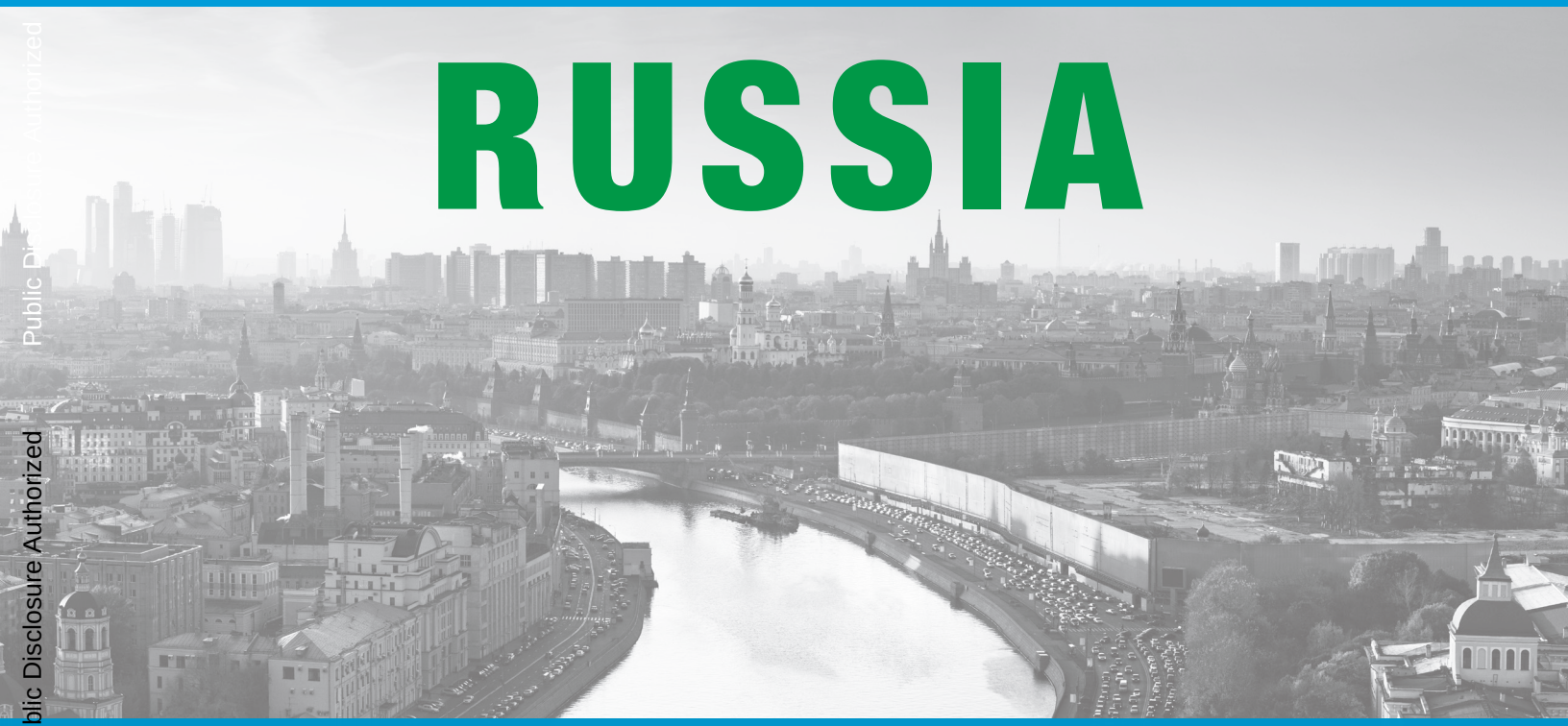
Public Disclosure Authorized

CITIES IN EUROPE AND CENTRAL ASIA

RUSSIA



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 Russia. The results suggest a significant and positive correlation between NLS intensity and GDP. In Russia, GDP to NLS elasticity was found to be 0.23 *(an increase in light intensity of 1 percent is associated with a 0.23 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 1,097 settlements in Russia as cities. Demographic trends are available for all 1,097 cities but NLS analysis is only available for 818 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

