# "Resilience of territorial communities amid the war against Ukraine: The role of budgetary instruments"

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# RESILIENCE OF TERRITORIAL COMMUNITIES AMID THE WAR AGAINST UKRAINE: THE ROLE OF BUDGETARY INSTRUMENTS

## Abstract

Russia's war against Ukraine has exacerbated challenges and risks to community development. Improving the ability to withstand the shocks of the external and internal environment, adapt to changes in the security environment, respond to threats, maintain sustainable functioning, and recover to the desired equilibrium will contribute to strengthening the resilience of communities. Budgetary instruments are crucial for ensuring the resilience of communities in such conditions. This study aims to identify the impact of budgetary instruments on ensuring the resilience of territorial communities amid the war in Ukraine (the case of Lviv oblast). The methods include a systemic and structural approach (building an information and analytical model of resilience research) and indicative and GAP analysis (identifying the impact of budgetary instruments on community resilience, in particular, local taxes, transfers, and personal income tax (PIT)). The data of 73 communities in Lviv oblast for 2021–2023 were collected. The study shows that the resilience of the territorial communities of Lviv oblast during the study period was at a moderate and above-moderate level; most were in the zones of resistance (resilience indicators ranging from 0.43-0.65) and decreasing resilience (0.42-0.20); the resilience of 8% was at a critically low level (2022–2023). The results estimate that the resilience of 90% communities in 2024 will not change significantly if military PIT is redirected from local to state budgets, except for those communities whose resilience is highly dependent on the amount of military PIT (the decrease in resilience will range from 12.5 to 4.2 percentage points).

## INTRODUCTION

Russia's war against Ukraine, the active phase of which has been going on since February 2022, has had a significant impact on local governments, which have taken on a massive burden of problems (from hosting people fleeing the war to solving security problems). The successful reforms of the administrative-territorial structure and decentralization in Ukraine in recent years have created the preconditions for local governments and territorial communities capable of ensuring and supporting the functioning of the local economy and the livelihoods of the population. Arguably, during the war, territorial communities have become a critical link in ensuring resilience and social stability for the rear regions and a catalyst for stabilization processes in the liberated territories.

During this time, society has clearly understood that all communities are in different security and socio-economic situations, depending on their proximity to the line of hostilities. Therefore, the risks of disruption to the resilience of frontline, rear, and core communities, as well as the communities where the control of the

state of Ukraine has been restored, are also different, as are the approaches to managing the development of territories and ensuring their resilience.

Given the limited possibilities of forming financial resources of territorial communities, the budgetary component of their financial capacity is dominant. The study of the impact of budgetary instruments on the resilience of communities in a rear oblast will reveal the consequences and impact of the war on the local budgets of these areas. Moreover, it can serve as an informational basis for decision-making that will allow local governments to be financially capable of fulfilling their own and delegated powers and ensuring their progress.

## 1. LITERATURE REVIEW

The issue of ensuring resilience as a systemic category has gained scientific attention with the intensification of crisis phenomena in the economy (Benson & Clay, 2006; Amaratunga et al., 2019). This required a shift in the focus of public administration from the top-down approach to the local level – to the issue of the ability of territorial communities to withstand challenges and adapt to new conditions (bottom-up approach) (Rapaport et al., 2018; Cutter et al., 2008; Cohen et al., 2013; Voznyak & Pelekhatyy, 2018). The inefficiency of top-down management of complex socio-economic systems and the focus on a decentralized approach are reasons for such changes (Ostrom et al., 2007). The government can be the center of leadership in overcoming the crisis, but institutional changes require coordinated efforts of all economic entities performing different functions at different levels of the socio-economic system (Gorddard et al., 2016).

The resilience of a territorial community is considered an interdisciplinary category at the intersection of economic, social, and environmental studies (Wilson, 2012), which is based on the patterns of management decision-making and the specific behavior of economic entities (social capital, values, and shared lifestyles) (Gorddard et al., 2016; Aldrich & Meyer, 2015; Cohen et al., 2013). This concept is interpreted as the existence, development, and mobilization of community resources by its members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise (Magis, 2010), or, looking at the category from another perspective, as a collective effort to improve community response and recovery in the face of crisis (Pfefferbaum et al., 2017). Understanding, measuring, and consequently finding ways to improve it is based on the characteristics of the community itself (Rapaport et al., 2018). The main elements of community resilience include resources, adaptive capacity, ability to absorb disturbances caused by crises (Rapaport et al., 2018); capacity for economic development, social capital, community members' competencies, information, and communication (Levesque et al., 2024).

The interchangeability and complementarity of community resilience elements are well known. For example, the sense of belonging and social engagement of rural communities offset their low economic capacity, as the inherent problem of self-sufficiency (dependence on available resources and inability to multiply them quickly compared to urban communities) contributes to higher social cohesion, which strengthens resilience (Skerratt, 2013; McManus et al., 2012).

In addition to the specific features of the community, the nature of the crisis also has an impact on the resilience of the territorial community, which requires the use of certain resources and the activation of social links at different levels. Most studies on the resilience of territorial communities address natural disasters (Adhikari et al., 2021), climate change (World Bank, 2023), economic crises (Skerratt, 2013; McManus et al., 2012), refugee crises in host communities (UNDP, 2018; Revel et al., 2018), pandemic and its impact (Shen et al., 2023), a wide range of crises with different causes and forms of manifestation. The determinants of the resilience of territorial communities include physical components, such as local resources (infrastructure, financial resources, accessibility of social services, and conditions of their provision). There are also behavioral patterns as a response to a stimulus (a person's perception of his or her community, social networks, social capital, and experience of commu-

nity members gained in stressful situations) (Cohen et al., 2013; Voznyak et al., 2023a), as well as conditions and specifics of the crisis. The budgetary factor is one of the key factors in ensuring the resilience of territorial communities in times of crisis, while budget flexibility determines the ability and speed of adaptation to new conditions (Premchand, 2000; Dzigbede et al., 2022).

