.5494	2.620	0.973	0.331	-2.595	7.694
NORWAY	3.0331	3.480	0.872	0.384	-3.800	9.866
POLAND	-0.3867	3.964	-0.098	0.922	-8.170	7.397
PORTUGAL	1.7514	4.137	0.423	0.672	-6.372	9.875
SPAIN	5.4544	2.840	1.921	0.055	-0.121	11.030
SWEDEN	4.4722	2.871	1.558	0.120	-1.165	10.110
SWITZERLAND	0.4808	3.356	0.143	0.886	-6.109	7.070
UNITED KINGDOM	0.6191	2.613	0.237	0.813	-4.511	5.749
UNITED STATES	2.1259	2.639	0.806	0.421	-3.055	7.307
Level_Global	1.3881	0.977	1.420	0.156	-0.531	3.307
Level_Regional/local	-1.1356	1.049	-1.083	0.279	-3.195	0.924
Level_National	-1.4276	1.153	-1.238	0.216	-3.692	0.836
Level_European	1.2431	1.089	1.142	0.254	-0.894	3.380

Omnibus:	605.403	**Durbin-Watson:**	2.038
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	21348.090
Skew:	3.692	**Prob(JB):**	0.00
Kurtosis:	29.007	**Cond. No.**	425.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.351
Model:	OLS	**Adj. R-squared:**	0.311
Method:	Least Squares	**F-statistic:**	8.699
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	8.16e-40
Time:	11:29:55	**Log-Likelihood:**	-2549.8
No. Observations:	701	**AIC:**	5184.
Df Residuals:	659	**BIC:**	5375.
Df Model:	41		
Covariance Type:	nonrobust		

	coef	std err	t	P> |t|	[0.025	0.975]
const	-9.6483	3.326	-2.901	0.004	-16.179	-3.118
Members FTE	8.7702	0.713	12.295	0.000	7.370	10.171
Revenue	0.5868	0.143	4.092	0.000	0.305	0.868
BELGIUM	3.2086	2.895	1.108	0.268	-2.477	8.894
DENMARK	0.2917	3.012	0.097	0.923	-5.623	6.206
ESTONIA	5.2046	4.390	1.186	0.236	-3.415	13.824
FINLAND	1.9550	2.807	0.696	0.486	-3.557	7.467
FRANCE	3.8888	2.600	1.496	0.135	-1.216	8.994
GERMANY	1.0856	2.526	0.430	0.667	-3.874	6.045
GREECE	-1.7418	4.108	-0.424	0.672	-9.808	6.324
IRELAND	6.3297	2.990	2.117	0.035	0.459	12.200
ITALY	1.6211	2.792	0.581	0.562	-3.861	7.103
NETHERLANDS	2.0650	2.644	0.781	0.435	-3.126	7.256
NORWAY	1.9121	3.477	0.550	0.583	-4.915	8.739
POLAND	-0.2493	3.962	-0.063	0.950	-8.028	7.529
PORTUGAL	1.8072	4.143	0.436	0.663	-6.327	9.941
SPAIN	4.7100	2.850	1.653	0.099	-0.886	10.306
SWEDEN	3.5027	2.892	1.211	0.226	-2.177	9.182
SWITZERLAND	0.7414	3.381	0.219	0.826	-5.898	7.380
UNITED KINGDOM	0.1752	2.641	0.066	0.947	-5.011	5.361
UNITED STATES	1.3205	2.669	0.495	0.621	-3.920	6.561
Level_Global	2.0791	1.013	2.052	0.041	0.089	4.069
Level_Regional/local	-1.0351	1.049	-0.986	0.324	-3.096	1.026
Level_National	-2.2249	1.172	-1.898	0.058	-4.526	0.076
Level_European	1.5886	1.096	1.449	0.148	-0.564	3.741
Business Services	-1.4587	1.445	-1.010	0.313	-4.296	1.378
Chemicals, Petroleum, Rubber and Plastic	-5.1945	1.713	-3.033	0.003	-8.558	-1.831
Communications	2.2225	2.029	1.095	0.274	-1.761	6.206
Computer Software	-0.1384	2.349	-0.059	0.953	-4.751	4.475
Food and Tobacco Manufacturing	-6.2101	2.003	-3.101	0.002	-10.142	-2.278
Industrial, Electric and Electronic Machinery	-1.8404	1.700	-1.083	0.279	-5.178	1.497
Leather, Stone, Clay and Glass products	-6.4808	3.476	-1.865	0.063	-13.305	0.344
Media and Broadcasting	-3.5353	2.324	-1.521	0.129	-8.098	1.028
Metals and Metal Products	-4.6243	2.683	-1.723	0.085	-9.893	0.644
Mining and Extraction	-2.1339	2.474	-0.863	0.389	-6.991	2.724
Printing and Publishing	-0.3381	3.038	-0.111	0.911	-6.303	5.627
Retail	-2.1808	3.134	-0.696	0.487	-8.335	3.974
Transport Manufacturing	0.7652	2.177	0.351	0.725	-3.510	5.040
Transport, Freight and Storage	-2.9440	1.835	-1.604	0.109	-6.547	0.659
Travel, Personal and Leisure	-2.3682	2.619	-0.904	0.366	-7.510	2.774
Utilities	-0.3491	1.818	-0.192	0.848	-3.918	3.220
Wholesale	-3.9676	1.973	-2.011	0.045	-7.841	-0.094

