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Explaining Ukraine's resilience to Russia's invasion: The role of local governance

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Abstract

Resilience of local communities (territorial hromadas) is an increasingly salient matter in the academic and policy debate on the factors which have determined Ukraine's resilience to Russia's 2022 invasion. Building on existing literature on institutional resilience and its predictors, this article explains the ability of Ukrainian self-governed municipalities to withstand the threats to institutional stability stemming from the invasion. First, it uses an exploratory qualitative design to operationalize the concept of resilience and its predictors with an account of varying experiences of Ukrainian hromadas during the full-scale invasion (e.g., hromadas near the frontline and in the rear). Next, it presents data from open sources and the results of a regression analysis to test the impact of various groups of predictors on hromadas' resilience to the full-scale invasion. Our models show a significant relationship between hromadas' resilience and geographical, politico-administrative and economic predictors influenced by the outcomes of the decentralization reform conducted in Ukraine since 2014.

1 | INTRODUCTION

Ukraine's resilience to Russia's war of aggression came as a surprise to politicians, experts and the general public worldwide, as Kyiv's fall to Russian forces after the full-scale invasion on February 24, 2022 was broadly presented as inevitable in a matter of hours. While many scholars point to the role of national unity and resilience of the national government (*Ibid*), an increasingly salient matter in this debate is resilience at the level of territorial hromadas (territorial communities).[1] One could argue that hromada's resilience is a consequence of the decentralization reform implemented since 2014, which envisaged the broadening of hromadas' competences and strengthening their financial and technical capacities (Brik & Murtazashvili, 2022). Yet we know little about specific factors that determine the resilience of hromadas on or near the frontline and others affected by the war to a wide range of risks affected by the invasion.

To fill this gap, this article explores the role of local self-government in the context of an interstate war. It builds on a conceptual framework of the resilience of local-level institutions and existing literature on the predictors of resilience, as well as context-specific knowledge on the decentralization reform in Ukraine to explain hromadas' resilience to the shocks of the invasion. We demonstrate that geographical, politico-administrative and economic predictors have been central in determining hromadas' institutional resilience, dealing with their ability to exercise local self-government as such. The timeframe of our research encompasses 9 months: from March to November 2022.

The study was conducted with the help of a mixed-methods approach. It uses qualitative methods, such as exploratory interviews with the representatives of local authorities in Ukraine and focus groups with Ukrainian and foreign experts on decentralization to explore hromadas' wartime experiences and operationalize the concept of resilience and its predictors, respectively. Surveys among the local authorities were used to gather information on the shocks experienced by hromadas and their wartime practices. We utilized the data acquired through the use of the aforementioned qualitative and quantitative methods and the data from open sources to apply regression models. They helped us to test which predictors and their groups show a significant effect on institutional resilience. Our models showed a significant effect on the dependent variable of geographical, politico-administrative and economic predictors. We discuss this correlation in the context of the 2014 decentralization reform and its implications for Ukraine's regional and local development.

With this, the article's key contribution is an insight into the role of local self-government and its resilience in the context of interstate war. It also contributes to the narrower substrand of literature on the decentralization reform and hromadas in Ukraine. Both within and outside the context of Ukraine, the article can be utilized as the basis for policy recommendations as to how hromada resilience can be strengthened with respect to multiple shocks of a contemporary war.

2 | THEORETICAL FRAMEWORK

Our theoretical framework starts with a brief enquiry into the concept of "hromada" against the background of the decentralization reform in Ukraine. Then we conceptualize hromadas' institutional resilience in wartime. This discussion is followed by the conceptualization and the operationalization of predictors which define hromadas' resilience during the invasion.

2.1 | Hromadas and the decentralization reform

Hromadas exercise local self-government, which is legally defined as both the right, guaranteed by the state, and real capability of the hromada, to independently solve issues of local

significance. Hromadas can exercise such rights both immediately and through local councils and their executive bodies.

Notably, hromadas acquired broad competencies following the decentralization reform in Ukraine which started in 2014.[2] The key idea behind the reform was to enhance the capacity of Ukrainian hromadas through their amalgamation and the subsequent broadening of their competencies and access to financial resources (Cabinet of Ministers of Ukraine, 2023). For instance, the executive bodies of local councils became responsible for the management of communal property, management of communal housing and utilities objects, and communally owned transport and networks, ensuring the functioning of primary and secondary health care facilities, as well as primary and secondary education. The distribution of personal income tax for village and town settlements has increased from 25% to 60% at first and up to 64% in 2022 (Verkhovna Rada of Ukraine, 2021 (with latest amendments of March 31, 2023)), positively affecting resource mobilization at the local levels and enabling local authorities to respond directly to citizens' needs (Keudel & Huss, 2023; Romanova & Umland, 2021; UCIPR, 2017). Both these achievements, as well as the increased independence of local authorities from regional ones contributed to hromadas' capability to resist the Russian invasion and continue exercising local self-governance and providing services even amidst fighting or under occupation (Movchan, 2022; Romanova, 2022; Shvyryda, 2022). An important limitation of tax decentralization in Ukraine is the discrepancy between the location of enterprises and the allocation of personal income tax to hromadas. The tax is allocated based on the registration of enterprises rather than their actual physical location, and this mismatch is acknowledged and taken into consideration in our research.

Such change in powers and financial resources created a new social contract between citizens and local administrations which fosters mutual trust in which the local administration is incentivized to increase revenues for their budget, while local citizens and businesses become the "principals" once they pay taxes into municipal budgets, allowing them to demand quality public services from their "agents," the individuals in local administration (Arends et al., 2023).