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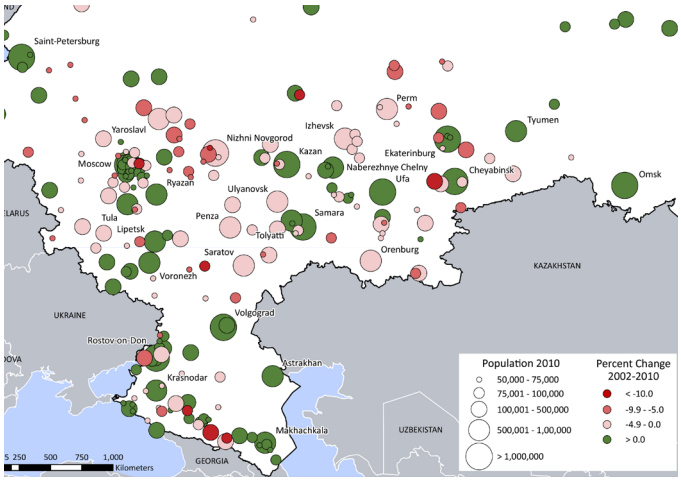
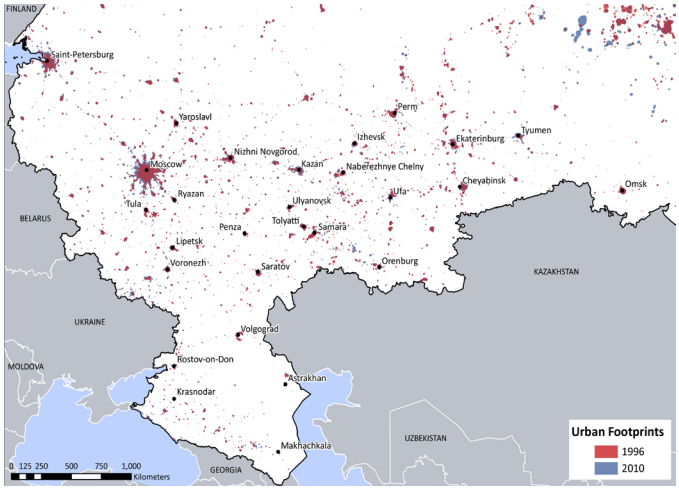
DEMOGRAPHICS

		BEFORE	RECENTLY
Fertility Rates	Russia	2.01[1]	1.57[2]
	ECA	1.95[1]	1.72[2]
Life Expectancy	Russia	69.17[1]	68.85[2]
	ECA	72.05[1]	75.83[2]
% of Population Above Age 65	Russia	10.06[1]	13.08[2]
	ECA	11.59[1]	14.65[2]
Population Growth (Average Annual %)	Russia	-0.07[3]	-0.24[4]
	ECA	0.26[3]	0.33[4]
Urban Population Growth (Average Annual %)	Russia	-0.06[3]	-0.19[4]
	ECA	0.41[3]	0.58[4]
Urbanization Level (%)	Russia	73.79[1]	73.68[2]
	ECA	67.30[1]	79.85[2]
Annual Urbanization Rate (%)	Russia	-0.01[3]	0.05[4]
	ECA	0.14[3]	0.24[4]
City Average Population	Russia	89,243[1]	88,846[2]
	ECA	72,515[1]	75,132[2]
% Cities With More Than 100,000	Russia	15.45[1]	14.94[2]
	ECA	12.97[1]	20.07[2]
% Cities With More Than 500,000	Russia	3.20[1]	3.37[2]
	ECA	2.03[1]	2.27[2]
% Cities losing Population	Russia	65.12[3]	59.58[4]
	ECA	73.42[3]	61.58[4]



