STRINGENCY OF COVID-19 RESTRICTIONS AMONG ITALIAN REGIONS AND THE ROLE OF REGIONAL ECONOMIC SYSTEMS

Giorgio Tassinari[1]
Fabrizio Alboni[2]
Arianna Tassinari[3]
Ignazio Drudi[4]

DOI: https://doi.org/10.31410/ERAZ.S.P.2020.1

Abstract: *The diffusion of COVID-19 pandemic among Italian Regions has been very uneven. The intensity of measures introduced to contrast its spread also shows a high heterogeneity among local jurisdiction, but this does not correspond, prima facie, with the intensity of the pandemic. What shapes the stringency of responses across different localities? Various factors could be hypothesised to be at play: factors related to the intensity of the pandemic, to the political and ideological orientation of governing authorities, to the models of growth and development characterising regional economic systems, and to the strength of lobbying groups pushing for more or less stringent responses. To address these questions, we elaborate a regional stringency index and analyse (using CART regression trees and other statistical methods) its relationships with some of these factors. The results show that the main driver of stringency (in an inverse way) is the weight of exports on regional GDP, suggesting that economic interests and business power might play an important role in shaping political responses to pandemics.*

Keywords: *Covid-19, Lockdown, Business interests.*

1. INTRODUCTION

A key challenge facing policymakers in the formulation of public policy responses to the Covid19 crisis has been how to balance the tension between two competing principles and guiding objectives of governmental activity: on the one hand, the preservation and safeguarding of public health, and on the other, the preservation of economic and business activity to safeguard economic growth and prevent an excessive decline in output. One of the main issue areas where the opposition of these two principles in public policy formulation has played out most evidently is the question of *timing* and *extensiveness* of restrictions on economic and productive activity during the lockdown. Which economic sectors should remain operational during the acute phase of the pandemic, and under what conditions? And how fast and extensive should the easing of these restrictions be, once the most acute phase of the pandemic crisis is over?

Political tensions over these questions have been at the centre of public policy and political debates in several countries. The heated controversies on the timing and conditions of re-openings of business and commercial activities after the peak of the pandemic in Italy, and the unfolding conflict between the UK government, unions and business groups on the UK government's 'return to work' plans provide illustrative examples in this respect. A key aspect of this debate

[1] Dept. of Statistical Sciences "Paolo Fortunati", Alma Mater Studiorum University of Bologna, Italy
[2] Dept. of Economics "Marco Biagi", University of Modena and Reggio Emilia, Italy
[3] Dept. of Social and Political Sciences, European University Institute, Fiesole, (FI), Italy
[4] Dept. of Statistical Sciences "Paolo Fortunati", Alma Mater Studiorum University of Bologna, Italy

concerns specifically the role that (organized) economic interests have played in shaping public policy responses to the pandemic, with particular regard to the timing, length, extensiveness and stringency of lockdown measures for economic and productive activities. Depending on the national context, European governments have alternatively been accused in media debates of having 'capitulated' to the pressures of powerful business groups when hesitating to implement fast and extensive restrictions on economic activity, or of being 'in the pocket of trade unions' when opting for longer or more extensive preventative measures restricting economic and production activity. This is a pressing challenge for policymakers and political systems, as lack of clarity and transparency about the role and influence that organized economic interests have played in shaping policy responses to the Covid19 pandemic can contribute to an escalation of political and social tensions among social groups, and foster a crisis of public trust arising from a perceived lack in transparency and input legitimacy of governmental activity.

The key hypothesis that we seek to test is that the stringency of public policy responses restricting economic activity to respond to the pandemic is influenced by the *structural* and *instrumental* power (cf. Culpepper 2010) that business groups in key economic sectors are able to exercise. In this exploratory paper, we use Italy as an illustrative and crucial case study. The choice of the Italian case is well suited to explore the influence of business interests on the responses to the COVID-19 pandemic. Italy was in the eye of the storm of the Covid-19 pandemic, as one of the European countries that was hit sooner and hardest. However, it displayed considerable regional inequalities in the spread of the pandemic, as it is shown in figure 2. Regional variation in the stringency of the lockdown measures implemented was also considerable, as after the constitutional reform of 2001 Italian regions have enjoyed considerable levels of autonomy on several areas of governance.