The war in Ukraine and the resilience of territorial communities in these conditions are rather interesting phenomena. According to the traditional understanding of state security, the expansion of the discretionary powers of the executive authorities and the reduction of the administrative activity of local governments are the natural reactions of the state to the challenges of war. Here, the role of the community is reduced to treating it as a victim in need of protection (Drury et al., 2019; Keudel & Huss, 2023). Meanwhile, in Ukraine, the local government system adapted to the challenges of war intensifying horizontal cooperation and partnership within communities with the public and the business sector. This contributed to the implementation of a "networked governance regime" that allowed all stakeholders to make management decisions with their own efforts, resources, and knowledge (Keudel & Huss, 2023; Voznyak et al., 2022).

Successfully implemented decentralization and administrative-territorial reforms in Ukraine have enabled local governments to respond adequately to the war challenges (OECD, 2022a). Expanded powers and increased financial resources at the disposal of local governments have contributed to the emergence of a social contract between them and citizens. Thus, local governments work to increase revenues to local budgets, and residents receive quality social and administrative services and quality infrastructure by paying taxes (Arends et al., 2023a). A high level of trust (leading to the development of social networks and social engagement), managerial autonomy (transfer of responsibility for decisions to the local level), and the economic capacity of the community (the ability to generate its own income, form, and execute local budgets) are crucial for the resilience of Ukrainian territorial communities during war (Rabinovych et al., 2023; Vasylieva et al., 2023; Arends et al., 2023b).

The main vector of ensuring the sustainability of territorial communities in Ukraine is to balance the use of budgetary resources – for economic recovery (growth of production, consumption, and employment) and for the provision of quality social services to the population (Voznyak et al., 2023a), which requires their sufficiency. The interest in identifying the impact of budgetary policy instruments (including budget revenues/expenditures, taxes/fees, and transfers) on the resilience of territorial communities in the context of the war in Ukraine is driven by several circumstances:

a) since the beginning of russia's full-scale invasion of Ukraine, territorial communities have been performing new, untypical, and resource-intensive functions – providing housing for IDPs, supporting territorial defense and the Armed Forces of Ukraine, or organizing the distribution of humanitarian aid (OECD, 2022a; Voznyak et al., 2023a), which requires additional budgetary resources;

b) the structure of local budget revenues changed as a result of amendments to the national budgetary and fiscal legislation introduced to stabilize the economic situation and support business (Legislation of Ukraine, 2022);

c) the uneven impact of the war on the development of territorial communities (by security factor and proximity to the front line, there are communities in the frontline regions, communities where Ukraine's control has been restored, communities in the core regions, and communities in the rear regions (UNDP Ukraine, 2023), which manifested itself in the deterioration of business activity (due to the closure/bankruptcy/destruction of enterprises), disruption of logistics chains, relocation of enterprises, displacement of the population both within the country and abroad (about 12 million people) (Keudel & Huss, 2023).

The new reality has manifested itself in different ways in different regions of the country, creating different conditions and opportunities for community budgeting (The World Bank, 2023).

The study focuses on the communities of Lviv oblast, Ukraine, when identifying the impact of

budgetary instruments on community resilience (understood as the ability of the community to adapt to changes in the security environment, withstand threats, maintain sustainable functioning, and recover to the desired equilibrium). This oblast, on one hand, is a rear area and has not suffered significant damage and destruction; on the other hand, it has provided shelter to a significant number of people (and thus has experienced an additional burden on the domestic labor market, social infrastructure, and local budgets) and businesses relocated from the areas of hostilities. Moreover, it is necessary to understand the extent to which the war has affected the development of the oblast and its ability to achieve strategic goals. Developing practical solutions to strengthen the resilience of communities in the new reality is an important task of strategic planning for territorial development.

This study aims to identify the impact of budgetary instruments on ensuring the resilience of territorial communities in the midst of the war in Ukraine (the case of Lviv oblast).

## 2. METHODOLOGY

A system of indicators was chosen to identify the impact of budget policy instruments on the resilience of territorial communities:

$$FR_{tn}^{m} = \begin{pmatrix} ILB_{tn}^{m}, DD_{tn}^{m}, FA_{tn}^{m}, TB_{tn}^{m}, \\ TTB_{tn}^{n}, IT_{tn}^{m}, BDB_{tn}^{m} \end{pmatrix}, \qquad (1)$$

where $FR_{tn}^{m}$ is the resilience of the $n$ community of the $m$ region in the $t$ period; $ILB_{tn}^{m}$ is the financial independence of the local budget of the $n$ community of the $m$ region in the $t$ period; $DD_{tn}^{m}$ is the subsidy dependence of the $n$ community of the $m$ region in the $t$ period; $FA_{tn}^{m}$ is the financial autonomy of the $n$ community of the $m$ region in the $t$ period; $TB_{tn}^{m}$ is the share of local taxes and fees in the structure of revenues of the $n$ community of the $m$ region in the $t$ period; $TTB_{tn}^{m}$ is the share of tax revenues in the structure of revenues of the $n$ community of the $m$ region in the $t$ period; $IT_{tn}^{m}$ is the tax independence of the $n$ community of the $m$ region in the $t$ period; $BDB_{tn}^{m}$ is the share of basic subsidies in the revenues of the $n$ community of the $m$ region in the $t$ period.