Omnibus:	597.253	**Durbin-Watson:**	2.053
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	20803.587
Skew:	3.617	**Prob(JB):**	0.00
Kurtosis:	28.689	**Cond. No.**	432.

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.429
Model:	OLS	**Adj. R-squared:**	0.353
Method:	Least Squares	**F-statistic:**	5.654
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	1.11e-37
Time:	11:30:54	**Log-Likelihood:**	-2505.2
No. Observations:	701	**AIC:**	5176.
Df Residuals:	618	**BIC:**	5554.
Df Model:	82		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-7.1791	3.445	-2.084	0.038	-13.945	-0.414
Members FTE	7.7117	0.766	10.067	0.000	6.207	9.216
Revenue	0.4816	0.153	3.141	0.002	0.181	0.783
BELGIUM	1.3619	2.933	0.464	0.643	-4.397	7.121
DENMARK	-0.3392	3.073	-0.110	0.912	-6.374	5.695
ESTONIA	4.0585	4.408	0.921	0.358	-4.599	12.716
FINLAND	0.5963	2.891	0.206	0.837	-5.080	6.273
FRANCE	2.5189	2.692	0.936	0.350	-2.767	7.805
GERMANY	0.3481	2.581	0.135	0.893	-4.720	5.416
GREECE	-4.0497	4.113	-0.985	0.325	-12.127	4.027
IRELAND	4.2560	3.038	1.401	0.162	-1.710	10.222
ITALY	0.2485	2.822	0.088	0.930	-5.293	5.790
NETHERLANDS	1.5577	2.672	0.583	0.560	-3.689	6.805
NORWAY	1.6716	3.527	0.474	0.636	-5.254	8.597
POLAND	-1.7669	3.966	-0.446	0.656	-9.555	6.022
PORTUGAL	-1.1727	4.196	-0.279	0.780	-9.412	7.067
SPAIN	3.0787	2.878	1.070	0.285	-2.574	8.731
SWEDEN	2.4669	2.905	0.849	0.396	-3.238	8.172
SWITZERLAND	0.3235	3.398	0.095	0.924	-6.349	6.996
UNITED KINGDOM	-1.1348	2.677	-0.424	0.672	-6.392	4.122
UNITED STATES	-0.6984	2.741	-0.255	0.799	-6.082	4.685
Level_Global	1.6715	1.024	1.632	0.103	-0.340	3.683
Level_Regional/local	-1.0556	1.055	-1.001	0.317	-3.127	1.016
Level_National	-2.5848	1.190	-2.171	0.030	-4.923	-0.247
Level_European	1.7099	1.087	1.573	0.116	-0.424	3.844
Business Services	-1.7561	1.642	-1.070	0.285	-4.980	1.468
Chemicals, Petroleum, Rubber and Plastic	-3.3235	2.060	-1.613	0.107	-7.369	0.722
Communications	1.0358	2.303	0.450	0.653	-3.487	5.558
Computer Software	-0.4606	2.466	-0.187	0.852	-5.302	4.381
Food and Tobacco Manufacturing	-3.4284	2.543	-1.348	0.178	-8.422	1.565
Industrial, Electric and Electronic Machinery	-2.1832	1.962	-1.113	0.266	-6.036	1.670
Leather, Stone, Clay and Glass products	-7.2859	3.641	-2.001	0.046	-14.436	-0.135
Media and Broadcasting	-5.3056	2.632	-2.016	0.044	-10.474	-0.137
Metals and Metal Products	-4.9443	2.921	-1.692	0.091	-10.682	0.793
Mining and Extraction	-2.4928	2.669	-0.934	0.351	-7.735	2.749
Printing and Publishing	-0.5079	3.158	-0.161	0.872	-6.709	5.693
Retail	-2.6218	3.216	-0.815	0.415	-8.937	3.693
Transport Manufacturing	1.0932	2.400	0.456	0.649	-3.619	5.805
Transport, Freight and Storage	-2.9095	2.184	-1.332	0.183	-7.199	1.380
Travel, Personal and Leisure	-2.6942	2.844	-0.947	0.344	-8.279	2.890