SPATIAL

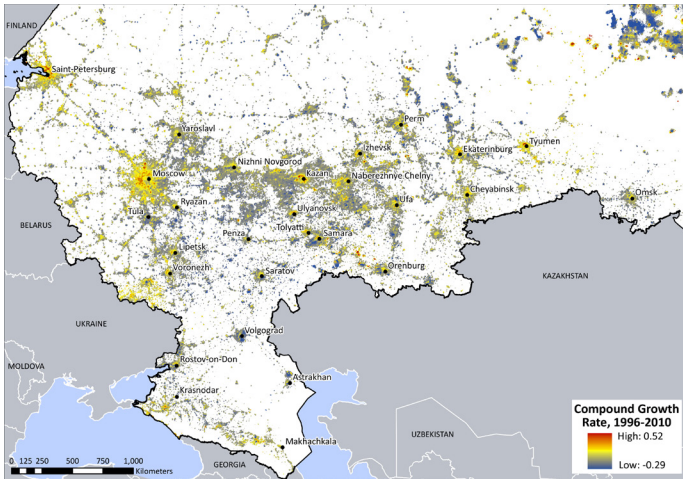
		BEFORE	RECENTLY
Built Up Area (100,000km²)	Russia	30,480[5]	51,214[6]
	ECA	156,892[5]	288,046[6]
Built Up m² Per Capita	Russia	205.54[5]	356.89[6]
	ECA	186.18[5]	320.89[6]
Built Up Area Growth (%)	Russia	68.02[7]	
	ECA	83.59[7]	
Built Up m² Per Capita Growth (%)	Russia	73.63[7]	
	ECA	72.13[7]	
Number of Cities in Analysis	Russia	1,097[8]	
	ECA	2,712[8]	
Number of Identified Cities (NLS)	Russia	818[9]	
	ECA	3,883[9]	
Number of Growing Cities (NLS Area)	Russia	354[9]	
	ECA	1,645[9]	
Number of Agglomerations(NLS)	Russia	64[9]	
	ECA	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 (%)	Russia	-2.24[3]	4.91[4]
	ECA	1.99[3]	1.69[4]
Annual GDP per capital growth (%)	Russia	-2.11[10]	5.17[4]
	ECA	1.72[10]	1.36[4]
Estimated contribution of urban GVA to GDP growth (%)	Russia	89.41[11]	
	ECA	—	
Unemployment Rate (%)	Russia	7.30[2]	
	ECA	9.33[2]	
Poverty rate (% at national poverty line)	Russia	12.50[2]	
	ECA	—	
Urban to rural GVA ratio	Russia	8.65[12]	
	ECA	—	
Urban NLS Intensity Growth (%, annual average)	Russia	-6.75[13]	6.25[14]
	ECA	2.20[13]	4.03[14]
% City Economies Growing (in NLS intensity)	Russia	8.44[13]	89.47[14]
	ECA	58.74[13]	81.01[14]
GDP to NLS Elasticity	Russia	0.23[9]	
	ECA	0.37[9]	

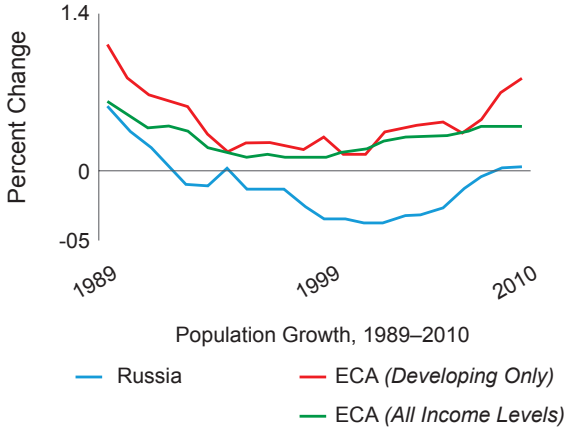


[1] 1989, [2] 2010, [3] 1989–2002, [4] 2002–2010, [5] 1990, [6] 2013, [7] 1990–2013, [8] 1989–2010, [9] 1996–2010, [10] 1990–2002, [11] 2002–2008, [12] 2008 [13] 1996–2000, [14] 2000–2010.