The community local budget independence rate is calculated as the ratio of own revenues and total revenues with transfers:

$$ILB_{tn}^{m} = \frac{SIn_{tn}^{m}}{In_{tn}^{m}}, \qquad (2)$$

where $SIn_{tn}^{m}$ is the revenues of the $n$ community of the $m$ region in the $t$ period (without transfers); $In_{tn}^{m}$ is revenues (with transfers) of the $n$ community of the $m$ region in the $t$ period.

The subsidy dependence rate is calculated as the ratio of the community's transfers to total revenues:

$$DD_{tn}^{m} = \frac{Tr_{tn}^{m}}{In_{tn}^{m}}, \qquad (3)$$

where $Tr_{tn}^{m}$ are transfers of the $n$ community of the $m$ region in the $t$ period.

Calculation of the rates of local budget independence and subsidy dependence and the share of the basic subsidy in own revenues allows one to determine the level of budgetary dependence of communities on the state budget. Financial autonomy is defined as the ratio of own revenues and expenditures (for performing general state functions, economic activity, social sphere, housing and communal services, capital expenditures) of communities. The autonomy coefficient is an indicator of the degree to which communities can adapt to shocks and apply crisis management tools in response. The fiscal self-sufficiency of communities is defined as the ratio of total tax revenues to the communities' own revenues (without transfers).

Thresholds are defined for each financial resilience indicator – the lower and upper optimal values. The vector of optimal values characterizes the permissible range of indicator values, the crossing of thresholds of which does not mean a violation of the financial stability of communities. At the same time, the violation of the upper thresholds means that communities lose their resistance to macroeconomic shocks, and their financial instability increases. Therefore, the axiom of strengthening or ensuring the financial resilience of communities is not to maximize the values of the relevant financial indicators but to ensure that they are within the optimal range.

The calculation of thresholds is based on the normal type of distribution of the initial data, which is characterized by the standard density of the data scatter plot. To build optimal thresholds, the following formulas were used:

$$z_{lit}^{opt} = \beta_{int} - \sigma_{int}, \qquad (4)$$

$$z_{hit}^{opt} = \beta_{int} + \sigma_{int} \qquad (5)$$

where $z_{lit}{}^{opt}$ is the lower optimal threshold of the $i$ indicator in the $t$ period; $z_{hit}{}^{opt}$ is the upper optimal threshold of the $i$ indicator in the $t$ period; $\beta_{int}$ is the mean value of the $i$ indicator of $n$ indicators in the $t$ period; $\sigma_{int}$ is the standard deviation of the $i$ indicator of $n$ indicators in the $t$ period.

The optimal threshold values for such indicators of community financial resilience as the share of local taxes and fees in the structure of revenues and tax revenues in the structure of income are calculated based on the principle of the maximum value of the general sample indicator:

$$z_{hit}^{opt} = \max_N x_{itn}^m, \qquad (6)$$

where $x_{it}{}^m$ is the value of the $i$ indicator of the $n$ community of the $m$ region in the $t$ period; $N$ is the general population sample (community in the region).

In the process of determining the thresholds of regressor indicators, the upper optimal thresholds become lower ones.

Formula (7) is used to normalize the regressor indicators and catalysts by the distance from the thresholds.

$$\ddot{fr}_{itn} = \begin{cases} \dfrac{fr_{itn}}{z_{hit}^{opt}}, & z_{hit}^{opt} \geq x_{itn}^{max} \\[2mm] \dfrac{fr_{hit}^{opt}}{a_{itn}}, & z_{hit}^{opt} \leq x_{itn}^{min} \end{cases}, \qquad (7)$$

where $\ddot{fr}_{itn}$ is the normalized value of the $i$ indicator of the financial resilience of the $n$ community in the $t$ period; $fr_{itn}$ – the value of the $i$ indicator of the financial resilience of the $n$ community in the $t$ period; $x_{itn}{}^{max}$ is the maximum value of the $i$ indicator of the $n$ community in the $t$ period.

A combined method of normalization was used for the indicators "financial autonomy" and "share of basic subsidies in own revenues:"

$$\ddot{fr}_{itn} = 1, \;\; if \; fr_{itn} \begin{cases} >1 \\ =0 \end{cases}, \qquad (8)$$

Community resilience is studied using a taxonomic approach based on the construction of an empirical indicator taking into account the taxonomic distance – the deviation of the current indicators from the thresholds, which allows taking into account the qualimetric and structural features of the phenomenon under study. The taxonomic approach implies calculating the distance of each financial resilience indicator from the reference multidimensional unit, whose coordinates are the upper thresholds (for catalyst indicators) and the lower thresholds (for regressor indicators).

$$d_{int}^{0m} = \sqrt{\sum_{i=1}^{j} \left( \ddot{fr}_{itn} - z_{it}^{opt} \right)^2}, \qquad (9)$$

where $d_{int}{}^{0m}$ is the distance of the $i$ indicator of the $n$ community in the $t$ period from the reference indicator of financial resilience; $j$ is the number of indicators.