The strength and orientation of business and economic interests also varies across regions. The Italian growth model has historically been demand-led, but it has increasingly been dependent on exports since the launch of Euro (Simonazzi, Ginzburg, and Nocella, 2013). This pattern has been deepened by the Great Recession (Bellofiore and Garibaldo, 2019; Perez and Matsaganis 2019). The manufacturing business confederation (Confindustria) is the most powerful business group, and has in recent years been highly influential in orienting government policies in the economic and labour policy fields to push for measures enhancing the external competitiveness of the Italian economy (cf. Pritoni and Sacchi, 2019; Bulfone and Tassinari forthcoming). The 21 Italian Regions display however considerable variation in the degree of economic development (that is reflected in differences in GDP per capita) and in their degree of export orientation. Hence, this makes the Italian case theoretically and empirically apt to investigate whether the strength of export-oriented economic interests at a regional level is correlated with the stringency of pandemic responses, whilst holding other factors (such as the national political system and the overall macroeconomic and fiscal context) constant.

Shedding light on the influence of economic interests on responses to the pandemic has great relevance and potential use for policymakers. Indeed, ascertaining the impact of economic interests and lobby groups on the crafting of policy responses to the Covid19 pandemic helps to illuminate and make legible the forces at work in shaping government policy responses, and in this way contribute to give greater (input) legitimacy to governmental decisions, as well as to introduce greater transparency in political debates over the role of business in politics.

2. THE COVID-19 PANDEMIC IN ITALY: A BRIEF CRONICLE

The official starting point of COVID-19 pandemic in Italy was on the 21st of February, when the first COVID patient was identified in Codogno, (Lodi), 80 kilometres south of Milan. After few days, a red zone was established in the southern area of the Province of Lodi, and from the 24th of February all schools and universities were closed in the entire country. The pandemic quickly spread (see figure 1) and on the 9th of March a total lockdown was established over the entire country. Although most public-facing commercial activities were closed down, most economic activities (such as agriculture, food industry, pharmaceuticals, and so on) remained operational, accounting for around 50% of the dependent labour force. A more restrictive lockdown of all 'non-essential' activities was implemented from 24th March onwards, following a heated tripartite negotiation between the government, unions and business groups. However, even after this fuller lockdown, several firms in 'non-essential' sectors were able to continue to operate after filing a request for permission (*aperture in deroga*) to the local government authorities (*Prefetture*). From the end of April, the diffusion of the pandemic started to decline. Consequently, the Italian Government has progressively reduced the stringency and extensiveness of the lockdown, both for what concerns closures and restrictions on productive activities, and the restrictions on the movement of people.

To fully understand the specificities of the Italian context, it is important to underline that the Italian Constitution grants regional authorities ample powers, first on the subject of health, whose organisation is fully devolved at the regional level, as well on many other issues, including those concerning the authorisation for the execution of productive and commercial activities, and the organisation of local transport. The policies enacted to prevent and contrast the pandemic have been differentiated across Italian regions in terms of timing and stringency. However, these do not co-vary with the intensity of the pandemic (figure 2). This provides the empirical base and rationale for the present research.

3. RESEARCH HYPOTHESES

The broad hypothesis we want to test in this work is whether the degree of stringency of lockdown in a given region is related to the strength and composition of economic interests, and to the capacity of economic interests of exercising influence on the political system. Given the political and strategic centrality of export-oriented business groups to the Italian political economy in the post-Great Recession context, we assume that their structural and instrumental power will be higher than those of domestic-oriented business groups. In this regard, we formulate the following hypothesis:

H1: *The stringency of lockdown measures is lower in regions where the structural power of export-oriented manufacturing is higher.*

We also theorise that regions governed by a centre-right party adopt policies which are more favourable to firms and in defence of the continuity of productive activities, thus adopting a more lenient line in terms of stringency of lockdown measures, whilst the regions governed by the centre-left would adopt more stringent policies prioritising the health interests of the population and the workforce.

H2: *The stringency of lockdown measures is lower in regions where centre-right parties are in power.*

It is also important to consider the considerable heterogeneity in the spatial diffusion of the pandemic in Italy. Figure 2 reports the cumulative number of Covid-19 related deaths per 100,000 inhabitants in the middle of the acute phase of the pandemic (18th April), by region. It shows that the hardest hit regions were those of Northern Italy (especially Lombardy). These regions are characterised by high per capita GDP levels and of a high weight of exports on regional GDP if compared to the other regions.

