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Session: Social Cohesion

Flood Risk and Indicators of Social Cohesion in the Western Balkans

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Abstract:

The study investigates a hypothetical relation between social cohesion and a major flood event affecting parts of the Western Balkans region. Using state-of-the-art bibliometric techniques, we show the evolution of research on social cohesion, its multi-disciplinary composition as well as the relations among the different knowledge domains. We use this as the basis for objectively selecting variables representing social cohesion. We find that despite the high uncertainties associated with the quantity and quality of the data set, a linear relationship between social cohesion and disaster response does indeed exist as an empirical phenomenon. We discuss implications of the results with regard to a possible trade-off between the individual and collective dimensions of social cohesion and how complementing the model results with a cultural analysis could facilitate policies on social cohesion, which are in tune with cultural preferences for systems of governance.

Keywords:

community resilience, disaster risk management, social cohesion

1 Introduction

While the phenomenon of social cohesion is so old as to be considered part of human nature by thinkers as early as Aristotle, the term social cohesion itself has only in the past three decades been used by a small number of academics and a somewhat larger body of policy analysts to describe the ephemeral quality of social systems that keeps a system's integrity, preventing its physical tendency toward disintegration, chaos and collapse. Social cohesion and resilience of social systems are intimately related concepts. Both have been subject to much academic speculation on how to define them, what constitutes them, what causes them, what consequences ensue as a result of their presence or absence, and what indicators best capture their dynamics.

The present research is conducted as part of the EU Erasmus project Knowledge for Resilient Society (K-FORCE) wherein a consortium of universities from the Western Balkans, two central European universities and three Scandinavian universities are working together to exchange and build new knowledge in the area of resilience and disaster risk management, with particular focus on educational activities.

2 Bibliometric Analysis of Social Cohesion

2.1 Evolution and Disciplinary Distribution of Research

The birth of the concept of social cohesion can be traced to the early 1990s. The evolution of research over the past 3 decades shows that while interest in social cohesion has progressively increased in the last 10 years, the concept is still a rather marginal subset of the broader concept of social capital (Fig.1). In academic publications social capital and social cohesion are for the most part distinguished. The former concerns only relations between individuals; the latter encapsulates the collective relations between individuals and social institutions additionally. In the policy-oriented literature on social cohesion the distinction is rarely made.

Even more marginal is research on social cohesion, which focuses on combing disaster risk and resilience, with a total number of records just over 100, mostly published in the last several years.

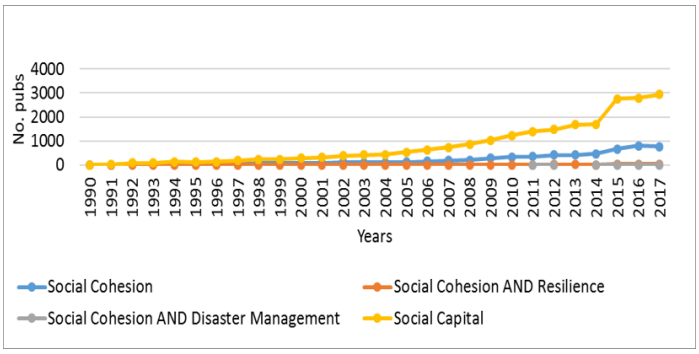

Figure 1- Evolution of research on social cohesion 1990-present

Social cohesion is a budding area of academic inquiry that has spurred interest from a number of different academic domains. In Fig. 2 it can be seen that social cohesion is studied in different application areas and from a number of different disciplinary perspectives. The two dominating knowledge areas are Psychology and Sociology and Social Sciences. Psychology research on social cohesion focuses primarily on the individual, while Sociology, Anthropology and Political Science study social cohesion from the collective perspective of social groups or society as a whole. The Social Sciences produce mostly theoretical research, whereas research in the areas of Psychology, Public & Environmental Health, Business, Government and Law tend to be more problem-oriented and focus on empirical research.

