

A stylized landscape illustration. The top left shows a bright sun with rays over light blue mountains and a few birds. The top right is a dark blue sky with stylized mountains. The bottom half features a river flowing through a green valley with various buildings, a fence, sheep, chickens, and sunflowers in the foreground.

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POLICY BRIEF

Territorial Exaptive Resilience

SEPTEMBER 2025

Foreword

In light of the profound geopolitical, economic and societal transformations facing the EU, the concept of regional resilience has emerged as an important pillar in rethinking the EU's strategic and policy frameworks. The recent succession of crises – from the COVID-19 pandemic to the war in Ukraine – has exposed structural vulnerabilities and underscored the urgent need for new approaches to sustainable development, security and cohesion across the EU territory.

This study, conducted by ESPON at the request of the Polish Presidency of the Council of the European Union, offers a timely and policy-relevant contribution to this critical time and discourse. It introduces and operationalises the concept of territorial exaptive resilience – the capacity of regions to creatively reconfigure existing assets, institutions and infrastructures in response to unforeseen disruptions. The focus of the study is placed on the EU's eastern border regions, which are often regarded as peripheral yet in fact possess unique geopolitical and socio-economic characteristics that position them as vital to Europe's long-term stability and adaptability.

This publication provides not only an academic contribution to the evolving field of regional resilience but also practical recommendations to inform the design of the post-2027 EU Cohesion Policy. It calls for a more integrated, adaptive and territorially sensitive approach – one that recognises border regions as strategic spaces for European integration rather than marginal zones. The territorial approach is also the key message of the Polish Presidency of the Council of the European Union – as a remedy for the changing world. This is reflected in two strategic documents: the 'Council Conclusions on cohesion and Cohesion Policy post-2027', and the 'Joint Declaration of Ministers responsible for Cohesion Policy, Territorial Cohesion and Urban Matters' (referred to as the Warsaw Declaration), endorsed under the Polish Presidency. Both documents highlight the need to strengthen the place-based approach across EU policies, emphasising territorial sensitivity, better coordination of sectoral actions, and active involvement of regional and local actors in shaping development responses tailored to the diversity of European territories.

On behalf of all involved, I invite policymakers, researchers and stakeholders at all levels to engage with the findings and implications of this study. Building a resilient and cohesive Europe will require not only robust policy instruments but also a paradigm shift that fully embraces the potential of its borderlands.

Renata Calak

Director of the Strategy Department, Ministry of Development Funds and Regional Policy, Poland

On behalf of the Polish Presidency of the Council of the European Union, ESPON conducted the on-demand study titled **Territorial Exaptive Resilience: Reinvigoration along EU Eastern Borders (TERRA RES)**. This policy brief summarises the key findings of the study, which explores how European regions respond to major crises by repurposing resources and restructuring their economies. Unlike traditional resilience strategies that focus on recovery and stability, **exaptive resilience** emphasises transformation and innovation, allowing regions to go beyond predefined pathways. The brief examines how regions responded to key economic shocks such as the **2008 financial crisis, the COVID-19 pandemic and the war in Ukraine**, identifying resilience patterns and uncovering exaptive practices that can inform future policy.

KEY POLICY MESSAGES

A key outcome of the research is the Territorial Exaptive Resilience Index (TERI), which evaluates regional resilience based on the ability to maintain employment and economic output and to shift labour and production across sectors after economic shocks. The study highlights the importance of social resilience, institutional quality, knowledge-intensive industries and EU funding in helping regions restructure their economies and navigate external shocks.

The findings reveal geographical variations in resilience, with industrial and economically strong regions tending to be shock-resistant, while exaptive responses, where regions actively repurpose resources, are more common in

central and eastern Europe. The war in Ukraine, however, has introduced new geopolitical challenges for eastern border regions that defy exaptive ability, highlighting the need for tailored policy responses. The study also highlights grassroots exaptive practices through case studies in Lithuania, Hungary, Poland, Romania and Finland, showing how regions have creatively reorganised their resources in response to disruptions.

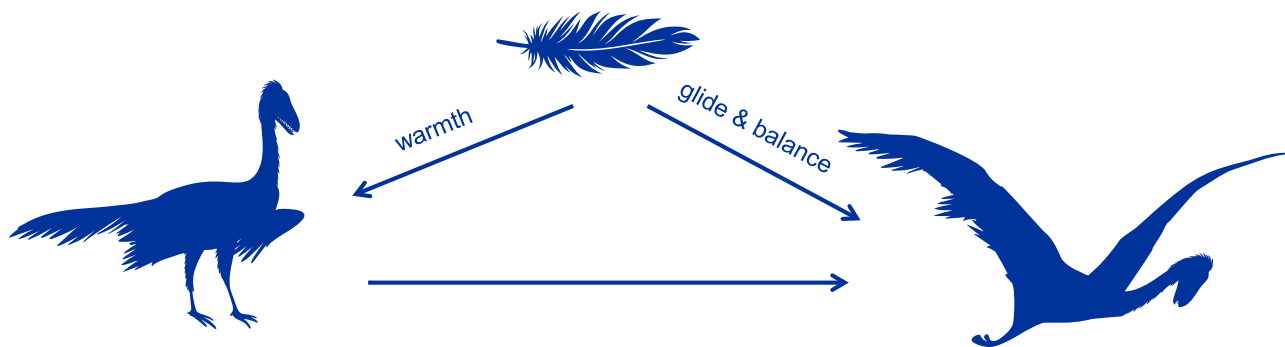
The insights provided will help shape future policies aimed at fostering economic resilience and structural transformation in European regions, particularly along the EU's eastern borders.

1

Why territorial exaptive resilience?