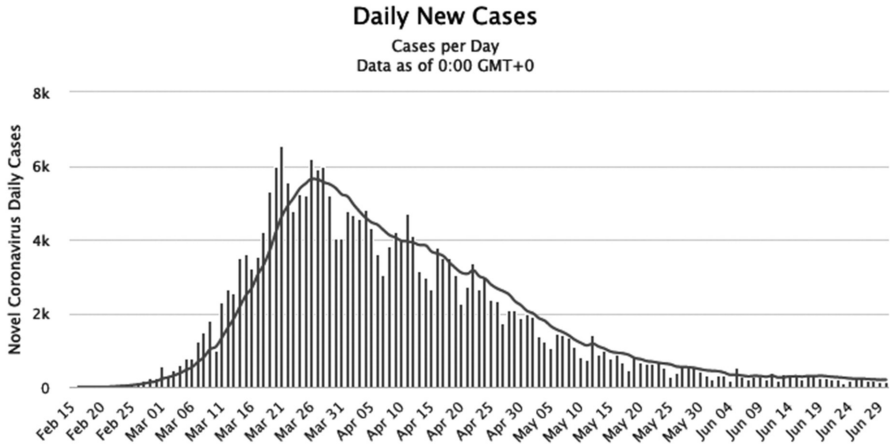

Figure 1. Number of daily new cases of Covid-19 in Italy and 7-days moving average
Source: Worldometer

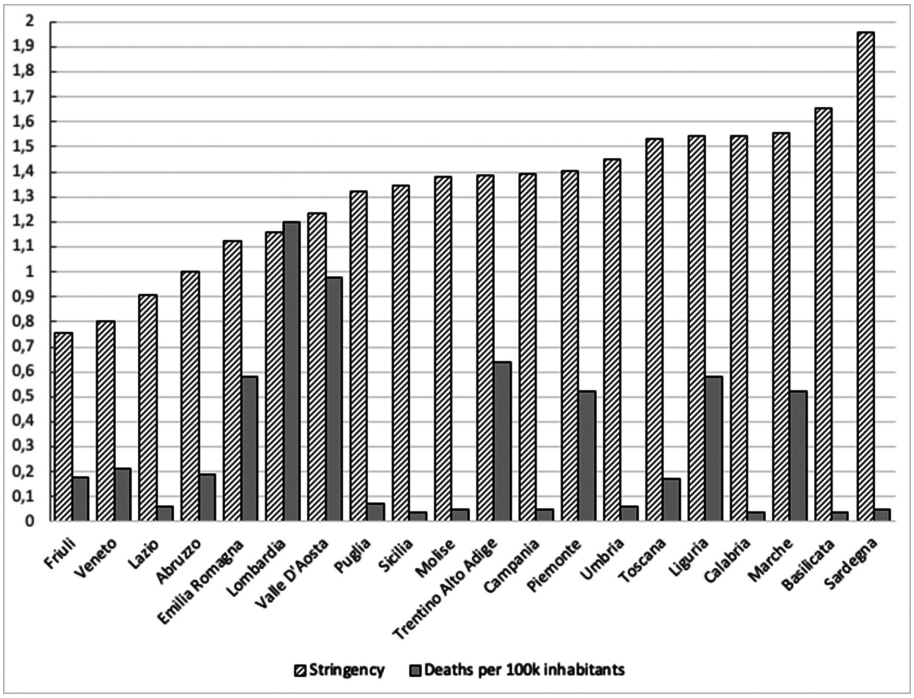

Figure 2. Stringency of lockdown measures and deaths per 100k inhabitants in Italy on 18/4/2020, by region
Source: authors' own elaborations on data from Google,
Italian Ministry of the Interior and Italian Health Ministry

4. THE DATA

To test our hypothesis, we constructed a *'regional stringency index'* to map the stringency of lockdown measures implemented in response to the pandemic across the various Italian regions. This is a preliminary measure that will be further refined in future iterations of this research.[5] The actual stringency index we use in this exploratory paper (our dependent variable) is given by a sum of two sub-indexes. The first is the % reduction in mobility in each region compared to the pre-pandemic period (source: Google, 04-26), which is a proxy of the actual extent of closure of productive activities at the height of the lockdown. The second is the percentage of firms in 'non-essential' sectors that obtained the permission to continue running their activities during the lockdown (source Ministry of Interior, 04-24), as a percentage of the overall population of firms in the region. Each regional indicator (x_{ij}) has been rescaled according to the formula as follows:

$$1 - \frac{x_{ij\_}Min_j}{Max_j - Min_j}$$

The two scaled indicators (each spanning between 0 and 1) have been summed so as to have an overall stringency indicator in the range 0-2 (the lower the value, the less stringent is the policy).

