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Rural Depopulation in the European Union: Regional Disparities and Policy Responses

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"Gli uomini non s'inducono ad abbandonar affatto le proprie terre, che sono naturalmente care a' natii, che per ultime necessità della vita; o di lasciarle a tempo, che o per l'ingordigia d'arricchire co' traffichi, o per gelosia di conservare gli acquisti." (Vico, 1857, p.98).[1]

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[1] Man cannot be induced to abandon their own lands, which are naturally dear to their native sons, except by the last necessities of life, or to leave them temporarily, either through the greed for enriching themselves by traffic, or through jealousy of protecting their acquisitions (translation mine).

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1. Introduction

The attachment of individuals to their native places has long been emphasized, with departure often occurring only under the pressure of necessity or in pursuit of new opportunities. Early reflections, such as those of Vico (1857), already highlighted how people rarely abandon their homeland unless compelled by difficult circumstances. Later, Ravenstein (1889) observed similar dynamics, noting that the expansion of towns and cities drew steadily on the rural population, where limited prospects pushed inhabitants to seek livelihoods elsewhere. These historical insights remind us that rural decline is not a recent anomaly but part of a longer structural trajectory accompanying modernization. In this sense, subsequent migration theories have deepened the interpretation, presenting population movements as systematic responses to structural pressures, unequal opportunities, and the uneven capacity of local contexts to sustain well-being.

These dynamics are still salient today. As Johnson and Lichter (2019) argue, chronic rural population loss in low-fertility countries is rooted in long-term agricultural transformation, industrial restructuring, and globalization. Through their combined effects on migration, fertility decline, and population ageing, these processes have generated durable demographic imbalances that weigh most heavily on peripheral and rural regions.

At the European scale, the urgency of rural depopulation has been explicitly acknowledged by the European Commission in its "Long-term Vision for the EU's Rural Areas" (European Commission, 2021). As shown in Figure 1, the Commission underlines that rural territories cover over 80% of the Union's land and are home to nearly 30% of its population, yet they face a disproportionate burden of demographic decline and ageing. Rural depopulation phenomenon is largely driven by negative natural change, insufficiently offset by migration inflows, a trend particularly acute in parts of Eastern and Southern Europe. This demographic shrinkage interacts with limited access to services, weaker infrastructure, lower educational attainment, and digital divides, reinforcing perception of marginalization among rural citizens. Without targeted action, these dynamics risk exacerbating territorial disparities and undermining cohesion, as rural regions fall further behind urban and peri-urban areas in economic opportunities, connectivity, and quality of life (European Commission, 2021). Recognizing this, the EU has made rural revitalization a cornerstone of its long-term agenda, linking it to the Green Deal, the Digital Decade, and the European Pillar of Social Rights. The Vision for 2040 thus places rural communities at the heart of Europe's sustainable future, calling for stronger, connected, resilient, and prosperous territories capable of retaining and attracting population.

Figure 1: Degree of urbanization in Europe, 2021 (local administrative units classified into cities, towns and suburbs, and rural areas, based on population density)
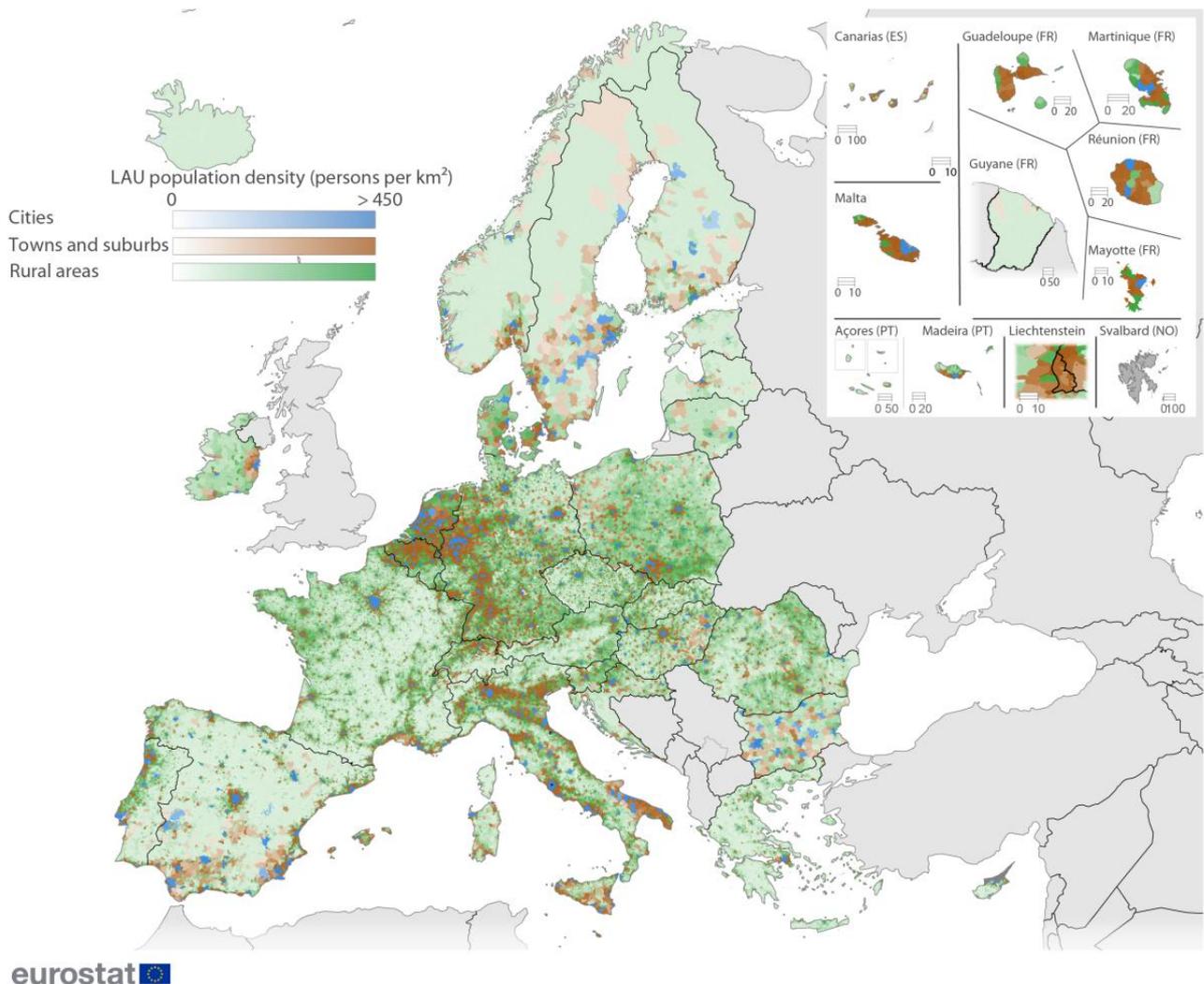
Depopulation further contributes to the widening of territorial polarization, as the impacts of population loss are not distributed evenly across space. Empirical evidence shows that rural areas present significant heterogeneity along different dimensions of growth and decline. These variations confirm that depopulation is a multifactor and complex phenomenon, shaped by a wide range of influences. The literature has linked rural demographic trajectories to socio-demographic characteristics, natural geography, and economic structures, as well as to differences in infrastructure endowment and historical legacies. This multidimensionality underscores the importance of analyzing rural population change not as a uniform process, but as the result of the interaction between structural, contextual, and place-specific drivers (Gómez Valenzuela & Holl, 2023).

This historical and contemporary continuity has provided the foundation for subsequent theoretical contributions – most notably Dorigo and Tobler's (1983) formalization of Push-Pull Theory and Max-Neef et al.'s (1986) Human Scale Development. Taken together, these perspectives underscore how structural pressures, unmet needs, and uneven opportunity structures continue to shape the persistent depopulation of rural Europe.

Beyond their demographic weight and land coverage, rural regions also carry significant value when assessed through the lens of territorial capital. As defined by De Rubertis, Ciavolino, and Labianca (2019), territorial capital consists of the tangible and intangible resources that shape the potential development of a place. These include generative factors, such as human and social capital, which influence the ability of individuals and communities to act. Moreover, they encompass sediment factors, such as infrastructures, cultural heritage, local production systems, and governance arrangements, which represent the accumulated results of fast choices and investments. From this perspective, rural areas are not simply spaces affected by demographic decline, but repositories of unique assets whose proper valorization can support resilience, innovation, and sustainable development. Their importance lies in the fact that they embody place-specific resources such as skills, traditions, landscapes, and networks that cannot easily be reproduced elsewhere.

To examine these dynamics systematically, this thesis builds on a set of complementary theoretical perspectives that illuminate different dimensions of rural depopulation. The Push-Pull Theory (Dorigo & Tobler, 1983), together with the concept of selective migration (Korpi & Clark, 2015), explain how adverse conditions in rural areas and attractive opportunities in urban centers combine in shaping migration flows, moderated by distance and accessibility. To widen the perspective, Human Scale Development theory (Max-Neef, 2017) will be used. It analyzes the means by which the fundamental needs of people are satisfied and their quality, showing that their erosion produces forms of deprivation that encourage outmigration. Furthermore, Demographic Transition Theory (DTT) embeds these dynamics within the long-term shifts in fertility, mortality, and population ageing that characterize advanced economies. Taken together, these perspectives provide a multidimensional framework – spatial, socio-cultural and temporal – for understanding why rural Europe continues to experience persistent population loss despite diverse policy efforts and socio-economic contexts.

Against this scenario, the central research question guiding this thesis is whether, and in what ways demographic, socio-economic, and policy related factors articulate in EU rural regions and how these dynamics vary across different macro-areas of the Union between 2001 and 2023. More specifically, the analysis investigates how structural pressures such as fertility decline, ageing, and net migration unfold in shrinking rural regions. Then it turns to how socio-economic conditions, including

education, employment, and income, combine with these demographic trajectories and to what extent European policy instruments influence the capacity of rural regions to mitigate or adapt to decline. By merging theoretical insights with comparative empirical evidence at the NUTS-2 level – a hierarchical system that divides the EU economic territory into three levels (NUTS 1, 2 and 3) to facilitate the collection of regional statistics and socio-economic analysis (Eurostat, 2024) - the thesis seeks to investigate the interplay of these factors and to generate conclusions of relevance for both academic debates and European rural policy design.

2. Theoretical Framework and Literature Review

2.1 Push-Pull Theory

Among the theoretical approaches employed to explain population movements, the Push-Pull model offers a particularly valuable lens for interpreting rural depopulation. Building directly on Ravenstein's nineteenth-century insights, Dorigo and Tobler (1983) provided a systematic formalization of this framework, conceptualizing migration flows as the combined effect of repelling conditions at the place of origin (push factors) and attractive opportunities at potential destinations (pull factors), moderated by distance or other frictions. According to their theory, migration is intended as a systematic and calculable response to structural imbalance between regions. In particular, the absence of local opportunities, low incomes, or declining services act as quantifiable "pushes", while the economic dynamism, educational opportunities, and cultural amenities of urban centers exert countervailing "pulls". Importantly, this framework allows the identification of migration dynamics even when individual motivations remain unobservable, since push and pull forces emerge in the aggregate balance of inflows and outflows.

Empirical applications have reinforced the relevance of the model explaining rural decline. Its adaptability has been illustrated by Yu, Zhang, Sun, and Guo's (2022) analysis of rural depopulation in the mountainous regions of Hebei, in China. Their study examined how demographic decline unfolded between 2000 and 2017 and identified the evolving balance of push and pull factors over time. The resulting findings demonstrated that rural outmigration is sustained not by a single determinant but by a layered set of disadvantages. Specifically, in the early 2000s, natural constraints such as fragile environments, limited arable land, and poor agricultural production played a decisive role. Instead in subsequent years accessibility, declining population density, and the scarcity of non-agricultural opportunities emerged as increasingly influential drivers. On the other side of the equation, the proximity of metropolitan regions with higher wages, diversified labor markets, and superior educational and infrastructural conditions exerted a growing gravitation pull on younger and

more mobile layers of population. Yu et al. (2022) thus highlight both the multidimensionality and the temporality of push-pull dynamics. In particular, the forces driving depopulation shift in salience as local conditions evolve, underscoring the need to interpret migration not as a static response, but as an adaptive process shaped by changing structural imbalances.

Shifting back to the Old Continent's scenario, the Push-Pull framework proves particularly well-suited to explain why rural depopulation persists across diverse contexts. As Johnson and Lichter (2019) argue, rural decline represents a cumulative demographic process set in motion by structural shifts such as agricultural transformation, industrial restructuring and globalization. These changes alter the balance of fertility, mortality, and migration over time, producing enduring patterns of population loss. European studies reinforce this view. In this regard, a study of Shucksmith et al. (2009) highlights the coexistence of strong push factors on the rural side of the continent – such as the converge of weak labor markets, limited services, and ageing population -and strong pull factors on the urban side. Notably, urban centers offer a wider, more dynamic labor market, cultural amenities, and improved life opportunities. According to the authors, this imbalance results in an uneven quality of life geography. Indeed, they show that rural households, especially in Eastern and Southern Europe, experience greater material deprivation, poorer access to services, and digital divides, even as they maintain relatively resilient subjective well-being. The problems highlighted by this study, published at the end of 2010s, are still present in the European scenario. As a matter of fact, the European Commission (2021) recently emphasized this theme in the context of cohesion concerns, highlighting that issues such as demographic decline and ageing weigh disproportionately on rural territories, exposing them to the risks of marginalization and territorial inequality (European Commission, 2021). In this sense, the European case mirrors the temporal adaptability identified by Yu et al. (2022), where the relative importance of push and pull factors varies by location and over time. However, the combined effect of these factors consistently drives depopulation. Thus, the rural depopulation phenomenon is shaped by the structural inequalities existing between regions with different degrees of urbanization. The ongoing nature of this trend, and the ingrained disparities it produces, suggest that these forces are not merely external drivers but have become deeply internalized within the social and economic fabric of these regions.