The ESPON TERRA RES study highlights an often overlooked aspect of territorial resilience that extends beyond traditional structural investments. While structural investments focus on fostering robust growth, productivity and employment in the face of various shocks, different crises such as the 2008 United States subprime mortgage meltdown, the COVID-19 outbreak in 2019 and the war in Ukraine since 2022 have shown that regional responses vary significantly, often leading to shifts in labour and productivity. What has largely been neglected in the Cohesion Policy so far is the capacity of regions to repurpose factors of production and reallocate output across sectors in response to crises. ESPON defines this as **territorial exaptive resilience**.

Exaptive resilience differs from adaptive resilience in that it emphasises transformation and innovation rather than stability and recovery. While adaptive resilience focuses on maintaining existing functions and responding to shocks within a predefined framework, exaptive resilience is about repurposing existing assets in unexpected ways to create new opportunities. It thrives on open-ended experimentation, serendipitous discovery and the ability to 'bounce forward' rather than merely 'bounce back'. This approach enables regions to break free from historical path dependencies and proactively shape their future by creatively recombining resources and capabilities in response to disruptive change.



Exaptation, a concept borrowed from evolutionary biology, refers to a shift in the function of a trait over time. Essentially, it's when a characteristic that originally evolved for one purpose is repurposed to serve a different function. This is distinct from adaptation, where traits evolve to suit a specific function directly. To illustrate exaptation, consider the example of bird feathers. Initially, feathers likely evolved for warmth, providing insulation to help early birds regulate their body temperature. However, over time, feathers were exapted for flight. While their original function was warmth, they evolved to serve the purpose of enabling birds to glide and ultimately fly, providing them with an advantage in mobility and survival. Exaptation has been previously used in regional studies to understand territorial differences in the ability to radically repurpose economic knowledge (e.g. backward patent citations from one technological domain applied in an innovation in a distant technological domain).

Feature	Adaptive resilience	Adaptive resilience
Focus	Stability and recovery	Transformation and innovation
Reaction to shock	Maintains existing functions	Repurposes assets unexpectedly
Approach	Predefined responses	Open-ended experimentation
Outcome	'Bounce back' to normal	'Bounce forward' to new opportunities

2

What is the Territorial Exaptive Resilience Index?

The Territorial Exaptive Resilience Index (TERI) is a composite index designed to measure regional resilience in response to major economic shocks in the EU and the European Free Trade Association (EFTA) countries. The index assesses the ability of regions to handle crises in two key dimensions: shock-resistance and reallocation. These dimensions measure the regions' immediate responses to economic disruptions, specifically how they withstand shocks and how they adjust their economic structures by reallocating resources, particularly labour and production, across sectors.

The TERI specifically examines the responses of regions to three significant economic shocks:

1. **Lehman Brothers collapse (2006-2012):** This period covers the global financial and economic crisis, which began in 2008 following the collapse of Lehman Brothers and caused widespread economic turmoil. The effects of the crisis were prolonged, particularly in Europe, where sovereign debt crises in countries such as Greece, Spain and Italy extended the financial instability. By 2012, while some regions had begun recovering, many economies were still grappling with the aftermath. Therefore, 2012 is taken as the year representing the shock's aftermath, with 2006 serving as the pre-crisis reference year.
2. **COVID-19 pandemic (2019-2021):** This period captures the immediate impacts of the COVID-19 health crisis, which affected the global economy and regional economies in Europe starting in 2020. The analysis compares regions before and after the shock, with 2019 representing the pre-crisis period and 2020-2021 covering the pandemic's direct impact.
3. **War in Ukraine (2022-2023):** This period focuses on the initial economic consequences of the Russian invasion of Ukraine in February 2022. The analysis evaluates how regions responded to this shock, with an emphasis on the immediate disruptions it caused to regional economies, particularly energy and supply chains.

The TERI is composed of two main components:

Shock-resistance Index

This sub-index measures a region's ability to withstand economic shocks. It reflects a region's capacity to maintain employment levels and overall economic output (gross value added (GVA)) in the immediate aftermath of a crisis. The focus here is on capturing how well the region can

absorb the shock without experiencing major economic downturns or losses.

- **Employment resistance:** This aspect tracks how employment in a region holds up during a shock. A region that maintains stable employment levels despite the crisis is considered more shock-resistant.
- **GVA resistance:** This tracks the GVA, or the economic output, within a region. A region with stable GVA is seen as more resistant to the shock.

The Shock-resistance Index is calculated separately for employment and GVA by comparing the performance of the region before and after the shock. The formula used calculates the growth rate of employment and GVA, with the resulting index reflecting how well a region has maintained stability despite the crisis.

Reallocation Index

This sub-index measures a region's ability to reallocate labour and productive resources across sectors in response to the shock. This is an essential part of regional resilience as it reflects how regions adjust their economic structures in the wake of an economic disruption. The reallocation can happen in various ways, such as shifting labour from one sector to another or changing the production focus of a region.

- **Employment reallocation:** This component captures how labour moves across different sectors of the economy. A high score means that the region was able to shift workers to sectors that either grew during the shock or that were able to absorb displaced workers from declining sectors.
- **GVA reallocation:** This measures the movement of production across sectors. If certain industries decline, but others expand, the region reallocates its productive capacity to sectors that can maintain or increase economic output.

Both employment reallocation and GVA reallocation are calculated by comparing the sectoral composition before and after the shock. The formula used calculates the changes in sectoral shares of employment and GVA, with the resulting index showing how much the region adapted its economic structure in response to the crisis.