The evidence as to both tangible resource mobilization at the local level and the increase of trust alleviates pre-existing and current concerns as to the decentralization reform serving primarily to empower oligarchs both prior to the war (Bader, 2020) and during wartime (Dolan-Evans, 2023). In contrast, a stronger resource base but also the experience of voluntary amalgamation created new opportunities for collective action at the local level, strengthening public scrutiny over local authorities and preventing misuse of resources, and also due to possible oligarchic pressures (Romanova, 2022). In combination, the new resources, cooperation patterns and resulting ownership of one's place of residence were early on seen in the literature as conducive both to local resistance to occupants and to hromadas' resilience (*Ibid*; Movchan, 2022; Keudel & Huss, 2023).

2.2 | The concept of resilience and its components

Resilience has gained prominence across various academic disciplines and research fields in the last 2 decades, from biology and engineering to sustainability studies and research on natural hazards and development issues. Early literature viewed resilience as a system's ability to "bounce back", "return to equilibrium", and "recover after disturbances" (e.g.,: Holling, 1973, 1986; van Strien, et al., 2019; Walker, et al., 2004). However, a more contemporary and widely accepted definition, attributed to Perrings (1998), sees resilience as a measure of a system's ability to withstand stresses and shocks, persisting in an uncertain world and adapting to change.

Similarly, the European Commission defines resilience as the capacity of individuals, households, countries, or regions to withstand, adapt, and recover quickly from stresses and shocks. At the community level, the concept aligns with this broader understanding, emphasizing the "existence, development and engagement of community resources by community members" (Berkes & Ross, 2013, p. 6).

While a considerable number of contributions provide shock-related definitions of resilience with regard to natural disasters (e.g., Fois & Forino, 2014; Uddin, et al., 2020), a very limited number of works explore state, societal and community resilience to war (e.g., Shapira, 2022).[3] Moreover, there are at least three features which differentiate Russia's war against Ukraine and its impact on Ukrainian hromadas from other conflicts and their implications, and thus require us to zoom in on the "resilience to what" question. First, Russia's war against Ukraine is of unprecedented scale. It is the largest war on the European continent since World War II, marked by genocidal intentions of the aggressor (e.g., Hook, 2022). Second, since not all Ukrainian regions experienced fighting and occupation, hromadas have different war-related experiences. Thirdly, Russia's war strategy is multifaceted, including not only striving for success on the battlefield but also blocking Ukraine's maritime exports, attacks on civilian (especially energy) infrastructure and extensive use of information warfare. Against this background, we argue that war should be seen as a combination of shocks, marked by different intensity, duration and complexity for different areas of Ukraine.

As mentioned above, to classify these shocks and gain insights into how hromadas dealt with them, we conducted eight interviews with local authorities, representing both hromadas that experienced occupation, direct military actions and rear hromadas with different distances to the frontline.[4] As a result we distinguish seven types of shocks, namely: institutional, security, economic, humanitarian, critical infrastructure, informational and early recovery issues experienced by hromadas (Annex 1). They also correspond to the elements defined in the Concept of the National Stability System of Ukraine (Rabinovych and Darkovich, 2022).

In explaining hromadas' ability to cope with the shocks of invasion, we will specifically focus on their resilience to threats to institutional stability. In this particular context, we think that this dimension of resilience can be defined as "institutional resilience" in a sense that we focus on hromadas' and their structures' (local councils and their executive bodies) ability to engage in institutional processes necessary to exercise local self-government as prescribed by law and address war-related challenges specifically (Aligica, 2013; Anderson & De Tollenaere, 2020). Threats to institutional stability thus primarily deal with the dysfunctionality of the structures, staff shortage or an inability to agree on implementable steps to address challenges. Our choice to focus on the resilience to institutional threats stems from the fact that particular structures and their viability are foundational to hromadas' institutional ecology and, consequently, their ability to withstand the whole spectrum of war-related shocks, for example, to ensure the protection and, if necessary, restoration of critical infrastructure or attracting businesses which seek relocation (Aligica, 2013). Based on interviews with local authorities, as well as existing literature (e.g., Reznikova, 2022, pp. 33, 64, 66; Klau & Weiskircher, 2005; Miller, et al., 2010), we understand hromadas' resilience to threats to institutional stability as comprising three aspects: (i) preparedness; (ii) robustness; (iii) adaptation. We explain these terms in Table 1 below and provide several examples to explain the delimitation:

Importantly, we understand preparedness as planning, organizing and coordination efforts undertaken not only before the full-scale invasion, but also as the invasion drags on, since Russia's war against Ukraine is an enduring and dynamic conflict. Consequently, preparedness means not only preparedness regarding the invasion itself but the whole spectrum of shocks it brings over

TABLE 1 Conceptualization of resilience to threats to institutional stability.

Dimension	Definition	Examples
Preparedness	A state of readiness to respond to disaster, crisis or another emergency situation (shock), which can be seen as emerging from "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during the incident response" (Department of Homeland Security, 2022)	Hromadas' having an emergency response plan and prepared stocks of resources
Robustness	The ability of a hromada as an institutional system to keep its functionality under shock or quickly resume performing its functions after a forced break (Klau & Weiskircher, 2005, p. 417, p. 417)	A hromada's ability to continue and/or quickly resume performing their functions in the communal sector, for example, ensure garbage collection after the start of the invasion.
Adaptation	A hromada's ability to deliberately change its practices and/or assume new ones in response to a shock through adaptive capacities to shocks (Norris, et al., 2008, p. 30, p.30)	A hromada's ability to organize the operation of its functions during long electricity cuts following Russia's shelling of energy infrastructure

time, compounded by changes in the invading power's strategy and tactics. Therefore, hromadas' preparedness in the wake of the invasion is mainly used as a threshold for comparative purposes.