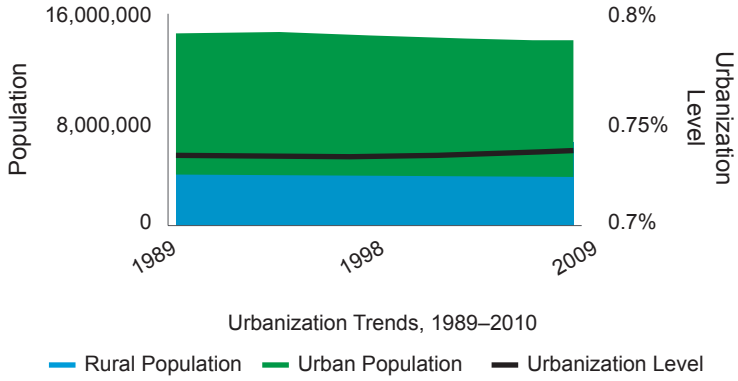
URBANIZATION TRENDS

Over the past two decades Russia has undergone population decline. Between 1989 and 2002 Russia averaged an annual population loss of 0.07 percent. Between 2002 and 2010 this decline persisted and Russia averaged an annual population loss of 0.24 percent. Beginning in 2009 Russia has witnessed a stabilization of its population, which grew by 0.04 percent. Historically, Russia's population loss has surpassed ECA's *(developed and developing)*.

Despite a declining population Russia continues to urbanize. By the fall of the Soviet Union Russia's urbanization level was well above ECA's at 73.39 percent. Between 1989 and 2010 the urbanization level increased a mere 0.29 percent to 73.68 percent. Russia's urban and rural populations have both declined between 1989 and 2010. However, Russia's rural population, which comprises a smaller share of total population, has declined three times faster than the urban population. As a result, although the urban population also declined by an annual average of 0.19 percent between 2002 and 2010, the urbanization rate grew an annual average of 0.05 percent in the same period.



Population Growth, 1989–2010



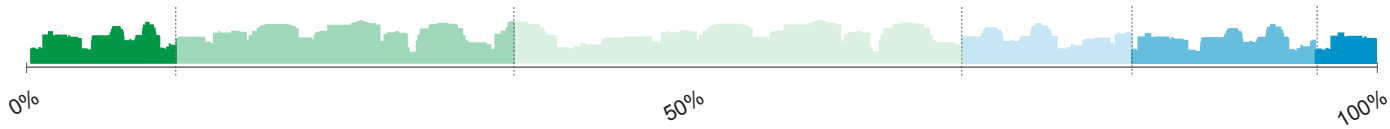
Urbanization Trends, 1989–2010

DEMOGRAPHICS OF THE URBAN SYSTEM

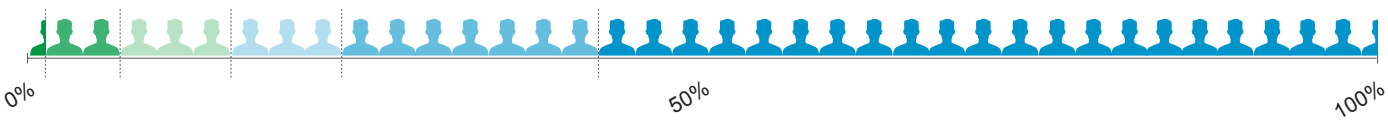
There is a large number of small cities in Russia but the majority of the urban population lives in major cities. In 2010, 70 percent of Russia's urban system was comprised of small, mid-sized and large towns *(populations of less than 50 thousand inhabitants)*. Despite the large number of towns in Russia, in 2010 over 85 percent of the population resided in cities with more than 50 thousand inhabitants. In fact, in 2010, 43 percent of the population resided in cities with more than 500 thousand inhabitants. Although Russia's population is declining, the average city size in Russia has increased by 1,449 inhabitants between 1989 and 2010.