As covariates we include both the strength of pandemic (deaths for 100.000 inhabitants), and the structural components of the regional economy which can act as proxies of the relative structural power of economic interests, and of export-oriented business groups in particular (GDP per capita, % of export over regional GDP, weight of manufacturing companies over the total number of firms in a region). In the following table each variable is described, and the statistical source is listed.

Table 1. Variables used in the analysis

Variable	Code	Source/Period
GDP per capita	Pilpc	Istat, 2019
Deaths for 100 thousand inhabitants	Death	Italian Gov., period from 02-21 to 04-18
Export/GDP	Export	Istat, 2019
% Manufacture on GDP	Manif	Istat, 2019
Political orientation of regional Government (dummy)	CentreLeft, CentreRight, Other	
Stringency index	Stringency	Our elaborations

Finally, we add a qualitative variable addressing the political orientation of regional governments (Centre-Left, Centre-Right, Autonomist). The rational is that Centre-Right regional governments will foster pro-firms' policies (less stringency), while Centre-Left should be pro-labour and households (more stringency). This variable enters as a dummy one, with the Autonomist category assumed as a basis.

[5] In a subsequent phase of this research, we plan to construct a *regional stringency index,* similar in inspiration to that constructed by the Oxford Blavatnik School of Government, measuring changes in the relative stringency of lockdown measures at the sub-national / regional level. This will be based on a hand-coding of all relevant regional ordnances restricting or relaxing economic and productive activities and other auxiliary activities (e.g. public transport).

5. METHODOLOGY AND RESULTS

As all variables are rational ones, we first run a standard linear regression by OLS. The specification we used is the following:

$$Stringency_i = \beta_0 + \beta_1 Pilpc_i + \beta_2 Death_i + \beta_3 Export_i + \beta_4 Manif_i + \beta_5 CentreLeft_i + \beta_6 CentreRight_i \varepsilon_i$$

where i =1,…,20 (the twenty Italians regions) and ε is a white noise.

The results are as follows:

Table 2. Results of standard regression

Coefficients	Estimate	Standard Error	t value	p-value
Intercept	1.479e+00	5.444e-01	2.718	0.0176
Pilpc	-2.355e-05	1.289e-05	-1.827	0.0908
Deaths	7.159e-01	3.814e-01	1.877	0.0831
Centre-right govt.	4,710e-01	4.238e-01	1.112	0.2865
Centre-left govt.	5.066e-06	4.595e-01	1.103	0.2902
Export	-5.079e-06	3.397e-06	-1.495	0.1588
Manufacturing	-3.0073-03	1.650e-02	-0.182	0.8582

Residual standard error: 0.2855 on 13 degrees of freedom
Multiple R-squared: 0.3718, Adjusted R-squared: 0.08184
F-statistic: 1.282 on 6 and 13 DF, p-value: 0.3306

The results are not very satisfactory as the F test is not significant, but the coefficients have the expected signs. In order to avoid multicollinearity, we then run a step-wise regression. The results are as follows (table 3).

Table 3. Results of stepwise regression

Coefficients	Estimate	Standard Error	t value	p-value
Intercept	1.935e+00	2.876e-01	6.728	4.85e-06
Pilpc	-2.410e-05	1.214e-05	-1.986	0.0645
Deaths	4.672e-01	2.922e-01	1.599	0.1294
Export	-3,176e-06	2.380e-06	-1.334	0.2007

Residual standard error: 0.2697 on 16 degrees of freedom
Multiple R-squared: 0.31, Adjusted R-squared: 0.1807
F-statistic: 2.397 on 3 and 16 DF, p-value: 0.1062

The F-statistics is barely significant and the R2 is very low. However, the signs of the coefficients are as expected: the strength of pandemic has a positive effect on the stringency index, while the GDP per capita and the percentage of exports with respect to the regional GDP have negative ones. This can be interpreted as a proxy of the pressure of entrepreneurial associations on the behaviour of the regional governments.