Moreover, it has been demonstrated that the effects of Push and Pull theory extend across all layers of population, though their salience varies with age. While younger cohorts are more responsive to educational and employment-related pulls, older residents are often disproportionately affected by the deterioration of services and community networks, which equally reinforces outmigration. This evidence confirms that push-pull dynamics operate simultaneously across generations, making rural

depopulation comprehensive processes that reshapes the demographic structure of entire territories (Alamá-Sabater et al., 2019).

While the Push-Pull model clarifies how structural inequalities translate into migratory flows, it does not fully explain why particular deficits become decisive triggers of departure rather than conditions to which communities adapt. In this regard, the notion of selective migration provides important refinement. Korpi and Clark (2015) demonstrate that migration outcomes are unevenly distributed across the population. Indeed, highly educated individuals and those with initially lower incomes tend to benefit the most from moving, while many others see limited or even negative returns. This evidence suggests that aggregate push-pull dynamics may mask substantial heterogeneity, since only certain groups possess the resources, incentives, or aspirations to act upon the structural imbalances implied by push and pull factors. Recognizing migration as a selective process therefore deepens the interpretation of rural depopulation, showing that it is not merely driven by universal responses to external pressure but also by differentiated capacities to grasp opportunities or escape constraints.

In line with this reasoning, it becomes clear that structural asymmetries and selective responses alone cannot fully account for why some communities experience persistent outmigration while others adapt. To address this gap, Max-Neef's Human Scale Development theory offers a complementary perspective by shifting the focus from economic incentives toward the degree to which fundamental human needs are satisfied within local contexts.

2.2 Human Scale Development

Max-Neef's Human Scale Development constitutes a means to deepen the comprehension of rural depopulation phenomenon. Dating back to the mid-1980s, this theory was conceived amid Latin America's neoliberal reforms and social crises. Indeed, the Human Scale Development theory's genesis is linked to Max-Neef's critique of the neoliberal economic policies and representative political systems that shaped the Continent in the 1980s. Confronted with the inability of dominant development models to address the real conditions of the poors, Max-Neef's sought to reorient development away from economic growth indicators and toward the fulfilment of fundamental human needs. His work emphasizes that while needs are universal and relatively stable over time, the means by which they are satisfied – namely satisfiers – vary across cultures and contexts (Cameron, 2023). This distinction, along with the recognition that communities should play a central role in defining and fulfilling their own needs, became the foundation of Human Scale Development framework.

As a matter of fact, what differentiates Human Scale Development from others development models is the role it gives to people, in this case they are considered the primary actors of their own

development process. This approach results in a decoupling of the concepts of progress and economic growth, giving importance to the satisfaction of fundamental human needs, the promotion of self-reliance, and the creation of balanced relationships between individuals, society, nature, and technology (Max-Neef, 2017).

At the core of this theory is the distinction between fundamental human needs and the satisfiers that fulfil them. Max-Neef (2017) argues that fundamental needs are finite, universal, and consistent across cultural and historical periods, whereas satisfiers – how these needs are met – vary according to the context. According to the theory, rather than existing in a rigid hierarchy, needs constitute a complex system characterized by simultaneities, complementarities, and trade-offs. For example, subsistence, protection, affection, understanding, participation, creation, leisure, identity, and freedom are constant human needs, but their fulfillment depends on locally and historically determined satisfiers (Max-Neef, 2017).

To operationalize this framework, Max Neef introduced a matrix of human needs and satisfiers organized along two dimensions. The first one refers to the existential categories, specifically Being, Having, Doing, Interacting. The second one instead refers to axiological categories which are the nine fundamental needs. The matrix enables communities to assess their current satisfiers, identify obstacles to fulfilling needs, and envision alternative solutions (Cameron, 2023).

TAB. 1: Fundamental Human Needs and Example Satisfiers

Need	Being (qualities)	Having (tools or institutions)	Doing (actions)	Interacting (spaces)
Subsistence	Health, adaptability, equilibrium, humor	Food, shelter, work	Feed, rest, work, procreate	Living environment, social setting
Protection	Care, autonomy, solidarity	Social security, rights, family, health systems	Prevent, plan, co-operate, help	Safe dwelling, social environment
Affection	Self-esteem, solidarity, respect, tolerance	Friendships, family, partnerships	Love, share, caress, express emotions	Privacy, intimacy, home, togetherness
Understanding	Critical awareness, curiosity, intuition	Education systems, teachers, communication policies	Study, investigate, analyze, meditate	Schools, universities, communities
Participation	Willingness, solidarity, dedication	Rights, responsibilities, work	Co-operate, dissent, express opinions	Associations, parties, churches, family
Leisure	Imagination, tranquility, humor, sensuality	Games, spectacles, clubs	Dream, fantasize, relax, play	Free time, landscapes, spaces of closeness
Creation	Passion, inventiveness, boldness	Skills, abilities, methods	Invent, design, build, compose	Workshops, cultural groups, spaces of expression
Identity	Belonging, self-esteem, assertiveness	Symbols, language, customs, values, religion	Commit, confront, get to know oneself	Social rhythms, everyday settings
Freedom	Autonomy, self-esteem, open-mindedness	Equal rights	Choose, dissent, run risks, disobey	Temporal/spatial flexibility

Source: Adapted from Max-Neef, M. (2017). *Development and human needs.* In D. A. Crocker & T. Linden (Eds.), *Development ethics* (pp. 169–186). Routledge.

Importantly, Max-Neef underlines that satisfiers can be of a different nature, and that not all of them are equally beneficial. Notably, the satisfiers which appear to meet a need but prevent their achievement by harming other needs are classified as violators or destroyers (e.g. an arms race justified as protection, but which undermines peace and freedom). Another category is the one of Pseudo-satisfiers which create only the illusion of meeting a need but fail to do so in the long run

(e.g. consumerist status symbols for identity). Moreover, the Inhibiting satisfiers over-emphasize one need while restricting others (e.g. excessive work productivity undermines leisure or affection). Finally, singular satisfiers are the ones which meet only one specific need without affecting others (e.g. professional armies providing just protection). By contrast, synergic satisfiers are the most desirable because they meet one need while simultaneously contributing to the fulfilment of others – for instance, breastfeeding which meets subsistence while also fostering protection, affection, and identity (Max-Neef, 2017; Cameron, 2023).

Crucially, the concept of poverty finds a wide reconceptualization in this new paradigm. Rather than being defined narrowly as insufficient income, poverty is conceived as the deprivation of any of the fundamental needs. Thus, there can be poverties of subsistence, protection, affection, participation, or identity, each of which can generate social and political pathologies (Max-Neef, 2017).

Within the context of rural depopulation, Max-Neef's theory provides a valuable analytical tool. Indeed, it reveals how outmigration and lack of fertility are often the results of the absence of satisfiers that meet key needs such as participation, identity, or protection. As Cameron (2023) underscores, when satisfiers are inhibiting or absent, human needs remain unfulfilled, accelerating processes of decline. In this regard, Elsen (2023) demonstrates the practical relevance of Human Scale Development theory by showing how social and solidarity economy initiatives – such as social agriculture and community cooperatives – can create synergic satisfiers that simultaneously meet subsistence, participation, identity, and ecological needs. These initiatives exemplify how Max-Neef's theory can be mobilized not only to diagnose the multidimensional poverty underlying rural depopulation but also to tackle it by fostering locally rooted participatory, and sustainable strategies for territorial revitalization.

At the same time, Max-Neef's theory can be seen as a complementary framework to empirical analyses. While statistical and demographic models capture important dimensions of rural depopulation, they often struggle to explain its deeper social and cultural drivers. As Farley, Costanza, Templet, Corson, Crabbé, Esquivel, and Wilson (2002) note, Human Scale Development is difficult to operationalize in quantitative terms, yet its strength lies in providing the conceptual depth to understand why such a complex phenomenon can only be partially observed through empirical data. In this sense, this theory enriches the analysis of rural depopulation by revealing its multidimensional nature, highlighting the unmet needs underlying outmigration, and pointing toward strategies that move beyond what conventional empirical models can capture.

2.3 Demographic Transition Theory

The Demographic Transition Theory (DTT) represents a valuable theoretical instrument to examine rural depopulation by situating it within broader structural and temporal demographic dynamics. Indeed, DTT is not a migration-centered perspective, such as the Push-Pull Theory and the Max-Neef's Human Scale Development Theory, thus it focuses on rural depopulation as a part of the longer demographic cycle of declining fertility and mortality. From this standpoint, natural decrease, which is the situation whereby deaths exceed births, results in a key driver of rural decline once fertility drops below replacement levels and population ageing intensifies (Johnson & Lichter, 2019). Indeed, DTT explains population change as a historical variation from regimes of high fertility and mortality to those characterized by sustained low vital rates. Initially, mortality declines due to advances in public health, nutrition, and social development. This process produces rapid population growth, while fertility remains high. Over time, fertility too declines, influenced by modernization, changing economic incentives, and new norms about family size, and this eventually leads to population stabilization or even contraction (Kirk, 1996).

This dynamics is schematically represented in the demographic transition model (illustrated in Figure 2), which shows how declining mortality and fertility produce successive phases of population growth and eventual stabilization or decline (Roser, 2013).

Figure 2: The five stages of the demographic transition. The model shows how birth and death rates evolve over time, producing different phases of population change and age structure.

The five stages of the demographic transition
The demographic transition is a model that describes why rapid population growth is a temporary phenomenon.

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Birth rate	High	High	Falling	Low	Yet to be seen possibly falling further, possibly rising again
Death rate	High	Falling rapidly	Falling slowly	Low	Low
Population change	Stable or slowly increasing	Rapidly increasing	Increase slows down	Falling and then stable	Little change

OurWorldinData.org – Research and data to make progress against the world's largest problems.   Licensed under CC-BY by the author Max Roser.

Source: Roser, M. (2013). *The Demographic Transition. Our World in Data*

More recently, scholars have argued that in many advanced societies this transition is deepened into a "second demographic transition", marked by persistent sub-replacement fertility, ageing populations, and diversification of family forms. These trends are linked not only to structural modernization but also to cultural shifts toward individual autonomy and self-realization (Zaidi & Morgan, 2017). Taken together, DTT and its later extensions frame demographic change as a long-term, path dependent process, highlighting how structural transformations in mortality and fertility create enduring constraints on population dynamics, particularly in rural regions. As a result, rural depopulation emerges not solely from economic pressures or migratory movements, but also from cumulative demographic imbalances which, in the later stages of transition, become self-reinforcing. The shift toward below-replacement fertility and the progressive ageing of populations mean that even in the absence of strong migratory outflows, many rural areas face a structural tendency toward decline. In this sense, DTT underscores that depopulation is not a temporary fluctuation, but the demographic legacy of earlier phases, where falling mortality, sustained outmigration of younger

cohorts, and cultural transformation in family formation converge to shape enduring trajectories of rural shrinkage.

Yet, this transition is far from homogenous across Europe. Regional contexts condition both the pace and the consequences of demographic change, leading to striking spatial disparities in rural trajectories. On one hand, Eastern and Southern European regions often experience accelerated and persistent decline due to the combined effects of low fertility, rapid ageing, and sustained youth outmigration. On the other hand, many Western and Northern areas show more gradual or even reversible patterns, often buffered by stronger welfare systems, diversified economies, and better integration into urban networks (Newsham & Rowe, 2023). This geographical unevenness highlights that the demographic transition does not unfold as a uniform process but rather interacts with socio-economic structures and policy environments to produce differentiated outcomes. As such, DTT provides not only a structural and temporal framework for understanding rural depopulation, but also a lens to interpret the territorial inequalities that share how and where demographic decline become most acute.

2.4 Toward an integrated framework

When viewed together, these theoretical approaches offer a broad and complementary understanding of rural depopulation in Europe. The Push-Pull framework clarifies how disparities in opportunities and living conditions translate into outward mobility, due to tensions between deteriorating prospects in the countryside and the attractions of urban centers. Importantly, recent contributions on selective migration refine this perspective by showing that such movements are not evenly distributed, but shaped by differences in education, income, and individual capacity to respond to structural irregularities. Moreover, Max-Neef's Human Scale Development enriches this view by focusing on the satisfaction of fundamental human needs, showing how the weakening of local means for satisfying them generates layers of deprivation that drive individuals to leave. Finally, DTT places these processes within the wider historical cycle of falling fertility, rising longevity, and population ageing, stressing how long-term demographic imbalances can perpetuate decline even in the absence of strong migratory flows. Taken as a whole, these paradigms contribute to the understanding of rural depopulation as the endpoint of a series of interconnected social, economic, and demographic processes unfolding at different scales. This conceptual synthesis establishes the foundation for empirical investigation, guiding the analysis toward both the measurable indicators of decline and the less tangible cultural and structural dynamics that sustain it.

3. Data and Methods

3.1 Research Focus

Given these theoretical premises, the rural depopulation phenomenon can be investigated as the outcome of intersecting structural, socio-economic, and policy conditions. To capture this complexity, the research is organized on three analytical levels: first, assessing the specificity of individual rural regions. Second, situating these regions within their national contexts. Third, comparing them across countries to identify broader European patterns. This structure leads to the following research questions:

Research Question 1: How do structural demographic pressures, socio-economic disparities, and policy frameworks shape decline and resilience within individual EU rural regions, and how do these regions position themselves in relation to their respective national contexts between 2001 and 2023?

Research Question 2: How do rural regions across EU member states compare to each other in terms of these dynamics, and what patterns emerge across different macro-areas of the Union?

3.2 Target Sample: Selection of Rural Regions

The research relied on a target sample built on a series of criteria. Since the objective of this thesis is to explain the intervening factors of rural depopulation in Europe, the study must focus on territories where rural dynamics are structurally significant. For this reason, the analysis is restricted to NUTS-2 regions entirely composed of NUTS-3 units classified as either *predominantly rural* or *intermediate*. The reliance on the NUTS-2 level is motivated by considerations of data availability and coherence. Eurostat provides harmonized, long-term demographic and socio-economic indicators consistently at the NUTS-2 level, which makes it possible to compare regions across Member States without the distortion that would arise from relying on more fragmented national or local statistics.