Growth and decline is not occurring evenly across Russia's urban system. 73.42 percent of the cities in Russia declined in population between 2002 and 2010. Cities smaller than 100 thousand inhabitants are, on average, declining in population while cities with more than 500 thousand inhabitants are, on average, growing. Of the 15 fastest growing cities in Russia, eight belong to agglomerations *(as defined by the nighttime lights threshold used in this analysis)* including the Moscow, Vladivostok and Nazran agglomerations *(see tables below)*. Magas, the fastest growing city in the Nazran agglomeration (increased in population by 809.81 percent between 2002 and 2010), is a planned city that replaced Nazran as the capital of the Republic of Ingushetia. This analysis includes data on 224 mono-towns whose economies are dominated by a single industry. Mono-towns declined, on average, by 6.72 percent in population compared to the national average decline of 2.63 percent between 2002 and 2010. Finally, there are no visible patterns in the spatial distribution of growing and declining cities in Russia.

DISTRIBUTION OF CITIES BY CITY SIZE: **2010**



URBAN POPULATION DISTRIBUTION BY CITY SIZE: **2010**



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 2010	% CHANGE 2002–2010
Moscow	1,1503,501	13.59
Saint-Petersburg	4,879,566	4.68
Novosibirsk	1,473,754	3.38
Ekaterinburg	1,349,772	4.34
Nizhniy Novgorod	1,250,619	-4.62
Samara	1,164,685	0.58
Omsk	1,154,116	1.77
Kazan	1,143,535	3.46
Chelyabinsk	1,130,132	4.91
Rostov-on-Don	1,089,261	1.96
Ufa	1,062,319	1.90
Volgograd	1,021,215	0.96
Perm	991,162	-1.04
Krasnoyarsk	973,826	7.09
Voronezh	889,680	4.82

LARGEST URBAN AGGLOMERATIONS

AGGLOMERATION MAIN CITY	POPULATION 2010	% CHANGE 2002–2010	CITY COUNT
Moscow	14983835	11.78	44
Saint-Petersburg	5103758	4.94	6
Nizhni Novgorod	1687595	-4.03	5
Ekaterinburg	1495845	4.39	5
Kazan	1307227	2.33	4
Cheyabinsk	1306330	3.71	3
Irkutsk	869401	-2.12	3
Samara	1345815	0.08	3
Orekhovo-Zuevo	163811	-0.93	3
Leninsk-Kuznetskiy	206054	-7.53	3
Volgograd	1351468	0.94	3
Serpukhov	175931	-1.93	3
Novokuznetsk	856399	-2.77	3
Apatity	113947	-5.33	3
Rostov-on-Don	1232896	1.91	3

FASTEST GROWING CITIES

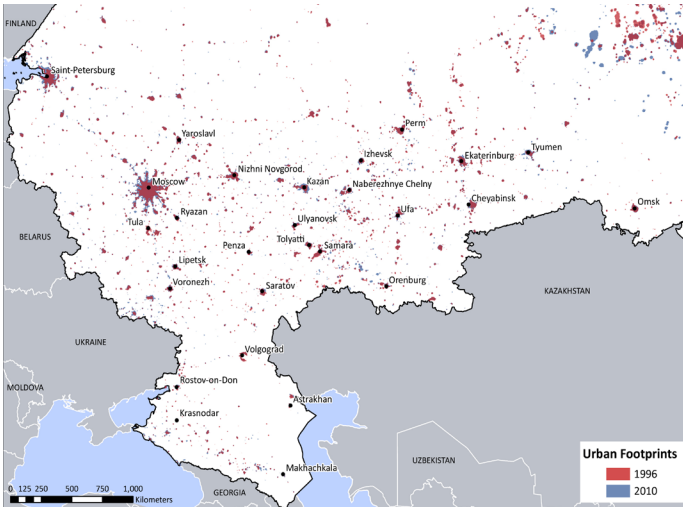
CITY	POPULATION 2010	% CHANGE 2002–2010	BELONGS TO AN AGGLOMERATION	AGGLOMERATION
Magas	2,502	809.81	Yes	Nazran
Donskoi	64,552	97.14	No	N/A
Kotelniki	32,338	82.21	Yes	Moscow
Domodedovo	96,145	77.78	Yes	Moscow
Artem	102,603	59.95	Yes	Vladivostok
Khanty-Mansiysk	80,151	48.55	No	N/A
Khimki	207,425	47.10	Yes	Moscow
Balashikha	215,494	45.69	Yes	Moscow
Pushkino	102,874	42.04	Yes	Moscow
Izerbash	55,646	41.35	No	N/A
Volokolamsk	23,433	40.68	No	N/A
Gudermes	45,631	35.17	No	N/A
Zvenigorod	16,395	34.88	Yes	Moscow
Dolgoprudniy	90,956	32.21	No	N/A
Kirzhach	29,965	31.98	No	N/A