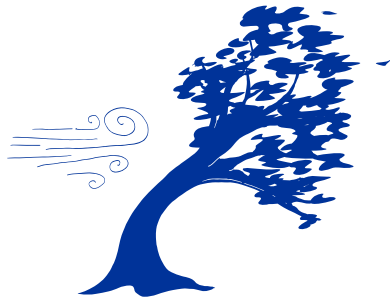
Once both the Shock-resistance and Reallocation indices are calculated, they are combined to form the final TERI for each region.

3 Shock-response classifications



Shock-resistant

Returning to the initial condition after shock



Exaptive response

Embracing a new growth path after the shock



Shock-vulnerable

Coping with the damage after the shock

Using the TERI, the European regions are classified into three groups based on the effects of their responses on labour markets and productivity:

1. **Shock-resistant:** These regions demonstrate high shock-resistance, with stable employment and GVA despite the crisis. However, these regions may not significantly reallocate resources across sectors, meaning their economy tends to stay relatively stable but without major structural adjustments.
2. **Exaptive responses:** These regions exhibit both high shock-resistance and significant reallocation. They are not only able to withstand the shock but also adjust

their economic structure to ensure continued growth or stability. The term 'exaptive' reflects the region's ability to repurpose existing economic resources and workforce to meet new demands or opportunities created by the crisis. In contrast to purely shock-resistant regions, exaptive regions display an active transformation of their economic structure.

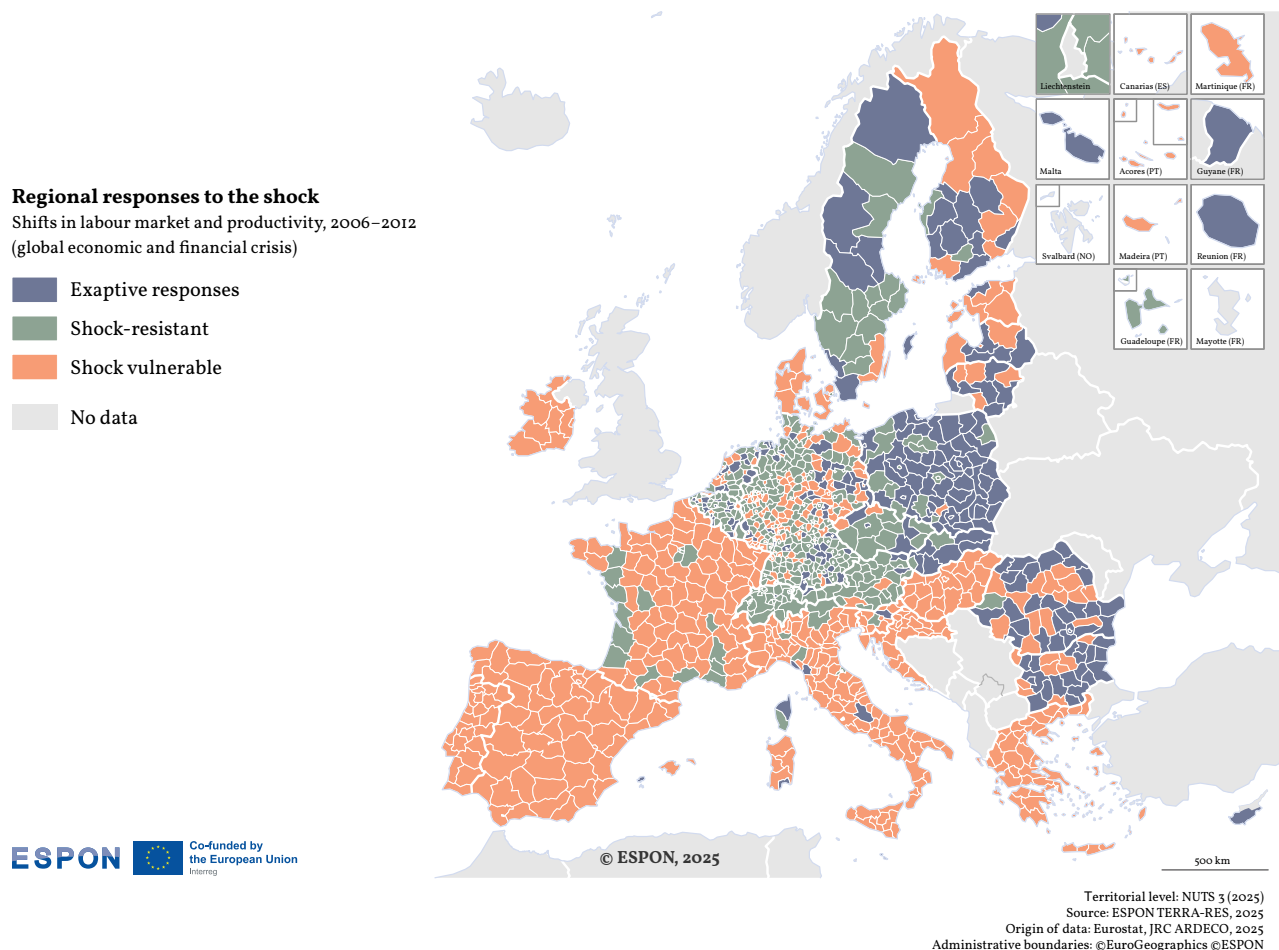
3. **Shock-vulnerable:** These regions struggle both in terms of shock-resistance and reallocation. They experience significant declines in employment and GVA after the shock and fail to shift resources or adapt their economy to new conditions. These regions are most at risk during economic crises.

4

The geography of evolution of territorial resilience

The TERI offers a nuanced way to understand how regions respond to economic shocks. Resilience responses vary depending on the nature of the shock as resilience is not a static concept. It evolves and shifts with each economic crisis.

