

CITIES IN EUROPE AND CENTRAL ASIA

ROMANIA



METHODOLOGY

This country snapshot was produced as part of an Advisory Services and Analytics (ASA) work developed by the Urban, Social, Rural and Resilient Global Practice (GPSURR). The objective of this ASA is to analyze economic, spatial and demographic trends in the urban systems of countries in Europe and Central Asia. City-level population data was obtained from the National Statistics Institute. In the absence of city-level economic and spatial data over the period of analysis, nighttime light (NLS) satellite imaging was used to assess spatial and demographic trends in cities. In previous studies, NLS intensity has been found to be positively correlated with levels of economic activity as measured by GDP. Regional-level regressions of NLS and GDP were conducted to assess the validity of using NLS as a proxy for economic activity in Romania. The results suggest a significant and positive correlation between NLS intensity and GDP. In Romania, GDP to NLS elasticity was found to be 1.07 (*an increase in light intensity of 1 percent is associated with a 1.07 percent increase in GDP*). This country snapshot presents its results at the city level. Due to measurement error, city-level economic and spatial results should be analyzed with caution; and when possible, additional city level data (*i.e. satellite imagery, firm-level data, and etc.*) should be consulted to corroborate results. This snapshot classified 186 settlements in Romania as cities. Demographic trends are available for all 186 cities but NLS analysis is only available for 167 cities; the remaining settlements did not produce enough light to be considered “urban” by the NLS threshold employed in this analysis. Similar assessments done for other countries suggest that NLS are able to capture most settlements with 30,000 inhabitants or more. For additional information on this ASA please contact Paula Restrepo Cadavid (prestrepocadavid@worldbank.org) or Sofia Zhukova (szhukova@worldbank.org)