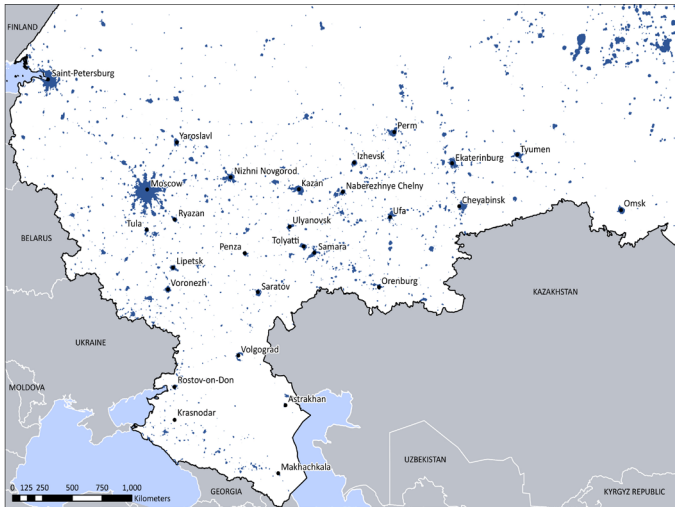
SPATIAL TRENDS OF THE URBAN SYSTEM

Most of the activity identified by the nighttime lights is concentrated in Central and Southern Russia, Urals and parts of Siberia. Despite this, there are cities in the Far East classified as urban based on the amount of nighttime lights they emit between 1996 and 2010 *(please refer to page 4 for detailed explanation of identified)*.

The identified cities in Russia are split between those that have grown in area and those that have declined in area. 47.32 percent of the identified cities declined in area between 1996 and 2010. In the same period, 52.68 percent of the identified cities experienced positive area growth. The average area change of all 690 identified cities in Russia was 39.40 percent with a standard deviation of 335.11 percent. 48 of the cities in Russia, a majority of which are located in Western Russia along the border shared with Eastern Europe and Central Asia, experienced growth in area greater than 100.00 percent. These cities include Sochi, Belgorod, and Kalingrad. Volgograd and Samara, also located in Western Russia, are 2 cities with populations over 1 million that experienced declines in area of—22.28 and—11.01 percent, respectively.

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.