The design ensures that the empirical investigation captures areas where depopulation pressures – such as fertility decline, ageing, or outmigration – are most visible, and where the interaction between demographic, socio-economic, and policy variables can be meaningfully assessed. In this sense, the sample selection directly links the empirical setting to the theoretical concerns outlined in the Push-Pull, Human Scale Development, and DTT frameworks, which all emphasize the importance of structural disadvantages and demographic imbalances in shaping long-term rural decline.

The classification of regions as rural or intermediate follows the Degree of Urbanization (DEGURBA) methodology developed by Eurostat and OECD. This approach divides the entire

European territory into population grid cells of 1km^2, which are subsequently aggregated to the regional level (European Commission, 2021). Each grid cell is assigned to one of three categories depending on its density and minimum population size. Urban centers are defined as contiguous cells with at least 1,500 inhabitants per km^2 and a minimum of 50,000 inhabitants; urban clusters consist of contiguous cells with at least 300 inhabitants per km^2 and a population of at least 5,000, excluding urban centers. Instead, rural grid cells are those with fewer than 300 inhabitants per km^2 and not belonging to either urban clusters or centers.

Once classified at the grid-cell level, the typology is transferred to NUTS-3 unit based on the share of population residing in rural grid cells. Units in which more than 50% of the population lives in rural cells are classified as *predominantly rural*, those with between 20% and 50% of their population in rural cells are *intermediate*, and those with less than 20% are considered *predominantly urban* (European Commission, 2021). For this study, the analytical sample has been built including one *predominantly rural* or *intermediate* NUTS-2 region from each of the twelve countries selected ensuring that all European macro-regions are represented. Within each country, just one NUTS-2 region whose NUTS-3 areas consistently fall into the *predominantly rural* or *intermediate* categories has been considered. Furthermore, the selection of regions was conducted according to specific criteria designed to enhance comparability and minimize the disproportionate influence of any single territory. Only those regions exhibiting population density levels among the lowest within the country under study were taken into account. From this subset, the final regions were identified on the basis of their provision of a complete dataset across all relevant variables. The first aim of this selection is to focus the analysis on the demographic dynamics of rural and intermediate regions, which are more affected by population decline, without the interference of the metropolitan areas' ones. At the same time, the selection process has been guided by data availability, so to ensure that the variables under study could be measured consistently across cases and that the analysis remained comparable across national and regional contexts. TAB. 2 reports the NUTS-3 territorial typology aggregated at the NUTS-2 level.

TAB. 2: NUTS-3 territorial typology by NUTS-2 region

Country	Region (NUTS 2)	NUTS 3 — name	NUTS 3 — code	Territorial typology
Bulgaria	Severozapaden (BG)	Vidin Province	BG311	Predominantly rural region
Bulgaria	Severozapaden (BG)	Montana Province	BG312	Intermediate region
Bulgaria	Severozapaden (BG)	Vratsa Province	BG313	Intermediate region
Bulgaria	Severozapaden (BG)	Plaven Province	BG314	Intermediate region
Bulgaria	Severozapaden (BG)	Lovech Province	BG315	Intermediate region
Czechia	Severovýchod (CZ)	Liberec Region	CZ051	Intermediate region
Czechia	Severovýchod (CZ)	Hradec Králové Region	CZ052	Intermediate region
Czechia	Severovýchod (CZ)	Pardubice Region	CZ053	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	North Karelia	FI1D3	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Kainuu	FI1D4	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Central Ostrobothnia	FI1D5	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Northern Ostrobothnia	FI1D6	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Lapland	FI1D7	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Etelä	Savo	Predominantly rural region
Finland	Pohjois- ja Itä-Suomi(FI)	Pohjois	Savo	Predominantly rural region
France	Centre Val de Loire (FR)	Cher	FR241	Predominantly rural region
France	Centre Val de Loire (FR)	Indre	FR243	Predominantly rural region
France	Centre Val de Loire (FR)	Loiret	FR246	Intermediate region
France	Centre Val de Loire (FR)	Eure	et	Predominantly rural region
France	Centre Val de Loire (FR)	Indre	et	Intermediate region
France	Centre Val de Loire (FR)	Loir	et	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Rostock, Kreisfreie Stadt	DE803	Intermediate region
Germany	Mecklenburg-Vorpommern (DE)	Schwerin, Kreisfreie Stadt	DE804	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Mecklenburgische Seenplatte	DE80J	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Landkreis Rostock	DE80K	Intermediate region
Germany	Mecklenburg-Vorpommern (DE)	Nordwestmecklenburg	DE80M	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Vorpommern	Greifswald	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Vorpommern	Greifswald	Predominantly rural region
Germany	Mecklenburg-Vorpommern (DE)	Vorpommern	Rügen	Predominantly rural region
Greece	Dytiki Makedonia (GR)	Grevena, Kozani	EL531	Predominantly rural region
Greece	Dytiki Makedonia (GR)	Kastoria	EL532	Intermediate region
Greece	Dytiki Makedonia (GR)	Florina	EL533	Predominantly rural region
Hungary	Dél-Alföld (HU)	Csongrád	Csanád	Intermediate region
Hungary	Dél-Alföld (HU)	Békés	HU332	Intermediate region
Hungary	Dél-Alföld (HU)	Bács	Kiskun	Intermediate region
Italy	Molise (IT)	Isernia	ITF21	Predominantly rural region
Italy	Molise (IT)	Campobasso	ITF22	Predominantly rural region
Netherlands	Drenthe (NL)	Noord	Drenthe	Intermediate region
Netherlands	Drenthe (NL)	Zuidoost	Drenthe	Intermediate region
Netherlands	Drenthe (NL)	Zuidwest	Drenthe	Intermediate region
Romania	Vest (RO)	Judeţul Arad	RO421	Intermediate region
Romania	Vest (RO)	Judeţul Hunedoara	RO423	Intermediate region
Romania	Vest (RO)	Judeţul Timiş	RO424	Intermediate region
Romania	Vest (RO)	Judeţul Caraş	Severin	Predominantly rural region
Spain	Castilla y León (ES)	Ávila	ES411	Predominantly rural region
Spain	Castilla y León (ES)	Burgos	ES412	Intermediate region
Spain	Castilla y León (ES)	León	ES413	Intermediate region
Spain	Castilla y León (ES)	Palencia	ES414	Intermediate region
Spain	Castilla y León (ES)	Salamanca	ES415	Intermediate region
Spain	Castilla y León (ES)	Segovia	ES416	Predominantly rural region
Spain	Castilla y León (ES)	Soria	ES417	Predominantly rural region
Spain	Castilla y León (ES)	Valladolid	ES418	Intermediate region
Spain	Castilla y León (ES)	Zamora	ES419	Predominantly rural region
Sweden	Norra Mellansverige (SE)	Värmlands län	SE311	Intermediate region
Sweden	Norra Mellansverige (SE)	Dalarnas län	SE312	Predominantly rural region
Sweden	Norra Mellansverige (SE)	Gävleborgs län	SE313	Intermediate region

Source: Eurostat (2016)

Moving forward, to provide a spatial overview of the regions analyzed, their spatial distribution and the geographical coverage of the study, a visual illustration of the sample has been realized. Notably, the map below (Figure 3) shows the regions retained for the analysis highlighted in two different colors depending on the degree of urbanization. Indeed, regions in which most NUTS-3 areas are classified as *predominantly rural* are shown in green, while those in which most NUTS-3 areas fall into the *intermediate* category are displayed in blue. This distinction allows for an immediate understanding of how the analytical sample is distributed across Europe and clarifies the internal demographic character of each NUTS-2 region included in the study.
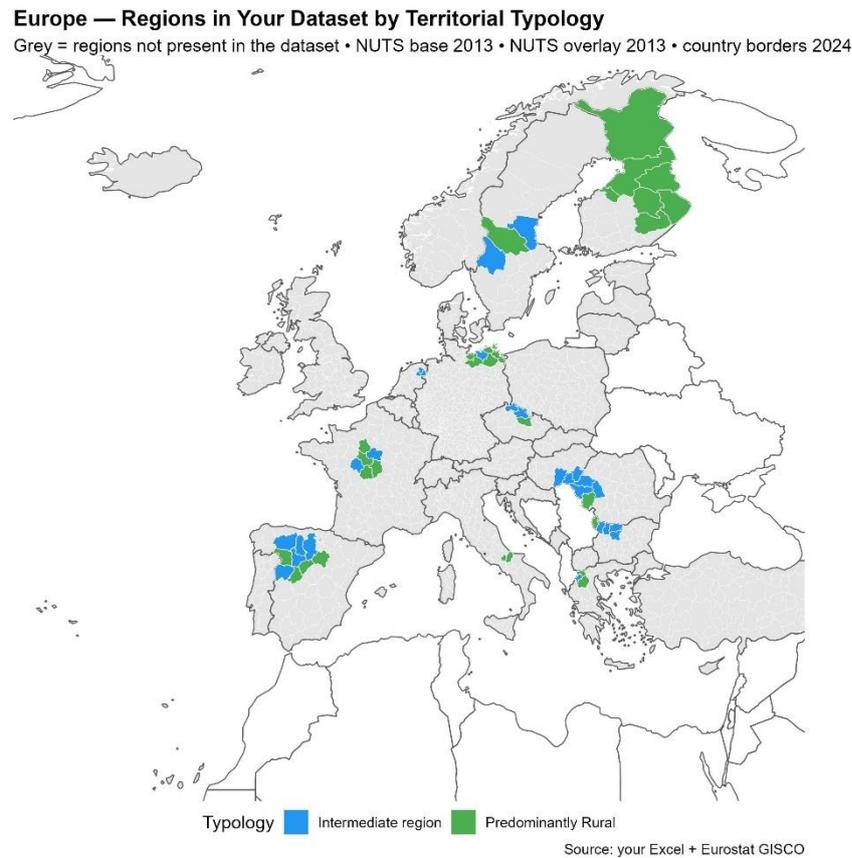
Figure 3: NUTS-2 regions from the dataset.
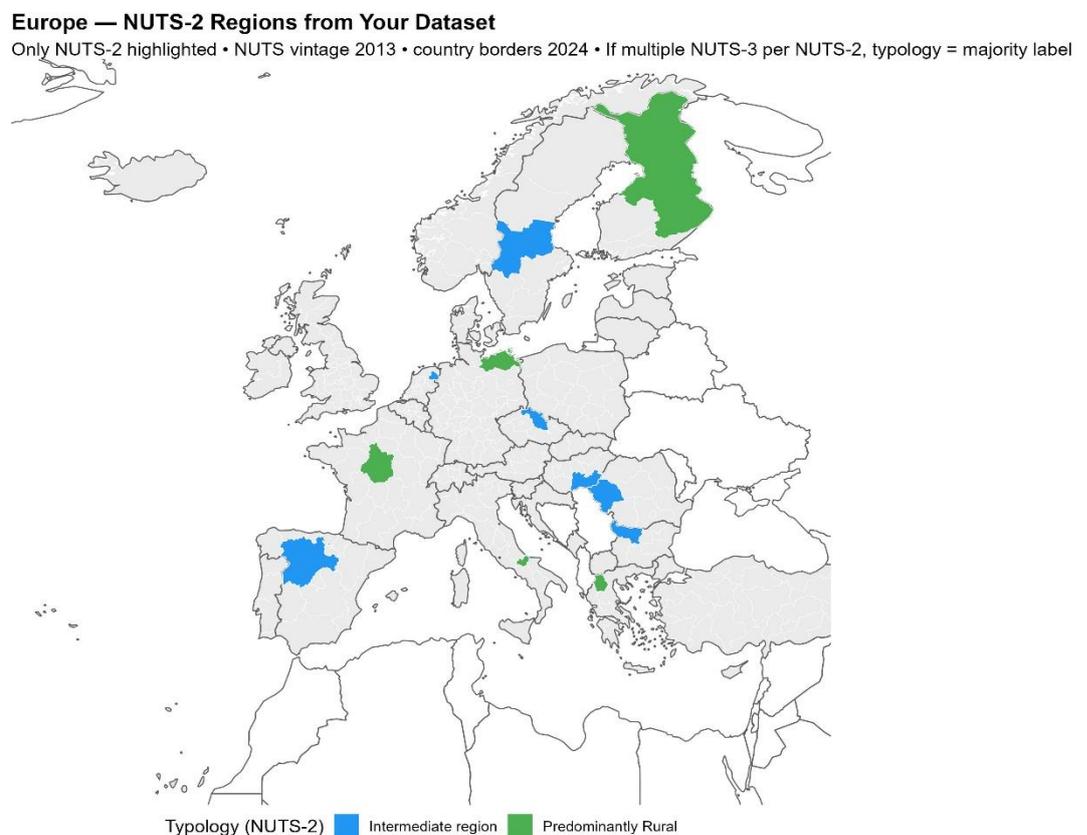
Source: Author's elaboration based on Eurostat (2016)

The internal composition of the selected NUTS-2 regions is further detailed through their NUTS-3 classification (Figure 4). Each constituent NUTS-3 unit is identified according to the DEGURBA typology as either *predominantly* or *intermediate*. This classification provides the empirical foundation for the NUTS-2 aggregation presented above and ensures that the selected regions are consistently rural in character. By documenting the territorial typology at this finer scale, the analysis underlines the coherence of the sample design and the comparability of the selected cases across national contexts.

Figure 4: NUTS-3 Units in the dataset by territorial typology.

Europe — Regions in Your Dataset by Territorial Typology
Grey = regions not present in the dataset • NUTS base 2013 • NUTS overlay 2013 • country borders 2024

Typology ▪ Intermediate region ▪ Predominantly Rural

Source: your Excel + Eurostat GISCO

Source: Author's elaboration based on Eurostat (2016)

3.3 Methodology

This section sets out the descriptive methods used in the study. The unit of analysis is the selected NUTS-2 regions, whereby each region is benchmarked to its own national context (share of national totals, difference from national rates, or ratio to national averages). Moreover, the temporal years covered range from 2001 to 2023, both displayed continuatively or by comparative snapshots for 2001, 2011, and 2023.