WORLD BANK GROUP
Social, Urban, Rural & Resilience

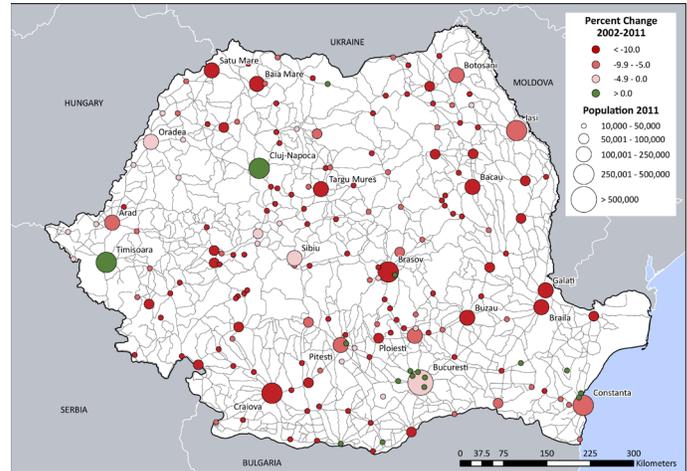


from the British people



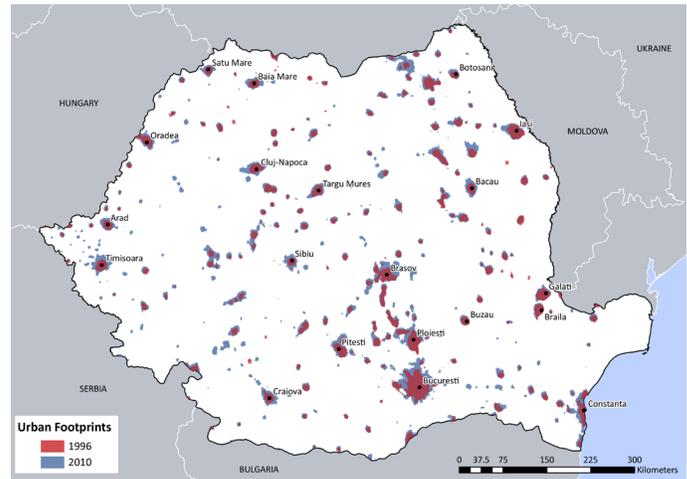
DEMOGRAPHICS

		BEFORE	RECENTLY
Fertility Rates	Romania	1.51 ¹	1.46 ²
	ECA	1.95 ¹	1.73 ²
Life Expectancy	Romania	69.78 ¹	74.56 ²
	ECA	72.05 ¹	76.77 ²
% of Population Above Age 65	Romania	11.05 ¹	16.02 ²
	ECA	11.59 ¹	15.37 ²
Population Growth (Average Annual %)	Romania	-0.51 ³	0.25 ⁴
	ECA	-0.94 ³	0.31 ⁴
Urban Population Growth (Average Annual %)	Romania	-0.71 ³	-0.73 ⁴
	ECA	0.37 ³	0.55 ⁴
Urbanization Level (%)	Romania	54.47 ¹	53.37 ²
	ECA	67.44 ¹	70.52 ²
Annual Urbanization Rate (%)	Romania	-0.19 ³	0.21 ⁴
	ECA	0.12 ³	0.23 ⁴
City Average Population- Not Balanced Panel	Romania	68,259 ¹	53,689 ²
	ECA	72,515 ¹	75,132 ²
% Cities With More Than 100,000	Romania	13.44 ¹	10.75 ²
	ECA	12.97 ¹	20.02 ²
% Cities With More Than 500,000	Romania	0.58 ¹	0.54 ²
	ECA	2.03 ¹	2.27 ²
% Cities losing Population	Romania	86.02 ³	90.86 ⁴
	ECA	59.58 ³	61.58 ⁴



SPATIAL

		BEFORE	RECENTLY
Built Up Area (100,00km ²)	Romania	5,885 ¹	12,705 ⁶
	ECA	156,892 ¹	288,046 ⁶
Built Up m ² Per Capita	Romania	253.68 ¹	636.45 ⁶
	ECA	186.18 ¹	320.49 ⁶
Built Up Area Growth (%)	Romania	115.89 ⁷	83.59 ⁷
	ECA	150.89 ⁷	72.13 ⁷
Built Up m ² Per Capita Growth (%)	Romania	186 ⁸	2,712 ⁸
	ECA	167 ⁹	3,883 ⁹
Number of Cities in Analysis	Romania	126 ⁹	1,645 ⁹
	ECA	20 ⁹	352 ⁹
Number of Identified Cities (NLS)	Romania	20 ⁹	352 ⁹
	ECA	352 ⁹	352 ⁹
Number of Growing Cities (NLS Area)	Romania	20 ⁹	352 ⁹
	ECA	352 ⁹	352 ⁹
Number of Agglomerations (NLS)	Romania	20 ⁹	352 ⁹
	ECA	352 ⁹	352 ⁹

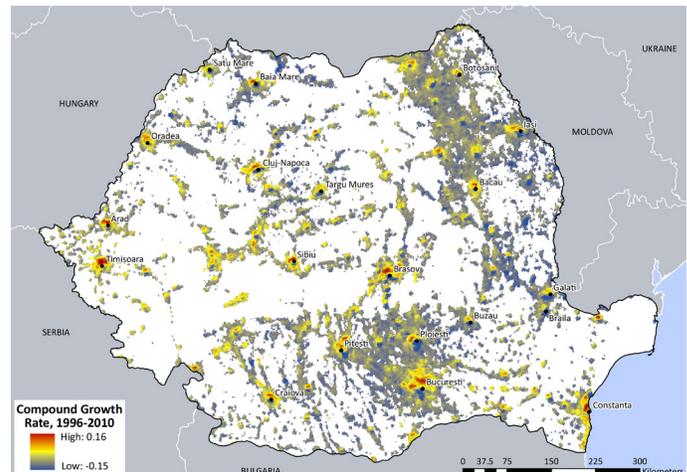


This section uses data from the Global Human Settlement Layer (GHSL) developed by the Joint Research Centre of the European Commission. The GHSL extracts geospatial imagery to map and report on human settlements and urbanization.