Responses to the global economic and financial crisis

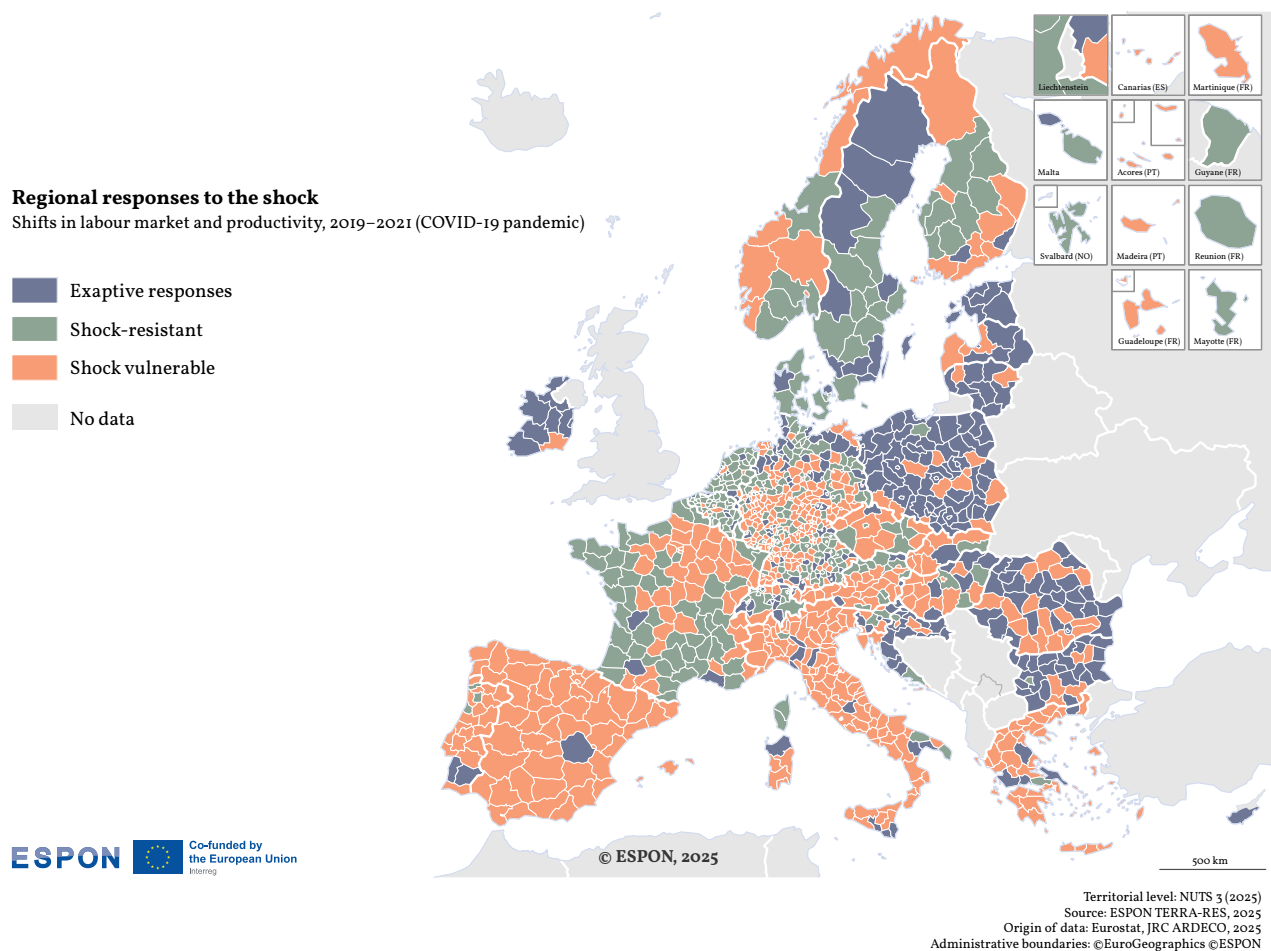


Source: ESPON, 2025

Southern European regions, for example, were heavily exposed to the housing market and construction sectors that were significantly impacted by the global economic and financial crisis. These economies also faced higher debt

levels and weaker fiscal positions, limiting their ability to respond effectively to the crisis. The EU's austerity measures that aimed to reduce public debt led to prolonged economic contraction in these regions.

