

Demographic Decline, Migration, and Sustainable Development: Romania and Portugal in Comparative Perspective

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Abstract

This paper analyses the relationship between demographic decline, labor emigration, and sustainable socio-economic development in Romania and Portugal, two EU economies facing similar demographic pressures despite distinct institutional trajectories. Focusing on the period 2007–2023, the study explores how population ageing, persistent emigration, and shrinking household structures influence EU structural fund absorption and long-term development sustainability. Using Eurostat panel data across 11 demographic and sustainability indicators, the research employs a comparative framework and constructs a composite Demographic Sustainability Pressure Index (DSPI) to capture multidimensional demographic stress. Both countries exhibit low fertility rates (1.46 in Romania and 1.33 in Portugal in 2023) and significant ageing trends, but with divergent outcomes. Romania's large-scale emigration—affecting up to 20% of its working-age population—generates remittance inflows that partially offset EU fund absorption, producing an “absorption–convergence paradox.” In contrast, Portugal benefits from more stable demographics and selective immigration, supporting stronger administrative capacity and more efficient fund utilization. The findings indicate that demographic decline weakens EU funds' absorptive capacity and intensifies regional disparities, highlighting the need for differentiated cohesion policy responses in demographically vulnerable regions.

Keywords

Demographic decline; labor migration; sustainable development; EU cohesion policy; Romania - Portugal comparison

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Introduction

Demographic change is emerging as one of the most structurally significant - yet insufficiently addressed - determinants of the effectiveness of EU cohesion policy. Population ageing, persistently low fertility rates, and the sustained emigration of working-age populations from less prosperous member states generate a triple demographic pressure. This dynamic reduces administrative capacity (through the loss of skilled labor), weakens domestic demand, erodes the tax base, and undermines the long-term sustainability of public services partially financed through EU structural funds (Eurostat, 2024; United Nations, 2022). The capacity of these funds to deliver growth, however, is not unconditional: evidence suggests that EU regional policy transfers may face diminishing returns beyond certain thresholds of fund intensity, with institutional quality playing a critical moderating role (Becker et al., 2012).

Romania and Portugal provide a compelling basis for comparison. Both EU member states have experienced substantial emigration of working-age populations following EU integration - Portugal since

the early 1990s, and Romania with a marked acceleration after 2007. Both exhibit some of the lowest total fertility rates in the EU and face rising old-age dependency ratios that constrain fiscal space for social investment. However, their development trajectories, institutional contexts, and policy responses have diverged significantly, offering a valuable comparative framework for analyzing how demographic pressures interact with EU cohesion policy to shape sustainable development outcomes (Castles et al., 2014; Ferreira, 2022).

This paper addresses three research questions:

H1: How do Romania and Portugal compare in terms of a composite Demographic Sustainability Pressure Index (DSPi), capturing fertility, migration, ageing, and household structure dynamics over the period 2007–2023?

H2: What relationships can be identified between demographic pressure and the absorption quality of EU structural funds, as well as broader sustainability outcomes?

H3: What policy frameworks are required to ensure the effectiveness of cohesion investments in regions affected by demographic decline?

The paper contributes to the thematic agenda of the BASIQ 2026 Conference, particularly its focus on socio-demographic futures and family dynamics, with specific attention to the implications of demographic change for labor markets and the sustainability of local economic structures.

The paper is organised as follows: Section 2 reviews the relevant literature; Section 3 presents the data and develops the methodology; Section 4 reports results and discusses the findings; Section 5 presents conclusions, develops limitations and research extensions.

1. Literature review

The relationship between demographic dynamics and sustainable development has generated a substantial interdisciplinary literature over the past two decades. Bloom et al. (2010) demonstrate that demographic transitions - specifically the compression of young-cohort populations and the expansion of older cohorts - significantly affect per capita GDP growth through changes in savings rates, labor force participation, and age-specific consumption patterns. Lee and Mason (2011) extend this analysis through the lens of National Transfer Accounts, showing that population ageing creates systematic fiscal deficits as the ratio of dependent elderly to working-age population increases.

For EU member states, demographic stress is compounded by intra-EU migration - a structural feature of the single market that produces persistent population losses in lower-income member states through selective emigration of younger, better-educated workers (Dustmann et al., 2017). Kahanec and Zimmermann (2016) document that intra-EU migration, while welfare-enhancing for individuals and aggregate EU welfare, generates significant negative externalities for sending regions: depressed local human capital, weakened institutional capacity, and reduced innovation potential. These effects are directly relevant to the absorptive capacity for EU structural funds, which require skilled administrative professionals - precisely the most mobile cohort within the EU.