2.3 | Predictors of resilience

Empirical contributions from many disaster- and war-prone regions of the world have engaged with distinguishing factors that determine community resilience (e.g., Eshel, et al., 2020; Rapaport, et al., 2018; Yeshel, et al., 2020). Dwelling on the Magis, 2010 definition of resilience as "existence, development and engagement of community resources", we used the typology by Norris, et al. (2008) to distinguish further predictors of resilience. According to Norris, et al. (2008), our understanding of factors that determine resilience should not be limited to tangible resources. In contrast, they argue that more attention should be paid to the "networked adaptive capacities" of a community that may encompass both specific material resources available to communities and immaterial "community strengths" such as social capital and networks within a community (p.136). Based on a literature review, the authors distinguish four groups of factors, determining community resilience, namely Economic Development, Social Capital, Information and Communication and Community Competence (*Ibid*). Here we would like to state early on that, due to data access limitations, our subsequent analysis will focus only on the Economic Development and Social Capital aspects of the framework.

Economic Development incorporates three aspects: volume and diversity of economic resources; equity of resource distribution and vulnerability to hazards. This means that it is not only the level of resources available to a community (i.e., land and raw materials, infrastructure, financial resources) but also the way such resources are allocated and managed. While the framework by Norris et al. (2008) considers the equity of resource distribution and vulnerability to hazards with respect to environmental shocks and ensuring the population's post-disaster

wellness, proper allocation and management of resources is also essential to respond to the shocks of war. Social Capital, in contrast, mainly deals with intangible aspects of community life, such as expected (perceived) and enacted (received) social support, social embeddedness (social ties), organizational linkages and cooperation, citizen participation (leadership and roles, formal ties), sense of community and attachment to ties. Social Capital is thus largely about citizens' engagement and horizontal ties between them that can be functional even amid the lack of vertical organizational structures. Horizontal ties and civic participation are widely regarded in scholarship as important for Ukraine, also in the context of war (e.g., Deineko and Aasland et al., 2022; Wilson, 2022).

3 | OPERATIONALIZATION OF HROMADAS' RESILIENCE AND ITS PREDICTORS

Our operationalization of hromadas' resilience (preparedness, robustness and adaptation) and its predictors relies on the aforementioned eight exploratory interviews with representatives of local authorities, four focus groups with a total of 17 Ukrainian and foreign experts, as well as secondary literature (e.g., ISO, 2019; Parsons, et al., 2016; Sherrieb, et al., 2010). Interviewed experts were Ukrainian and international experts working in the domains of decentralization, local governance, as well as local finance and budgeting, for example, in the "U-LEAD with Europe: Local Empowerment, Accountability and Development Program", financed by the EU and its Member States (Germany, Denmark, Estonia, Poland, Sweden and Slovenia) and "Support decentralization in Ukraine. Phase II", funded by the Swedish International Development Cooperation Agency (SIDA). In addition, we conducted an expert survey with nine participants specializing in decentralization, local governance and national security to develop an Index of Preparedness, namely to assign weights to the importance of each of its components for hromadas' resilience (from 1—least important to 10-most important). The need to include the weights is determined by the need to reconcile our decision to include all aspects of resilience referred to by interviewees and potential biases amid the relatively low number of interviews.

3.1 | Dependent variables. Hromada's resilience indicators

The operationalization of the preparedness dimension of resilience resulted in the formation of the Index of Preparedness. It includes various planning and organizational activities which hromadas in Ukraine had to prepare to better react in emergency and war-related situations. The index items are binary and take a value of 1 if the preparation event occurred prior to February 2022, which was before the full-scale invasion. If the preparation event did not occur before that date, the index item takes a value of 0. The index is calculated by summing all the items, each weighted by its importance for preparedness as rated by experts. As such, the index can range from 0 to 14. Detailed descriptive statistics for the index are provided in Annex 2, Image 1. The full list of index items and their average rating of importance by experts is contained in Annex 2. The internal consistency reliability of the index was assessed using two measures: item-total correlation and Cronbach's Alpha. Item-total correlation was high (Pearson's product-moment correlation coefficient >0.20) for all items of the index, suggesting a strong association between each item and the overall index score. The ITCs were highest for items that measure whether means of warning the population were checked and whether the emergency response plan had

been updated or approved. The Cronbach's Alpha coefficient for the index was 0.78, indicating a high degree of internal consistency reliability (Annex 2, Image 1).

The suspension and renewal of administrative and garbage collection services in hromadas was used as an indicator of hromadas' robustness amid the war, as these processes rested entirely with the local authorities and had to be ensured even under the risks of massive shelling or with the influx of internally displaced persons (IDPs). The hromada's resilience can be demonstrated through its ability to provide alternative means of governance and service provision, such as setting up temporary offices or utilizing digital platforms for administrative services provision, establishing temporary waste collection points or implementing recycling programs for garbage collection services. We choose suspension metrics and use data only from rear hromadas, understanding limitations of to suspension of services at frontline or occupied hromadas.

Massive strikes on critical infrastructure in October and November 2022 pushed hromadas toward creative strategies and solutions on how to provide heat and water for their residents. Resilience as adaptation was operationalized as hromadas' ability to prepare for winter and possible challenges. In the annex of this paper, a table was presented which outlines the questions asked of hromadas regarding their winter preparation measures (Annex 4). The number of measures reported by each hromada was used as an indicator of their level of adaptation.

3.2 | Independent variables. Predictors of resilience

3.2.1 | Demographic, politico-administrative and wartime-related predictors of hromadas' resilience

Our analysis embraces demographic (population), politico-administrative (type of hromada, its area) and geographical predictors (macro-region,[5] distance from the regional center, distance to the EU border, Belarus and Russia, distance to the frontline), illustrative of the variation of Ukrainian hromadas, as well as their wartime experiences (i.e., occupation or/and military actions taking place in a hromada). Demographic and politico-administrative predictors are also of relevance for Ukraine in light of the decentralization reform. For instance, since the reform influenced hromadas' population size through the amalgamation process, it aimed to strengthen their capabilities and, consequently, their ability to take on ambitious new competencies. The amalgamation process should have also contributed to the narrowing of the urban-rural divide through strengthening the capabilities of all types of hromadas. The reform also inevitably impacted such geographic predictors as hromadas' area, distances from the center of hromada to regional centers and borders with the EU or Russia/Belarus.