Responses to the COVID-19 pandemic

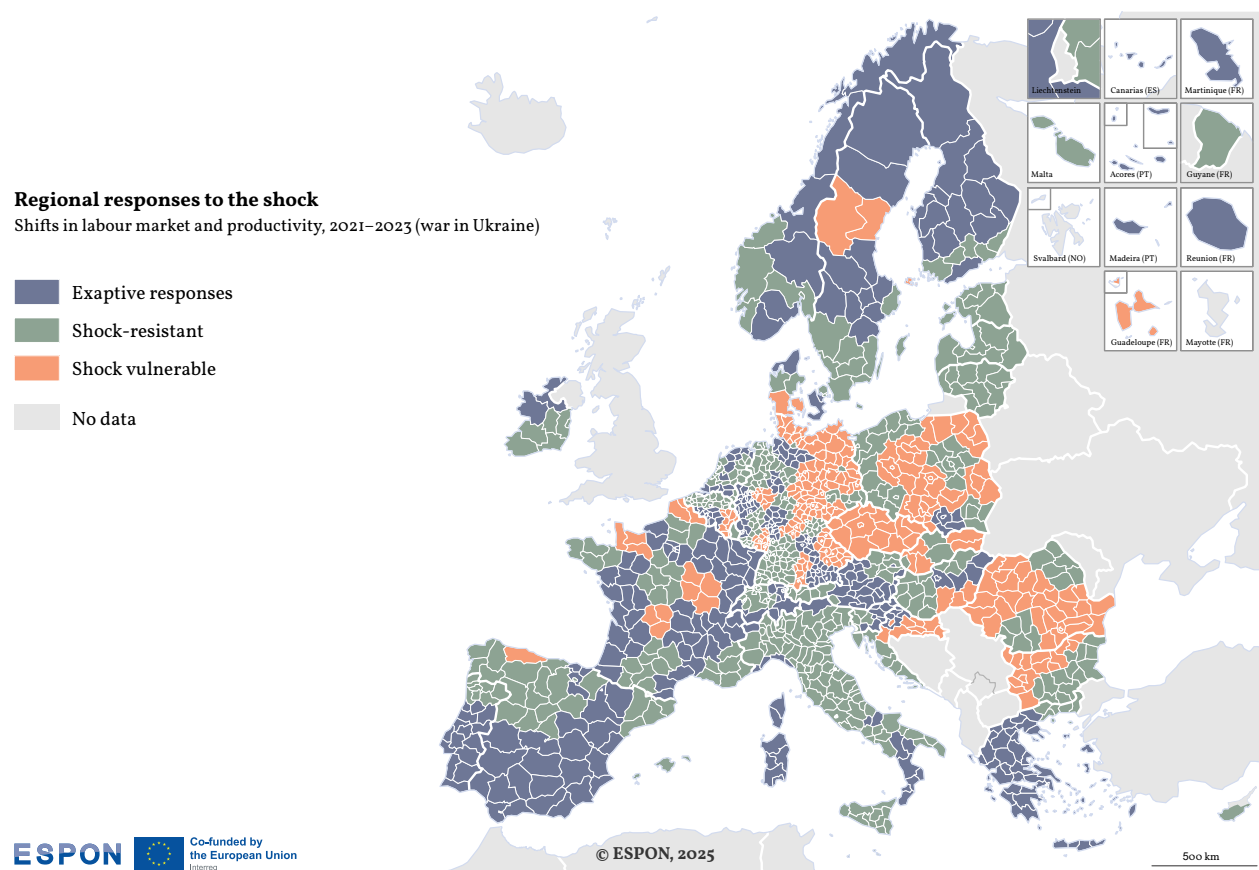


Source: ESPON, 2025

In contrast, industrialised regions and economic strongholds tended to demonstrate shock-resilience across the three major crises since 2008. These regions were better equipped to absorb shocks and adapt due to their more diversified economies and stronger fiscal positions. Exaptive responses that involve repurposing existing resources and capabilities to address new challenges

were most commonly seen in central and eastern Europe during the various shocks. However, the war in Ukraine marked a significant exception as it exposed these regions to geopolitical externalities that required a different, more focused approach to resilience. The geopolitical nature of this shock highlights the need for special attention and tailored responses in these areas.