Utilities	-0.2893	2.103	-0.138	0.891	-4.420	3.841
Wholesale	-3.9665	2.233	-1.776	0.076	-8.352	0.419
Field_Economy	-1.5933	1.590	-1.002	0.317	-4.716	1.529
Field_Enlargement	-0.7607	1.486	-0.512	0.609	-3.680	2.158
Field_Food safety	-1.2572	1.374	-0.915	0.361	-3.956	1.442
Field_Trans-European Networks	-1.7327	1.083	-1.600	0.110	-3.860	0.394
Field_Business and industry	-0.1144	0.984	-0.116	0.908	-2.048	1.819
Field_Agriculture and rural development	-2.9188	2.417	-1.208	0.228	-7.665	1.827
Field_Youth	2.9097	1.730	1.681	0.093	-0.489	6.308
Field_Migration and asylum	1.4437	2.790	0.517	0.605	-4.036	6.923
Field_Climate action	1.5710	1.073	1.464	0.144	-0.536	3.678
Field_Trade	2.0820	0.977	2.130	0.034	0.163	4.001
Field_Sport	-5.8767	3.427	-1.715	0.087	-12.607	0.854
Field_Borders and security	0.9023	1.384	0.652	0.515	-1.816	3.621
Field_Culture and media	1.8925	2.209	0.857	0.392	-2.445	6.230
Field_Humanitarian aid and civil protection	-2.4737	1.802	-1.372	0.170	-6.013	1.066
Field_Single market	0.9921	1.113	0.892	0.373	-1.193	3.177
Field_finance and the euro	-0.1283	1.170	-0.110	0.913	-2.426	2.169
Field_Education and training	-0.2808	1.183	-0.237	0.812	-2.604	2.043
Field_Fraud prevention	0.7954	1.378	0.577	0.564	-1.912	3.502
Field_Transport	7.1557	3.461	2.067	0.039	0.359	13.953
Field_Taxation	0.6829	0.993	0.688	0.492	-1.267	2.633
Field_Institutional affairs	1.1452	0.994	1.152	0.250	-0.807	3.097
Field_International co-operation and development	1.5110	1.023	1.477	0.140	-0.498	3.520
Field_Customs	-2.8678	1.028	-2.789	0.005	-4.887	-0.849
Field_External relations	-0.2037	1.034	-0.197	0.844	-2.234	1.827
Field_Banking and financial services	-0.7748	1.064	-0.728	0.467	-2.865	1.316
Field_Maritime affairs and fisheries	-1.4304	1.521	-0.940	0.347	-4.417	1.556
Field_Competition	-0.3602	1.060	-0.340	0.734	-2.443	1.722
Field_Energy	1.1932	1.031	1.157	0.248	-0.832	3.218
Field_Public health	-1.7018	1.129	-1.507	0.132	-3.920	0.516
Field_Environment	-1.1906	1.152	-1.034	0.302	-3.452	1.071
Field_Justice and fundamental rights	2.4680	1.117	2.210	0.027	0.275	4.661
Field_Culture	1.6607	2.279	0.729	0.466	-2.815	6.136
Field_Consumers	0.8107	0.980	0.827	0.408	-1.114	2.735
Field_Regional policy	0.5272	1.173	0.449	0.653	-1.777	2.831
Field_Research and innovation	-1.1395	0.957	-1.191	0.234	-3.019	0.740
Field_Digital economy and society	0.5198	1.254	0.415	0.679	-1.942	2.982
Field_Communication	-2.8663	1.153	-2.486	0.013	-5.131	-0.602
Field_European neighbourhood policy	-1.6818	1.974	-0.852	0.395	-5.559	2.196
Field_Budget	2.1216	1.198	1.771	0.077	-0.231	4.474
Field_Employment and social affairs	0.5258	0.997	0.527	0.598	-1.433	2.485
Field_Foreign affairs and security policy	0.2724	1.141	0.239	0.811	-1.968	2.513