3.2.2 | Economic and social capital predictors of hromada's resilience

Based on Norris, et al. (2008), we developed the following operationalization of resilience predictors. The utilization of these indicators is rooted in the resilience literature and also highlights the impact of the decentralization reform in Ukraine.

- For the **Economic Development "Resource volume and diversity"** subgroup, we chose available indicators from local open data, which refers to the quantity and diversity of resources available to a hromada or region in the Ukrainian context. By measuring *the percentage of own*

budget revenues in total income and own budget revenues per capita, we can understand the extent to which a hromada is able to rely on fiscal inflows from various taxes, fees and other sources not in form of transfers from the central government. These indicators also deal with the hromada's self-sufficiency and potential risks associated with dependence on state sources of financing. This indicator serves also as evidence of the success of the economic decentralization process in hromadas, reflecting the aim to retain more economic resources at the local level. We also estimate that level of personal income tax allocation in Ukraine is based on the registration of enterprises rather than their actual physical location, so own income indicatore can be proxi for hromada governance and encouraging businesses to register and pay taxes in the hromada.

- For the **Economic Development "Resource equity and social vulnerability"** subgroup, we assume that *the percentage of the urban population*. By using the percentage of urban population as a proxy for resource equity and social vulnerability, we aim to capture that in Ukraine urban areas generally tend to have higher access to resources, such as infrastructure, services, and economic opportunities, compared to rural areas, because of difference in percent of personal taxes that retained in urban areas before decentralizations (0% - in rural municipalities, 60%–75% to urban) (Carelin, 2015). In addition, we have included a predictor for *the presence in hromada of a "city of oblast significance"*, as these cities were able to retain 75% of the personal income tax before the reform, potentially affecting their fiscal capacities. It could also serve as a proxy for institutional capacities as the cities of oblast significance have had a broader number of functions prior to the reform and therefore could have more experience in planning. However, it is essential to acknowledge that this operationalization has limitations, as it simplifies the complexities of resource distribution and social vulnerabilities within hromadas.
- For the **Social Capital "Organizational structure and linkages"** subgroup, we picked *availability of a business support center and youth center within the hromada*, as these centers serve as a hub of networking and collaboration, providing a platform for entrepreneurs, investors, and other stakeholders to connect, share ideas and collaborate on projects. Longstaff (2008) highlighted the importance of these "keystones" or "hubs", "super-connected" networks and its members who link one network to another. In our study, we operationalized linkages between hromadas using several indicators, including the number of active and overall agreements between hromadas, as well as the number of hromadas with which cooperation agreements have been signed by each hromada. Predictor *the number of hromadas in an active network (cooperation agreements) with subject hromada* was used to capture the extent of inter-hromada linkages. This indicator can provide insights into the broader network of relationships between hromadas and the potential for information sharing and collaboration. For similar purposes but with focus on the intensity of hromada engagement in cooperation we use *the number of cooperation agreements with other hromadas*. We measure cooperation indicators over time and active on February 24, 2022, to divide historic ties between hromadas and active ones. Additionally, these indicators are linked to the effects of the decentralization reform, which have encouraged local authorities to engage in cooperative efforts during the amalgamation process. This, in turn, has demonstrated the impact on shock resistance in Ukraine (Keudel & Huss, 2023).
- For the **Social Capital "Citizen participation and leadership"** subgroup we assume that *head of hromada characteristics* are important. Incumbency on a local level has affected trust to authorities or possibly make them better leaders for crises (Parker & Parker, 1993). Our operationalization of social capital also includes insights about citizen participation for example, voter turnout during the last local election (2020). Moreover, high *voter turnout* indicates a strong sense of community and a willingness to collaborate toward common objectives.

The voting turnout also reflects the level of civic engagement and participation in democratic processes, which can contribute to social capital. Citizen participation indicators are also connected to the process of "political decentralization".

The analysis was conducted with the help of the following methods: (i) semi-structured exploratory interviews used for conceptualizing hromadas' resilience; (ii) focus groups with experts for operationalizing hromadas' resilience; (iii) surveys with hromadas and experts to weigh the Index of Preparedness and (iv) regression analysis.

4 | METHODOLOGY

In this study, we employed a cross-sectional design to investigate the resilience of hromadas. By utilizing a cross-sectional design, we obtained a snapshot of hromada resilience at a specific point in time, allowing us to explore the relationship between different variables and resilience outcomes.

In our research, we utilized open data from various sources, including both government and non-governmental sources, as well as the data from two surveys[6] conducted by Kyiv School of Economics (KSE) Institute, for the purposes of measuring the dependent variables.[7] Survey #1 was conducted online with representatives of hromadas in June-August 2022 and is used to measure robustness by the suspension of services. The total number of responses is 474 (33% out of all 1438 hromadas[8]). The sample contains responses from 148 urban hromadas and 326 rural hromadas. The sample gives a good representation of the general population of hromadas and has no statistically significant differences from it in most respects. It has a slightly higher share of urban hromadas (31.4% vs. 26.4% of all hromadas, $p < 0.05$) and a lower share of rural hromadas (36.9% v. 43.5%, $p < 0.01$). The composition of the sample by region also aligns with the general population of hromadas: a slightly higher share of hromadas from the North of Ukraine (21.2% vs. 16.9%, $p < 0.05$) and a lower share from the South (8.8% vs. 13.4%, $p < 0.01$), with almost equal shares from the Center (20.5% vs. 20.7%), East (20.8% vs. 19.5%) and West (28.7% vs. 29.5%). The sample also contains relatively fewer hromadas in the combat zone as of June 2022 (13% vs. 19%, $p < 0.01$) and in the 30 km zone from the borders with Russia and Belarus (5% vs. 8%, $p < 0.05$), given that representatives of these hromadas are more difficult to reach.