The family as the primary socio-demographic unit mediates between macro-level demographic trends and local economic outcomes in ways that aggregate statistics often obscure. Coleman and Garssen (2010) demonstrate that collapsing fertility rates in Southern and Eastern Europe reflect not primarily value changes but structural constraints: housing unaffordability, labor market precarity, insufficient childcare infrastructure, and inadequate family policy support. These structural constraints are simultaneously causes and consequences of insufficient public investment, precisely the investment gap that EU structural funds are designed to address.

The behavioral economics dimension of demographic decision-making has received growing academic attention in the context of emigration and family dissolution. Stark and Bloom (1985) pioneered the relative deprivation hypothesis, showing that emigration decisions are driven not only by absolute income differentials but by perceived relative standing within the reference community. Applied to Romania and Portugal, this framework predicts that emigration pressures persist even as absolute income levels rise, as long as relative disparities vis-a-vis destination country reference groups remain large, a dynamic confirmed by the continued emigration from Romania despite significant GDP convergence documented in this study (Diminescu, 2008).

Prior comparative research on Portugal and Romania within EU cohesion policy has been limited. Bachtler et al. (2019) include both in broader Southern/Eastern European analyses but focus primarily on economic

convergence rather than demographic sustainability. Empirical assessments of EU regional policy using quasi-experimental methods confirm that cohesion expenditure has produced positive but heterogeneous growth effects across eligible regions, with the size of impacts varying considerably depending on local structural conditions (Pellegrini et al., 2013). Ferreira (2022) examines Portugal's demographic challenges in the context of Atlantic coastal depopulation, finding that EU rural development funds have had limited impact on reversing demographic decline in interior regions. Diminescu (2008) and Sandu (2010) document the Romanian diaspora formation and its remittance effects on household welfare, confirming that private transfers partially substitute public investment in demographic-stressed communities. This heterogeneity extends to the member-state level: Crescenzi & Giua (2020) demonstrate that cohesion policy cannot be treated as a single uniform instrument, as its economic impacts differ systematically across national contexts, underscoring the relevance of country-specific analyses such as the present one.

The present paper fills the comparative gap by directly juxtaposing the two countries' demographic-development nexus for the first time using an integrated five-indicator framework.

2. Research methodology

The analysis uses Eurostat panel data for Romania and Portugal covering 2007-2023, sourced from official databases accessed in April 2026. Demographic indicators include: total fertility rate (TFR, series *demo_find*); net migration rate per 1,000 population (series *demo_gind*); old-age dependency ratio - population aged 65+ as % of 15-64 population (series *demo_pjanbroad*); and household size (average number of persons per private household, series *ilc_lvph01*). Sustainability indicators include: GDP per capita as % of EU-27 average in PPS (series *tec00114*); AROPE poverty and social exclusion rate (series *ILC_PEPS01N*); Gini coefficient of equivalized disposable income (series *ILC_DI12*); GHG emissions per capita in tonnes CO₂ equivalent (series *SDG_13_10*); and renewable energy share (series *NRG_IND_REN*).

The Demographic Sustainability Pressure Index (DSPI) is constructed as a composite indicator combining four demographic stress dimensions, each standardized to a 0-100 scale where higher values indicate greater demographic pressure: fertility deficit (distance from replacement rate 2.1); emigration intensity (net migration rate sign-reversed); old-age dependency acceleration (change in dependency ratio); and household fragmentation (decline in average household size, a proxy for family dissolution). The DSPI is computed as the unweighted average of the four standardized sub-indicators, producing a single annual composite score for each country that enables direct bilateral temporal comparison.

3. Results and discussion

Table no. 1 presents the key demographic indicators for both countries at three reference years spanning the study period. The data reveal parallel demographic challenges with important structural differences that generate distinct sustainability implications.

Table no. 1. Demographic Indicators: Romania and Portugal, 2007-2023

Indicator	Romania 2007	Romania 2015	Romania 2023	Portugal 2007	Portugal 2015	Portugal 2023
Total Fertility Rate (TFR)	1.55	1.58	1.46	1.41	1.31	1.33
Net Migration Rate (/1,000)	-1.8	-8.2	-3.1	+2.0	-3.5	+5.4
Old-Age Dependency Ratio (%)	21.3	26.1	32.8	26.0	31.5	37.1
Avg. Household Size (persons)	2.8	2.6	2.4	2.6	2.5	2.4
Population (millions)	21.5	19.8	18.9	10.6	10.4	10.2
Pop. change 2007-23 (%)	--	--	-12.1%	--	--	-3.8%

Source: Eurostat (2024)

Romania's demographic crisis is structurally more acute than Portugal's across all four DSPI dimensions. Romania's population declined by 12.1% between 2007 and 2023, from 21.5 million to 18.9 million, the largest absolute population loss among EU member states in this period. This loss combines two reinforcing mechanisms: natural decrease (deaths exceeding births in every year since 1991) and emigration, estimated to have removed 3-4 million working-age citizens since EU accession in 2007 (Sandu, 2010; Eurostat, 2024). The net migration rate of -8.2 per 1,000 in 2015, the peak emigration year -- reflects the dramatic acceleration of outflows following the 2008-2010 austerity period, which pushed skilled graduates towards Western European labor markets.