Omnibus:	508.915	**Durbin-Watson:**	1.997
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	12246.707
Skew:	2.950	**Prob(JB):**	0.00
Kurtosis:	22.608	**Cond. No.**	461.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Group countries

Dep. Variable:	Strength	**R-squared:**	0.291
Model:	OLS	**Adj. R-squared:**	0.285
Method:	Least Squares	**F-statistic:**	49.56
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	4.30e-51
Time:	13:29:30	**Log-Likelihood:**	-2692.7
No. Observations:	733	**AIC:**	5399.
Df Residuals:	726	**BIC:**	5432.
Df Model:	6		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-7.4138	2.199	-3.372	0.001	-11.731	-3.097
Members FTE	8.9676	0.660	13.579	0.000	7.671	10.264
Revenue	0.5054	0.126	3.996	0.000	0.257	0.754
East Europe	-2.7490	2.345	-1.172	0.241	-7.353	1.855
North Europe	0.0925	1.329	0.070	0.945	-2.517	2.702
South Europe	0.2673	1.529	0.175	0.861	-2.734	3.268
West Europe	-0.2286	1.273	-0.180	0.857	-2.727	2.270

Omnibus:	643.431	**Durbin-Watson:**	2.000
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	23420.226
Skew:	3.794	**Prob(JB):**	0.00
Kurtosis:	29.631	**Cond. No.**	130.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-10.1629	2.625	-3.871	0.000	-15.317	-5.009
Members FTE	8.9676	0.660	13.579	0.000	7.671	10.264
Revenue	0.5054	0.126	3.996	0.000	0.257	0.754
North America	2.7490	2.345	1.172	0.241	-1.855	7.353
North Europe	2.8415	2.142	1.327	0.185	-1.363	7.046
South Europe	3.0164	2.267	1.330	0.184	-1.435	7.467
West Europe	2.5204	2.115	1.192	0.234	-1.632	6.673