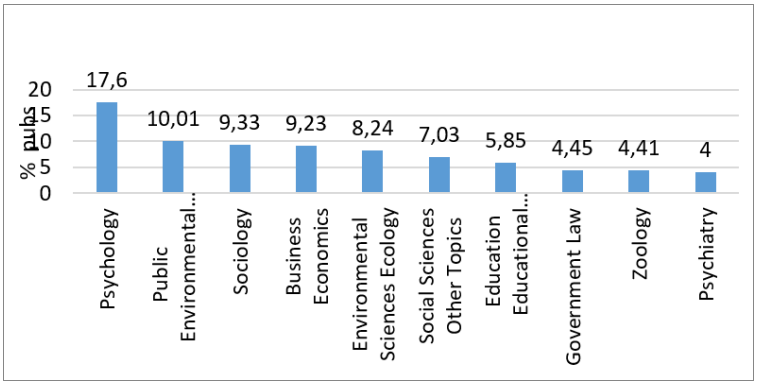

Figure 2- Social Cohesion Top 10 contributing research areas

2.2 Keyword co-occurrence Analysis

As a qualitative literature review yielded a large number of contradicting definitions of social cohesion (Chan et al. 2006, Schiefer and van der Noll 2016) largely stemming from different disciplinary camps, we used a quantitative data mining technique, namely keyword co-occurrence analysis, to strip some of the subjectivity and polemicism from the debate what constitutes social cohesion. In Fig. 3 the results based on the 6000+ records extracted from the Web of Science is visualized as network composed of keywords

and links. The larger the circle, the more frequent the keyword occurrence. Links are connections or relations between two keywords. The stronger the link, the thicker the line. Keywords are also grouped together into clusters. A cluster represents a set of keywords strongly linked together.

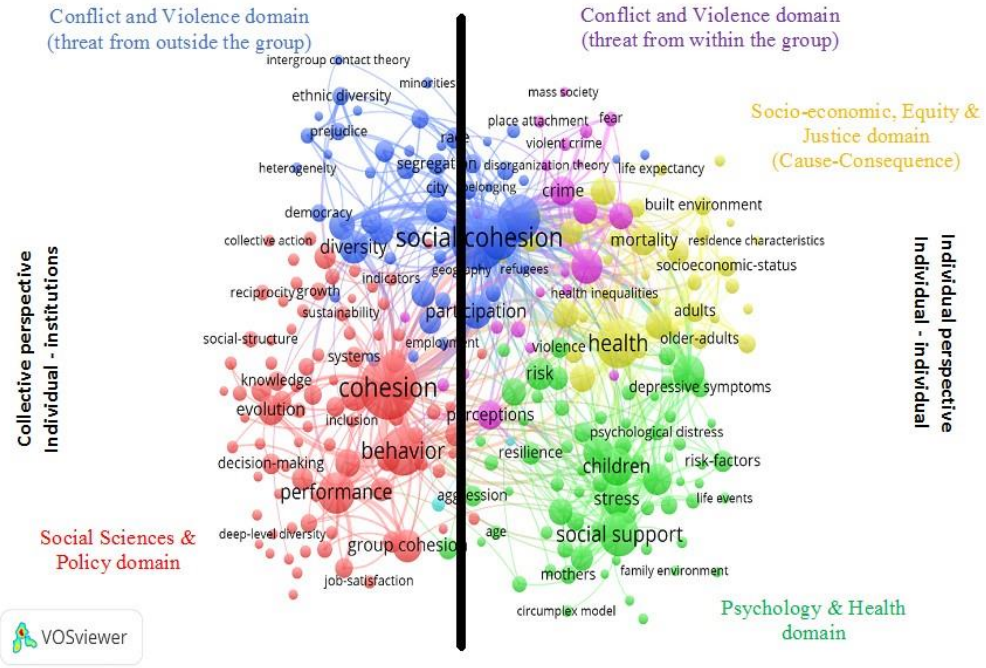

Figure 3 - Network visualization of social cohesion 1990-present

The five clusters in this network correspond to the dominant disciplinary perspectives on social cohesion. The red cluster contains items pertaining to the Social Sciences and Policy domains. Here dominant elements are behavior and performance, decision-making, systems, social structure, diversity, and elements such as reciprocity, collective action, and sustainability. This cluster is clearly about collective rather than individual relations and behavior.

The blue and pink clusters are about social cohesion from the perspective of conflict and violence. We believe that we see a difference between them in that the blue is more oriented toward collective threat by outsiders of a group while the pink represents more an individual level of violent crime from within a group.

The yellow cluster we designate as the “cause-consequence” cluster where we see different socio-economic and demographic indicators, such as life expectancy, inequality, health, age, etc. They may be

individual or group-related but we argue that they are conditions for or results of social cohesion rather than essential elements of social cohesion.