ECONOMICS

		BEFORE	RECENTLY
Average Annual GDP growth (%)	Romania	0.77 ³	4.20 ⁴
	ECA	2.00 ³	1.53 ⁴
Average GDP per capital growth (%)	Romania	1.30 ³	5.08 ⁴
	ECA	1.75 ³	1.19 ⁴
Estimated contribution of urban GVA to GDP growth (%)	Romania	91.72 ¹⁰	—
	ECA	—	—
Unemployment Rate (%)	Romania	7.20 ¹¹	9.33 ¹¹
	ECA	22.6 ¹²	—
Poverty rate (% at national poverty line)	Romania	10.75 ¹³	—
	ECA	—	—
Urban to rural GDP ratio	Romania	-0.77 ¹⁴	2.20 ¹⁴
	ECA	2.20 ¹⁴	—
Urban NLS Intensity Growth (% annual average)	Romania	40.29 ¹⁴	96.40 ¹⁵
	ECA	58.74 ¹⁴	81.01 ¹⁵
% City Economies Growing (in NLS intensity)	Romania	1.07 ¹⁶	0.55 ¹⁶
	ECA	0.55 ¹⁶	—
GVA to NLS Elasticity	Romania	1.07 ¹⁶	0.55 ¹⁶
	ECA	0.55 ¹⁶	—



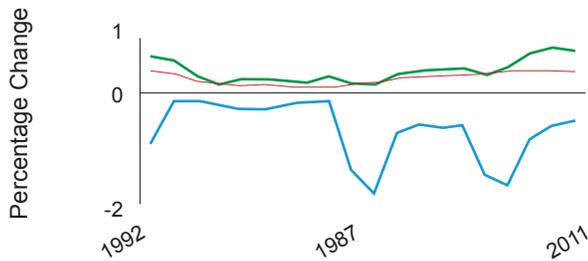
¹ 1992, ² 2011, ³ 1992–2002, ⁴ 2002–2011, ⁵ 1990, ⁶ 2013, ⁷ 1990–2013, ⁸ 1992–2011, ⁹ 1996–2010, ¹⁰ 1996–2008, ¹¹ 2010, ¹² 2011, ¹³ 2008, ¹⁴ 1996–2000, ¹⁵ 2000–2010, ¹⁶ 1996–2010.



URBANIZATION TRENDS

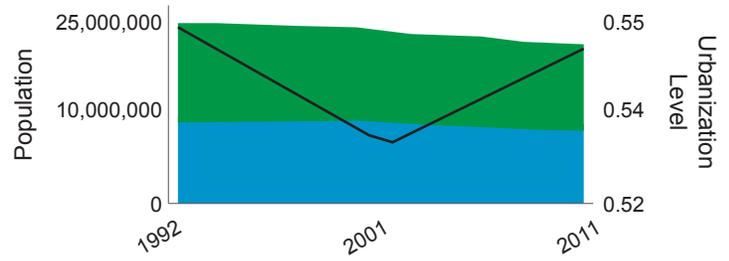
Romania is undergoing a dramatic reduction of its population. Between 1992 and 2002 Romania's population declined by an annual average of 0.51 percent. This population decline has since intensified and, between 2002 and 2011, reached an annual average of 0.94 percent. As a result since 1992, Romania's population has declined 11.61 percent—a level of population decline that is substantially higher than observed in other countries in the region. This dramatic decrease in population is further exacerbated by declining fertility rates that are below replacement levels and an ageing population.

Romania has not yet reached high-urbanization levels and is de-urbanizing due to urban population decline. In 1992 Romania's urbanization level was 54.47 percent, which was well below ECA's average of 67.44 percent. By 2011 the urbanization level slowly dropped to 53.37 percent. Both the urban and rural populations in Romania are declining although the urban population declined slightly more than the rural population between 1992 and 2011.



Population Growth, 1992–2011

— Romania — ECA (All Income levels)
— ECA (Developing Only)