Survey #2 was sent online to the local authorities between October and November 2022 to get an insight into hromadas' preparedness and adaptation to the full-scale invasion. The survey was filled in by 138 representatives of hromadas (9.6% out of 1438 hromadas, excluding hromadas that were occupied in 2014). Without hromadas that experience occupation or military actions as of November 2022, the number is 116 out 1131 hromadas (10.3% response rate). 13% of the sample is located in the combat zone as of June 2022 (which constitutes 19% of all hromadas, $p < 0.05$), while 6% are situated within the 30 km zone from the borders with Russia and Belarus (which accounts for 8% of all hromadas). The composition of the sample closely aligns with the regional distribution of hromadas, with a slightly higher representation from the Western region and a comparatively lower representation from the Eastern region (West: 37.7% vs. 29.5%, $p < 0.05$; Center: 17.4% vs. 20.7%; North: 16.7% vs. 16.9%; South: 14.5 vs. 13.4%; East: 13.8% vs. 19.5%, $p < 0.1$). Village hromadas (33.3% vs. 43.5%, $p < 0.05$) were underrepresented in the survey.

Regression analysis was employed to determine the size and direction of the effect that independent variables (predictors) had on the dependent variable (resilience indicators). Given the limited number of observations, we used models with one dependent variable (for each of the predictors) and controlling only for being in the combat zone for the adaptation indicator (number of measures to prepare for winter) and the fact of being in the combat zone together

with city hromada status for the robustness indicators (Suspension of garbage collection service and Full suspension of administrative services).

5 | LIMITATIONS

There are several limitations to this study that should be acknowledged. Firstly, the study focuses solely on the threats to institutional stability or, in other words, the resilience of hromadas' institutional structures, rather than the whole spectrum of shocks experienced by hromadas. Other shocks that may affect the resilience of hromadas are not considered in this analysis, so future research is required to develop a comprehensive insight into hromadas' wartime resilience. Secondly, the indicators used to assess the robustness and adaptation of hromadas are limited in scope, and further research may benefit from a more comprehensive operationalization of resilience as a dependent variable. As a result, the limited number of control variables could be applied in the analysis. Particularly, we do not control the proximity to the frontline that could affect the findings. Thirdly, longitudinal studies that follow hromadas over time would be necessary to determine the causal relationships between community resilience and various predictors of resilience.

Additionally, the study indicators rely on self-reported data from hromada officials, which may be subject to bias or inaccuracies. Triangulating these data with other sources would be necessary to increase the reliability of the findings. We also acknowledge that the survey #1 was conducted only a few months after the full-scale invasion, which may limit the ability to fully assess the long-term resilience of hromadas and data about recovery aspects, which are an important part of resilience. The effects of the invasion may continue to unfold over time, and further research may be necessary to fully understand their impact on hromada resilience. The effect of "survey fatigue" of local government bodies, power outages and rocket attacks that took place across Ukraine during the survey also affected the lower response rate, which may also serve as a limitation of the data for our study. However, our survey covered more than 10% of hromadas across Ukraine and was relatively evenly distributed across macro-regions.

6 | FINDINGS

Given the limited number of observations for using models with multiple independent and control variables, Table 2 presents the results of separate models with one dependent variable (column titles), one independent (row titles) and one control variable (type of hromada: city) for the *Preparedness Index* and two control variables (type of hromada: city and war zone as of June 20, 2022) for *number of measures to prepare for winter*, *suspension of garbage collection* and *full suspension of administrative service*.

Despite the small sample size, we stress the statistical power of our results by setting a significance level below 1%, as the regional analysis revealed significant variation, indicating a difference between South macro-region respondents from others. Additionally, other significant findings at a level below 5% suggest a statistical association. While we acknowledge the limitations of our sample, we will still discuss our findings to shed light on the observed patterns.

6.1 | Preparedness

The present model establishes a positive relationship between the *urban type of hromada* and the *Preparedness Index*. Our assumption at the outset of the research was that urban hromadas,

TABLE 2 Model testing.

Indicators	Survey #2, $n = 138$		Survey #1, $n = 474$	
	Preparedness index (linear regression) (1)	**Adaptation. Number of measures to prepare for winter (neg. Binomial regression) (2)**	**Robustness. Suspension of garbage collection service (logistic regression - logit) (3)**	**Robustness. Full suspension of administrative service (logistic regression - logit) (4)**
Demographic and politico-administrative predictors				
Population size (log)	**2.519*** **	−0.059	−0.015	−0.050
	(0.668)	(0.096)	(0.166)	(0.140)
Type of hromada: City	**1.591*** **	0.051	−0.357	**0.622** **
	(0.508)	(0.068)	(0.256)	**(0.205)**
Type of hromada: Settlement	−0.250	0.058	0.312	0.078
	(0.460)	(0.119)	(0.284)	(0.245)
Type of hromada: Village	**−1.341*** **	0.026	0.026	−0.078
	(0.424)	(0.065)	(0.284)	(0.245)
Area of hromada (log)	0.069	0.051	0.167	−0.060
	(0.630)	(0.093)	(0.146)	(0.115)
Distances from the center of hromada to regional centers (travel time by car, in hours)	0.007	0.009	−0.069	−0.196
	(0.221)	(0.038)	(0.146)	(0.117)
Geographical attributes				
Region: Center	0.249	−0.065	−0.165	−0.229
	(0.553)	(0.080)	(0.314)	(0.255)
Region: West	0.357	0.050	−0.346	**−0.572***
	(0.484)	(0.059)	(0.290)	**(0.235)**
Region: East	−0.019	0.048	−0.335	−0.490
	(0.754)	(0.063)	(0.340)	(0.298)
Region: North	−0.256	**0.431*** **	**1.230*** **	**1.045*** **
	(0.603)	**(0.116)**	**(0.273)**	**(0.239)**
Region: South	−0.660	**−0.556*** **	**−1.918** **	0.277
	(0.531)	**(0.170)**	**(0.731)**	(0.341)
Distance to the border of Belarus or Russia (in 100 km)	0.024	**−0.056***	**−0.388***	**−0.379** **
	(0.222)	**(0.030)**	**(0.164)**	**(0.119)**
Distance to the EU border (in 100 km)	−0.024	**0.034** **	0.118	0.073
	(0.112)	**(0.014)**	(0.063)	(0.052)
Hromadas in 30 km from the border of Belarus or Russia	−0.717	**0.551*** **	**1.328** **	**1.133***
	(0.691)	**(0.167)**	**(0.505)**	**(0.505)**