Finally, the green cluster is clearly the domain of psychology, family and health and represents exclusively the individual dimension.

3 Selected Variables

Based on a qualitative literature review and the bibliometric analysis, we selected a number of variables, for the subsequent multiple regression analysis. The variables are divided into three types: flood exposure variables, social cohesion variables and control variables.

The flood variables (independent variables) relate to a major, so-called 100-year flood event that occurred in May 2014 and severely affected two of the countries in the region – Serbia and Bosnia and Herzegovina – for the purpose of determining variations in the social cohesion outputs before and after this event. Albania and Macedonia were not affected by this flood event. We are further interested in comparing variations in the variables we have chosen to represent the state of social cohesion between the affected and unaffected countries in the region (Table 1).

Table 1- Exposure variables

Exposure Variables	Note
POSTt	1 if t>=2015 (the occurrence of the major flood event in 2014); otherwise, = 0
Influ by Flood2014	if the country is influenced by the major flood event in 2014, it will be 1 for t>=2014; otherwise, = 0
POSTt x Influ by Flood2014	interaction between the above two variables

To represent the multi-facetted concept of social cohesion, the social cohesion variables (the model's outputs or dependent variables) are grouped into three thematic domains: (i) Trust and Social Relations, (ii) Altruistic Behavior and (iii) Compliance (Table 2). In our classification, we further distinguish between factors positively or negatively influencing social cohesion as well as whether a variable measures perceived or observed behavior.

Table 2 - Social cohesion variables

Dimension	Social Cohesion Variable	Note	Pos (+)/ Neg (-)	Individual (I)/ Collective (C)	Perceived (P)/ Observed (O)
Trust and Social Relations	Trust in Fellow Citizens	"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" (V23/V25 World Values Survey)	+	I	P
	Government Effectiveness	Perceptions of the quality of public services, the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. (World Bank - Worldwide Governance Indicators)	+	C	P
	Marriage	Crude Marriage rate per 1000 population (Eurostat)	+	I	O
	Divorce	Crude Divorce rate per 1000 population (Eurostat)	-	I	O
Altruistic Behavior	Giving Money	A composite country score for charity based on data from Gallup's WorldView World Poll. The survey question is "Have you donated money to an organization in the past three months?" Incl. political parties/organisations as well as registered charities, community organisations, and places of worship. (World Giving Index)	+	C	P
	Volunteering Time	Same as above. The survey question is: "Have you volunteered time to an organization in the past three months?"	+	C	P

	Helping a Stranger	Same as above. The survey question is: “Have you helped a stranger or someone you didn’t know in the past three months?”	+	I	P
Compliance	Rule of Law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. (World Bank - Worldwide Governance Indicators)	+	C	P
	Corruption	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. (World Bank - Worldwide Governance Indicators)	-	C	P
	Crime	Intentional homicides per 100,000 people (World Bank – World Development Indicators)	-	I	O

The socio-economic and demographic conditions relevant for social cohesion have been included as control variables (independent variables, see Table 3). In here, variables related to health, wealth and inequality as identified in the bibliometric analysis are deemed to be causes and/or consequences of the presence or absence of social cohesion. They are implicit in the HDI and Gini country scores. Variations in the Gini could be taken as a proxy indicator on the grid axis of the cultural grid-group model, which represents a range of societal acceptance for social assymetry of roles and the degree of hierarchy in a given society. The HDI we believe is a proxy indicator for quality of life in that it aggregates economic purchasing power, health and education. The majority of models measuring social cohesion include quality of life or life satisfaction as an indicator of social cohesion. We take a position that it can be both a cause and a consequence but it is not a necessary condition for social cohesion.