— Rural Population — Urban Population — Urbanization Level

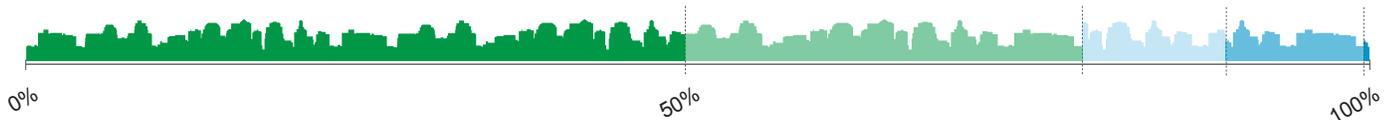


DEMOGRAPHICS OF THE URBAN SYSTEM

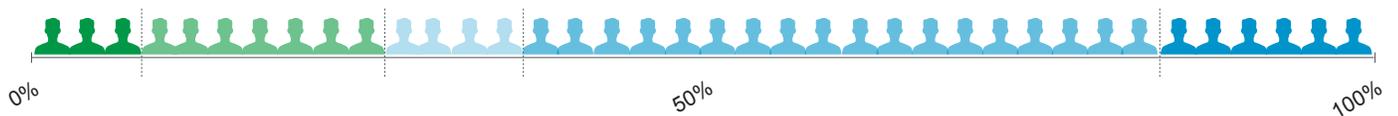
Population decline is widespread across Romania's urban system. In 2011, a majority of Romania's urban system was comprised of cities with less than 50 thousand inhabitants although a majority of the population lives in cities with greater than 100 thousand inhabitants. Of 186 cities used in this analysis, a significant majority—90.86 percent lost population between 2002 and 2011. The average population decline of cities used in this analysis was 17.85 percent (1992–2011), which is more than five percent greater than national population decline. Small cities between 50 and 100 thousand inhabitants underwent the highest level of decline and are followed closely by cities between 20 and 50 thousand inhabitants. Of the largest cities by population in Romania, 13 out of 15 declined in population between 2002 and 2011.

Growth of small cities surrounding agglomerations suggest suburbanization in Romania. Between 2002 and 2015, 13 of the 14 largest agglomerations in Romania declined in population (see table below). Despite this, 10 of the 15 fastest growing cities in Romania belong to an agglomeration, which suggest that small cities surrounding the core of the agglomeration are attracting population while main cities at the core of the agglomeration are losing population.

DISTRIBUTION OF CITIES BY CITY SIZE: 2011



URBAN POPULATION DISTRIBUTION BY CITY SIZE: 2011



■ Small Town (<10k) ■ Mid-Size Towns (10k–20k) ■ Large Towns (20k–50k) ■ Small Cities (50k–100k) ■ Mid Size Cities (100k–500k) ■ Major Cities (>500k)

LARGEST CITIES BY POPULATION

CITY	POPULATION 2011	% CHANGE 2002–2011
Bucuresti	1,883,425	11.12
Cluj-Napoca	324,576	2.08
Timisoara	319,279	0.51
Lasi	290,422	-9.49
Constanta	283,872	-8.57
Craiova	269,506	-10.94
Brasov	253,200	-11.03
Galati	249,432	-16.54
Ploiesti	209,945	-9.71
Oradea	196,367	-4.96
Braila	180,302	-16.64
Arad	159,074	-7.96
Pitesti	155,383	-7.76
Siblu	147,245	-4.94
Bacau	144,307	-17.77

LARGEST URBAN AGGLOMERATIONS

AGGLOMERATION MAIN CITY	POPULATION 2011	% CHANGE 2002–2011	CITY COUNT
Bucuresti	2,011,416	-0.01	7
Brasov	344,204	-0.09	5
Deva	145,483	-0.13	4
Petrosani	107,402	-0.18	4
Constanta	340,916	-0.07	4
Pitesti	201,922	-0.07	3
Ploiesti	239,063	-0.09	3
Moinesti	53,602	-0.14	3
Turnu Magurele	35,813	-0.09	2
Reghin	49,209	-0.09	2
Radauti	37,130	-0.11	2
Sfantu Gheorghe	66,120	-0.09	2
Sibiu	161,527	-0.05	2
Turda	69,967	-0.15	2
Baia Mare	139,214	-0.10	2