Considered variables have been selected to capture the demographic and socio-economic dimensions of rural depopulation phenomenon, as exposed in Theoretical Framework section. Notably, indicators comprehend population size, births and fertility, deaths and natural change, net migration (via the demographic balance), age structure and tertiary educational attainment. Furthermore, to include the economic dimension of the selected rural regions, economic performance in terms of absolute GDP has been considered together with GDP per capita. Specifically, absolute GDP permits to outline the relative economic contribution of each rural region to its national context, while GDP per capita ensures feasibility of comparison among different regions.

For each variable, descriptive evidence is organized in three outputs. First, baseline tables show regional levels alongside national benchmarks for three snapshot years. Second, annual series trace the evolution of regional-national differences over time to identify convergence, divergence or stability. Third, conclusions are drawn from interregional comparisons.

4. Results: Descriptive Comparison of Selected EU Rural Regions

4.1 Population Size

An initial dimension of analysis concerns the absolute population size of the selected regions and their demographic contribution to the national totals. TAB. 3 reports a temporal comparison of all regions' population and their national demographic share (2001-2023).

TAB. 3: Population in selected EU Regions and Countries (2001, 2011, 2023): Absolute values and Regional Share of National total

		2001		2011		2023		2001	2011	2023
Country	**Region**	Region	Country	Region	Country	Region	Country	Regional Share of National births		
		Absolute values (in thousands)						Share (in per cent)		
Bulgaria	Severozapaden	1067	8149	848	7369	672	672	13.1	11.5	10.4
Czechia	Severovýchod	1487	10232	1509	10487	1533	1533	14.5	14.4	14.2
Finland	Pohjois- ja Itä-Suomi	1310	5181	1298	5375	1271	1271	25.3	24.1	22.8
France	Centre Val de Loire	2462	60979	2557	64979	2582	2582	4.0	3.9	3.8
Germany	Mecklenburg-Vorpommern	1776	82260	1615	80222	1576	1576	2.2	2.0	1.9
Greece	Dytiki Makedonia	286	10836	286	11123	250	250	2.6	2.6	2.4
Hungary	Dél-Alföld	1380	10200	1308	9986	1200	1200	13.5	13.1	12.5
Italy	Molise	321	56961	315	59948	291	291	0.6	0.5	0.5
Netherlands	Drenthe	475	15987	491	16656	502	502	3.0	3.0	2.8

Romania	Vest	2038	22430	1914	20199	1671	1671	9.1	9.5	8.8
Spain	Castilla y León	2463	40666	2545	46667	2384	2384	6.1	5.5	5.0
Sweden	Norra Mellansverige	833	8883	827	9416	860	860	9.4	8.8	8.2

Source: Author's elaboration based on Eurostat (2025a)

The data confirm that all the selected regions represent a modest share of their respective national population, though with considerable variation across cases. At the lower end of the spectrum, Molise (Italy) accounts for just 0.5% of the national total in 2023 (291,000 inhabitants), illustrating the demographic fragility of some European rural regions. At the opposite end, Pohjois- ja Itä-Suomi (Finland) still concentrates 22.8% of the national population (1.27 million inhabitants), a reminder that in more sparsely populated countries peripheral areas can still carry significant demographic influence. Intermediate situations include Severovýchod (Czechia), which maintains around 14.2% of the population, and Vest (Romania), which despite its relative decline remains close to 9% of the national total. These contrasts observed in this specific sample may suggest a structural heterogeneity of selected rural regions, where some of them remain demographically central while others persist only as marginal components of their national systems.

Despite these differences, a common trend emerges in the form of a gradual decline in regional population shares. Severozapaden (Bulgaria) dropped from 13.1% in 2001 to 10.4% in 2023, reflecting a steady erosion of demographic relevance. Similarly, Castilla y León (Spain) declined from 6.1% to 5.0% over the same period, while Mecklenburg-Vorpommern (Germany) and Drenthe (Netherlands) registered persistently low and further shrinking shares, reaching 1.9% and 2.8% respectively in 2023. Other regions show more modest reductions, such as Centre-Val de Loire (France) (from 4.0% to 3.8%) and Norra Mellansverige (Sweden) (from 9.4% to 8.2%). Even areas with a comparatively large demographic prominence, including Pohjois- ja Itä-Suomi (Finland) and Vest (Romania), experienced contraction over time, confirming that rural territories across diverse national contexts face similar pressures.

Crucially, no region in the sample demonstrates sustained growth in national demographic relevance. While absolute population sometimes remained relatively stable or even slightly increased, the relative population share of rural regions systematically diminished as national populations grew or restructured. These dynamics may suggest a process of demographic marginalization.
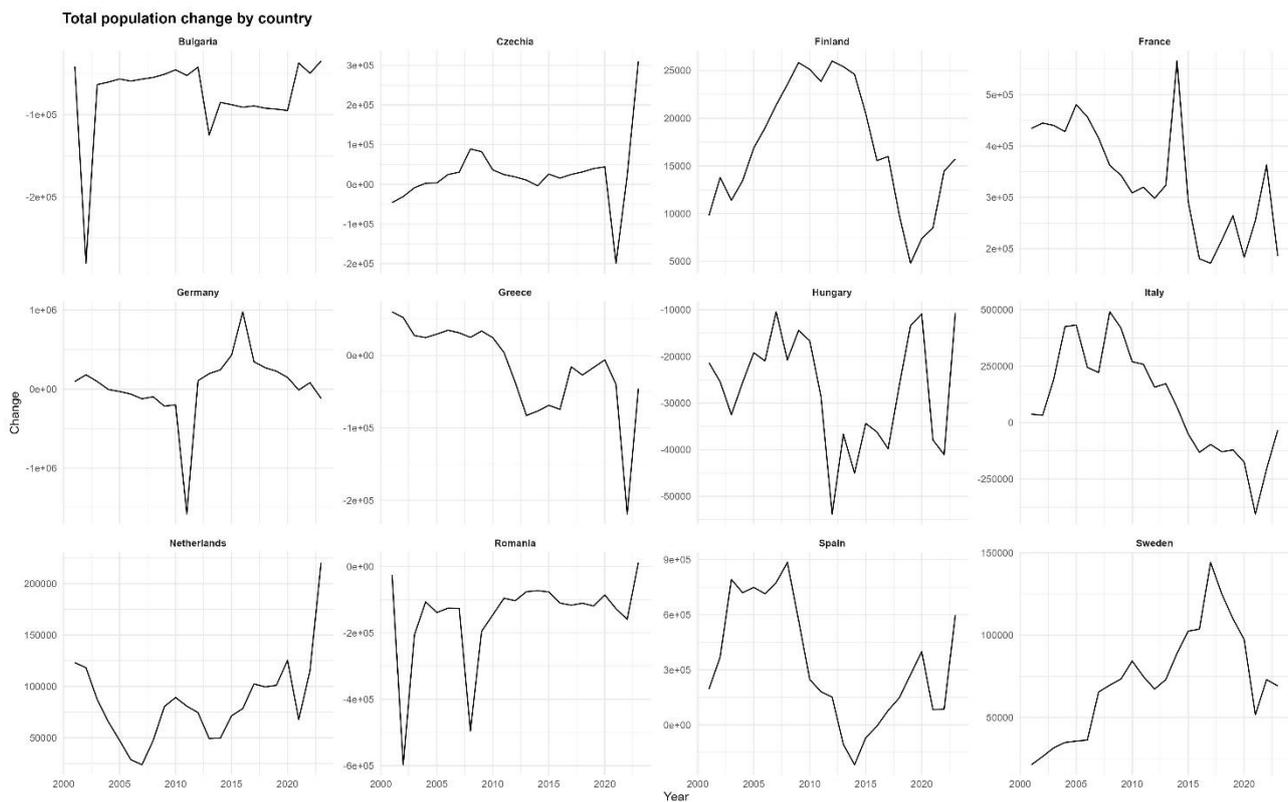
4.2 Total Population Change

Total population change, computed for each rural region and relative country permits to better outline the population change dynamics over the sample. The figures below report annual total population change in the selected countries (Figure 5) and their corresponding regions (Figure 6) over the period 2001-2023. National trajectories are presented separately from regional ones, with values expressed in absolute numbers.

Specifically, total population change was measured as the difference between the populations of two consecutive years, calculated by subtracting the population of the previous year from that of the most recent year (Lundquist et al., 2015):
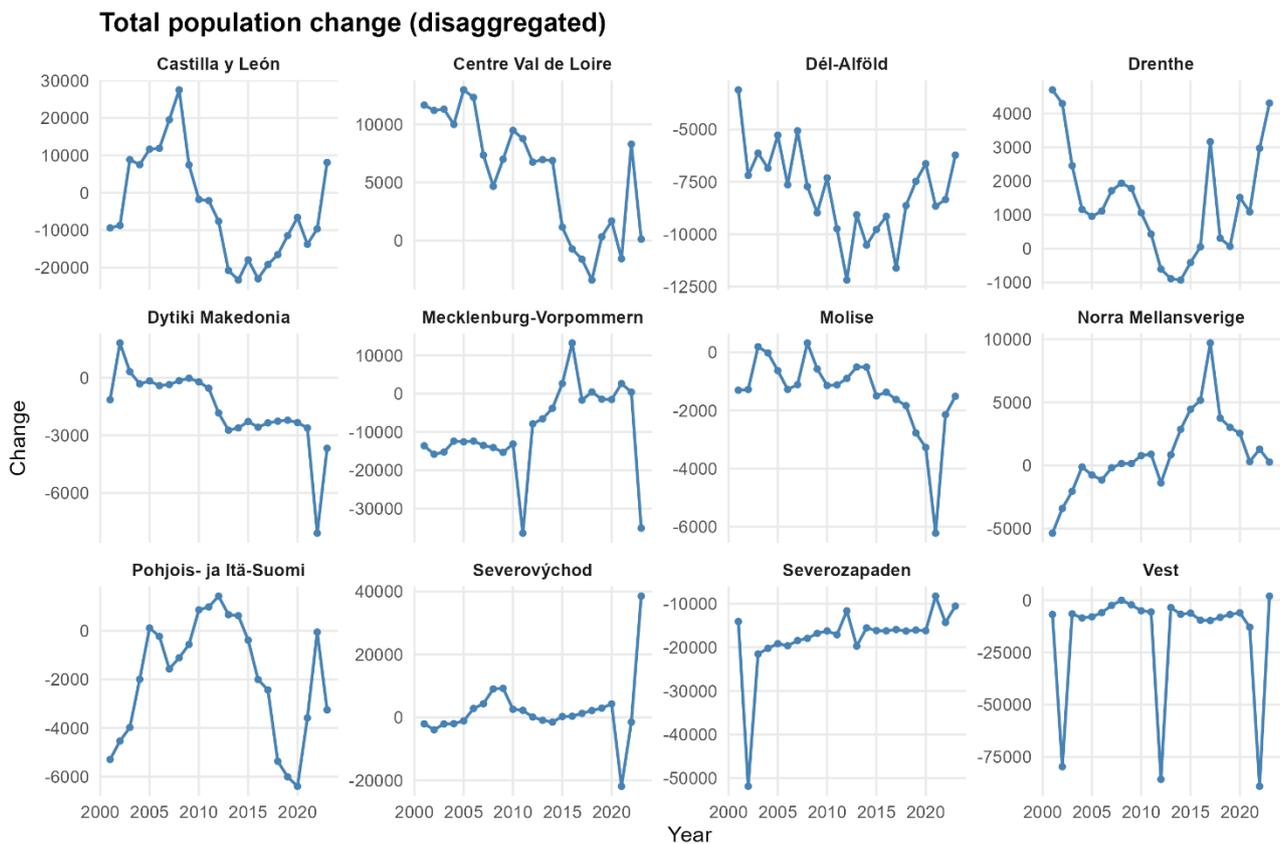
$$\Delta P = P\ t2 - P\ t1$$

Where ΔP is total population change.

Figure 5: Total Population Change in selected EU Countries : 2001-2023

Source: Author's elaboration based on Eurostat (2025a)

Figure 6: Total Population Change in selected EU Regions: 2001-2023

Total population change (disaggregated)

At the national level, population dynamics follow recognizable phases but with notable country-specific divergences. Between 2001 and 2007, most countries show moderate increases or stability, with stronger gains in France, Spain, and Italy, while Bulgaria, Romania, and Hungary already recorded losses or stagnation. The 2008–2013 period, coinciding with the financial crisis, marks a clear turning point: Spain, Italy, and Greece shifted into sustained decline, while Germany temporarily dipped before a sharp rebound. From 2014 to 2019, partial recoveries are visible in countries such as Germany, France, and Sweden, while Italy and Greece continued downward trends and Hungary remained negative. The 2020–2023 period adds a disruptive layer. Notably, COVID-19 impacts, combined with longer-term demographic pressures, produced renewed losses in Italy, Greece, and Bulgaria, volatility in France and Spain, and a steep contraction in Germany. By contrast, several Northern and Western countries, including Sweden, the Netherlands, and Finland, managed to maintain or regain positive balances in this most recent phase.

Regional patterns mirror national phases but with sharper swings. In the pre-crisis years (2001–2007), weaker or stagnant growth was already evident in areas such as Castilla y León (Spain), Dytiki Makedonia (Greece), and Pohjois- ja Itä-Suomi (Finland). The 2008–2013 crisis years deepened these gaps, with Molise (Italy), Mecklenburg-Vorpommern (Germany), and Severozapaden (Bulgaria)

registering sharp declines well below their national averages. Recovery after 2014 was uneven: Severovýchod (Czechia) and Norra Mellansverige (Sweden) showed visible improvements, while Dél-Alföld (Hungary) and Vest (Romania) remained highly fragile. The pandemic years (2020–2023) amplified volatility, with regions like Severozapaden, Vest, and Dytiki Makedonia displaying abrupt contractions, while Drenthe (Netherlands) and Centre-Val de Loire (France) showed rebounds that diverged from national trajectories.