Omnibus:	643.431	**Durbin-Watson:**	2.000
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	23420.226
Skew:	3.794	**Prob(JB):**	0.00
Kurtosis:	29.631	**Cond. No.**	195.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.298
Model:	OLS	**Adj. R-squared:**	0.289
Method:	Least Squares	**F-statistic:**	30.71
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	1.63e-49
Time:	13:32:30	**Log-Likelihood:**	-2688.7
No. Observations:	733	**AIC:**	5399.
Df Residuals:	722	**BIC:**	5450.
Df Model:	10		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-10.6712	2.702	-3.949	0.000	-15.977	-5.365
Members FTE	8.8800	0.672	13.220	0.000	7.561	10.199
Revenue	0.5289	0.127	4.168	0.000	0.280	0.778
North America	2.1840	2.423	0.901	0.368	-2.573	6.941
North Europe	2.6081	2.175	1.199	0.231	-1.663	6.879
South Europe	2.9697	2.295	1.294	0.196	-1.536	7.475
West Europe	2.4348	2.146	1.134	0.257	-1.779	6.648
Level_Global	1.0013	0.926	1.081	0.280	-0.817	2.820
Level_Regional/local	-1.1832	1.001	-1.182	0.238	-3.149	0.782
Level_National	-1.5859	1.106	-1.434	0.152	-3.756	0.585
Level_European	1.4246	1.029	1.384	0.167	-0.596	3.445

Omnibus:	632.414	**Durbin-Watson:**	2.003
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	21852.233
Skew:	3.712	**Prob(JB):**	0.00
Kurtosis:	28.698	**Cond. No.**	199.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.331
Model:	OLS	**Adj. R-squared:**	0.305
Method:	Least Squares	**F-statistic:**	12.90
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	1.92e-45
Time:	13:33:41	**Log-Likelihood:**	-2671.4
No. Observations:	733	**AIC:**	5399.
Df Residuals:	705	**BIC:**	5528.
Df Model:	27		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-9.8675	2.972	-3.321	0.001	-15.702	-4.033
Members FTE	8.5444	0.681	12.551	0.000	7.208	9.881
Revenue	0.6008	0.133	4.517	0.000	0.340	0.862
North America	1.8480	2.459	0.752	0.453	-2.979	6.675
North Europe	2.4926	2.181	1.143	0.253	-1.789	6.774
South Europe	2.7453	2.289	1.199	0.231	-1.750	7.240
West Europe	2.4875	2.150	1.157	0.248	-1.734	6.709
Level_Global	1.6525	0.962	1.718	0.086	-0.236	3.541
Level_Regional/local	-1.0841	1.003	-1.081	0.280	-3.053	0.885
Level_National	-2.3131	1.119	-2.067	0.039	-4.510	-0.116
Level_European	1.7332	1.034	1.677	0.094	-0.296	3.763
Business Services	-1.1500	1.397	-0.823	0.411	-3.893	1.593
Chemicals, Petroleum, Rubber and Plastic	-5.1337	1.651	-3.109	0.002	-8.376	-1.891
Communications	2.0962	1.968	1.065	0.287	-1.767	5.959
Computer Software	0.1417	2.264	0.063	0.950	-4.304	4.587
Food and Tobacco Manufacturing	-6.0165	1.948	-3.088	0.002	-9.842	-2.191
Industrial, Electric and Electronic Machinery	-2.1871	1.627	-1.344	0.179	-5.382	1.008
Leather, Stone, Clay and Glass products	-6.5919	3.211	-2.053	0.040	-12.896	-0.288
Media and Broadcasting	-3.2243	2.246	-1.436	0.152	-7.633	1.185
Metals and Metal Products	-2.4320	2.412	-1.008	0.314	-7.167	2.303
Mining and Extraction	-1.7975	2.329	-0.772	0.440	-6.369	2.774
Printing and Publishing	-0.8801	2.973	-0.296	0.767	-6.717	4.956
Retail	-2.0107	2.692	-0.747	0.455	-7.297	3.275
Transport Manufacturing	1.1533	2.102	0.549	0.583	-2.973	5.280
Transport, Freight and Storage	-2.6240	1.779	-1.475	0.141	-6.117	0.869
Travel, Personal and Leisure	-1.9714	2.565	-0.768	0.442	-7.008	3.065
Utilities	-0.2866	1.722	-0.166	0.868	-3.667	3.094
Wholesale	-3.9236	1.899	-2.066	0.039	-7.653	-0.194