Unemployment is a widely accepted cause of social unrest and breakdown. Particularly interesting in terms of the interplay between the individual and collective dimesnions of social cohesion is informal employment or shadow economy, which is alledgedly very high in the Balkans region. While informal employment may be said to undermine community resilience in that it hinders socio-political institutions to accumulate resources that may be distributed as relief and reconstruction efforts after a disaster event, informal employment may also be seen as a proxy indicator for social cohesion on the individual scale of informal relations between individuals, which are important in determining co-operative and altruistic behavior that fosters community resilience. Ineffective governance and corruption decrease trust in institutions and people's willingness to contribute to public goods in the form of taxes. These potential contributions remain or are exchanged in an informal way between individuals, which strengthens the individual dimension of social cohesion while at the same time weakening the collective. If a hypothetical society is culturally prone to be low grid and low group, i.e. place value on individualism and freedom expressed negatively as freedom from control, it will show a political preference for social structure where the individual, not the collective institution is the dominant actor. By contrast, a high grid high group society will seek to convince its members that absolute institutional control is necessary to ensure the availability of equal public goods.

Table 3- Control variables

Control Variables	Note
Gini	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. (World Bank)
HDI	The Human Development Index (HDI) is a summary measure of achievements in three key dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. The HDI is the geometric mean of normalized indices for each of the three dimensions. Data inputs for the HDI index include: Life expectancy at birth, Expected and mean years of schooling, and GNI per capita. (UNDP)
Unemployment	Unemployment (age 15+) per 1000 persons, 1 year period average (SEE Jobs Gateway database, based on data provided by national statistical offices and Eurostat)
Informal Employment	Informal employment as a percentage of total employment. Data on informality are collected by the labor force surveys of Albania, the FYR Macedonia, and Serbia only; no data is available on Bosnia and Herzegovina. All countries use the comprehensive International Labor Organization (ILO) definition for informal employment, covering (1) Self-employed in unregistered businesses, (2) Wage workers without written contract and, (3) Unpaid family workers. (SEE Jobs Gateway database, based on data provided by national statistical offices and Eurostat)

4 Results and Discussion

We build on the work of Calo-Blanco et al. (2017) who conducted a similar study of social cohesion and earthquake disaster recovery in Chile. While in principle the same regression model, the exposure, social cohesion and control variables were changed to fit both the different type of natural hazard and the different socio-cultural elements relevant for the Balkans region. Our model is written as:

$\gamma_{ct} = \alpha + \beta_1 POST_t + \beta_2 Influ\ by\ Flood\ 2014_c + \beta_3\ POST_t \times Flood\ 2014_c + \gamma X_{ct} + \varepsilon_{ct}$

where,

y_{ct} is an indicator of social cohesion in a country c at time t

β_1 -shows the average increase or decrease in the indicator between the period before and after the 2014 event for the unaffected countries

β_2 shows the difference between affected and unaffected countries before the 2014 event

β_3 shows the average difference in the evolution of the indicator between affected and unaffected countries from before the event to after the event

γXct is a vector of control variables

α represents regional fixed effects

ε_{ct} represents an error term

Typically, the two important values to consider are the R-square value and the p-values. The R-square value expresses how much variation is explained by the model. The greater R-square value indicates high correlation and a good model fit. The p-value is an expression of the statistical significance. In general, the best scenario is a combination of high R-square and low p-value. However, due to the very limited data we were able to obtain, the 0.05 p-value cut off criteria cannot be justified in our model. We focus therefore on comparing the R-square values, which give us a good preliminary indication of the relevance of our hypothesis, namely that a linear correlation exists between social cohesion and disaster response. In Fig. 4 the solid lines represent the R-squared values or the regression; the punctuated lines show the p-values, or the uncertainties of the model. The higher the correlation of a given variable, the closer the uninterrupted line is to the outer boundary of the spider diagram. The higher the uncertainty associated with a particular variable, the larger the surface of the punctuated lines.