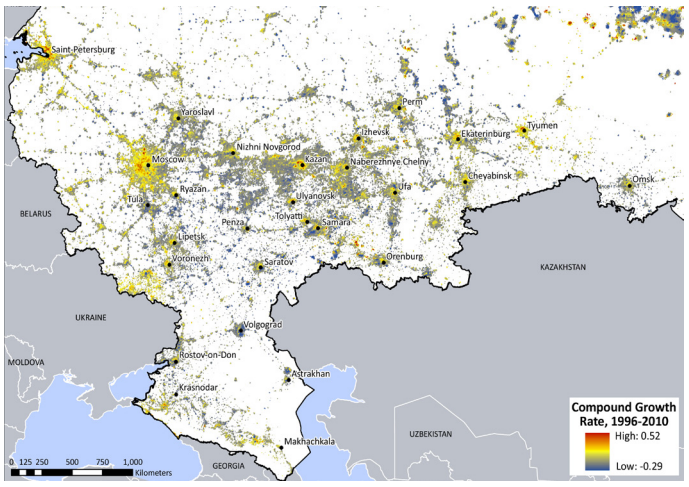


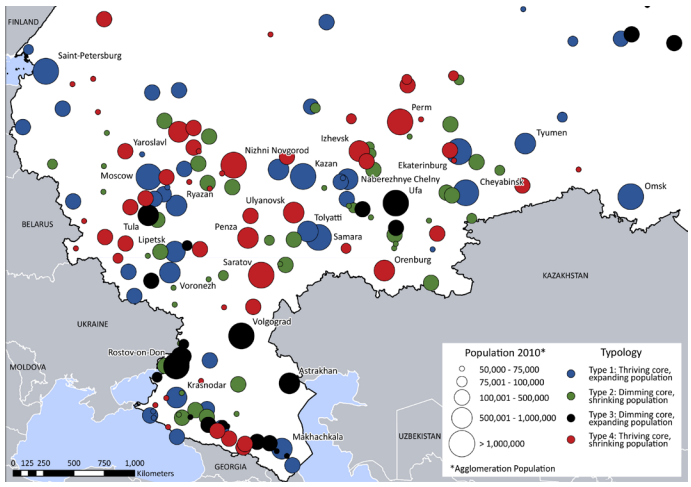
ECONOMICS OF THE URBAN SYSTEM

The urban sector is a critical component of Russia's economic growth. From 2002 to 2008 growth in the urban sector accounted for an estimated 89.41 percent of the growth in Russia's GVA. In 2008, the urban to rural GVA ratio was 8.65 while the urban to rural population ratio was 2.78, which indicates that urban areas are more productive per person than rural areas in Russia.

Russia's cities are growing in economic activity. Nighttime lights are used as a proxy for economic activity in this analysis *(please refer to methodology on page 1)*; according to the nighttime lights threshold used in this analysis, 89.47 of cities in Russia have experienced an increase in economic activity between 2000 and 2010. This represents a dramatic increase from only 8.44 percent of cities increasing in economic activity between 1996 and 2000. Leningrad Oblast in Northwestern Russia, which includes the city of Saint-Petersburg, contained cities whose average increase in economic activity was the highest in Russia at 17.17 percent 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 Russia '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 Russia, 74.57 percent of the cities emitted enough light to be considered urban in both periods *(identified)*, 1.64 percent were only considered urban by nighttime lights standards in 2010 *(emerging)* and the remaining 23.79 percent were not considered urban in both periods *(not identified)*. Ten of the eighteen emerging cities are located along Russia's Western border with Ukraine and Belarus. Additionally, Kaliningrad Oblast, a region located between Lithuania and Poland, has the highest concentration of emerging cities in Russia.

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 Russia, 14.20 percent of the identified cities have a growing population and growing economic activity *(type 1)*. **Type 1 cities** include Moscow, Saint-Petersburg and Novosibirsk. 45.27 percent of the identified cities have a declining population and declining economic activity *(type 2)*. **Type 2 cities** include Nizhniy Tagil, Murmansk and Ufa. 14.05 percent of cities have a growing population and declining economic activity *(type 3)*. **Type 3 cities** include Rostov-on-Don, Surgut and Volgograd. 26.48 percent of the identified cities have a declining population and growing economic activity *(type 4)*. **Type 4 cities** include Nizhniy Novgorod, Perm and Ekaterinburg.

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.

TYPOLOGY 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.

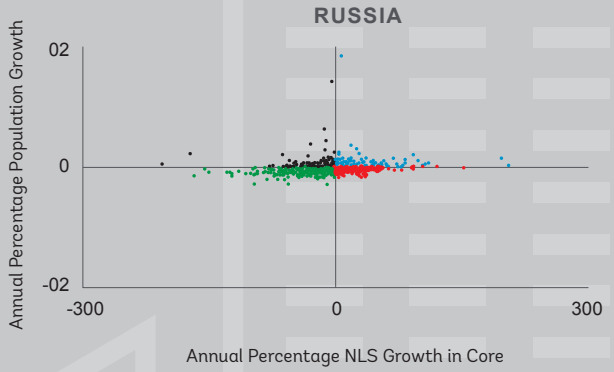
TYPOLOGY 1			
TYPOLOGY 1	**DESCRIPTION**	**NUMBER**	**PERCENTAGE**
Identified	City emits enough light in both 1996 & 2010	818	74.57
Emerging	City emits enough light in only 2010	18	1.64
Submerging	City emits enough light only in 1996	0	0.00
Non-Identified	City does not emit enough light in both 1996 & 2010	261	23.79