The empirical indicator of the financial resilience of communities is calculated by:

$$FR_{tn}^m = 1 - \frac{d_{int}^{0m}}{d_0}, \qquad (10)$$

where $d_0$ is the reference distance of the community financial resilience indicators calculated according to the 3σ rule:

$$d_0 = \overline{d_{int}^{0m}} + 3 \cdot \sqrt{\frac{\left( d_{int}^{0m} - \overline{d_{int}^{0m}} \right)^2}{j}}, \qquad (11)$$

## 3. RESULTS AND DISCUSSION

Figure 1 shows that the resilience of all communities in Lviv oblast was at a moderate and above moderate level. Most communities correspond to the resistance zone (0.43-0.65) and decreasing financial resilience (0.42-0.20) levels. In contrast, several communities are identified as financially dependent in different periods (Biskovytska and Borynska – in 2021 and 2022; Zabolotsivska,

Pidkaminska, Turkivska, and Hyrivska – in 2023). None of the communities had a value of the financial resilience indicator within the ranges of financially resilient (0.80-1.00) and financial resilience reserve (0.66-0.79) during this period.

This state of territorial communities' finances is caused by the specifics of the region's economic development and is not, in fact, related to military operations in the country. After all, the analysis did not reveal any disruption in the resilience of communities since the beginning of the war: no significant decrease in the level of financial resilience of most communities was recorded, and some of them even improved their financial situation. Therefore, the positive experience of adaptation of the communities of the rear region to the conditions and consequences of the russian invasion of Ukraine can be stated. In this context, the following question is relevant: what are the reasons for the resilience of these communities amid the large-scale military threat? First, it is worth noting that the communities of Lviv oblast did not suffer widespread destruction, massive migration, or contamination with explosive devices. The negative impact of the war on their development was manifested in the deterioration of the investment environment and the situation of economic entities, as well as a decrease in the revenues from certain tax payments (excise tax, land tax, and single tax) to community budgets, which, accordingly, forced local governments to optimize local budget expenditures.

The war led to the strengthening of the role of the defense industry in economic development, which is reflected in the increase in the number and the income of military personnel. Thus, this led to a sixfold increase in revenues from military personal income tax to local budgets in 2022 compared to pre-war 2021. Accordingly, the communities where military units are registered/deployed have significantly increased their budget revenues, which has become a certain "safety margin" in the face of extreme uncertainty.

This statement is confirmed by the dynamics of the level of financial resilience of Lviv oblast communities in 2021–2022. Out of 73 communities in the region, 1/3 (26) showed an improvement in financial resilience. At the same time, the most rapid improvement in resilience was observed in the territorial communities that have historically developed as places of "accumulation" of military units and training grounds (Yavorivska (+0.10 p.p.), Novokalynivska (+0.09 p.p.), Novoyavorivska (+0.14 p.p.), Velykomostivska (+0.12 p.p.)). In 2022, their revenue was largely (over 70%) made up of military personal income tax.

Interestingly, the strengthening of financial resilience in 2022 is typical for communities in the resistance zone (0.43-0.65), i.e., those that had better initial values of the analyzed indicator in the reference year (2021) – 18 communities, i.e., every second community. Only eight communities are in the decreasing financial resilience zone. The level of community economic development affects
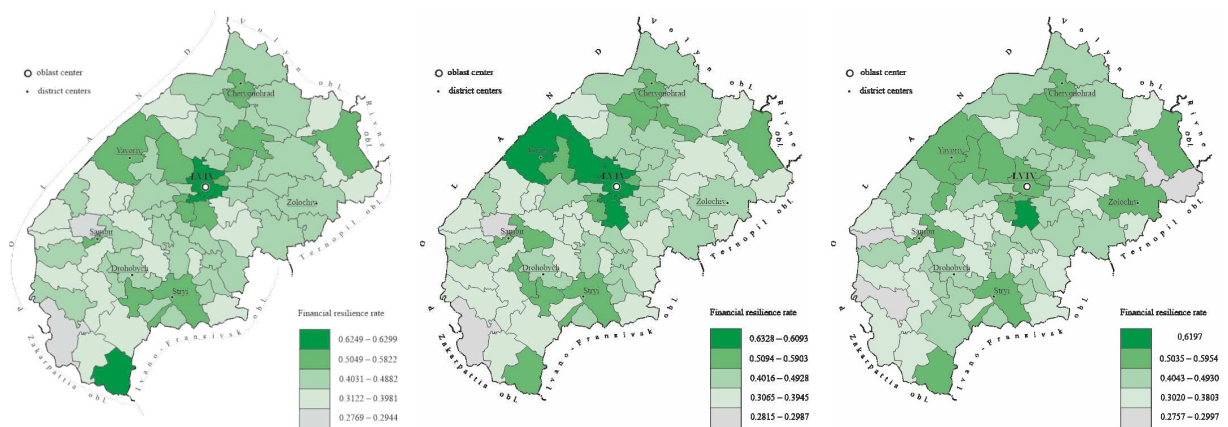


*Note:* Coefficients are in the range from 0 to 1 (0.8 – 1.0 – financially resilient communities; 0.66-0.79 – financial resilience reserve zone; 0.43-0.65 – resistance zone; 0.42-0.20 – decreasing financial resilience; 0.19-0.0 – loss of resilience, financial dependence). Grading is based on the Harrington scale.