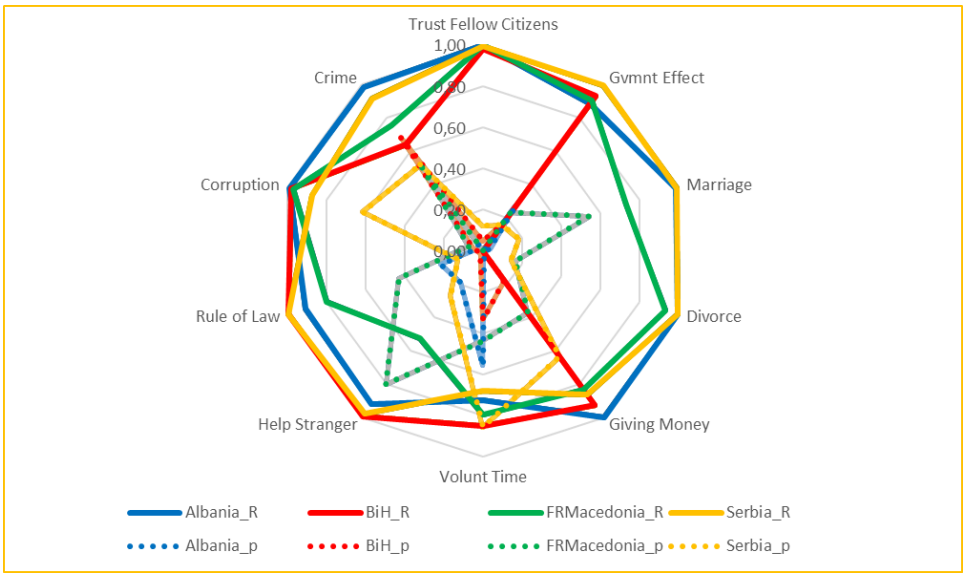

Figure 4 – Comparative correlation results for Albania, BiH, FR Macedonia, and Serbia

While most variables show high correlation irrespective of country, the uncertainty associated with the results is smaller in the case of Albania and Bosnia and Herzegovina and significantly larger for the FR Macedonia and Serbia. To compare, the results between the affected and unaffected countries, we compare the values of the root mean squared error (RMSE) of the regression, which express the average model prediction error. RMSE ranges from 0 to ∞, where a lower value indicates a better model prediction. Fig. 6 shows that the two unaffected countries show an almost perfect fit to the data, while the affected ones show less certain results.

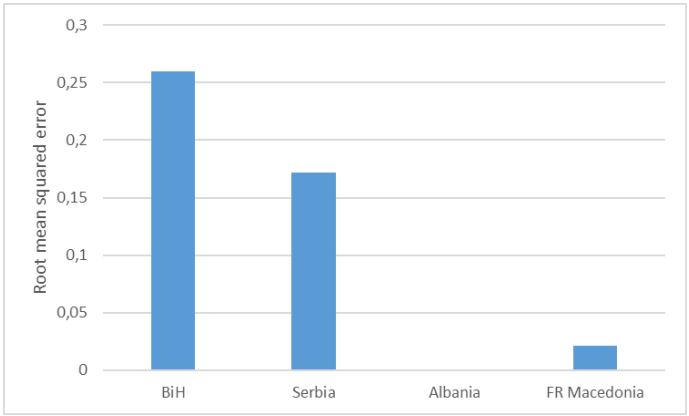

Figure 5 – Comparative root mean squared error results for the affected and unaffected countries

In Fig.6 the sensitivity results for the four countries are shown based on the standardized regression coefficients for each independent variable. The results of the sensitivity analysis appear similar for all the

countries except Serbia. In most cases, the absolute value of the coefficients of GINI is bigger than that of the others while Informal Employment has significantly higher values for Albania and Serbia. Potentially, this could be indicative of Bosnia and Herzegovina if we are able to support the qualitative information we obtained on informal employment in BiH from grey literature with a dataset.