Responses to the crisis related to the war in Ukraine

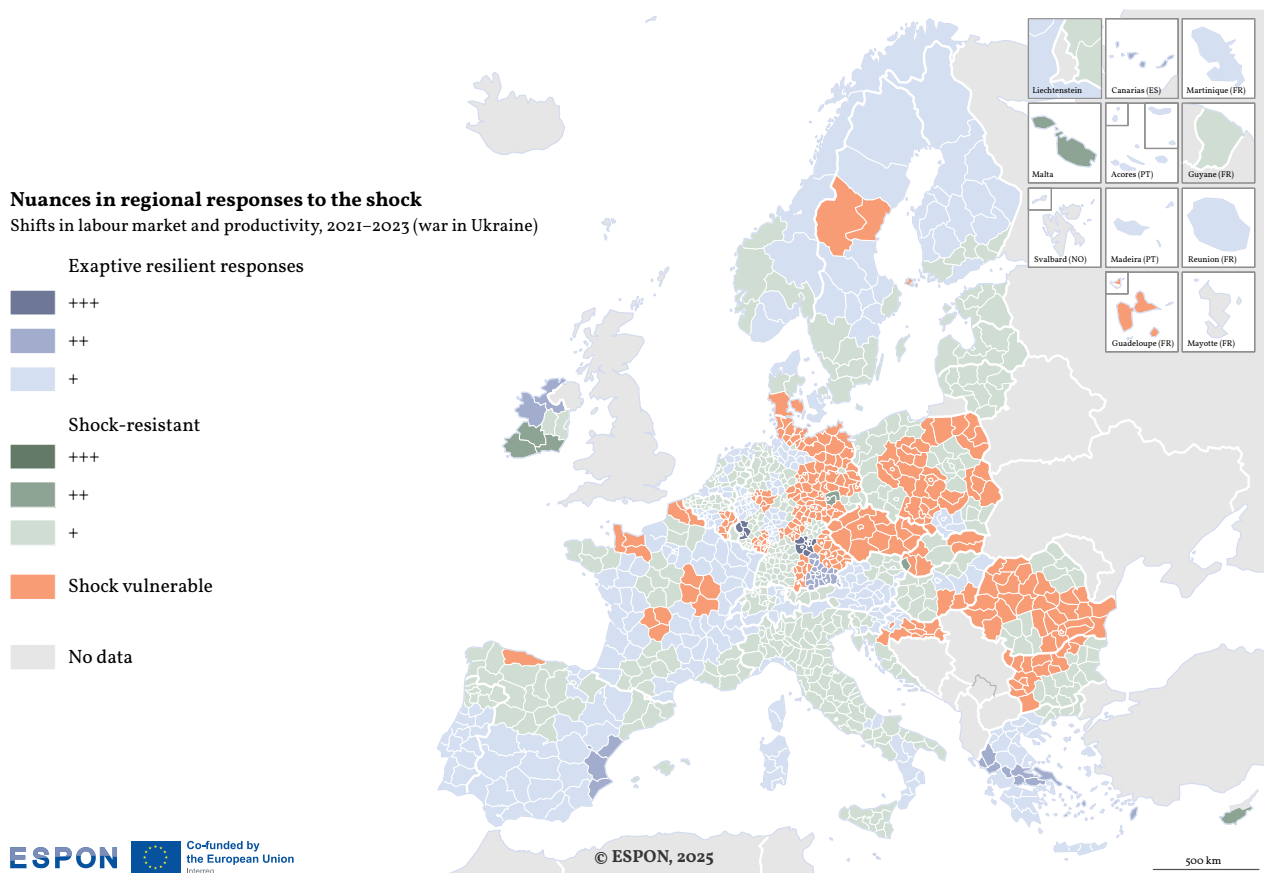


Source: ESPON, 2025

It is important to note that the shock-resistant observations in 2023, showing stable employment levels compared to 2021, are based on the data and methods used in the TERRA RES study. Firstly, the analysis reflects the type and degree of resilience of certain regions through changes in employment in 2023 relative to 2021, which alone does not capture the full range of potential socio-economic implications of external shocks. While the 2023 employment data indicate a degree of shock-resistance in some eastern border regions, a more comprehensive

understanding will require further data and analysis. Secondly, the observation relies on 2023 employment data, which should be treated with caution, as the long-term effects of recent global events, such as the ongoing war, are still unfolding and may only become visible over time. Thirdly, even with a focus on currently available employment data only, the TERI suggests nuances in relation to the strength of shock-resistance and the degree of exaptation.

Nuances in responses to the crisis related to the war in Ukraine



Source: ESPON, 2025

5 Factors favouring shock-resistance and exaptive resilience

The ESPON study estimated the probabilities of a region being exaptive resilient, shock-resistant or vulnerable based on factors such as social resilience, institutional quality, knowledge-intensive economic activity and EU funding, while also accounting for geographic and economic heterogeneity across European regions.

The study approached social resilience through three related factors: disposable income, happiness, and intra- and inter-regional connections. Disposable income data is sourced from a newly compiled open-access dataset that provides detailed estimates of disposable income at the subnational level across Europe. The dataset has been derived from existing income data such as gross income, gross earnings and equivalised income published by national statistical institutes at various geographical levels.

The dataset provides a comprehensive view of the spatial distribution and evolution of income inequality within and across countries. Social connectedness data is sourced from a widely recognised index that captures social ties both within and between regions. The data distinguishes between within-region and between-region connections, with a ratio calculated to provide a balanced measure of intra- and inter-regional connectedness. Happiness data is sourced from the European Social Survey, which provides region-specific data at varying NUTS levels. The three factors are combined into a single index that represents social resilience.

Institutional quality is being approximated using data from the European Quality of Government Index, which is based on citizen surveys that assess perceptions of corruption, fairness and the quality of public services across regions.

To measure **knowledge-intensive economic activity**, the study uses data from Eurostat that tracks two important factors: the share of employment and the share of GVA generated by sectors closely related to knowledge-intensive activities, such as professional, scientific and technical services. These sectors include activities like research and development and other business services that support innovation. By looking at both employment and GVA, the study captures how central knowledge-intensive activities and innovation are to a region's economy.

Data on **EU funding** is sourced from the 'Historic EU payments - regionalised and modelled' dataset, which provides detailed annual expenditure information for various EU funds, including the European Regional Development Fund (ERDF), Cohesion Fund, European Agricultural Fund for Rural Development (EAFRD) and the European Social Fund (ESF).

Increasing shock-resistance

Shock-resistant regions are strongly influenced by three main factors: social resilience, knowledge-intensive economic activity, and institutional quality. The analysis shows a nearly 100 % certainty of having a positive impact on a region's ability to withstand shocks.

First, social resilience plays a pivotal role in maintaining stability. A small increase in social resilience, such as improvements in social well-being, income and social connectedness, can significantly enhance the likelihood of a region remaining stable under adverse conditions. In fact, a 1 % improvement in social resilience leads to approximately a 5.3 % increase in the odds of a region being categorised as shock-resistant.

Knowledge-intensive economic activity also has a major influence. When regions invest in knowledge-based sectors, including research and development and high-tech industries, their chances of resisting shocks increase. A 1 % boost in the share of knowledge-intensive sectors raises the likelihood of a region's shock-resistance by around 3.9 %.

Institutional quality, which refers to the effectiveness of governance and public services, is another critical factor. A region with stronger institutions is better equipped to manage crises. A 1 % improvement in institutional quality results in a 2.6 % increase in the odds of a region being shock-resistant.

Additional factors like manufacturing and employment also contribute to shock-resilience. For example, a 1 % increase in the manufacturing share of the regional economy corresponds to a 3.23 % rise in the likelihood of being shock-resistant, while a 1 % increase in overall employment raises the chances by 1.73 %.

Enabling exaptive responses

Social resilience remains a significant driver. A 1 % increase in social resilience leads to a 2.3 % rise in the odds of a region being exaptively resilient, with near 100 % certainty that this effect is positive.

Knowledge-intensive economic activity also plays an important role in exaptive resilience. A 1 % increase of the share of these sectors results in a 1.8 % increase in the odds of exaptive resilience, highlighting the ongoing importance of innovation and knowledge-based industries in helping regions repurpose their economies.

Institutional quality continues to be a key enabler. A 1 % improvement in institutional quality leads to a 1.1 % increase in the odds of a region achieving exaptive resilience, reinforcing the idea that strong governance and public services are essential for regions to thrive during economic transformations.

EU funding, especially in eastern border countries, plays a crucial role in supporting exaptive resilience. A 1 % increase in EU funding leads to a 5.3 % increase in the odds of exaptive resilience, with very high certainty that this relationship is positive.