**Figure 1.** Resilience of communities in Lviv oblast, 2021–2023

its ability to respond effectively to the shock, recover from the crisis, and adapt to new circumstances. When analyzing which communities in Lviv oblast have increased their financial capacity in 2022, it is possible to trace a dependence on two factors (military personal income tax and the level of economic development) and divide the communities into the following groups:

- communities where the revenues from the military personal income tax ensure over ½ of the own budget revenues (Yavorivska (81.7%), Solonkivska (75.5%), Velykomostivska (71.8%), Novoyavorivska (70.5%), Ivano-Frankivska (62.3%), and Novokalynivska (57.0%)), and over 40% of the own revenues (Biskovytska (45.8%) and Sambirska (43.4%);

- suburban (to the oblast center – Lviv) communities (Sokilnytska, Pustomytivska, Solonkivska, Pidberiztsivska, Zymnovodivska, Ivano-Frankivska, Kulykivska, and Davydivska), which, being de facto part of Lviv agglomeration, are characterized by comparatively higher economic development parameters and concentration of economic entities on their territories, as well as mostly positive demographic dynamics due to migration to these communities, etc.;

- communities created around the former cities of oblast significance and district centers (Stryiska, Chervonohradska, Sambirska, Boryslavska, Morshynska, Zolochivska, and Mostyska) – most of these communities are characterized by equally higher economic development and social infrastructure development indicators in the cities-administrative centers; moreover, some of them also have military units on their territory; therefore, these communities have increased their revenues due to military personal income tax, although to a lesser extent (Sambirska (43.4% of own revenues accounts for military personal income tax), Morshynska (38.7%), Zolochivska (28.2%), and Mostyska (21.8%).

In January-September 2023, the level of resilience of the territorial communities in Lviv oblast slightly deteriorated. The value of the indicator decreased in the majority of communities. Strengthening of

financial resilience was recorded only for 26 communities. Moreover, there is no clear dependence on the level of economic development or the income from certain payments to the community budget. At the same time, the number of communities with a level of financial stability in the resistance zone (0.43-0.65) remained constant – 37 communities (every second community). The number of communities whose financial resilience reached a critical level – up to 0.19 – in the range of loss of resilience, financial dependence – increased (from 2 to 4).

The results of the empirical research suggest the following:

1) no significant deterioration in the resilience of the territorial communities of the rear oblast since the beginning of the full-scale invasion of Ukraine by russia, which indicates that the communities respond effectively to shocks and are able to adapt to new conditions in the short term;

2) a slight deterioration in the resilience of communities under the impact of the war in 2022 and an intensification of this trend in 2023. This indicates that local governments are insufficient in predicting and preventing potential risks, which should lead to a change in the approach to territory management (with a focus on development at least in the medium term). In 2022, economic entities in the communities increased their efforts (volunteering, working with IDPs, paying taxes "in advance" to support the economy during the war, and establishing close contacts between local governments, businesses in the territory, and community residents to counter the threat), which helped strengthen their resilience (including financial). In 2023, communities should not focus on achieving such a behavioral effect, as economic entities have become accustomed to war conditions. Accordingly, the lack of awareness of the change in the situation has led to a slight deterioration in resilience (even with additional financial resources coming to local budgets – military personal income tax).

Comparative analysis of empirical indicators of financial resilience of communities with thresholds shows that the resilience of communities in Lviv

oblast in 2023 (January-September) ranges from 0.595 to 0.276. The range of 0.430-0.655 is the zone of community resistance to macroeconomic and other shocks. Communities with resilience scores above 0.430 demonstrate significantly greater capacity to withstand economic risks and hazards, and their financial resources are sufficient to ensure the system's transition to a different state of equilibrium. Communities with an empirical indicator of financial resilience below 0.430 have below-average financial capacity to restore their own economic stability and significant dependence on external sources of funding and are therefore characterized by decreasing financial resilience. For example, Lvivska and Yavorivska communities demonstrated the highest level of resilience among all urban communities (0.595 and 0.589, respectively), and Solonkivska and Sokilnytska communities among rural communities and, in particular, among all communities in Lviv oblast (0.620 and 0.583, respectively). The resilience of Lvivska and Yavorivska communities is in the resistance zone, and is 6.1 and 6.7 percentage points below the upper optimal threshold, respectively, and that of Solonkivska and Sokilnytska communities – by 3.5 and 7.2 percentage points, respectively (Figure 2). Slavska, Ivano-Frankivska (township), Kamianka-Buzka, Sambirska, Novoyavorivska, and Velykomostivska (urban) communities show deviations from the upper optimal threshold at the level of 7.8-8.4 percentage points.

Skolivska (0.421), Horodotska (0.419), Mykolayivska (0.418), Zhovkivska (0.414), Peremyshlyanska (0.408), Buska (0.406), Novorozdilska (0.380), Komarnivska (0.379), Hlynyanska (0.371), Hodorivska (0.362), Rudkivska (0.323), Dobromylska (0.316), Hyrivska (0.300), and Turkivska (0.295) communities demonstrated a decreasing resilience in January-September 2023. The empirical indicators of these communities were below the lower optimal threshold. For example, the financial resilience of Skolivska community is 0.9 percentage points lower than the optimal value of the lower threshold, and that of Turkivska community is 13.5 percentage points lower.

All township communities, except for Slavska, Ivano-Frankivska, Dobrotvirska, and Hnizdychivska, can be classified as unstable in 2023. Thus, the empirical indicators of these communities were below the lower optimal threshold, which indicates a significant decrease in resistance to macroeconomic shocks and in the financial capacity of the territory. Rudkivska (33.3 p.p.), Dobromylska (34.1 p.p.), Hyrivska (35.6 p.p.), and Turkivska (36.1 p.p.) communities had the highest divergence between the current level of resilience and the upper optimal threshold.