Overall, national populations absorb shocks more gradually, while rural regions reveal fragile and irregular demographic paths. Crises and disruptions amplify their vulnerability. For instance, Severozapaden (Bulgaria) and Vest (Romania) experienced sharp population collapses during both the financial crisis and the pandemic years, far exceeding national declines. Similarly, Molise (Italy) and Dytiki Makedonia (Greece) show long-run negative trajectories that deepen in downturns and rarely recover even when their countries stabilize. By contrast, regions such as Severovýchod (Czechia) and Norra Mellansverige (Sweden) occasionally outperformed their national contexts in recovery phases, yet these episodes proved temporary and were often reversed by the next disruption. Alignment with national trends is thus rare and fleeting, underscoring a persistent structural weakness in rural demographic systems where external shocks translate into disproportionately large swings.

4.3 Births and Fertility

Beyond aggregate population totals, natural dynamics (births and deaths) provide a deeper understanding of the drivers of demographic change. Grasping this phenomenon requires more than looking at total population figures. Aggregate numbers can hide important dynamics, while the balance between births and deaths provides insight into the natural growth or decline of a population. By examining these natural dynamics at both national and regional levels, it becomes possible to identify where growth is sustained by higher birth rates, and where population pressures may arise due to low fertility or an ageing population. Thereby, TAB. 4 reports the births recorded in each region, and it compares them with the national ones.

TAB. 4: Births in selected EU Regions and Countries (2001, 2011, 2023): Absolute values and Regional Share of National totals

Country	Region	2001		2011		2023		2001	2011	2023
		Region	Country	Region	Country	Region	Country	Regional share of National Births		
		Absolute values (in thousands)						Share (in per cent)		
Bulgaria	Severozapaden	8	68	7	71	5	57	12.3	10.2	9.5
Czechia	Severovýchod	13	91	15	109	13	91	14.8	14.2	13.8
Finland	Pohjois- ja Itä-Suomi	14	56	15	60	9	43	25.0	24.5	21.6
France	Centre Val de Loire	30	802	30	822	24	678	3.7	3.6	3.5
Germany	Mecklenburg-Vorpommern	13	734	13	663	10	693	1.8	1.9	1.4
Greece	Dytiki Makedonia	3	102	2	106	1	71	2.6	2.2	2.0
Hungary	Dél-Alföld	12	97	10	88	11	88	12.8	11.8	12.0
Italy	Molise	3	535	2	547	2	380	0.5	0.4	0.4
Netherlands	Drenthe	6	203	5	180	4	164	2.9	2.6	2.5
Romania	Vest	18	220	16	196	13	160	8.0	8.3	8.2
Spain	Castilla y León	18	405	20	471	12	320	4.3	4.2	3.9

Sweden	Norra Mellansverige	7	91	8	112	7	100	7.9	7.4	7.0

Source: Author's elaboration based on Eurostat (2025c)

Data show a persistent decline in both absolute values and relative shares. For instance, Castilla y León (Spain) registered 18,000 births in 2001 (4.3% of the national total), decreasing to 12,000 in 2023 (3.9%). Severozapaden (Bulgaria) declined from 8,000 (12.3%) to 5,000 (9.5%) over the same period. Particularly severe is Dytiki Makedonia (Greece) case, which contracted from 3,000 (2.6%) to only 1,000 (2.0%). Even stronger regions, such as Pohjois- ja Itä-Suomi (Finland) saw their share fall from 25% to 21.6%.

While the table highlights the absolute number of births across regions compared with the national totals, these figures are strongly shaped by population size and age structure. To better understand the underlying reproductive behavior, it is useful to shift the focus from crude counts to fertility indicators. The following plots (Figure 7) present the total fertility rate, which measures the average number of children a woman is expected to have over her lifetime. Unlike crude birth rates, this indicator allow direct comparison between regions by controlling for differences in population composition, thus offering a clearer view of regional demographic dynamics.

Figure 7: Total Fertility Rate in selected EU Regions and Countries: 2001-2023
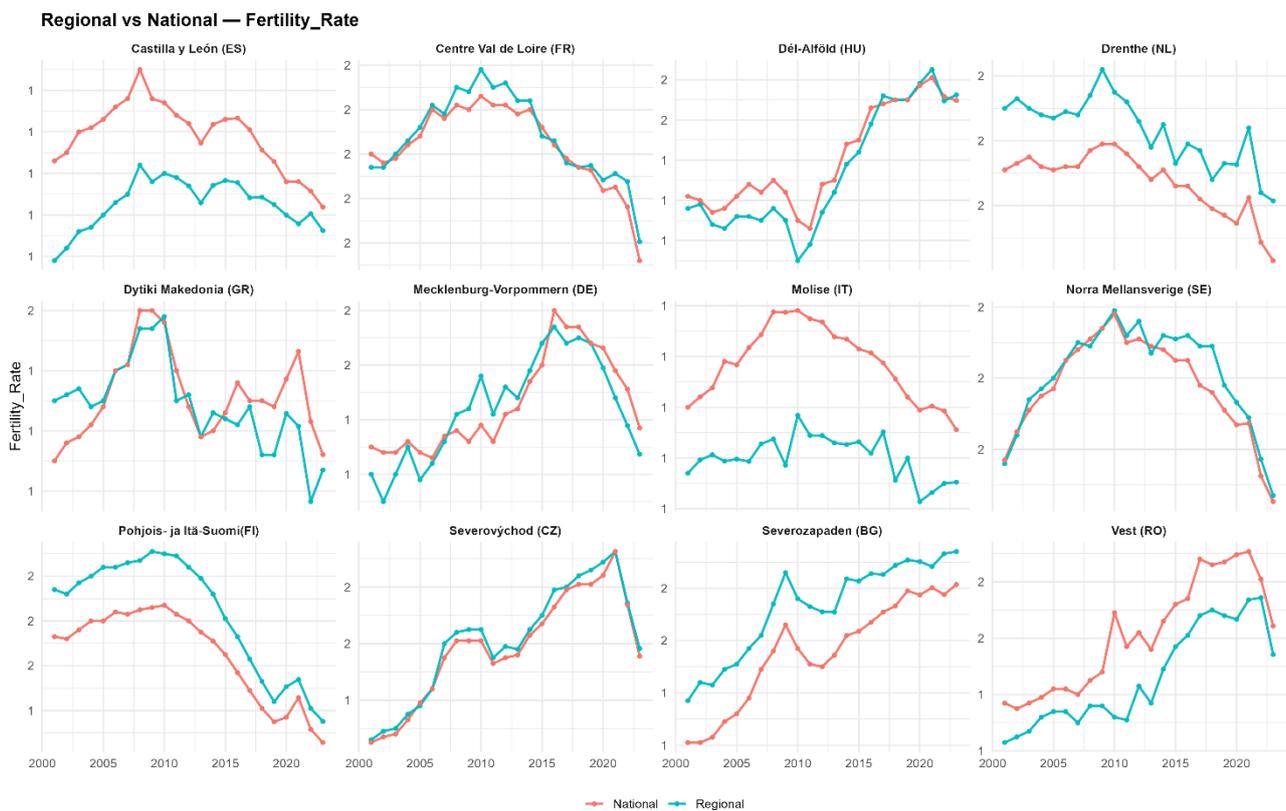
Overall, fertility decline is a shared trend across Europe, but the plots show that regional variation follows different patterns depending on the national context. In several countries, rural regions retain relatively higher fertility levels compared to their national counterparts. For instance, Centre-Val de Loire (France) and Norra Mellansverige (Sweden) display persistently higher total fertility rates than the French and Swedish averages, suggesting that less urbanized areas can sustain stronger reproductive behavior. A similar dynamic is visible in Severovýchod (Czechia) and Vest (Romania), where rural regions have outperformed the national trends. By contrast, in Southern and Eastern European cases such as Castilla y León (Spain), Severozapaden (Bulgaria), and Dytiki Makedonia (Greece), these regions show systematically lower fertility levels than their national averages,

combining outmigration and ageing with structural declines in reproductive intensity. These diverging patterns suggest that the geography of fertility is not uniform in the sample. Indeed, while in some considered countries rural regions act as demographic "reserves", in others they are the areas most exposed to fertility erosion. The line plots thus help better understand the declining births' phenomenon observed above by linking the shrinking populations to the structural decreases in reproductive intensity, with rural-urban divides emerging as a plausible key determinant of demographic trajectories.

4.4 Mortality and Ageing

Exploring the other side of natural balance, attention shifts to the number of deaths in each region. The table below (TAB. 5) illustrate this measure for each region and their share of the national total in 2001, 2011, and 2023.

TAB. 5: Deaths in selected EU Regions and Countries (2001, 2011, 2023): Absolute values and Regional Shares on National totals

Country	Region	2001		2011		2023		2001	2011	2023
		Region	Country	Region	Country	Region	Country	Regional shares of National deaths		
		Absolute values (in thousands)						Share (in per cent)		
Bulgaria	Severozapaden	19	112	16	108	14	101	16.7	15.1	13.5
Czechia	Severovýchod	15	108	15	107	16	113	14.1	14.4	14.3
Finland	Pohjois- ja Itä-Suomi	13	49	13	51	16	61	26.0	26.1	25.5
France	Centre Val de Loire	25	539	24	544	28	639	4.6	4.4	4.4
Germany	Mecklenburg-Vorpommern	17	829	19	852	24	1028	2.1	2.2	2.3
Greece	Dytiki Makedonia	3	103	3	111	4	127	2.7	2.8	2.8
Hungary	Dél-Alföld	19	132	18	129	18	129	14.1	14.1	13.9
Italy	Molise	3	548	4	593	4	671	0.6	0.6	0.6
Netherlands	Drenthe	5	140	5	136	6	169	3.1	3.4	4.0
Romania	Vest	25	260	23	251	22	244	9.5	9.2	9.0
Spain	Castilla y León	25	358	27	386	28	433	7.1	7.0	6.5
Sweden	Norra Mellansverige	10	94	9	90	10	94	10.9	10.5	10.2

Source: Author's elaboration based on Eurostat (2025c)

The data show that mortality levels remained high and broadly proportional to population shares, often exceeding births level and driving structural natural deficits. In 2023, Severozapaden (Bulgaria) accounted for 13.5% of national deaths, against only 10.4% of the population share. Castilla y León (Spain) displayed a similar imbalance, with 6.5% of deaths compared to 5% of regional-national ratio. By contrast, Vest (Romania) showed the opposite pattern, notably 9% of deaths versus nearly 17% of the national population.

Moving to Northern regions, they displayed more proportional levels of mortality. Notably, Pohjois - ja Itä-Suomi (Finland) accounted for about one quarter of national deaths, aligning with its population share, while Norra Mellansverige's (Sweden) contribution to national deaths (10-11%) was slightly higher than its national population share (around 7%). Accordingly, Western and Central European regions recorded proportional outcomes, with Centre-Val de Loire (France), Mecklenburg-Vorpommern (Germany), and Dél-Alföld (Hungary) broadly aligned with their demographic contribution to national total.

Taken together, high mortality coupled with declining births confirms that natural balance is structurally negative in nearly all cases, most acutely in Eastern and Southern regions, where low fertility intersects with significant mortality. These natural dynamics also translate into profound shifts in the age structure of regional populations.

4.5 Age Dependency Ratio

A useful way to capture this process is through the age dependency ratio, which captures the proportion of dependent cohorts (population aged 0-14 and 65+) relative to the working age population (15-64). Figure 8 shows the evolution of this indicator for the selected regions and their national benchmarks over the period 2001-2023.

Figure 8: Age Dependency Ratio in selected EU Regions and Countries: 2001-2023

Regional vs National — Age_Dependency_ratio
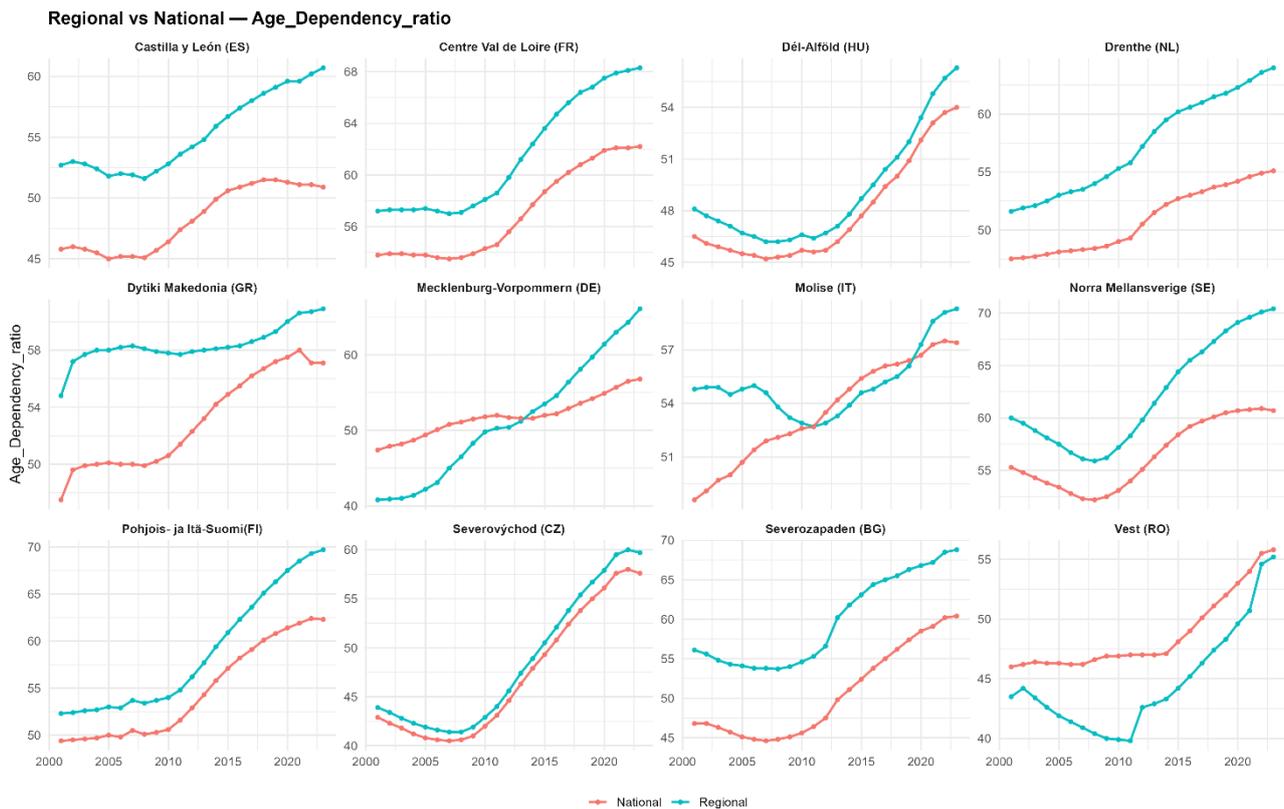
Source: Author's elaboration based on Eurostat (2025b)