Manufacturing also plays a role in regions that repurpose their economies. A 1 % increase in the share of manufacturing in a region's GVA results in a 3.71 % increase in the odds of exaptive resilience. However, a rise in manufacturing employment share is associated with a slight decrease in exaptive resilience, with a 2.36 % reduction in the odds for every 1 % increase. This suggests that labour-intensive manufacturing may be more vulnerable to economic shocks because it is more difficult to reskill workforce and repurpose productive activities. In contrast, modernising manufacturing enables greater flexibility, supporting regions in navigating economic changes and challenges.

The agricultural sector contributes to exaptive resilience as well. A 1 % increase in the agricultural employment ratio leads to a 1.85 % rise in the odds of exaptive resilience, illustrating how traditional sectors, when modernised and supported by strong institutions and knowledge, can still play a key role in repurposing regional economies in response to shocks.

6 Grassroots exaptation practices

The TERRA RES study involved interviews with a wide range of stakeholders to gather diverse perspectives on territorial exaptive resilience. Interview partners included representatives from local and regional authorities, civil society organisations, business associations and academia. These individuals provided insights into the specific challenges and opportunities faced by border regions, as well as the strategies and practices employed to repurpose resources in response to various crises. The study aimed to retrieve information on regional assets, local development strategies, the impact of cross-border cooperation, and how these regions responded to geopolitical changes, environmental crises and humanitarian issues. The interviews also focused on identifying exaptive practices, where existing resources and capabilities were repurposed to address new challenges and opportunities.

The selected case study regions were Maramureş County (Romania), Lapland (Finland), Szabolcs-Szatmár-Bereg County (Hungary), Olsztyn (Poland) and Vilnius County (Lithuania). These regions were chosen to reflect the diversity within the eastern EU border context and to provide a balanced view of how different territories face and respond to challenges. They were selected for their proximity to Russia, Belarus and Ukraine, representing regions most affected by geopolitical tensions, notably the war in Ukraine and the ongoing refugee crisis. The geographical diversity along the EU eastern border was also a key criterion, ensuring a broad representation of different border areas from the Baltic Sea in the north to the Carpathians in the south. Additionally, the case studies include both urban and rural areas, offering a comprehensive view of how various community types respond to crises. The regions differ in socio-economic conditions, industrial structure and demographics, ensuring a varied analysis of territorial resilience across different types of economies and social structures. Furthermore, the regions have distinct profiles in cross-border relations and dependencies. Stakeholders from these regions shared experiences on how local resources were creatively repurposed to meet emerging challenges, providing valuable examples of exaptive resilience in practice.

Repurposing territorial cooperation resources: Olsztyński region (PL)

The Olsztyński region, located in north-eastern Poland, is grappling with a series of challenges arising from geopolitical shifts, economic restructuring and population decline. Over the past two decades, the population has decreased by 3.5 %, intensifying the region's peripheral nature. The closure of local border traffic with Kaliningrad

Oblast in 2016, combined with the deterioration of Polish-Russian relations, has hindered the development of cross-border relations. Furthermore, Russia's invasion of Ukraine has further isolated the region's north, accelerating depopulation and leading to a decline in small businesses, tourism and investment. This crisis has underscored the need to strengthen ties with other Polish and European regions. The suspension of cooperation with the Kaliningrad Oblast has prompted the repurposing of some European funds in favour of the Poland-Lithuania and South Baltic cross-border cooperation programmes. These repurposed investments focus on road infrastructure, crisis management, border guard services, innovation and the labour market. Moreover, the use of the region's natural assets is now shifting towards alternative forms of tourism and ecosystem services. Experience in exaptive use of resources during previous crises has been valuable. For example, during the pandemic, dispersed hotel forms were developed, vacant warehouse spaces were converted into production facilities or distribution centres, and summer houses in small towns were rented out to employees from larger Polish cities for remote work. Today, the approach has shifted from an 'adaptive mode' of waiting for improved cooperation with Russia to a 'seeking new opportunities' mindset, focused on leveraging existing European resources and endogenous potentials.

From post-industrial regeneration to new prospects for Ukrainian reconstruction: Maramureş County (RO)

With a population of 454 000 as of 2021 and a diverse geography encompassing mountains, hills and basins, the county's economic history spans agriculture, forestry, mining and manufacturing. Over time, the county has faced structural economic shifts, including a decline in mining and agricultural employment, alongside growing service and tourism sectors. The collapse of the mining industry in the early 2000s left a legacy of unemployment, environmental degradation and community dislocation. Contaminated sites and abandoned mines still pose health and ecological risks. The COVID-19 pandemic further disrupted key sectors like tourism and manufacturing, exposing systemic weaknesses in healthcare and infrastructure. The war in Ukraine brought an influx of refugees, testing local resources and cross-border networks. Maramureş has embarked on repurposing natural and human assets in response to the crises. The EU-funded project Smart Post-Industrial Regenerative Ecosystem (SPIRE) demonstrates

the use of phytoremediation to clean contaminated soil while generating biomass for energy, showcasing circular economy principles. Emerging pathways in Maramureş include expanding niche tourism, such as ecotourism and agrotourism, leveraging the region's natural and cultural heritage, gastronomy and traditional crafts. The SPIRE HUB, a repurposed building in Baia Mare, now supports eco-digital innovation and collaboration, utilising a local digital currency to incentivise sustainable behaviour. Maramureş's longstanding ties with Ukraine were initially strained by the war but have adapted to meet refugee needs. Local authorities and NGOs collaborated to provide humanitarian aid, while projects like the new border bridge highlight opportunities for enhanced future connectivity and cooperation. The region is well positioned to play a role in Ukraine's post-war reconstruction, strengthening its strategic importance.