FASTEST GROWING CITIES

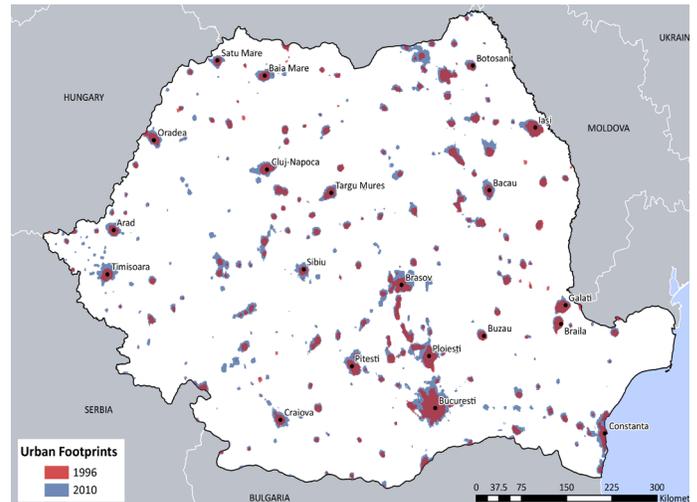
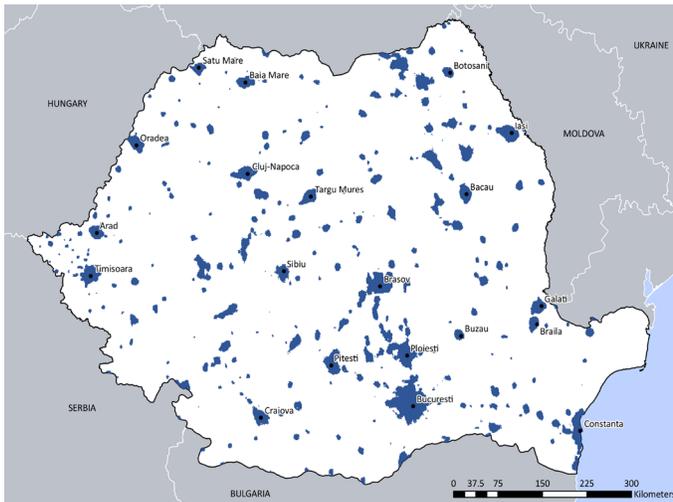
CITY	POPULATION 2011	% CHANGE 2002–2011	BELONGS TO AN AGGLOMERATION	AGGLOMERATION
Bragadiru	15,329	87.74	No	N/A
Pantelimon	25,596	59.79	No	N/A
Popesti-Leordeni	21,895	44.86	Yes	Bucuresti
Voluntari	42,944	43.07	Yes	Bucuresti
Otopeni	13,861	35.69	Yes	Bucuresti
Magurele	11,041	19.08	Yes	Turnu Magurele
Chitila	14,184	12.19	Yes	Bucuresti
Stefanesti	14,541	12.00	Yes	Pitesti
Bolintin-Vale	12,929	10.49	Yes	Bucuresti
Bufta	22,178	8.98	Yes	Bucuresti
Tandarei	13,219	6.07	No	N/A
Ovidiu	13,847	5.43	Yes	Constanta
Sacele	30,798	2.95	Yes	Brasov
Borsa	27,611	2.32	No	N/A
Cluj-Napoca	324,576	2.08	No	N/A



SPATIAL TRENDS OF THE URBAN SYSTEM

Despite widespread population decline, Romanian cities continue to increase in area. 126 identified cities in Romania increased in nighttime light footprint between 1996 and 2010 with an average area change of 237.00 percent (*please see page 4 for detailed explanation of identified*). Gorj, a region in southeastern Romania had the highest increase in nighttime light footprint. The magnitude of footprint growth in Romania is suggestive of urban sprawl. Data on built-up areas in Romania reveal built-up area growth between 1990 and 2013 that is 1.38 times larger than the average growth in ECA. Furthermore, the average built-up area per capita in Romania is nearly twice as large as ECA's average between 1990 and 2013.

Note: Night-Lights are used to define urban footprints and follow their change over time. A urban threshold (*above which a certain pixel is considered urban*) is estimated for each country and used to delimit cities' footprints. Agglomerations—as defined by NLS—are composed of cities whose NLS footprint merges. Single cities are cities who do not belong to any agglomeration.