Omnibus:	624.930	**Durbin-Watson:**	2.027
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	21402.863
Skew:	3.644	**Prob(JB):**	0.00
Kurtosis:	28.449	**Cond. No.**	225.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Dep. Variable:	Strength	**R-squared:**	0.411
Model:	OLS	**Adj. R-squared:**	0.350
Method:	Least Squares	**F-statistic:**	6.801
Date:	jeu., 23 nov. 2023	**Prob (F-statistic):**	1.16e-42
Time:	13:34:12	**Log-Likelihood:**	-2624.8
No. Observations:	733	**AIC:**	5388.
Df Residuals:	664	**BIC:**	5705.
Df Model:	68		
Covariance Type:	nonrobust		

	coef	**std err**	**t**	**P> |t|**	**[0.025**	**0.975]**
const	-9.1796	3.083	-2.977	0.003	-15.234	-3.125
Members FTE	7.4991	0.725	10.344	0.000	6.076	8.923
Revenue	0.4990	0.141	3.540	0.000	0.222	0.776
North America	1.7426	2.458	0.709	0.479	-3.084	6.569
North Europe	3.3687	2.182	1.544	0.123	-0.916	7.654
South Europe	3.1245	2.270	1.376	0.169	-1.333	7.582
West Europe	3.6671	2.144	1.710	0.088	-0.544	7.878
Level_Global	1.1984	0.971	1.235	0.217	-0.707	3.104
Level_Regional/local	-1.0506	1.009	-1.041	0.298	-3.032	0.931
Level_National	-2.5121	1.131	-2.221	0.027	-4.733	-0.292
Level_European	1.6598	1.020	1.627	0.104	-0.343	3.662
Business Services	-1.7294	1.580	-1.095	0.274	-4.832	1.373
Chemicals, Petroleum, Rubber and Plastic	-3.8723	1.979	-1.957	0.051	-7.758	0.013
Communications	0.8276	2.238	0.370	0.712	-3.567	5.222
Computer Software	-0.4865	2.357	-0.206	0.837	-5.115	4.142
Food and Tobacco Manufacturing	-3.8487	2.466	-1.561	0.119	-8.691	0.993
Industrial, Electric and Electronic Machinery	-2.8902	1.866	-1.549	0.122	-6.554	0.773
Leather, Stone, Clay and Glass products	-7.7020	3.365	-2.289	0.022	-14.308	-1.096
Media and Broadcasting	-5.1771	2.492	-2.077	0.038	-10.071	-0.283
Metals and Metal Products	-3.2724	2.665	-1.228	0.220	-8.506	1.961
Mining and Extraction	-2.2803	2.507	-0.909	0.363	-7.203	2.643
Printing and Publishing	-1.2443	3.073	-0.405	0.686	-7.278	4.790
Retail	-3.4746	2.774	-1.253	0.211	-8.922	1.973
Transport Manufacturing	1.1157	2.316	0.482	0.630	-3.432	5.664
Transport, Freight and Storage	-2.8312	2.108	-1.343	0.180	-6.971	1.309
Travel, Personal and Leisure	-2.7812	2.764	-1.006	0.315	-8.208	2.645
Utilities	-0.3848	1.992	-0.193	0.847	-4.296	3.526
Wholesale	-4.3347	2.146	-2.020	0.044	-8.548	-0.122
Field_Economy	-1.5748	1.521	-1.035	0.301	-4.562	1.412
Field_Enlargement	-1.1168	1.404	-0.795	0.427	-3.874	1.640
Field_Food safety	-1.1523	1.323	-0.871	0.384	-3.749	1.445
Field_Trans-European Networks	-1.9458	1.039	-1.872	0.062	-3.987	0.095
Field_Business and industry	0.1885	0.923	0.204	0.838	-1.624	2.002
Field_Agriculture and rural development	-3.2511	2.312	-1.406	0.160	-7.791	1.288
Field_Youth	3.3991	1.689	2.013	0.045	0.083	6.715
Field_Migration and asylum	1.5984	2.705	0.591	0.555	-3.713	6.910
Field_Climate action	1.0998	1.027	1.071	0.285	-0.917	3.117
Field_Trade	2.0145	0.936	2.151	0.032	0.176	3.853
Field_Sport	-5.5419	3.191	-1.737	0.083	-11.808	0.724
Field_Borders and security	0.6399	1.329	0.481	0.630	-1.970	3.250