The evidence confirms a generalized increase in dependency pressures, consistent with the common negative tendency of natural balance observed before. Nonetheless, the pace and the gap between national and regional values vary considerably across cases. Most regions register values persistently above national levels, highlighting their advanced stage of demographic ageing. By contrast, Molise (Italy) and Mecklenburg-Vorpommern (Germany) illustrate more dynamic patterns. Notably, in the case of Molise, the regional age dependency ratio was higher at the beginning of the considered period, converging to the national one around 2013 to further surpassing it at the end of 2010s. Conversely, Mecklenburg-Vorpommern (Germany) started from an advantaged point registering a lower age dependency ratio than the national one at early 2000s, converging to it around 2013 and largely outclassing it by 2020s. Standing alone, Vest (Romania) shows a consistently and still lower rural level of age dependency throughout all the considered years.

All things considered, the increase in age dependency ratio is a widespread phenomenon recorded across the whole sample both at regional and national levels. Despite the outlier represented by Vest (Romania), the general trend points at higher levels in rural areas compared to the national contexts.

4.6 Net Migration

Moving forward, migration represents the second key dimension of demographic change. Because of lack of available data, this measure was computed using the following equation:

$$\text{Net migration} = \Delta P - (\text{Births} - \text{Deaths})$$

Where $\Delta P = P_{t2} - P_{t1}$ is total population change and (Births – Deaths) is natural change over the interval. This approach was useful to overcome the limited presence of comparable information for all regions, and it derives from the population balancing equation (Preston, Heuveline & Guillot, 2001). TAB. 6 reports this measure for each region considered.

TAB. 6: Net Migration in selected EU Regions (values in thousands): 2001, 2011, 2023

Country	Region	2001	2011	2023
Bulgaria	Severozapaden	-4	-8	-2
Czechia	Severovýchod	0	2	42
Finland	Pohjois- ja Itä-Suomi	-7	-1	3
France	Centre Val de Loire	7	3	5
Germany	Mecklenburg-Vorpommern	-9	-30	-21
Greece	Dytiki Makedonia	-1	0	-2
Hungary	Dél-Alföld	3	-2	1
Italy	Molise	-1	0	1
Netherlands	Drenthe	30	27	28
Romania	Vest	0.2	1.4	10.7
Spain	Castilla y León	7	5	8
Sweden	Norra Mellansverige	24	2	2

Source: Author's elaboration based on Eurostat (2025c)

The results highlight significant territorial disparities. In Eastern Europe, Severozapaden (Bulgaria) consistently experienced outflows, with a net loss of 4,000 in 2001, 8,000 in 2011, and 2,000 in 2023. A similar trend characterizes Mecklenburg-Vorpommern (Germany), where losses accelerated to 30,000 in 2011 before easing slightly to 21,000 in 2023. By contrast, Severovýchod (Czechia) demonstrates a marked reversal, shifting from stagnation in 2001 to a substantial gain of 42,000 in 2023, signaling renewed demographic attractiveness. Conversely, Hungary's Dél-Alföld region displayed ambiguous small-scale movements, from +3,000 in 2001 to +1,000 in 2023.

Romania's Vest region stands out among Eastern cases, recording net gains that ranged significantly from near balance in 2001, when it registered an increase of about 200 residents, to the significant increment of about 10,700 inhabitants in 2023.

Northern regions present ambivalent trends. As a matter of fact, Pohjois-ja Itä-Suomi (Finland) moved from a loss of 7,000 inhabitants in 2001 to a small gain of 3,000 residents in 2023, while Norra Mellansverige (Sweden) only increased of 2,000 residents in 2023 compared to the amount of 24,000 in 2001. Western Europe shows relatively stable yet divergent outcomes. Notably, Centre-Val de Loire (France) recorded modest but persistent inflows (5,000 in 2023), whereas Drenthe (Netherlands) consistently attracted migrants, with inflows exceeding 25,000 units at each time point.

Looking at Southern regions, balances remain generally weak or negative. For instance, Dytiki Makedonia (Greece) doubled its loss in 2023 compared with the outflow of 1,000 residents in 2001. Furthermore, Molise (Italy) remained marginal, with values oscillating between -1,000 and + 1,000, while Castilla y León (Spain) retained modest but steady gains, reaching an increase of 8,000 units in 2023.

Overall, the migration balances reveal a heterogeneous picture. While regions such as Severozapaden (Bulgaria) and Mecklenburg-Vorpommern (Germany) continue to lose population through sustained outflows, others, notably Severovýchod (Czechia) and Vest (Romania), exhibit growing inflows that partially counteract natural losses. Northern and Western regions show moderate but stable movements, while Southern regions remain characterized by stagnation or weak gains insufficient to reverse demographic decline. Importantly, when combined with the findings on natural balance, these results demonstrate that migration rarely compensates for the structural deficits created by declining fertility and persistent mortality. Instead, in most cases, it reinforces the trajectory of demographic contraction, with only a few exceptions where migration has mitigated natural decrease, such as in Romania's Vest region.

4.7 GDP: Absolute and Per Capita

Having outlined the demographic dynamics of the selected regions, the analysis now turns to their economic dimension. The introduction of key economic statistics is fundamental to assess whether demographic decline is accompanied by relative economic weakness, stability, or resilience, and to explore how population and economic trajectories intersects in shaping processes of peripheralization.

To assess the economic role of the selected regions within their national contexts, TAB. 7 reports the evolution of GDP in absolute terms and as a share of national GDP for the years 2001, 2011, and 2023. This indicator points out both the scale of economic activity generated in each region and its relative weight within the broader national economy, allowing for the identification of long-term trends of convergence, divergence or persistent marginality.

TAB. 7: GDP in selected EU Regions and Countries (2001, 2011, 2023): Absolute values and Regional Share of National values

Country	Region	2001		2011		2023		2001	2011	2023
		Region	Country	Region	Country	Region	Country	Regional Share of National GDP		
		Absolute values (in millions)						Share (in per cent)		
Bulgaria	Severozapaden	1 815	15 905	3 006	41 480	6 527	94 709	11.4	7.2	6.9
Czechia	Severovýchod	9 828	76 071	19 380	166 546	36 454	317 386	12.9	11.6	11.5
Finland	Pohjois– ja Itä–Suomi	27 850	144 613	38 564	197 655	52 818	273 318	19.3	19.5	19.3
France	Centre Val de Loire	54 871	1 530 071	68 193	2 062 141	89 893	2 822 455	3.6	3.3	3.2
Germany	Mecklenburg–Vorpommern	29 686	2 172 540	36 160	2 693 560	60 481	4 185 550	1.4	1.3	1.4
Greece	Dytiki Makedonia	3 545	147 439	5 036	203 475	4 435	225 197	2.4	2.5	2.0
Hungary	Dél–Alföld	5 971	60 069	9 018	101 987	17 170	196 639	9.9	8.8	8.7
Italy	Molise	5 698	1 304 137	6 700	1 648 756	7 750	2 128 001	0.4	0.4	0.4
Netherlands	Drenthe	10 506	481 881	13 815	656 013	21 497	1 067 599	2.2	2.1	2.0

Romania	Vest	4 328	45 144	13 599	138 528	28 423	324 369	9.6	9.8	8.8
Spain	Castilla y León	37 940	700 958	54 329	1 068 690	70 876	1 498 324	5.4	5.1	4.7
Sweden	Norra Mellansverige	20 597	270 640	28 893	410 290	33 368	540 833	7.6	7.0	6.2

Source: Author's elaboration based on Eurostat (2025e)

Focusing on the data, it is evident that every region increased its output, with some such Severozapaden (Bulgaria) more than tripling in absolute terms, from €1.8 billion in 2001 to €6.5 billion in 2023. Similar trajectories can be observed in regions like Mecklenburg (Germany) and Vest (Romania), where GDP approximately doubled or tripled over the period.

Despite this widespread expansion, the relative weight of most regions within their national economies declined. Severozapaden (Bulgaria) fell from 11.4% of national GDP in 2001 to 6.9% in 2023, reflecting both structural marginality and divergence from national growth dynamics. A comparable pattern is visible in Castilla y León (Spain) whose share contracted from 5.4% to 4.7%, and in Norra Mellansverige (Sweden), declining from 7.6% to 6.2%. These cases exemplify the relative weaking of rural regions' economies to their national cores.

Other regions maintained a more stable contribution, though often at modest levels. For instance, Molise (Italy) consistently accounted for only 0.4% of national GDP, while Mecklenburg-Vorpommern (Germany) remained between 1.3% and 1.4%, underlining their persistent marginal role. Similarly, Drenthe (Netherlands) showed gradual erosion, from 2.2% to 2%, despite steady growth in absolute terms. Similarly, Pohjois- ja Itä-Suomi (Finland), which retained a share close to 19% across the whole period, confirmed its structural weight within the Finnish economy. Comparably, Vest (Romania) similarly maintained a significant contribution, positioning over between 9.6% and 8.8%, despite the overall expansion of Romania's national GDP.

In summary, three tendencies emerge in the regional trajectories. The first pattern concerns the structural marginality of small rural economies, exemplified by Molise (Italy) and Mecklenburg-Vorpommern (Germany), whose contribution to national GDP remains negligible despite absolute growth. A second trend can be observed in regions such as Severozapaden (Bulgaria), Castilla y León (Spain), and Norra Mellansverige (Sweden), where regional expansion has been systematically slower than national growth, leading to a relative decline in economic weight. Finally, cases such as Pohjois- ja Itä-Suomi (Finland) and Vest (Romania) demonstrate a higher degree of stability, maintaining their proportional contribution over time and thereby reflecting relative convergence within their national contexts.

While aggregate GDP figures highlight the absolute economic weight of each region within national economies, they are strongly influenced by population size. Therefore, to ensure comparability across different cases it is necessary to consider GDP per capita, which adjusts economic outputs for demographic scale. This indicator provides a more accurate measure of regional performance, allowing for cross-regional comparability and revealing whether growth has translated into improvements in individual economic well-being relative to national averages. For this reason, TAB. 8 presents regional and national GDP per capita values and the percentage ratio of regional to national averages, thereby enabling a comparative evaluation of relative economic performance.

TAB. 8: GDP per capita in selected EU Regions and Countries (2001, 2011, 2023): Regional values and percentage of National average

Country	Region	2001		2011		2023		2001	2011	2023
		Region	Country	Region	Country	Region	Country	Regional GDP as share of the National value		
		Absolute values						Share (in per cent)		
Bulgaria	Severozapaden	1 800	2 000	3 600	5 600	9 800	14 700	90.0	64.3	66.7
Czechia	Severovýchod	6 600	7 400	12 800	15 900	23 700	29 200	89.2	80.5	81.2
Finland	Pohjois– ja Itä–Suomi	21 300	27 900	29 700	36 700	41 600	49 000	76.3	80.9	84.9
France	Centre Val de Loire	22 200	25 000	26 600	31 700	34 900	41 300	88.8	83.9	84.5
Germany	Mecklenburg–Vorpommern	16 900	26 700	22 400	33 600	37 100	49 500	63.3	66.7	74.9
Greece	Dytiki Makedonia	12 400	13 600	17 700	18 300	17 100	21 300	91.2	96.7	80.3
Hungary	Dél–Alföld	4 300	5 900	6 900	10 200	14 400	20 500	72.9	67.6	70.2
Italy	Molise	17 800	22 900	21 300	27 500	26 700	36 100	77.7	77.5	74.0
Netherlands	Drenthe	22 000	30 000	28 100	39 300	42 700	59 700	73.3	71.5	71.5
Romania	Vest	2 100	2 000	7 500	6 900	17 000	17 000	105.0	108.7	100.0
Spain	Castilla y León	15 400	17 200	21 400	22 900	29 700	31 000	89.5	93.4	95.8

| Sweden | Norra Mellansverige | 24 800 | 30 400 | 35 000 | 43 400 | 38 700 | 51 000 | 81.6 | 80.6 | 75.9 |

Consistent with the observation on GDP in absolute terms, the analysis of GDP per capita provides a complementary perspective on the relative prosperity of the selected regions. While the previous table showed that most territories experienced significant growth in absolute GDP but declining shares of national output, the per capita figures illustrate how this structural marginality translates into living standards and regional productivity.

In several regions, the trajectory points toward divergence. Severozapaden (Bulgaria), which already recorded a declining share of national GDP, also suffered a sharp deterioration in relative GDP per capita, falling from 90.0% of the national mean in 2001 to only 66.7% in 2023. A similar outcome can be observed in Dél-Alföld (Hungary) and Norra Mellansverige (Sweden), where the decline in national GDP shares was mirrored by a relative weaking in per capita income, underscoring the dual demographic and economic pressures shaping these territories.