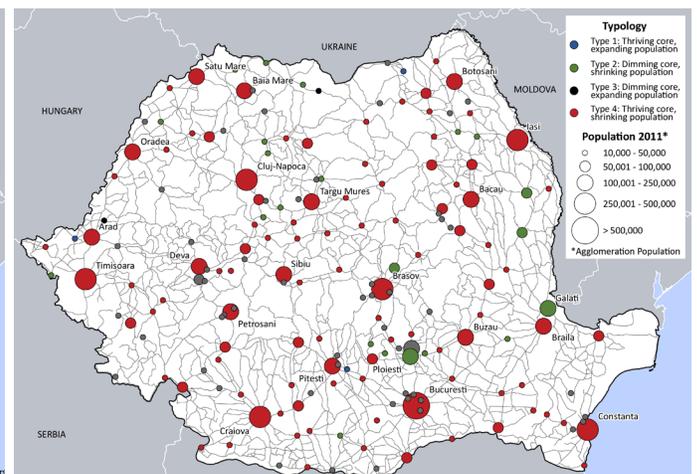
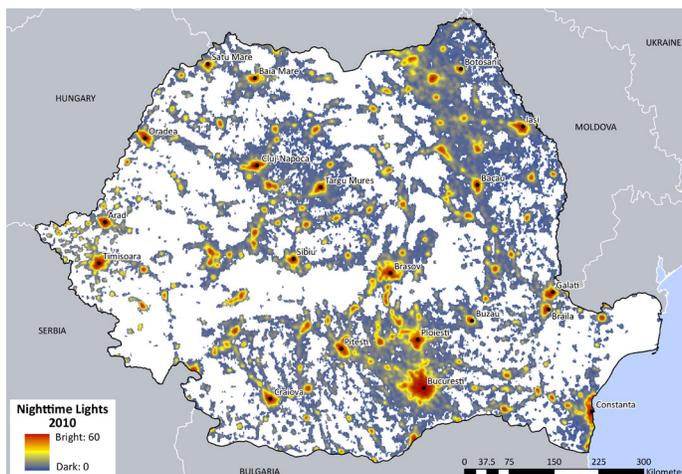


ECONOMICS OF THE URBAN SYSTEM

Romania is experiencing economic growth spurred by growth in the urban sector. Between 1996 and 2008 urban areas accounted for an estimated 91.72 percent of growth in Romania's gross value added. In 2008, the urban to rural population was 1.15, which suggest that urban areas are more productive than rural areas.

Romania's cities are growing in economic activity. Nighttime lights are used as a proxy for economic activity in this analysis (*please refer to page 1 for methodology*). According to the nighttime lights threshold used in this analysis, 96.40 percent of Romanian cities are growing in economic activity between 2000 and 2010. This is a substantial increase over only 40.29 percent of cities undergoing economic growth between 1996 and 2000. Tulcea, Constanta and Botosani, regions that are all located on the Eastern half of Romania, had the highest levels of nighttime lights growth between 2000 and 2010.

Note: Night-light intensity is being used as a proxy for economic activity at the city-level. For more information on the methodology please refer to page 1 of this snapshot. Gross value added (GVA) data by sector, as reported by the United Nations Statistics Bureau, is used to measure urban and rural production as a part of total production. The sectors were divided into those that are urban and those that are rural using the International Standard Industrial Classification of all economic activities (ISIC), rev. 3.





CITY TYPOLOGIES

Two city typologies were created based on nighttime lights (see below). These typologies are intended to shed light on economic and demographic trends in Romania's urban system. **Typology 1** divides cities based on whether they emit enough light to be classified as urban in 1996 and in 2010. In Romania, 89.78 percent of the cities emitted enough light to be considered urban in both periods (*identified*), 3.76 percent were only considered urban by nighttime lights standards in 2010 (*emerging*), 0.54 percent were considered urban only in 1996 (*submerging*) and the remaining 5.91 percent were not considered urban in both periods (*not identified*).

Typology 2 classifies identified cities into four types based on their nighttime light trends (*thriving or dimming*), which are used as a proxy for growing or declining levels of economic activity, and population trends (growing or declining). In Romania, 1.59 percent of the identified cities have a growing population and growing economic activity (*type 1*). Type 1 cities include Topoloveni and Radauti. 17.05 percent of the identified cities have a declining population and declining economic activity (*type 2*). Type 2 cities include Vaslui, Galati and Ploiesti. 0.78 percent of cities have a growing population and declining economic activity (*type 3*). The type 3 cities is Borsa. 80.62 percent of the identified cities have a declining population and growing economic activity (*type 4*). Type 4 cities include Cluj-Napoca, Bucuresti and Timisoara.