Portugal's demographic challenge, while significant, operates through different mechanisms. Portugal's TFR was already below Romania's in 2007 (1.41 vs. 1.55) and has remained lower throughout, reaching 1.33 in 2023, one of the EU's lowest. However, Portugal has been partially compensated by selective immigration inflows, primarily from Brazil, Angola, Cape Verde, and more recently Ukraine, which have stabilized the total population (-3.8% vs. Romania's -12.1%) and introduced younger demographic cohorts that moderate the speed of ageing. Portugal's net migration rate turned strongly positive (+5.4 per 1.000) by 2023, reflecting its attractiveness as an immigration destination for Portuguese-speaking communities globally.

The old-age dependency ratio trajectory is alarming for both countries but more advanced in Portugal: from 26.0% in 2007 to 37.1% in 2023 in Portugal, versus 21.3% to 32.8% in Romania. By 2023, both countries exceed the EU-27 average of approximately 32.5%, placing them among the most demographically aged societies in the Union. The fiscal implications are profound: increasing elderly dependency ratios require growing shares of public expenditure for pensions and healthcare, constraining the fiscal space available for EU cofinancing - a direct mechanism through which demographic stress reduces structural fund absorption capacity.

Table no. 2 presents the five sustainability indicators for both countries alongside the computed DSPI values, revealing how demographic stress correlates with sustainability performance across economic, social, and environmental dimensions.

Table no. 2. Sustainability Indicators and DSPI: Romania and Portugal, 2007-2023

Indicator	Romania 2007	Romania 2023	Change (pp)	Portugal 2007	Portugal 2023	Change (pp)
GDP per capita (% EU-27 avg.)	43.8	74.8	+31.0	78.3	80.6	+2.3
AROPE rate (%)	45.9	32.0	-13.9	25.0	20.1	-4.9
Gini coefficient	37.8	31.0	-6.8	36.8	33.0	-3.8
GHG per capita (t CO ₂ eq)	5.9	3.0	-2.9	6.3	4.4	-1.9
Renewable energy share (%)	18.2	25.8	+7.6	24.9	37.8	+12.9
DSPI (0–100)	52	71	+19	44	61	+17

Notes: DSPI = Demographic Sustainability Pressure Index. Higher values indicate greater demographic pressure.

All changes are expressed in percentage points (pp), except where otherwise indicated.

Source: Eurostat (2024) and authors' calculations

First, Romania records a substantial GDP per capita convergence (+31.0 percentage points), one of the strongest improvements in the EU over the period analyzed. However, this performance coincides with increasing demographic pressure, as reflected by the rise in the DSPI score from 52 to 71. This apparent paradox—strong economic convergence alongside demographic decline—can be explained by the nature of GDP per capita as an indicator, which captures output relative to the remaining population rather than aggregate welfare. The simultaneous reduction in population and improvement in GDP per capita suggests a combination of genuine productivity gains and compositional effects. In particular, the emigration of younger cohorts may have contributed to changes in the structure of the resident labor force, thereby influencing average productivity levels.

Second, Portugal demonstrates stronger progress in renewable energy adoption, with an increase of +12.9 percentage points compared to Romania's +7.6. This divergence is consistent with Portugal's sustained policy commitment to renewable energy development, supported by long-term investment and EU co-financing. By contrast, Romania's more moderate progress may be associated with institutional and regulatory constraints that have limited the full exploitation of its renewable potential. These differences highlight how policy consistency and administrative capacity can shape environmental sustainability outcomes even under comparable EU policy frameworks.

Third, both countries achieved reductions in income inequality, as measured by the Gini coefficient, with Romania recording a larger absolute decline (-6.8 pp compared to -3.8 pp in Portugal). In Romania, this trend coincides with periods of rapid wage growth and public sector expansion, while in Portugal it aligns with broader social policy measures and labor market adjustments. In both cases, the observed improvements may also be partly associated with demographic and migratory dynamics, which can alter the income distribution of the resident population.

Taken together, these findings suggest that higher demographic pressure, as captured by the DSPI, is associated with more uneven and potentially less sustainable development outcomes. Increasing demographic stress may constrain administrative capacity and reduce the effectiveness of EU structural fund absorption,

particularly in regions experiencing significant population loss. This underscores the need for cohesion policy frameworks that explicitly account for demographic dynamics, by integrating demographic resilience into allocation criteria and strengthening institutional capacity in demographically vulnerable regions.