Other regions exhibit signs of convergence or relative improvement, even when their share of national GDP remained stable or declined only marginally. Mecklenburg-Vorpommern (Germany) provides a clear example. Notably, although its weight in the national economy is limited (around 1.3 and 1.4%), its GDP per capita rose from 63.3% to 74.9% of the national average, suggesting gradual catching up in living standards despite structural marginality. Pohjois- ja Itä-Suomi (Finland) also reflects this pattern, combining a stable share of total GDP with a steady increase in per capita terms, moving from 76.3% to 84.9% of the national average.

Other regions demonstrate stability, such as Castilla y León (Spain) which combined a modest decline in national GDP share (from 5.4% to 4.7%) with strong convergence in per capita income, rising from 89.5% to 95.8% of the national level. Likewise, Vest (Romania) stands out as a particularly balanced case. More precisely, even if its contribution to national GDP decreased from 9.6% to 8.8%, GDP per capita remained at or above the national average across the whole period.

Ultimately, persistent marginality characterizes regions such as Molise (Italy) and Drenthe (Netherlands), which not only retain negligible shares of national GDP (0.4% and 2.0% in 2023, respectively) but also continue to lag in per capita terms, remaining in a range between 70% and 75% of national levels.

Considered together, the two economic indicators suggest that regions which are losing ground in national economic weight tend also to exhibit a parallel relative decline in prosperity, while those

showing partial convergence in per capita terms nonetheless remain peripheral in their structural contribution to the national economy.

To complement the GDP indicators, the analysis also considers regional unemployment. The unemployment rate was computed using Eurostat data on the absolute number of employed and unemployed people. The indicator was derived as the ratio of unemployed people to the total labor force, defined as the sum of employed and unemployed individuals. This method is consistent with the international definition provided by the World Bank (2023), which specifies that unemployment is measured as the share of unemployed persons within the total labor force[2].

The values obtained are shown in Figure 9, which compares the unemployment rate computed for each region with the relative national one across the period 2001-2023.

Figure 9: Unemployment rate in selected EU Regions and Countries: 2001-2023
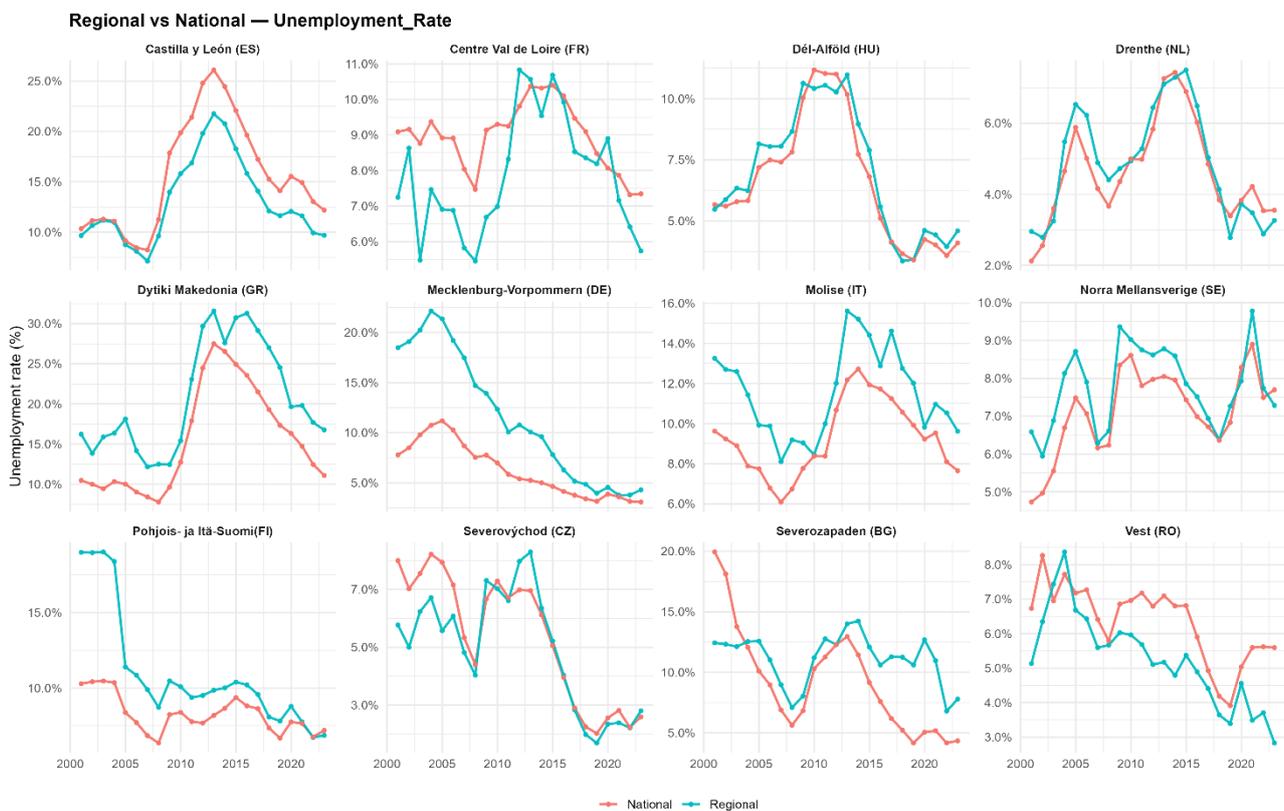
Source: Author's elaboration based on Eurostat (2025g; 2025h)

The analysis of unemployment corroborates that labor market conditions reflect the uneven socio-economic positioning of the selected regions. Most territories experienced a peak of unemployment during the 2008-2013 period, followed by partial recovery, but with markedly different trajectories.

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[2] Both employed and unemployed measures were considered as the numbers of employed and unemployed people aged from 15 to 74 years old.

Regions such as Dytiki Makedonia (Greece), Severozapaden (Bulgaria), and Castilla y León (Spain) consistently registered higher unemployment than national averages, reinforcing the patterns of economic marginality and demographic decline identified earlier. By contrast, regions like Severovýchod (Czechia), Pohjois- ja Itä-Suomi (Finland), and Vest (Romania) broadly tracked national trends, reflecting greater resilience and aligning with their relatively stronger economic performance. A notable case of structural improvement is Mecklenburg-Vorpommern (Germany), which reduced unemployment from 20% in the early 2000s to near the national average by 2023, consistent with its convergence in GDP per capita.

Viewed in its entirety, the evidence demonstrates that labor market outcomes are tightly interwoven with both demographic decline and economic capacity. High unemployment amplifies outmigration and weakens growth prospects, while convergence in employment patterns often parallels improvements in relative economic standing.

Comparative evidence indicates that demographic, economic, and labor market trajectories are closely intertwined across the selected regions. Declining population shares, fueled by persistent low fertility, ageing, and recurrent outmigration, are paralleled by a weakening of regional economic weight within national contexts. While all territories expanded in absolute GDP terms, most failed to keep pace with national growth. Per capita indicators also reveal that some regions stand further behind, such as Severozapaden (Bulgaria) and Dél–Alföld (Hungary). Conversely, there are regions showing gradual alignment with national standards, notably Mecklenburg-Vorpommern (Germany) and Vest (Romania).

Labor market dynamics reinforce these patterns. The global financial crisis magnified existing disparities, with regions already vulnerable, including Castilla y León (Spain) and Severozapaden (Bulgaria), experiencing persistently higher unemployment than national averages. In contrast, regions where unemployment converged with national levels, such as Mecklenburg-Vorpommern (Germany), also demonstrated relative progress in per capita GDP, suggesting a virtuous link between labor market stabilization and economic catch-up.

Finally, the findings suggest a cumulative process of regional disadvantages in which demographic contraction, fragile economic performance, and labor market vulnerabilities overlap. Nonetheless, certain cases highlight that adaptation and convergence remain attainable, pointing to the importance of understanding how structural constraints and institutional contexts shape divergent regional trajectories.

4.7 Tertiary Educational Attainment

Tertiary educational attainment results are also useful to widen the dimension of the analysis of rural depopulation because they capture both individual opportunities and broader regional capacities for development. Higher levels of education are closely linked to employment prospects, income, and social mobility, while the lack of such opportunities can reinforce structural disadvantages. For this reason, tracking educational attainment in rural regions and in national contexts can be helpful to assess whether rural contexts are converging or diverging from national standards. Figure 10 shows the evolution of the data between 2001 and 2023 in the selected regions and countries.

Figure 10: Tertiary educational attainment in selected EU Regions and Countries: 2001-2023

Source: Author's elaboration based on Eurostat (2025f)

The graphs highlight a generalized upward trend in tertiary educational attainment, reflecting its Europe-wide expansion. However, regional disparities in comparison with national levels remain evident and display heterogenous patterns.

In several regions, such as Castilla y León (Spain), Centre-Val de Loire (France), Dél-Alföld (Hungary), and Drenthe (Netherlands), the regional share consistently stand behind national averages,

though the gap has narrowed only modestly over time. This suggests that rural areas continue to face structural disadvantages in tertiary educational attainment despite general progress.

By contrast, regions including Molise (Italy) and Vest (Romania) show trajectories largely convergent with national levels, indicating that rural territories can partially close gaps in higher education participation. Pohjois- ja Itä-Suomi (Finland) also demonstrates relative convergence, though the regional share remains slightly below the Finnish national average.

Other cases illustrate persistent or widening gaps. Mecklenburg-Vorpommern (Germany) and Severozapaden (Bulgaria) exhibit significant divergence, with regional attainment level stagnating or improving only modestly, while national averages rose sharply. These territories exemplify how rural regions risk falling further behind in knowledge, economy, reinforcing their demographic and economic vulnerability.

A small group of regions demonstrates relative resilience. For example, Severovýchod (Czechia) and Norra Mellansverige (Sweden) track national averages closely, suggesting that tertiary education's expansion is more evenly distributed in these contexts.

Overall, the evidence suggests that although tertiary educational attainment has risen everywhere, regional disparities persist. In many rural regions, slower progress relative to national benchmarks point to structural barriers in accessing higher education, reinforcing selective migration dynamics whereby more educated cohorts are more likely to leave.

5. European Governance on Rural Development Fund: Allocation and Policy Framework

To contextualize the demographic and socio-economic determinants presented in descriptive analysis, it is useful to consider the distribution of resources from the suitable policy represented by the European Agricultural Fund for Rural Development (EAFRD) across the sampled regions. TAB. 9 reports per capita allocations for the programming years 2007, 2011, and 2022, drawing on the dataset "Historic EU Payments – regionalized and modelled (NUTS-2): EU cohesion policy funds" provided by the European Commission, DG regio (2025). These figures illustrate the intensity of rural development aids across the twelve regions under study, thereby providing an ulterior descriptive layer. To ensure comparability across regions and time, the figures reported below were computed by aggregating the total EAFRD allocations at NUTS-2 level and dividing them by the resident population of each region in the corresponding year. This per capita measure provides a standardized

indicator of the relative intensity of rural development support, allowing meaningful cross-regional and temporal comparison.

TAB. 9: EU EAFRD Funds per capita by NUTS-2 Regions (2007, 2011, 2022)

Region	2007 (€/capita)	2011 (€/capita)	2022 (€/capita)
Severozapaden	0.00	53.12	31.74
Severovýchod	14.80	45.00	39.77
Mecklenburg-Vorpommern	36.78	78.90	20.39
Castilla y León	29.01	44.23	85.47
Pohjois- ja Itä-Suomi	93.48	92.58	81.91
Centre Val de Loire	16.83	20.05	24.05
Dytiki Makedonia	145.48	37.70	135.00
Dél-Alföld	24.91	86.70	66.87
Molise	39.48	41.76	53.22
Drenthe	3.66	6.67	7.15
Vest	0.00	18.82	20.08
Norra Mellansverige	29.25	36.67	36.51

Source: Author's elaboration based on European Commission (2025)

The distribution of per capita EAFRD allocations across regions shows that substantial EU financial transfers often coexist with divergent demographic outcomes. Regions such as Dytiki Makedonia (Greece) and Mecklenburg-Vorpommern (Germany) received among the highest per capita allocations, yet both experienced persistent population decline. This indicates that funding intensity alone does not suffice to reverse structural drivers such as ageing, fertility erosion, and outmigration. By contrast, Severovýchod (Czechia) and Drenthe (Netherlands) benefited from comparatively modest but steady support and displayed more stable demographic trajectories. Other cases, including Castilla y León (Spain) and Pohjois - ja Itä-Suomi (Finland), underscore the complexity of this

relationship. In particular, despite significant level of support both regions still registered marked population losses, mostly in the post-2010 period. Taken together, these patterns suggest that while EAFRD allocations provide an important layer of support for rural development, their role in addressing demographic decline may be limited and appears to vary considerably depending on broader socio-economic and structural conditions.

This reflection must also be situated within the broader regulatory architecture of the Common Agricultural Policy (CAP). The most recent reform cycle, embodied in Regulation (EU) 2021/2115, establishes the framework for CAP Strategic Plans and enhances subsidiarity by granting Member States flexibility to adapt interventions to local needs while respecting common objectives (European Union, 2021). Complementary, Regulation (EU) 2021/2116 sets out the rules for financing, management, and monitoring, introducing a performance-based delivery model that ties disbursement more closely to results (European Union, 2021). Finally, Regulation (EU) 2021/2117 amends the Common Market Organization and related acts, ensuring coherence between market measures and rural development interventions.

Jointly, these regulations frame the EAFRD not only as a financial instrument but also as a governance mechanism aimed at increasing the resilience of rural areas through conditionality, performance monitoring, and environmental ambition. In this respect, the per capita allocations reported in TAB. 9 provide an empirical reference point for understanding how EU support is territorially distributed, but they also raise questions about the effectiveness of funding in counteracting structural demographic decline.

This subsection therefore provided a bridge between the statistical results and the broader discussion on the interplay between demographic trends and EU policy instruments. Combined findings underscore the multi-dimensional nature of rural depopulation in Europe.