Obroshynska, Murovanska, Zhovtanetska, Davydivska, Zymnovodivska, Trostianetska, and Pidberiztsivska communities are characterized by moderate levels of financial resilience ranging from 0.423 to 0.560. The size of the financial resilience vector of Solonkivska, Sokilnytska, Obroshynska, and Murovanska communities with the lower optimal threshold was 19.0, 15.3, 12.7, and 12.1 percentage points, respectively. Meanwhile, Strilkivska, Kozivska, Dobrosynsko-Maherivska, and Zabolotsivska demonstrated the highest values of convergence of financial resilience and the upper optimal threshold among rural communities in 2023 (34.6, 34.8, 34.8, and 37.9 percentage points, respectively). Therefore, a significant share of tax revenues in total community revenues largely determines their ability to withstand macroeconomic and other shocks, including wartime threats. Interestingly, the resilience of communities in 2023 also depended to a large extent on subventions and grants from the state budget, and thus the independence of local budgets influenced the readiness of communities to economic shocks and turbulence. It is worth mentioning that rural and township communities in Lviv oblast had lower resilience and lower financial capacity to generate their own revenues during the study period (2021–2023) compared to urban communities.

Russia's full-scale war against Ukraine has led to a sharp increase in military spending and the number of military personnel (for comparison, the number of military personnel in the Armed Forces was 250,000 in 2021 and 700,000 in 2022) (Povoroznik, 2023). Since the beginning of the war, military personal income tax has become one of the most important sources of local budget revenues. However, one has recorded a decrease in revenues from other sources due to economic, demographic, and other reasons caused by the war. In 2022–2023, tax revenues accounted for the largest share in the structure of local budget revenues in Lviv oblast, about 70% of all revenues. Tax revenues, such as excise
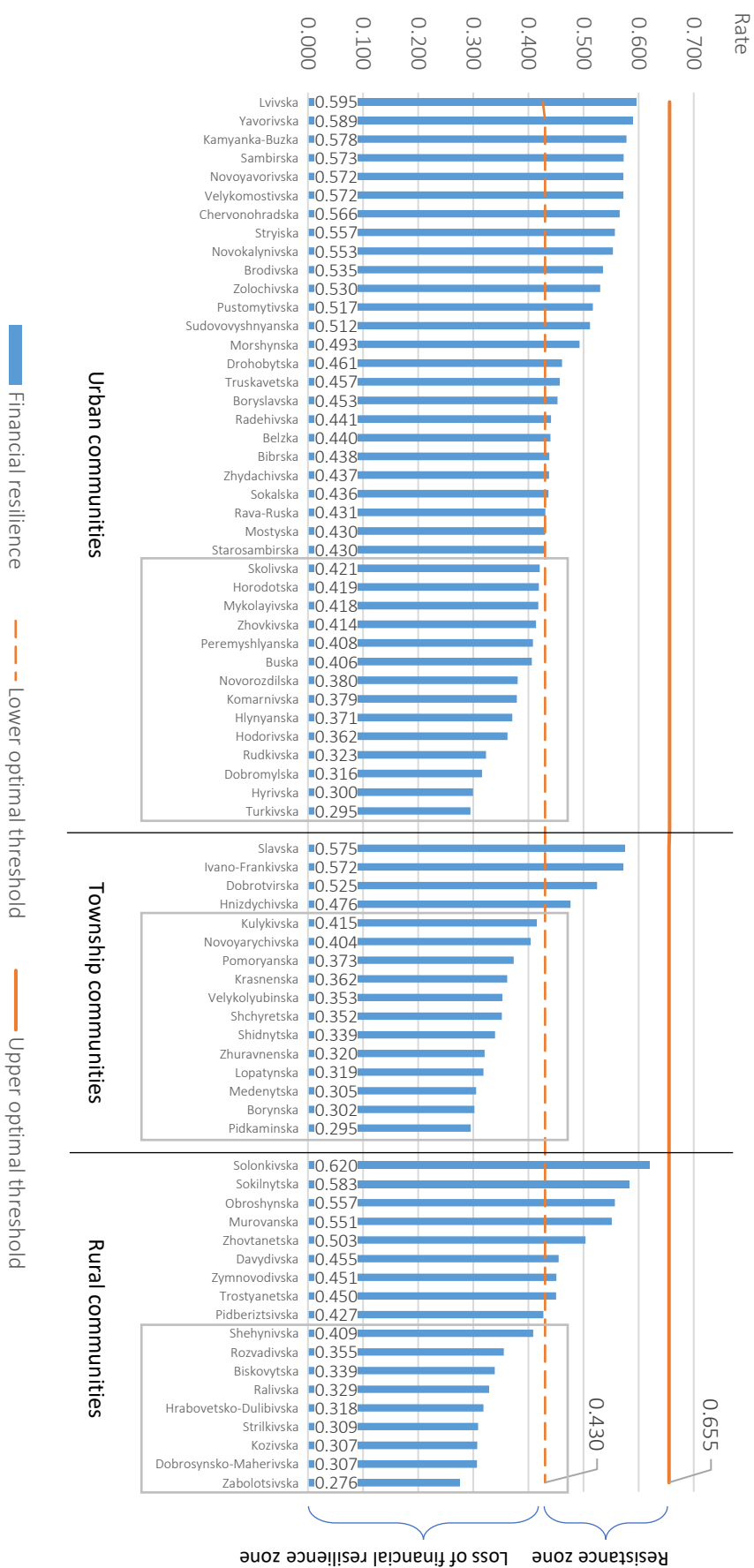
**Figure 2.** Resilience of communities in Lviv oblast considering thresholds, January-September 2023

tax, land tax, and other local taxes and fees, have decreased significantly. Interestingly, during this period, the differentiation of the region's communities by revenues increased significantly, due to a significant increase in military personal income tax in communities where military units or training centers are registered.