(Continues)

TABLE 2 (Continued)

Indicators	Survey #2, $n = 138$		Survey #1, $n = 474$	
	Preparedness index (linear regression) (1)	Adaptation. Number of measures to prepare for winter (neg. Binomial regression) (2)	Robustness. Suspension of garbage collection service (logistic regression - logit) (3)	Robustness. Full suspension of administrative service (logistic regression - logit) (4)
Economic development predictors				
Percentage of own budget revenue in total budget revenues	**0.027****	−0.001	0.384	0.562
	(0.013)	(0.001)	(0.647)	(0.591)
Total budget revenues per capita	0.049	−0.006	−0.033	0.048
	(0.205)	(0.028)	(0.062)	(0.052)
Own budget revenues per capita	0.294	−0.015	−0.030	0.042
	(0.212)	(0.024)	(0.057)	(0.049)
Percent of urban population	**0.025*****	−0.001	−0.081	0.299
	(0.007)	(0.001)	(0.521)	(0.423)
City of oblast significance status	**2.585***	0.185	−0.538	0.474
	(1.012)	(0.098)	(0.443)	(0.339)
Social capital predictors				
Presence of business support center in hromada	**1.557****	−0.008	0.115	0.399
	(0.731)	(0.086)	(0.347)	(0.288)
Presence of youth center in hromada	0.300	−0.009	0.015	−0.246
	(0.581)	(0.077)	(0.355)	(0.287)
Presence of youth council	−0.056	0.065	−0.389	0.131
	(0.970)	(0.106)	(0.441)	(0.347)
Head of hromada gender: Male	0.344	−0.065	−0.048	0.332
	(0.455)	(0.071)	(0.299)	(0.255)
Head of hromada age	0.005	0.001	−0.004	−0.013
	(0.023)	(0.003)	(0.012)	(0.011)
Head of hromada political experience	−0.735	0.167	−0.161	−0.013
	(0.606)	(0.159)	(0.297)	(0.256)
Head of hromada incumbency	0.137	0.021	−0.124	−0.035
	(0.462)	(0.063)	(0.238)	(0.197)
Voting turnout in hromada in 2020 local election	−0.021	**0.014*****	0.329	−0.436
	(0.028)	**(0.004)**	(1.327)	(1.234)
Number of cooperation agreements with other hromadas over time (including inactive as of 24.02)	**0.216****	**0.030***	−0.055	−0.003
	(0.089)	**(0.016)**	(0.066)	(0.032)

TABLE 2 (Continued)

Indicators	Survey #2, $n = 138$		Survey #1, $n = 474$	
	Preparedness index (linear regression) (1)	**Adaptation. Number of measures to prepare for winter (neg. Binomial regression) (2)**	**Robustness. Suspension of garbage collection service (logistic regression - logit) (3)**	**Robustness. Full suspension of administrative service (logistic regression - logit) (4)**
Number of cooperation agreements with other hromadas active as of 24.02	0.262	−0.002	−0.104	−0.059
	(0.218)	(0.037)	(0.101)	(0.050)
Number of hromadas with which cooperation agreements have been signed over time (including inactive as of 24.02)	0.064	−0.011	−0.007	**−0.086****
	(0.077)	(0.007)	(0.040)	**(0.034)**
Number of hromadas with which active cooperation agreements were in place as of 24.02	0.091	−0.007	−0.001	**−0.142*****
	(0.096)	(0.007)	(0.043)	**(0.040)**

Note: Standard errors (robust) are reported in parentheses. Categorical variables with more than two levels (hromada type and region) were recoded as dummy variables. For each of them, the default category was "all other regions/hromada types except [region/hromada type]". A robustness check was performed by introducing the military occupation status of hromada in the regression analysis. Model 2: "region North", "region South" as well as "distance to the border of Russian or Belarus", "distance to the EU border" and "Hromadas in 30 km from the border of Belarus or Russia" lost their significance. Conversely, "percentage of own budget revenue in total budget revenues" and "own budget revenues per capita" showed a significant relationship ($p < 0.05$) with the outcome. Model 3 and 4: "region North", "region South" as well as "Number of hromadas with which cooperation agreements have been signed over time (including inactive as of 24.02)" and "Number of hromadas with which active cooperation agreements were in place as of 24.02" remained statistically significant. Other variables lost their significance. Bold was used to highlight statistically significant results, acquired through regression analysis.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

owing to their greater resource availability, would exhibit a higher Index score. This hypothesis is validated by the positive correlation observed between *the population size* and the Index score, and between *the percentage of urban population* and *the presence in hromada of a "city of oblast significance"* and Index score. This indicates that hromadas with more resources tend to perform better in terms of preparedness. A similar trend is observed when considering the negative effect the Index has on *village hromadas*. It is possible to infer that urban hromadas used to have more human and financial capacities to engage and develop existing resources to foresee potential shocks and prepare for them.