Note: TYPOLOGY 1: Divides cities into types depending on whether they satisfy a minimum level of light brightness that is pre-defined for the settlement to be considered urban. IDENTIFIED indicates cities that have night-lights data for both periods used in this analysis (1996 and 2010); EMERGING indicates cities that only have night-lights data for the second period; SUBMERGING indicate cities that only have night-lights data for the first period; NOT IDENTIFIED indicates cities that do not have night-lights data for either period.

TYPOLGY 2: Divides the IDENTIFIED cities into types according to whether they have positive or negative growth in population and NLS brightness. Growth is calculated between 1996 and 2010.

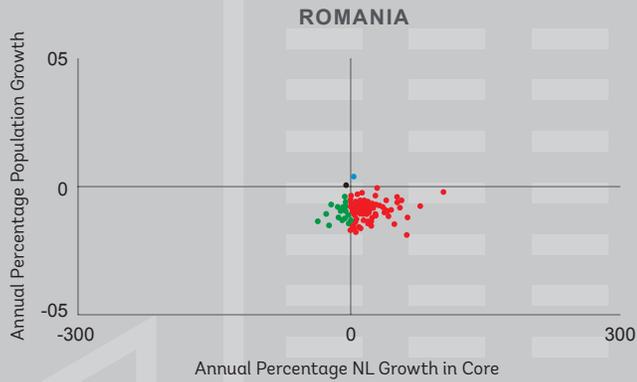
TYPOLGY 1			
TYPOLGY 1	DESCRIPTION	NUMBER	PERCENTAGE
Identified	City emits enough light in both 1996 & 2010	167	89.78
Emerging	City emits enough light only in 2010	7	3.76
Submerging	City emits enough light only in 1996	1	0.54
Non-Identified	City does not emit enough light in both 1996 & 2010	11	5.91

TYPOLGY 2			
TYPOLGY 2	DESCRIPTION	NUMBER	PERCENTAGE
Type 1 (Blue)	Growing population & growing economic activity (thriving core)	2	1.55
Type 2 (Green)	Declining population & declining economic activity (dimming core)	22	17.05
Type 3 (Black)	Growing population & declining economic activity (thriving core)	1	0.78
Type 4 (Red)	Declining population & growing economic activity (dimming core)	104	80.62

	TYPE 1: Growing Population & Growing Economic Activity	TYPE 2: Declining Population & Declining Economic Activity	TYPE 3: Growing Population & Declining Economic Activity	TYPE 4: Declining Population & Growing Economic Activity
Population 2011 (000s)	23.67 (19.03)	446.11 (66.35)	27.61 (N/A)	82.96 (205.85)
Average Annual Population Growth (% 1192–2011)	0.72 (0.42)	-0.94 (0.59)	0.03 (N/A)	-0.90 (0.69)
Total NLS Value in 2010 (000s)	7.74 (9.62)	3.52 (6.95)	0.78 (N/A)	7.23 (16.65)
NLS per Capita (2010)	0.35 (0.34)	0.06 (0.03)	0.03 (N/A)	0.09 (0.07)
NLS Growth (% 1996–2010)	39.85 (10.57)	-0.24 (14.33)	2.98 (N/A)	44.05 (27.13)
Examples of Cities	Topoloveni, Radauti	Vaslui, Galati, Ploiesti	Borsa	Cluj-Napoca, Bucuresti, Timisoara