It is difficult, however, to think that the right specification is a simple linear one. Many other mathematical functions are plausible (multiplicative, with interactions and so on). To overcome the difficulties of specification (given that we do not have any theory about the behaviour of

agents during COVD-19 crisis), we use an explorative method known as CART (Breiman et al. 1984). Classification and regression trees (CART) are a non-parametric decision tree learning technique that belongs to the wide set of data mining methods (Rokach and Maimon, 2008) and that produces either classification or regression trees, depending on whether the dependent variable is categorical or numeric, respectively.

The objective of the CART algorithm is to classify the observations in classes defined in function of the values of the dependent variable. Accordingly, the algorithm will attempt to position the observations among the different classes in the most accurate way possible, disregarding those attributes or those values of attributes that do not lead to a correct classification of the observations. In formal terms, the algorithm in the various phases of the analysis will choose some 'splitter' attributes among those present in the training set, and will try different values of those attributes in order to minimise the impurity function at each node. Minimising the impurity function coincides with finding, in the various phases of the analysis, the attributes and the respective threshold values that lead to the more correct classification and that should thus yield, in that phase, greater information. The process of analysis is iterative and only stops when it is no longer possible to minimise the impurity function at each node by manipulating the choice of the attributes and their threshold values. The impurity of a node is maximum when all the classes of the dependent variable are present in the same proportion, whilst it is minimum when the node contains cases belonging to just one class. The methods commonly used to measure impurity are entropy and Gini index when the dependent variable is qualitative, and the reduction of variance when the dependent variable is quantitative.

In this analysis, we run CART using a dedicated R routine and imposing a number of splits equal to five. The results are shown in figure 3.