Moreover, the economic indicators also support our assumptions about institutional capacity. Specifically, we discovered that *the percentage of own revenue in the general income* of the hromada has a positive impact on the Index. This indicator reflects the hromada's ability to gather financial resources from local taxes and fees, showcasing fiscal self-sufficiency and autonomy in the budgeting system. Notably, the difference in own income rates between urban and rural hromadas may explain the observed variations.[9] However, after including a control variable accounting for *the percentage of urban population in each hromada*, the positive relationship between own income predictor and the Preparedness indicator remained. Consequently, our analysis suggests a strong link between hromadas' economic efficiency in generating their own revenues and their preparedness levels,

as the total income per capita predictor did not show a statistically significant relationship with preparedness.

Additionally, we identified a significant linkage between the *presence of a business support center in hromada predictor*, which we controlled for using *the urban population* variable to minimize the potential influence of any correlation between urban hromadas and these business support centers. These support centers may serve as possible hubs or business associations within hromadas, and we observed that those hromadas possessing such centers displayed higher levels of preparedness. It is important to recognize that the *presence of a business support center within a hromada* may also serve as a proxy indicator for business activity within that locality. This is because a greater number of businesses within a given hromada may potentially give rise to more initiatives for such hubs and associations.

Moreover, it is worth highlighting that the study found a positive correlation between *the number of cooperation agreements established between hromadas over time* and the Preparation Index. The fact that *the number of cooperation agreements over time* showed significant effect while other indicators with cooperation agreements did not might imply that this indicator is a good proxy for measuring the institutional capacities of the local governments.

6.2 | Adaptation

Our analysis further revealed the impact of the predictor *region* on the adaptation indicator *number of measures taken to prepare for winter*. Specifically, we observed a positive correlation between hromadas in the northern regions and a number of measures to prepare for winter, and a negative effect between Southern territorial hromadas and this indicator.

The study's results reveal a positive correlation between *hromadas situated within 30 km* from the state border and the implementation of adaptation measures. This finding can be attributed to the fact that a substantial proportion of the hromadas in this group are situated within the North macro-region. The finding is confirmed by another indicator and the fact that the increase in *distance from the border with Russia and Belarus*, which runs along the north of Ukraine correlates with a decrease in the number of winter preparation measures. At the same time hromadas closer to the EU border showed fewer preparation measures taken.

In addition, our results indicate that hromadas with higher *voter turnout* had higher rates of adaptation to the challenges of war in winter. This finding could underscore the critical role of citizen participation in building resilience.

Moreover, we found that the *number of cooperation agreements established between hromadas over time* was positively and significantly related to the adaptation indicator. This finding suggests that the sharing of resources, expertise and best practices among local governments has a positive impact on their future administrative adaptation. By actively engaging in cooperative agreements with other hromadas, local governments are better equipped to address and respond to potential shocks and stressors, thereby promoting effective preparedness and response measures.

6.3 | Robustness

In our Robustness indicators models, we discovered that certain *politico-administrative* and *geographical predictors* were significantly related to the occurrence of administrative services' suspension. Particularly, the *type of hromada* and *region* predictors influenced this outcome. Urban hromadas had a higher likelihood of experiencing complete service suspension, while hromadas in the Northern region were more susceptible to interruptions, likely due to their

proximity to conflict zones. In the Western macro-region, there were statistically fewer instances of full service suspension. Regarding the *waste management problems indicator*, significant relationships were found in the North and South macro-regions. The North showed a positive effect, while the South had a negative effect, resulting in fewer garbage collection suspensions. Additionally, *hromadas within* 30km *of the national border* had a positive correlation with Robustness indicators, with both administrative services' suspension and garbage collection being influenced by the North macro-region predictor.

The number of hromadas in an active network (cooperation agreements) with subject hromada shows a significant negative effect on full suspension of administrative services. We assume that there is a crucial role of inter-local government collaboration in enhancing effective shock preparedness and response. The result implies that hromadas which engage in active cooperation agreements with other local governments possess an advantage in terms of administrative robustness. This advantage is likely due to the exchange of resources, knowledge, and best practices among local governments. On the other hand, it can be a proxy-indicator of a special type of leadership in hromadas which influences both the active cooperation process and administrative adaptation.

7 | DISCUSSION

The findings of our analysis demonstrate the importance of hromadas' capabilities, as well as economic and social tangible and intangible resources available to them, in ensuring their preparedness to the invasion as a complex multi-component shock. In terms of the preparedness aspect, our findings confirm the role of Economic Development and Social Capital as predictors of resilience suggested by Norris, et al. (2007). With regard to the Economic Development dimension, it should be stressed that it is not the amount of resources available to a hromada but its capacity to generate its own income that matters for its preparedness to complex, multi-dimensional shocks. Even though Ukraine's decentralization reform generally, and its fiscal dimension specifically, put a strong emphasis on ensuring hromadas' capabilities, rural hromadas demonstrate lower capabilities to generate their own income compared to urban ones. Overall, however, our research confirms earlier findings as to the importance of Ukraine's fiscal decentralization efforts for resource mobilization, needed for hromadas to provide public services amidst the war and adapt to the changing environment (Council of Europe, 2023; Keudel & Huss, 2023).

Coming to Social Capital, our research on preparedness also revealed the positive role of physical hubs and virtual networks for hromadas' preparedness to the invasion. This testifies to the fact that not only material resources as such, but engagement and governance are essential for ensuring the preparedness dimension of resilience. In this regard, the decentralization reform in Ukraine with its strive for building capacity of hromadas and strengthening citizens' participation at the local level has been conducive to hromadas' resilience to the invasion that can be in many respects seen as a "stress-test" for territorial hromadas' resilience. Another aspect, whereby the decentralization reform positively influenced hromadas' resilience, deals with it opening up the path for knowledge exchange and collaboration between Ukrainian territorial hromadas through collaboration agreements. This confirms previous findings as to the importance of the decentralization reform-induced horizontal networks for hromadas' resilience (Council of Europe, 2023).

In combination, insights into the predictors of hromadas' preparedness to the invasion showcases the value of the decentralization reform in terms of fostering the autonomy and ownership of local decision-making. Hromadas' broader autonomy and stronger capabilities (by comparison

with the pre-reform state-of-play), including new resource mobilization opportunities and horizontal links between hromadas, enabled their more active cooperation and learning, as well as contributing to their ability to attract external support.