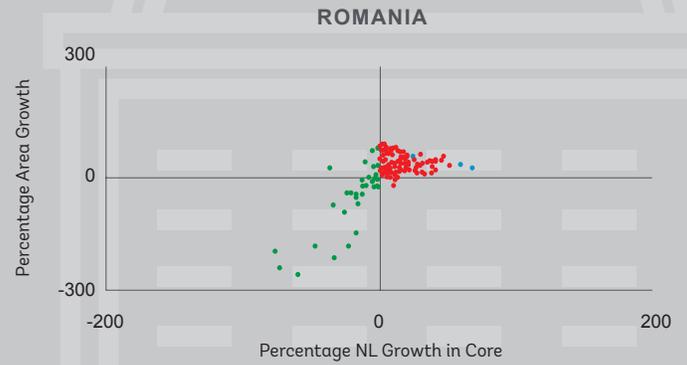
A spatial component added to the Typology 2 classification provides insight on the interaction between spatial, economic and demographic trends across Romania's urban system. According to the nighttime lights threshold used in this analysis, a majority of the **type 2 cities** (*declining population, declining economic activity*) and **type 4 cities** (*declining population, growing economic activity*) shrank in nighttime light footprints. The **type 1** (*growing population, growing economic activity*) and **type 3** (*growing population, declining economic activity*) cities expanded in nighttime lights footprint.

POPULATION AND ECONOMIC DYNAMICS*



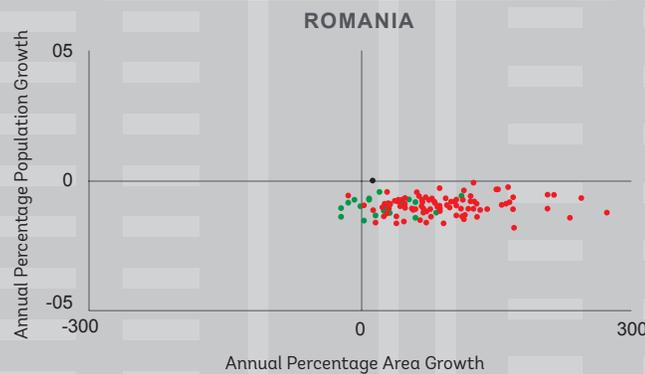
* Econ growth in NLS growth 1996–2010.
Population growth in annual avg. 1992–2011.

SPATIAL AND ECONOMIC DYNAMICS*



* Area growth in NLS footprint growth 1986–2010;
Population growth in annual avg. 1992–2011.

POPULATION AND SPATIAL DYNAMICS*



* Area growth is NLS footprint growth 1996–2010;
Population growth in annual avg. 1992–2011.

■ **Type 1:** Growing population, growing economic activity ■ **Type 2:** Declining population, declining economic activity

■ **Type 3:** Growing population, declining economic activity ■ **Type 4:** Declining population, growing economic activity



CONCLUSIONS

Romania has been experiencing a very significant decline in its population. Over the periods analyzed in this snapshot, Romania's population has declined sharply with no indications of stabilizing. The population decline in Romania is intensified by an ageing population and fertility levels that are below replacement levels.

This level of indiscriminate decline across Romania's urban system means that the country is deurbanizing, albeit slowly. Unlike other countries that are declining in the region, the decline in Romania's urban areas slightly outpace the decline in rural areas. Within Romania's urban system, the level of decline is fairly consistent although the decline in settlements between 50 and 100 thousand inhabitants is highest. Unlike patterns observed in other countries in the region, in Romania the main cities in the core of an agglomeration are not attracting population.

Instead, it is the small cities surrounding the core of the an agglomeration that are attracting population, which is suggestive of suburbanization. Cities in Romania continue to expand their urban footprints despite population decline. Although footprint expansion is not to the extent that is observed in other countries in the region, given the magnitude of population decline in Romania, footprint growth suggest urban sprawl across Romania's urban system. Between 1990 and 2013 the built-up areas in Romania increased by more than 100 percent, outpacing the average growth of built-up areas in ECA.

In addition to footprint growth, cities in Romania continue to grow in economic activity as measured by growth in nighttime lights between 1996 and 2010. Urban sectors contribute to a majority of the growth of Romania's GVA. Furthermore, urban areas although only slightly more populated than rural areas constitute a higher share of economic output, which suggest that urban areas are more product than rural areas. The increase in economic activity in Romania despite persistent population decline suggest that in Romania urban population decline is not always linked to economic decline.

The typology of decline in Romania leans heavily towards population decline and economic growth. As a result and unlike most countries in the region, there is a need to focus on developing an approach that can adequately address population decline in urban areas, urban sprawl and aging while fostering the economic potential of Romania's urban system.



WORLD BANK GROUP
Social, Urban, Rural & Resilience



UKaid
from the British people