By adopting the Law of Ukraine No. 3428-IX as of November 8, 2023 (Legislation of Ukraine, 2023), Verkhovna Rada of Ukraine introduced a mechanism for withdrawing revenues from military, police, and junior and senior officers' income tax from local budgets and transferring them to the state budget. Thus, starting from October 1, 2023, the military personal income tax is transferred from local budgets to the state budget (in absolute terms, the amount of the transfer will be UAH 97.3 billion).

The ambiguity of government decisions on changing the mechanisms for implementing budget policy in terms of local budget execution in the middle of the budget year makes it necessary to test the hypothesis: how much (and whether) the resilience of territorial communities in Lviv oblast will change in 2024 if the military personal income tax is completely removed from local budgets while maintaining the reverse subsidy and all other sources of revenue.

The results of modeling the resilience of communities in Lviv oblast in 2024 using the GAP method provided that the military personal income tax is redirected from local to state budgets, confirms the thesis that resilience will remain virtually unchanged for 90% of the oblast's communities (Table 1). The removal of the military PIT will significantly affect the resilience of Velykomostivska and Yavorivska communities, namely, it will decrease financial resilience by 10.3 percentage points and 12.7 percentage points, respectively. For Mostyska, Novokalynivska, Novoyavorivska, and Solonkivska communities, financial resilience is expected to decrease by 8.2, 7.6, 6.8, and 6.8 percentage points, respectively. The decrease in the resilience of Morshynska, Sambirska, and Ivano-Frankivska communities is modeled at 2.6, 2.5, and 4.2 percentage points, respectively. In other words, the resilience of territorial communities that are overly dependent on this source of revenue will be significantly affected. For the rest, the impact of this initiative will not be too painful.

**Table 1.** Modeling the resilience of communities in Lviv oblast in 2024 under the condition of transferring military PIT from local to state budgets

| | Communities | Financial resilience rate | | Change, % |
|---|---|---|---|---|
| | | 2023 | 2024 | |
| Urban communities | Lvivska | 0.595 | 0.636 | 4.11 |
| | Belzka | 0.440 | 0.476 | 3.60 |
| | Bibrska | 0.438 | 0.431 | −0.74 |
| | Boryslavska | 0.453 | 0.494 | 4.09 |
| | Brodivska | 0.535 | 0.516 | −1.94 |
| | Buska | 0.406 | 0.442 | 3.63 |
| | Velykomostivska | 0.572 | 0.469 | −10.33 |
| | Hlynyanska | 0.371 | 0.403 | 3.25 |
| | Horodotska | 0.419 | 0.449 | 2.98 |
| | Dobromylska | 0.316 | 0.340 | 2.39 |
| | Drohobytska | 0.461 | 0.460 | −0.09 |
| | Zhydachivska | 0.437 | 0.472 | 3.43 |
| | Zhovkivska | 0.414 | 0.442 | 2.82 |
| | Zolochivska | 0.530 | 0.522 | −0.82 |
| | Kamyanka-Buzka | 0.578 | 0.579 | 0.05 |
| | Komarnivska | 0.379 | 0.417 | 3.81 |
| | Mykolayivska | 0.418 | 0.455 | 3.67 |
| | Morshynska | 0.493 | 0.468 | −2.50 |
| | Mostyska | 0.430 | 0.348 | −8.20 |
| | Novokalynivska | 0.553 | 0.478 | −7.58 |
| | Novorozdilska | 0.380 | 0.414 | 3.32 |
| | Novoyavorivska | 0.572 | 0.504 | −6.79 |
| | Peremyshlyanska | 0.408 | 0.421 | 1.26 |
| | Pustomytivska | 0.517 | 0.553 | 3.63 |
| | Rava-Ruska | 0.431 | 0.397 | −3.38 |
| | Radehivska | 0.441 | 0.471 | 3.02 |
| | Rudkivska | 0.323 | 0.347 | 2.35 |
| | Sambirska | 0.573 | 0.548 | −2.52 |
| | Skolivska | 0.421 | 0.410 | −1.03 |
| | Sokalska | 0.436 | 0.468 | 3.22 |
| | Starosambirska | 0.430 | 0.401 | −2.93 |
| | Stryiska | 0.557 | 0.581 | 2.44 |
| | Sudovovyshnyanska | 0.512 | 0.507 | −0.45 |
| | Truskavetska | 0.457 | 0.494 | 3.73 |
| | Turkivska | 0.295 | 0.301 | 0.56 |
| | Hyrivska | 0.300 | 0.311 | 1.17 |
| | Hodorivska | 0.362 | 0.390 | 2.78 |
| | Chervonohradska | 0.566 | 0.575 | 0.92 |
| | Yavorivska | 0.589 | 0.462 | −12.70 |
| Township communities | Borynska | 0.302 | 0.321 | 1.91 |
| | Velykolyubinska | 0.353 | 0.385 | 3.18 |
| | Hnizdychivska | 0.476 | 0.520 | 4.39 |
| | Dobrotvirska | 0.525 | 0.535 | 0.99 |
| | Zhuravnenska | 0.320 | 0.350 | 2.94 |
| | Ivano-Frankivska | 0.572 | 0.530 | −4.23 |
| | Krasnenska | 0.362 | 0.351 | −1.05 |
| | Kulykivska | 0.415 | 0.443 | 2.78 |
| | Lopatynska | 0.319 | 0.347 | 2.82 |
| | Medenytska | 0.305 | 0.333 | 2.80 |
| | Novoyarychivska | 0.404 | 0.441 | 3.71 |
| | Pidkaminska | 0.295 | 0.321 | 2.52 |
| | Pomoryanska | 0.373 | 0.349 | −2.47 |
| | Slavska | 0.575 | 0.626 | 5.10 |
| | Shidnytska | 0.339 | 0.366 | 2.71 |
| | Shchyretska | 0.352 | 0.384 | 3.23 |