New function of public authorities and territorial cooperation: Vilnius County (LT)

Vilnius County, a region in south-eastern Lithuania, shares a 678.82-km border with Belarus, the longest among the three Lithuanian NUTS-3 regions bordering Belarus. The county has been confronted with a long series of challenges since 2020, including the opening of the Belarusian Astravec nuclear power plant in 2020, the influx of people fleeing Belarus following the presidential elections in August 2020, the COVID-19 pandemic in 2020 and 2021, the irregular immigration shock in summer 2021, the Russian-Belarusian exercise Zapad-2021 and the war in Ukraine in 2022. The migration crisis marked a turning point for Lithuania. The influx of migrants occurred at an unprecedented scale and speed with over 4 000 unauthorised entries reported in 2021 alone. Various resilience-building measures were taken by Lithuanian authorities, such as declaring a state of emergency, introducing new legislation, increasing border protection and establishing temporary housing. The state and municipal authorities expanded existing centres and established additional sites across municipalities, repurposing various facilities, including previously unused or underutilised buildings, to serve as temporary accommodation centres. Public agencies embarked on new roles and functions. For example, the State Border Guard Service (VSAT) had to carry out functions not inherent to its role as a law enforcement agency, such as expanding housing facilities and providing basic medical, social and legal services. The illegal immigration crisis catalysed a shift in institutions' understanding of the value of NGOs and territorial cooperation for crisis management and

social resilience. Prior to the crisis, the county maintained cross-border cooperation with Belarus in the field of border security and socio-economic cooperation. The crisis severely disrupted this cooperation, halting previously established frameworks for collaboration and affecting the local economy in border regions. Conversely, the crisis fostered stronger ties between Lithuania and Poland and other EU partners, with ongoing collaborative efforts on border security measures. Future development pathways include investing in multi-purpose facilities that can be repurposed during emergencies and enhancing cooperation with EU neighbours through joint border security initiatives, strengthening and building social resilience.

From disrupted cross-border cooperation with Ukraine to grassroots solidarity: Szabolcs-Szatmár-Bereg County (HU)

Szabolcs-Szatmár-Bereg County, situated in north-eastern Hungary and bordering Ukraine, has been at the forefront of the humanitarian response to the refugee crisis triggered by the war in February 2022. The region's proximity to the conflict zone and its well-established cross-border ties have made it a focal point for the influx of Ukrainian refugees. As a border region, Szabolcs-Szatmár-Bereg County has long faced challenges related to its peripheral location, such as limited economic opportunities and outmigration. However, its border status has also endowed it with unique resources and connections, such as a rich history of cross-cultural exchange and an infrastructure for cross-border cooperation, which have proven crucial in enabling the region to respond effectively to the sudden influx of refugees. The county demonstrates exaptive resilience by repurposing existing facilities for refugee housing, such as cultural centres and unused buildings. Local civil society organisations and religious groups were instrumental in coordinating relief efforts, leveraging their networks to mobilise resources. Multilingual locals, particularly ethnic Hungarians from Transcarpathia, acted as cultural mediators, enhancing communication and integration. Personal, familial and business relationships facilitated aid. Collaboration among municipalities, NGOs and the private sector further strengthened the response. The refugee crisis highlighted both the challenges but also the strengths of cross-border cooperation. While formal cooperation mechanisms with Ukraine were disrupted due to tightened border controls, grassroots solidarity flourished.

Strategic value of local Sami communities from tourism to NATO: Lapland (FI)

Lapland shares a strategically significant 380-km border with Russia, which has gained increased attention since Finland's 2024 NATO accession. The geopolitical tensions have disrupted infrastructure projects in the Arctic and strained long-standing cross-border ties with Russia. Historical collaboration through initiatives like the Barents Euro-Arctic Cooperation has stalled. The Arctic Council's diminishing influence has created a void in regional governance, while NATO's growing presence, exemplified by its largest military exercise near Rovaniemi in Autumn 2024, has reshaped regional dynamics. This situation has been further exacerbated by the Russian military base at Alakurtti, located just 50 km from the Finnish border town of Salla, which represents a significant strategic concern for the region. Finland's NATO membership has increased military activity, with Ivalo now hosting the alliance's closest base to mainland Russia, while discussions continue about establishing a new NATO headquarters in either Rovaniemi or Sodankylä. In the context of exaptation, regional experts interviewed in the ESPON TERRA RES study report that local Sami communities, traditionally a touristic asset, are now not only aiding the Arctic adaptation strategies but also providing valuable insights for NATO operations in the region.

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Key policy takeaways

Social resilience, institutional quality and knowledge-intensive economic activity are strong determinants of resilience, influencing both shock-resistant and exaptive responses. A region's response to shocks can vary depending on the nature of the shock itself. Shock-resistant responses are often associated with path dependency, where a region's response follows a predictable trajectory unless the shock significantly deviates from that path.

In contrast, exaptive responses are found in regions at the crossroads of development, where existing resources and capabilities are repurposed to address new challenges and opportunities. EU funding plays a significant role in supporting exaptive responses, particularly in eastern border regions, where it helps facilitate the adaptation of these areas to new conditions and external shocks.

Aftershocks, however, can derail these newly emerging development paths, requiring special attention to regions that demonstrate exaptive resilience following the latest observable shock. Such regions need tailored strategies to ensure their ability to continue adapting and building long-term resilience.

Territorial exaptive resilience will be an important consideration for the Cohesion Policy post-2027, particularly as new roles in security and resilience become central to regional development strategies. Understanding how regions can adapt and repurpose their resources will be crucial for shaping effective policies and ensuring that these areas remain resilient in the face of future challenges.

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