Field_Culture and media	1.6331	2.116	0.772	0.441	-2.522	5.788
Field_Humanitarian aid and civil protection	-1.9967	1.747	-1.143	0.253	-5.426	1.433
Field_Single market	0.2384	1.044	0.228	0.819	-1.812	2.288
Field_finance and the euro	-0.3703	1.112	-0.333	0.739	-2.554	1.813
Field_Education and training	-0.0639	1.132	-0.056	0.955	-2.287	2.159
Field_Fraud prevention	0.9089	1.309	0.694	0.488	-1.662	3.480
Field_Transport	6.9553	3.252	2.139	0.033	0.570	13.341
Field_Taxation	0.8264	0.945	0.875	0.382	-1.029	2.682
Field_Institutional affairs	1.6055	0.946	1.697	0.090	-0.252	3.463
Field_International co-operation and development	1.4334	0.976	1.468	0.142	-0.483	3.350
Field_Customs	-2.4967	0.991	-2.519	0.012	-4.443	-0.551
Field_External relations	-0.6357	1.000	-0.636	0.525	-2.599	1.328
Field_Banking and financial services	-0.5419	1.029	-0.527	0.599	-2.563	1.479
Field_Maritime affairs and fisheries	-1.6681	1.470	-1.135	0.257	-4.555	1.219
Field_Competition	-0.0653	1.001	-0.065	0.948	-2.032	1.901
Field_Energy	1.0151	0.981	1.035	0.301	-0.910	2.941
Field_Public health	-1.6129	1.087	-1.483	0.138	-3.748	0.522
Field_Environment	-0.7550	1.086	-0.695	0.487	-2.887	1.377
Field_Justice and fundamental rights	2.3068	1.064	2.168	0.030	0.218	4.396
Field_Culture	1.9489	2.196	0.888	0.375	-2.363	6.261
Field_Consumers	0.8574	0.947	0.906	0.366	-1.002	2.717
Field_Regional policy	0.4541	1.137	0.399	0.690	-1.779	2.687
Field_Research and innovation	-0.7756	0.903	-0.859	0.391	-2.549	0.997
Field_Digital economy and society	0.3175	1.210	0.262	0.793	-2.059	2.694
Field_Communication	-2.7628	1.106	-2.498	0.013	-4.934	-0.592
Field_European neighbourhood policy	-1.8741	1.871	-1.001	0.317	-5.549	1.800
Field_Budget	2.4074	1.163	2.070	0.039	0.124	4.691
Field_Employment and social affairs	0.4926	0.957	0.514	0.607	-1.387	2.373
Field_Foreign affairs and security policy	0.2850	1.102	0.259	0.796	-1.879	2.449

Omnibus:	530.602	**Durbin-Watson:**	1.973
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	12540.045
Skew:	2.957	**Prob(JB):**	0.00
Kurtosis:	22.381	**Cond. No.**	277.

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.