The research on hromadas' adaptation and robustness, nevertheless, shows that suspensions mainly depended on the region (and its affectedness by military actions) than the type of hromada per se. Thus, in contrast to hromadas' preparedness, there had been mainly geographic factors and affectedness by military activity which influenced their robustness and adaptation. Such difference requires more in-depth qualitative analysis for governance priorities during wartime in different regions. On a more general note, further research is required to study the relationship between hromadas' preparedness, robustness and adaptation for policymakers to decide on aspects to be emphasized in further local resilience-building policies in Ukraine and when applying Ukrainian experiences abroad.

8 | CONCLUSION

Combining qualitative and quantitative research methods, our study aimed to explain the resilience of Ukrainian hromadas with respect to the institutional threats amid Russia's full-scale invasion of Ukraine. The peculiarity of the study lies in the fact that hromadas' experiences of the invasion have been very different, depending on whether they are in the rear, close to the frontline or experienced occupation. Yet, given the scale of the invasion and the multiplicity of shocks, threats to institutional stability were common to all hromadas, not only those close to the frontline or under occupation.

We found that economic and social predictors of resilience correlate with hromadas' preparedness for the invasion, while geographic factors and closeness to the frontline have been the central factors in hromadas' robustness and adaptation toward threats to institutional stability. Citizens' active stances, in particular, high voters' turnout was found to matter also for hromadas' adaptation to institutional challenges. Thus, not just material but immaterial resources mattered for hromadas' ability to cope with the threats to institutional stability. Hromadas' exchange of information and best practices through institutionalized and permanently functioning collaboration agreements was also found to correlate with their preparedness for the invasion and robustness to the shocks of war.

The decentralization reform that made hromadas more capable and less dependent on the center can be seen as conducive to various aspects of hromadas' resilience to institutional threats, especially the Preparedness Index. Autonomy and ownership of local decision-making made hromadas more flexible in collaborating with one another, as well as attracting support from outside, inter alia, from international partners and donor agencies, compared to the pre-reform situation. Resulting networks and learning experiences contributed to the hromadas' resilience, in part related to preparedness. The decentralization reform did not, however, manage to fully bridge the urban-rural divide in Ukraine, as rural territorial hromadas, especially small ones, were found to have less capabilities to generate their own income. Limited own income-generation capabilities were among the factors which negatively impacted hromadas' preparedness.

The case of *hromadas'* resilience in the context of Russia's war against Ukraine testifies to the importance of fostering communities' economic capabilities (in particular, their ability to generate their own income), social networks and citizens' participation to strengthen their resilience to institutional shocks in the context of a contemporary war. Further research is required to develop a more comprehensive picture of factors behind Ukrainian hromadas' resilience to other types

of shocks beyond institutional stability, such as the influx of IDPs in rear hromadas, threats to critical infrastructure and informational shocks. Additional studies are also required to zoom in on the relationship between hromadas' preparedness, robustness and adaptation.

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CONFLICT OF INTEREST STATEMENT

All the authors (Maryna Rabinovych, UiA/KSE, Tymofii Brik, KSE; Andrii Darkovich, KSE; Myroslava Savisko, KSE; Valentyn Hatsko, KSE; Serhii Tytiuk, KSE and Igor Piddubnyi, KSE) hereby declare the absence of the conflict of interest associated with the paper "Explaining Ukraine's Resilience to Russia's Invasion: The Role of Local Governance".

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

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ENDNOTES

[1] Terminological note: the Ukrainian word "hromada" is commonly translated into English as a "territorial community" (this term is, inter alia, used in the official glossary of the decentralization reform, as provided for by the unified "Decentralization" portal) (Decentralization.gov.ua, 2023). In functional terms, the Ukrainian concept of "hromada" is, however, close to the European one of a "self-governed municipality". We explain the concept and functions of hromadas in the theoretical section of the paper below. In our research we use the short version "hromada" for the term "territorial hromada" from Ukrainian legislative acts.

[2] Ukraine's decentralization reform is widely regarded in political documents and academic literature as a success story among the post-Euromaidan reforms in Ukraine (e.g., Oleinikova, 2020; Romanova & Umland, 2021).

[3] Terminological note: when using the term "community", we mean a social group, living in a specific territory, rather than a self-governed territorial entity itself (i.e., similar to the notion of "municipality"). When referring to such entities (units of self-government) in Ukraine, we systematically use the term "hromadas" throughout the article.

[4] For security and ethical reasons, we cannot disclose the identity of hromadas' leaders

[5] Our understanding of the term "macro-region" and the delimitation of macro-regions we use is based on the definition, provided in the Law of Ukraine "On the foundations of state regional policy" of 5 February 2015 (with the most recent amendments of 13 December 2022).

[6] Both surveys were administered using KoboToolbox software for collecting data, the examples of questions could be found in Annex 4. The questionnaires were distributed through Ukrainian hromadas' association (survey #1); regional offices of U-LEAD with European, international cooperation project funded by Germany and the EU with presence in all regions of Ukraine, and the database of the Center for Sociological Research, Decentralization and Regional Development in KSE (survey #2) and the database of the Center for Sociological Research, Decentralization and Regional Development in KSE (survey #2).

[7] Center for Sociological Research, Decentralization and Regional Development at Kyiv School of Economics (KSE) Institute conducted a survey for Index of Preparedness and adaptation indicator, the Center for Food Resources and Land Use Research at KSE for robustness indicators.

[8] Hereafter, we use 1438 hromadas as the general population of Ukrainian hromadas: 1470 created hromadas excluding 31 hromadas occupied as of 23 February 2022 and the city of Kyiv

[9] In urban hromadas the proportion of own income source is 62%, while in rural hromadas it is 53%.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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