**Table 1 (cont.).** Modeling the resilience of communities in Lviv oblast in 2024 under the condition of transferring military PIT from local to state budgets

| | Communities | Financial resilience rate | | Change, % |
|---|---|---|---|---|
| | | 2023 | 2024 | |
| Rural communities | Biskovytska | – | – | 0.20 |
| | Hrabovetsko-Dulibivska | 0.339 | 0.341 | 2.22 |
| | Davydivska | 0.318 | 0.340 | 1.14 |
| | Dobrosynsko-Maherivska | 0.455 | 0.466 | 2.81 |
| | Zhovtanetska | 0.307 | 0.335 | 0.91 |
| | Zabolotsivska | 0.503 | 0.513 | 2.26 |
| | Zymnovodivska | 0.276 | 0.298 | 3.21 |
| | Kozivska | 0.451 | 0.483 | 2.47 |
| | Murovanska | 0.307 | 0.332 | 5.06 |
| | Obroshynska | 0.551 | 0.602 | −0.89 |
| | Pidberiztsivska | 0.557 | 0.548 | 3.73 |
| | Ralivska | 0.427 | 0.464 | 3.02 |
| | Rozvadivska | 0.329 | 0.359 | 3.16 |
| | Sokilnytska | 0.355 | 0.387 | 5.35 |
| | Solonkivska | 0.583 | 0.637 | −6.78 |
| | Strilkivska | 0.620 | 0.552 | 5.81 |
| | Trostyanetska | 0.309 | 0.367 | 1.55 |
| | Shehynivska | 0.450 | 0.466 | 0.76 |

Speaking about the legitimacy (or expediency) of transferring financial resources from local to state budgets, the wartime economy is radically different from the peacetime economy, which means that there is a need for changes in state and local finances. The destructive impact of the war forced the governments of the belligerent states to repeatedly resort to tightening fiscal measures, increasing public debt and budget deficits (Hall & Sargent, 2022). Money issuance, military bonds, and debt financing were the main instruments for financing the growing expenditures (Hall & Sargent, 2022). Ukraine is no exception in this regard. By the way, Ukraine received a total of USD 42.5 billion in external financing in 2023. In addition, in 2023, the Ministry of Finance held 206 auctions for the placement of domestic government bonds, raising UAH 552.6 billion to finance the state budget. Of course, these resources (along with tax revenues) do not fully cover military spending. Increased defense spending is forcing the government to make unpopular decisions, one of which we are discussing.

The empirical study confirms the following theses:

a) for communities that rely on the economic component of building financial capacity, the removal of military personal income tax revenues is "painless" (and therefore a minor disruption of financial resilience), unlike communities that are overly dependent on this one source of revenue;

b) the removal is significant for the communities that depend on a single source of income (and hence disruption of financial resilience). In this case, however, the explanations are of an individual nature – the payment of military personal income tax based on the physical registration of military units.

In general, the problem of ensuring the resilience of communities as hostilities continue and the security factor increases will be one of the most important. Its solution will require effective efforts of all branches of state authorities and local governments. There is no debate that fiscal policy should ensure sufficient mobilization of financial resources for military operations in times of war, while the expediency of fiscal changes in the middle of the year violates the principles of budgetary policy and undermines the resilience of communities. Moreover, it is important to mention that the local budgets of Ukraine (especially in those oblasts without active hostilities) are in a better financial position than the state budget, and therefore it is very important that such exemptions (i.e., military PIT) do not become the rule.

## CONCLUSION

The study aimed to identify the impact of budgetary instruments on ensuring the resilience of territorial communities in the midst of the war in Ukraine (the case of Lviv oblast). The results of the study confirm the thesis that the war did not significantly affect the resilience of communities in Lviv oblast. For most of them, resilience was at a moderate and above moderate level. Meanwhile, not a single community was identified in the period under study for which the resilience rate was in the financially re-

silent and financial resilience reserve ranges. The study proves that the absence of military PIT in 2024 will significantly affect the resilience of only those communities in the region that are overly dependent on this source of revenue (for Velykomostivska and Yavorivska communities, the decrease in resilience is modeled by 10.3 and 12.7 percentage points, respectively, and for Mostyska, Novokalynivska, Novoyavorivska, Solonkivska, and Ivano-Frankivska communities – by 8.2, 7.6, 6.8, 6.8, and 4.2 percentage points, respectively), and all others will retain the ability to adapt to changes in the security environment, withstand threats, maintain sustainable functioning, and restore to the desired balance.

The study reveals that the deterioration of the investment climate and decline in entrepreneurial activity, as well as the decrease in revenues from property taxes to local budgets, forced local governments to optimize expenditures. An increase in the number of military personnel led to a significant increase in local budget revenues in the form of personal income tax, which allowed communities with military units registered on their territory to significantly increase budget revenues and provide a "safety margin." The challenges of the war affected the resilience of about 10% of the communities in Lviv oblast, while the rest were able to adapt to the conditions of instability, minimize the effects of the war, and restore a state of equilibrium. There is a clear transfer dependence of rural and township communities on the state budget, and thus lower resilience compared to urban communities.

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