Building on the results presented in Table no. 2, the DSPI scores (Romania: 52 in 2007, rising to 71 in 2023; Portugal: 44 to 61) indicate that Romania operates under consistently higher and intensifying demographic pressure. This divergence, observed alongside differences in economic convergence, inequality reduction, and environmental performance, suggests that demographic stress may influence the effectiveness of EU cohesion policy through several interrelated mechanisms.

First, the human capital depletion mechanism refers to the impact of sustained emigration on the availability of skilled administrative personnel required for EU fund management. In the Romanian case, higher demographic pressure (as captured by DSPI) coincides with more volatile development outcomes and may be associated with reduced institutional capacity. Existing evidence indicates that the outflow of qualified professionals—such as project managers and financial specialists—can weaken program implementation and continuity. By contrast, Portugal’s lower demographic pressure and more stable population dynamics are consistent with stronger administrative capacity and more effective fund utilization.

Second, the fiscal constraint mechanism links demographic ageing to reduced co-financing capacity. The increase in old-age dependency ratios—reflected indirectly in rising DSPI values—places additional pressure on public budgets through higher pension and healthcare expenditures. In regions experiencing population decline, this may limit the financial resources available for co-financing EU-funded projects. The Romanian case, characterized by both higher demographic pressure and stronger structural change, illustrates how fiscal constraints can coexist with economic convergence, potentially affecting the sustainability of investment outcomes.

Third, the demographic polarization mechanism highlights the uneven territorial distribution of development benefits. The improvements observed in national-level indicators (e.g., GDP convergence and inequality reduction) may mask increasing spatial disparities, as economically dynamic urban areas are better positioned to attract and implement EU-funded projects. In contrast, demographically declining regions face constraints related to limited human capital and administrative capacity. This pattern, documented in previous studies (Ianos et al., 2013; Ferreira, 2022), suggests that demographic pressure can amplify territorial inequalities, potentially undermining the cohesion objectives of EU policy. This argument is reinforced by evidence that the quality of government is among the most significant determinants of the returns on cohesion investment: regions with weaker governance consistently derive lower economic benefits from EU expenditure, irrespective of the volume of funds received (Rodriguez-Pose & Garcilazo, 2015).

Taken together, these mechanisms indicate that higher DSPI values are not only associated with demographic stress but may also signal reduced capacity to effectively absorb and utilise EU structural funds. This reinforces the argument that cohesion policy design should explicitly incorporate demographic criteria and support institutional capacity in regions most affected by population decline.

Conclusions

This paper has shown that demographic decline represents a structural constraint on the effectiveness of EU cohesion policy that remains insufficiently integrated into current policy design. The comparative analysis of Romania and Portugal highlights that both countries face intensifying demographic pressure—captured by the Demographic Sustainability Pressure Index (DSPI)—but with distinct implications for their sustainable development trajectories.

Romania’s strong GDP per capita convergence (+31.0 percentage points compared to Portugal’s +2.3) is accompanied by pronounced demographic decline, including a 12.1% reduction in population and a significantly higher DSPI score by 2023. These dynamics raise concerns regarding the long-term sustainability of growth, particularly in the context of weaker environmental performance and potential constraints on administrative capacity. Portugal, by contrast, benefits from a more stable demographic structure, partially supported by immigration, which is associated with more consistent progress in renewable energy and potentially more effective utilization of EU funds. However, it also faces persistent challenges related to low fertility and rapid population ageing.

The findings point to three key policy implications. First, demographic sustainability should be explicitly incorporated into EU cohesion policy, with targeted support mechanisms—such as technical assistance and simplified procedures—for regions experiencing acute demographic decline. Second, the DSPI framework

offers a useful analytical tool for identifying territories where demographic pressures may undermine the quality and effectiveness of EU fund absorption, enabling more proactive policy design. Third, demographic and family policy considerations should be more closely integrated into cohesion policy, not as isolated interventions but as cross-cutting dimensions of long-term sustainability.

This study is subject to several limitations. The analysis relies on national-level data, which may obscure important regional disparities in demographic trends and development outcomes. In addition, the study does not establish causal relationships between demographic pressure and EU fund performance but rather identifies associations that require further empirical validation.

Future research should extend the analysis to the NUTS2 regional level to capture intra-national variation and better understand how demographic pressures shape cohesion policy effectiveness across different territorial contexts. Further work could also explore the causal mechanisms linking demographic dynamics to administrative capacity and fund absorption through mixed methods approaches combining quantitative analysis with institutional case studies.

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