6. Discussion

Through the examination of each variable's behavior within both regional and national contexts and the identification of corresponding trends, a comprehensive overview of the results is obtained, providing insights pertinent to both research questions. Generally, the comparative analysis of the twelve rural regions reveals a common divergence between rural and national contexts.

First, in relation to Research Question 1, structural demographic pressures emerge as the most decisive factors shaping decline and resilience. Indeed, population shares steadily eroded due to the combined effect of low fertility, high mortality, and outmigration. Regional population shares to national totals consistently declined, a result that correspond to comparative findings on cumulative rural depopulation processes (Pinilla & Sáez, 2017; Santos & Fernández Fernández, 2023). More specifically, the population evolution over the temporal interval can be better interpreted through the observation of total population change. This variable better highlighted the differences between rural and national cases showing that exogenous shocks are generally worse absorbed by the former in terms of population loss. To disaggregate this result, the single components of fertility, mortality and net-migration have been considered. On the one hand, the level of fertility in the rural context fell below national averages after the mid-2000s in most regions, thus reducing their contribution to national births. However, this trend is not valid across the whole sample as regions such as Norra Mellansverige (Sweden), Centre-Val de Loire (France), Severovýchod (Czechia), and Vest (Romania) still exhibit higher scores than their national averages. On the other hand, looking at mortality, a heterogenous trend emerges displaying cases in which the rural regions disproportionately contribute to the national mortality rate, others in which the two levels overlap, and remaining ones exhibiting a lower rural mortality rate. For instance, Severozapaden (Bulgaria) falls into the first category, while Vest (Romania) situates at the opposite side. Ultimately, the intermediate level is occupied by regions such as Pohjois- ja Itä-Suomi (Finland) and Centre-Val de Loire (France). The last component of the triad to be investigated consists in net migration, which reflects the intrinsic complexity by which the phenomenon unfolds across Europe. Cases of extremely high inflows or outflows can be detected in the sample. Notably, Severovýchod (Czechia) recorded a gain of 42,000 in 2023 while Drenthe (Netherlands) displayed a balanced, yet relevant rise of roughly 28,000 from migration. Overall, these findings related to fertility, mortality, and migration align with the evidence of structural vulnerability of rural demographic areas as shown by Johnson & Lichter (2019).

Turning to the last demographic variable, the age dependency ratio aims to capture the stage of ageing process unfolding in the EU. The following conclusions permit to outline a general trend of rising pressures of inactive population on the active one in both rural and national contexts. More in depth, the rural regions consistently showcased higher values than their national counterparts, with the only exception of Vest (Romania) which, despite following the common trajectory of rising ageing, registered a lower pressure compared to the national average. This dynamics is the result of the combination of low fertility and net migration in locking areas in demographic contraction (Johnson & Lichter, 2019; Pinilla & Sáez, 2017).

The same line of reasoning can be applied to the socio-economic side of the research. Variables, such as GDP in absolute values, GDP per capita, unemployment rate, and tertiary educational attainment seek to draw a multidimensional overview of the economical and societal dimension of the studied regions. More precisely, GDP in absolute terms helps situate rural regions in terms of contribution to the national economy, GDP per capita returns cross regional and national comparable measures of wealth, while the unemployment rate reveals the labor-market dynamics in both contexts. To complement this overview, tertiary educational attainment has been considered with the objective of isolating the effects that higher education can have on population dynamics in rural scenarios. Starting with GDP in absolute terms, a general rise of absolute values has been registered in all the rural regions, but their prominence shrank. This tendency confirms a structural marginalization of rural economies which cannot keep the national pace (Cuadrado-Roura, 2023). Similarly, GDP per capita trajectories show a partial convergence. In fact, in some cases, such as Mecklenburg-Vorpommern (Germany) and Vest (Romania), per capita income improved relatively to national averages. Looking at the interplay of these variables, it is possible to argue that those regions which display more troubles in coping with the national economic advancements, also show more moderate level of prosperity. On the other hand, those which are closing the gap with the national contexts are not necessarily experimenting with an improvement in prosperity levels. These structural disadvantages are further worsened by the inclination of labor market in rural areas to accentuate unemployment in correspondence of general and exogenous crises. Peculiarly, a shared pattern consists in higher levels of unemployment registered in rural regions which appear to suffer more hardly compared to their nations of reference. Forecasting the future of rural economies, the level of tertiary educational attainment is worth exploring. Even in this case, all rural regions and countries experienced a collective increase. However, rural regions still register lower achievements in this sense. This gap between regional and national domains reflects selective out-migration of skilled cohorts toward more dynamic areas as documented in European analyses of rural depopulation (Alamá-Sabater, Budí, Roig-Tierno, & García-Álvarez-Coque, 2021; Shucksmith, Cameron,

Merridew, & Pichler, 2009). All things considered, these socio-economic indicators contribute to the demographic decline of rural areas by means of weak labor-market and accessibility constraints, as evidenced by Santos & Fernández Fernández (2023) in Spanish municipalities.

In relation to Research Question 2, the comparative analysis highlights significant heterogeneity across Europe's macro-regions. Although all rural areas are subject to long-term demographic pressures, the pace, intensity, and outcomes of decline vary widely, reflecting national economic structures, institutional capacity, and welfare regimes.

In Eastern Europe, demographic contraction is most acute. In Severozapaden (Bulgaria) the combination of decreasing levels of birth rate, increasing mortality and persistent major outmigration, produces severe losses. Instead, Severovýchod (Czechia) exhibits that rising migration inflows can partly offset the natural decrease. Vest (Romania) inserts in this line as it has registered significant net gains by 2023 that temporarily counterbalanced low fertility and ageing.

Southern Europe is characterized by chronic stagnation and weak compensatory mechanisms. Regions such as Molise (Italy) and Dytiki Makedonia (Greece) show persistent population decline, driven by fertility collapse and selective out-migration incentivized by generally high tertiary educational attainment. In the case of Castilla y León (Spain), the existence of migration inflows appears insufficient to counterbalance the natural demographic decrease. Overall, this scenario revolves deeply around the structural vulnerability caused by the negative natural balance.

Northern Europe exhibits ambivalent outcomes. Notably, Pohjois- ja Itä-Suomi (Finland) shifted from population loss in 2001 to modest gains in 2023, while Norra Mellansverige (Sweden) experienced long-term stagnation despite early positive balances. In addition, fertility levels remain closer to national averages compared to Eastern and Southern cases.

Western Europe represent a virtuous case. Centre-Val de Loire (France) and Drenthe (Netherlands) register consistent inflows, also of large scales, which presumably offset the steady regional ageing process as highlighted by higher levels of age dependency ratio. Indeed, in these cases fertility rates do not suffer particularly sharp downturns compared to other areas, such as Southern regions. Moreover, socio-economic indicators show a coherent picture of lower unemployment rate, together with lower tertiary educational attainment which presumably do not act as push factors for outmigration.

Central Europe shows ambiguous evidence. Mecklenburg-Vorpommern (Germany) continues to face strong outflows and ageing burdens, while Dél-Alföld (Hungary) oscillates between small gains and

losses, reflecting structural fragility. These cases corroborate that demographic contractions persists when fertility remains low and out-migration keeps high.

Across all the macro-regions, structural weaknesses compound demographic pressures. Fertility remained below national averages in most rural regions, mortality often exceeded demographic share in national contexts, and age dependency ratios rose everywhere. Migration rarely compensated for natural decrease, with Romania's Vest and Czechia's Severovýchod representing rare exceptions. On the socio-economic side, GDP in absolute terms increased but rural shares of national output declined, GDP per capita remained lower in structurally weaker territories, and unemployment levels tended to diverge during crises. Tertiary educational attainment also rose everywhere, but persistent gaps reinforced selective migration, particularly in Eastern and Southern Europe.

Ultimately, these results suggest that rural depopulation is a widespread phenomenon in EU, but its expression varies across the different macro-areas. Eastern and Southern Europe emerge as the most fragile ones, Northern and Western Europe are more balanced but still display structural pressures. Lastly, Central Europe exhibits significant internal heterogeneity. This confirms the interplay of demographic factors and socioeconomic prosperity in influencing rural depopulation, producing uneven outcomes across European macro-regions.

Building on these comparative findings, it is possible to return to the theoretical framework introduced at the beginning of the thesis. The persistence of outmigration across almost all cases confirms the relevance of Push-Pull dynamics (Dorigo & Tobler, 1983; Johnson & Lichter, 2019). Adverse rural conditions such as weak labor markets, limited access to services, and demographic ageing acted as strong "push" factors, while urban regions continued to attract with more diversified economic opportunities and improved living standards (Shucksmith et al., 2009). Yet, the data also show that these dynamics are not uniform. In Severozapaden (Bulgaria), the cumulative effect of low fertility, high mortality, and net outflows mirrors the classic expectations of Push-Pull theory. In contrast, regions such as Severovýchod (Czechia) or Vest (Romania) demonstrate that migration inflows can partly offset natural decrease, at least temporarily. This indicates that while Push-Pull theory captures the general direction of flows, it must be nuanced by selective migration processes. Consistent with Korpi & Clark (2015), more educated cohorts are more likely to leave, deepening the loss of skilled portion of population and reinforcing rural disadvantages.

Human Scale Development theory (Max-Neef, 2017) further helps explain why depopulation persists beyond material considerations. The erosion of satisfiers related to participation, identity and protection is evident in contexts of long-term demographic decline. In Castilla y León (Spain), for example, migration inflows are present but remain too weak to counterbalance the combined

pressures of fertility collapse and ageing. Similarly, Molise (Italy) illustrates how stagnation and the absence of opportunities of community participation reinforce outmigration. By contrast, regions such as Drenthe (Netherlands) display more stable dynamics. Indeed, sustained inflows and relatively balanced socio-economic conditions suggest that stronger local satisfiers – such as employment prospects, social cohesion, or mobility option – can act as synergic factors that slow decline. These contrasts support the interpretation that rural depopulation is not only economic in origin but also rooted in unmet multidimensional needs that weaken the long-term viability of communities (Max-Neef, 2017; Cameron, 2023).

The Demographic Transition framework also provides an important reference point. Classical DDT expected that after a decline in fertility and mortality, populations would stabilize as low equilibrium levels (Kirk, 1996). The evidence from rural Europe suggests that such equilibrium is rarely achieved. Fertility has fallen below replacement in most regions, while mortality remains high due to ageing and the demographic structure is affected by persistent outmigration. Instead of stabilization, most rural regions are experiencing continuous natural decrease. Migration seldom compensates for this imbalance, with Romania's Vest and Czechia's Severovýchod standing as rare exceptions. These findings align more closely with the concept of a "second demographic transition" (Zaidi & Morgan, 2017) where sub-replacement fertility and sustained ageing lock populations into long-term decline. At the same time, territorial variation shows that demographic processes interact with institutional capacity and socio-economic resilience, producing uneven outcomes across Europe (Newsham & Rowe, 2023).

Collectively, these perspectives suggest that no single framework fully captures rural depopulation. Push-Pull Theory highlights structural imbalances that generate migration, but they must be complemented by insights into selective outflows. Human Scale Development underscores the importance of unmet needs in shaping the long-term viability of rural communities. Demographic Transition Theory situates these processes within broader demographic transformations, while also revealing that the predicted equilibrium is not observed. The evidence therefore supports an integrated view: rural depopulation emerges from structural demographic imbalances, filtered through selective migration, compounded by unmet fundamental needs, and locked in by demographic legacies.

From this interpretation, three broader considerations arise. First, rural depopulation in Europe may be considered as a cumulative process, with demographic, economic, and social mechanisms reinforcing one another over time. Second, its intensity varies across territories. In particular, Eastern and Southern European regions are the most vulnerable, whereas parts of Central and Northern Europe demonstrate greater resilience. Third, while EU policy initiatives such as the Long-Term

Vision for Rural Areas (European Commission, 2021) and the European Agricultural Fund for Rural Development are important steps, their effectiveness is far limited in shifting structural trajectories. Recent scholarship highlight how European Union is moving toward more flexible, experimentalist governance to reconcile common objectives with local diversity (Zeitlin & Rangoni, 2022). This may offer more promising avenues for addressing depopulation in differentiated territorial contexts.

In sum, the results confirms that rural depopulation is a multidimensional process, being demographic, economic, social, and territorial at the same time. Addressing it will require integrated strategies that combine economic diversification, improved service provision, and locally grounded development. Whether the vision of resilient, connected, and sustainable rural territories outlined in the European agenda for 2040 can be realized will depend on the capacity to tackle demographic, socio-economic, and policy dimensions together (European Commission, 2021).

7. Conclusions

This thesis explored rural depopulation in the European Union between 2001 and 2023, combining a comparative regional perspective with different theoretical approaches. The main aim was to contribute to the analytical understanding of a complex and sustained process.

The research suggests that rural decline is best seen as a structural trajectory rather than a temporary fluctuation, shaped by demographic pressures, economic disparities, and institutional contexts. At the same time, the comparative analysis shows that these processes unfold unevenly across Europe, with significant variation in their pace and intensity.

The dialogue between theory and evidence indicates that established frameworks remain useful but also have limits when confronted with the diversity of European rural experiences. Push-Pull dynamics, Human Scale Development, and Demographic Transition theory each capture important dimensions, yet no single perspective can fully explain the patterns observed. An integrated view therefore seems more appropriate, while remaining open to refinement as new evidence emerges.

These findings come with clear limitations. The regional scale of analysis may hide important differences within territories, while quantitative focus cannot capture all the social and cultural dimensions of decline. Further work could benefit from combining statistical evidence with qualitative research and from examining how local initiatives interact with broader structural forces.

Policy implications must also be drawn with caution. The results suggest that addressing rural depopulation requires integrated strategies that consider demographic, economic, and social dimensions together, but there is no simple recipe. Efforts at the European level provide useful

frameworks, yet their success will depend on how flexibly they can be adapted to the varied realities of different regions.

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