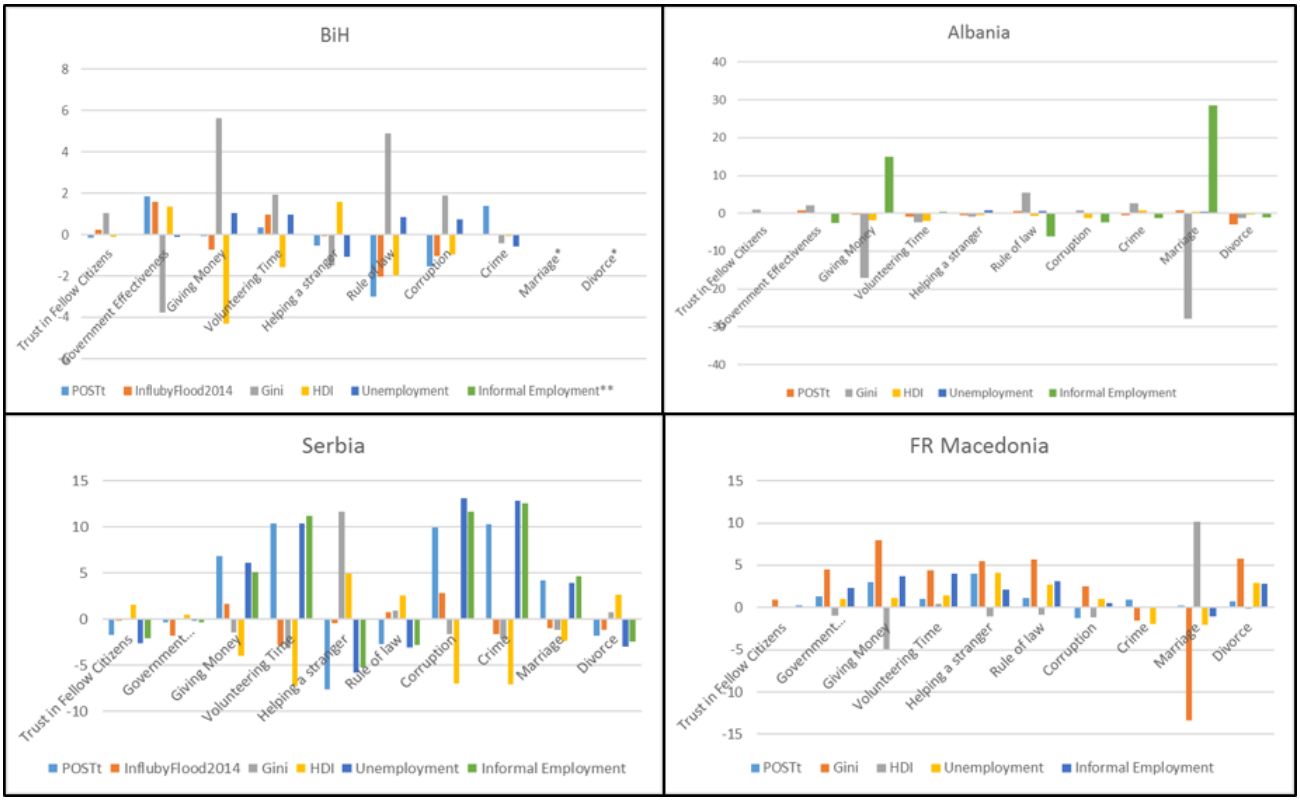

Figure 6 – Sensitivity results for Albania, BiH, FR Macedonia and Serbia

** No data could be obtained for Marriage and Divorce for Bosnia and Herzegovina*

*** No data could be obtained on Informal Employment for Bosnia and Herzegovina, however various grey literature sources estimate that its labor market is also characterized by a substantial informal economy. Estimates of its size vary between one third and one half of total employment. A report by the ILO (2009) based on a 2006 labor force survey, informal employment makes up around one third of all employment.*

5 Conclusions and Future Outlook

The goal of this study has been to investigate whether there is multiple linear relation between social cohesion and a major flood event affecting parts of the Western Balkans region. We find that despite the limited and often highly uncertain data, a linear relationship does indeed exist. While our model cannot be statistically verified with the present amount of observations, it nevertheless points to the fact that a

hypothetical correlation between disaster response and social cohesion could be an empirical phenomenon of the world and not simply of the model. The need for a better data set on all the identified variables will be indispensable in the further calibration of the model.

The differences in the value of the correlation coefficients across the countries as shown in the sensitivity analysis might further come from cultural or historical factors that are not captured in the variables we have selected. To examine such effects the functional grid-group model developed by anthropologist Mary Douglas in the 1970s could shed additional light on how homogeneous or heterogeneous the Western Balkans region is with regard to the dynamics of social cohesion in the aftermath of a natural hazard event. Functionalist methods rely on empirical data to describe objective social conditions that influence human behavior at the macro scale of a whole society. Douglas' grid-group models social organization on a two dimensional axis, where the vertical grid dimension is a measure of the degree of social hierarchy within a given society and the horizontal dimension is a measure of the group's cohesiveness, expressed as a degree of individual or group centeredness (Douglas 2007). While conducting a grid-group analysis is outside the scope of the present study, we believe that the model could be a relevant complement in the context of providing a culturally-nuanced policy advice because the relative position of a country on the grid-group axis will give an indication of the societal preference system for governance and whether this preference supports the collective institutional dimension exemplified by a system of strong state political and economic institutions or the individual dimesion exemplified by a system of private contracts and informal arrangements.

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Attachments:

Figures:

Tables