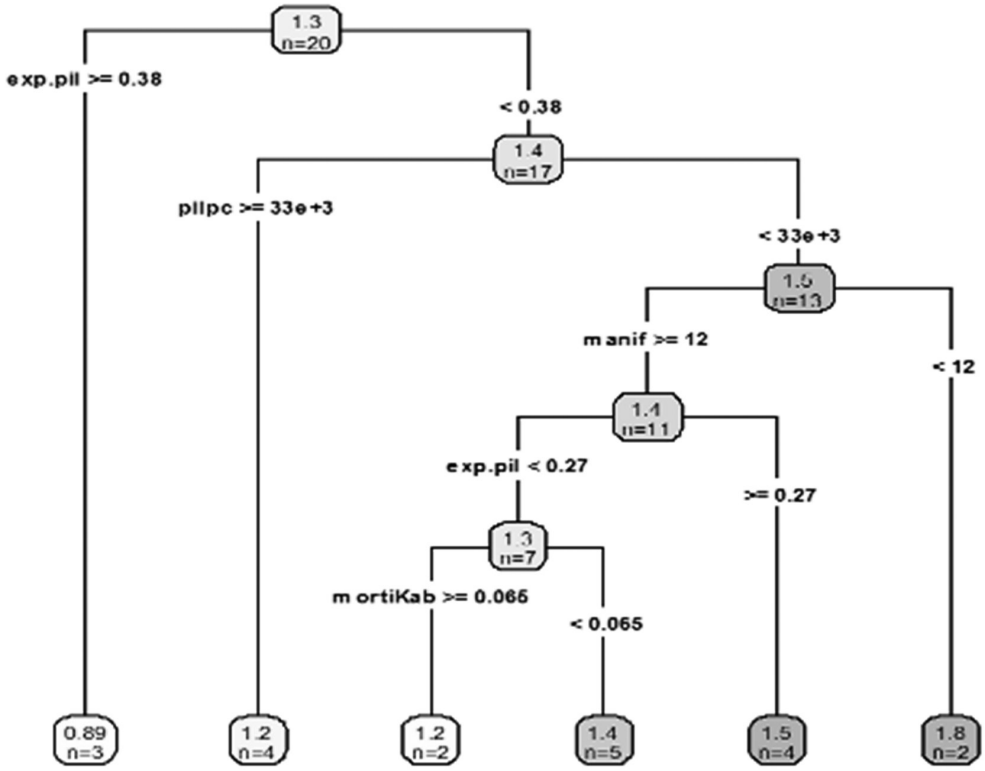

Figure 3. Results of CART regression tree

Source: authors' own elaboration

As CART is a hierarchical method, the dendrogram should be read from above. The results are very satisfactory. First of all, R^2 is about 0,80, and we have a clear representation of the hierarchy of variables. We get six classes of regions. The first splitting is made according to the weight of exports on GDP. The second partition is made on the basis of GDP per capita. This way we obtain two groups (7 regions, Lombardy, Veneto, Emilia-Romagna, Friuli-Venezia Giulia, Piedmont, Lazio) that have the lowest values of the stringency index. The other regions are split on the basis of the weight of manufacturing and again on the basis of exports. The last variable to intervene is the number of corona virus deaths for 100 hundred inhabitants, and this contradicts our expectation that the strength of pandemic was one of the main drivers of regional stringency. Besides, the political orientation of the regional governments seems not to have any influence in the determination of the stringency index.

6. DISCUSSION AND CONCLUSION

From the results presented above, we can draw some preliminary observations. First, it appears reasonably clear that the determination of the intensity of stringency of lockdown measures at the regional level is driven by structural features of the regional economic structure, and more specifically by the structural power of export-oriented business groups in a given locality (% of exports on GDP), and in second place by the strength of the local economic system. Where these indicators are higher, the level of stringency is significantly lower, even though these regions were, on average, also those more exposed to the contagion and more at risk of spread of the disease. To be sure, the weight of exports and manufacturing in the regional economy is a coarse measure of the structural power of business. In future work, more precise proxies will be employed. However, these results are nonetheless indicative that there is some empirical basis to our hypothesis about a correlation between economic interests and the stringency of lockdown measures. The implications of these results are clear. Indeed, it is commonplace to point out that the more lenient the stringency of lockdown measures on productive activities, the higher the chances of diffusion of contagion. In this respect, it is indeed useful to recall that according to the official data from the Italian government (INAIL), around 25% of all contagions can be traced back to contagions that took place in the workplace.

From our two initial starting hypotheses (effect of the structural power of economic organisations, and effect of the political orientation of regional authorities), only the first is confirmed by our analysis – albeit only indirectly. From the point of view of measures implemented to counter the spread of the pandemic, it appears that regional authorities with a right-wing or a left-wing orientation have implemented similar policies. Or rather: if we divide the regions on the basis of the colour of the local government, we obtain two groups characterised by very strong heterogeneity in terms of stringency and pro-business or pro-people orientation. Hence, the economic characteristics of the regional context seem to play a more important role in shaping responses to the pandemic than political variables.

This preliminary analysis constitutes only a first attempt at testing our hypotheses of interest. There are various directions in which the analysis can be developed. The most important, in our view, is to improve the informational basis of the analysis by elaborating a more accurate regional stringency index that reflects the *actual* policies and ordnances implemented on a regional basis. The other important next step will be the development of a quantitative content analysis of news coverage at a regional level to identify more directly the lobbying pressures exercised by economic interest groups towards the easing of the lockdown (and vice versa, by unions for a more restrictive approach).

REFERENCES

Bellofiore, R. Garibaldo, F (2019), Le dernier metro. Europe and the Edge of the Abyss*, Crisis and Critique*, 6, 1, pp. 25-46.

Breiman, Leo; Friedman, J. H.; Olshen, R. A.; Stone, C. J. (1984). *Classification and regression trees.* Monterey, CA: Wadsworth & Brooks/Cole Advanced Books & Software. *ISBN 978-0-412-04841-8.*

Bulfone, F. and Tassinari, A. (forthcoming) Under pressure. Economic constraints, electoral politics and labour market reforms in Southern Europe in the crisis decade. *European Journal of Political Research.*

Culpepper PD (2010) *Quiet Politics and Business Power: Corporate Control in Europe and Japan*. Cambridge: Cambridge University Press.

Perez SA and Matsaganis M (2019) Export or Perish: Can Internal Devaluation Create Enough Good Jobs in Southern Europe? *South European Society and Politics* 24(2): 259–285.

Pritoni A and Sacchi S (2019) Interest Groups and the «Jobs Act»: Lobbying with What Effects? *Rivista Italiana di Politiche Pubbliche* (2/2019).

Simonazzi, A.M., Ginzburg, C. and Nocella, G. (2013*), Economic relations between Germany and Southern Europe*, *Cambridge Journal of Economics,* 37, 3, pp. 653-675.

Rokach, L. and Maimon, O. (2008), *Data mining with decision trees: theory and applications*, World Scientific Pub. Co. Inc.