TYPOLOGY 2			
TYPOLOGY 2	**DESCRIPTION**	**NUMBER**	**PERCENTAGE**
Type 1 (Blue)	Growing population & growing economic activity **(thriving core)**	96	14.20
Type 2 (Green)	Declining population & declining economic activity **(dimming core)**	306	45.27
Type 3 (Black)	Growing population & declining economic activity **(thriving core)**	95	14.05
Type 4 (Red)	Declining population & growing economic activity **(dimming core)**	179	26.48

	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 2014 (000s)	**408.62** (1,274.29)	**44.018** (81.40)	**89.28** (162.07)	**121.58** (220.29)
Average Annual Population Growth (% 2002-2014)	**0.85** (1.16)	**-0.83** (0.54)	**0.94** (1.82)	**-0.53** (0.38)
Total NLS Value in 2010 (000s)	**111.28** (371.54)	**8.12** (21.93)	**23.13** (74.20)	**31.71** (65.02)
NLS per Capita (2010)	**0.26** (0.36)	**0.15** (0.17)	**0.21** (0.56)	**0.25** (0.22)
NLS Growth (% 2000–2010)	**75.43** (87.68)	**-11.77** (23.18)	**-7.18** (19.91)	**40.24** (30.31)
Examples of Cities	**Moscow, Saint-Petersburg, Novosibirsk**	**Murmansk, Ufa, Nizhniy Tagil**	**Rostov-on-Don, Surgut, Volgograd**	**Perm, Nizhniy Novgorod, Ekaterinburg**

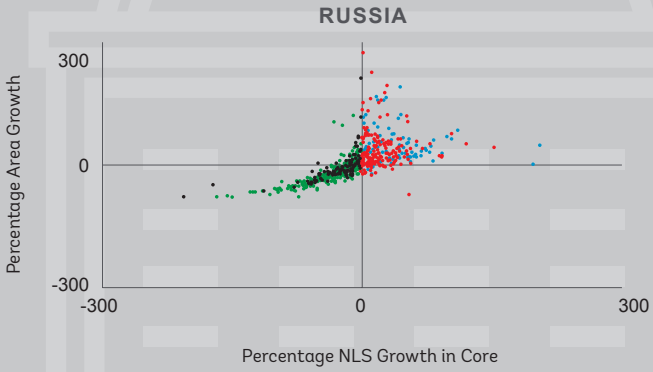
A spatial component added to the **Typology 2** classification provides insight on the interaction between spatial, economic and demographic trends across Russia's urban system. Adding the spatial element reveals that 81.00 percent of **type 2 cities** *(declining population and economic activity)* and 63.00 percent of **type 3 cities** *(growing population and declining economic activity)* are declining in area. On the other hand, 96.12 percent of **type 1 cities** *(growing population and growing economic activity)* and 91.06 percent of **type 4 cities** *(declining population and economic activity)* are increasing in area.

POPULATION AND ECONOMIC DYNAMICS*



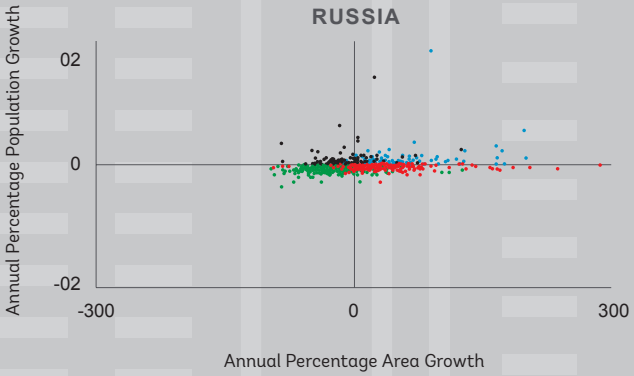
* Econ growth is NLS growth (1996–2010);
Population growth is annual avg (1989–2010).

SPATIAL AND ECONOMIC DYNAMICS*



* Area growth is NLS footprint growth 1996–2010);
Econ growth is NLS growth (1996–2010).

POPULATION AND SPATIAL DYNAMICS*



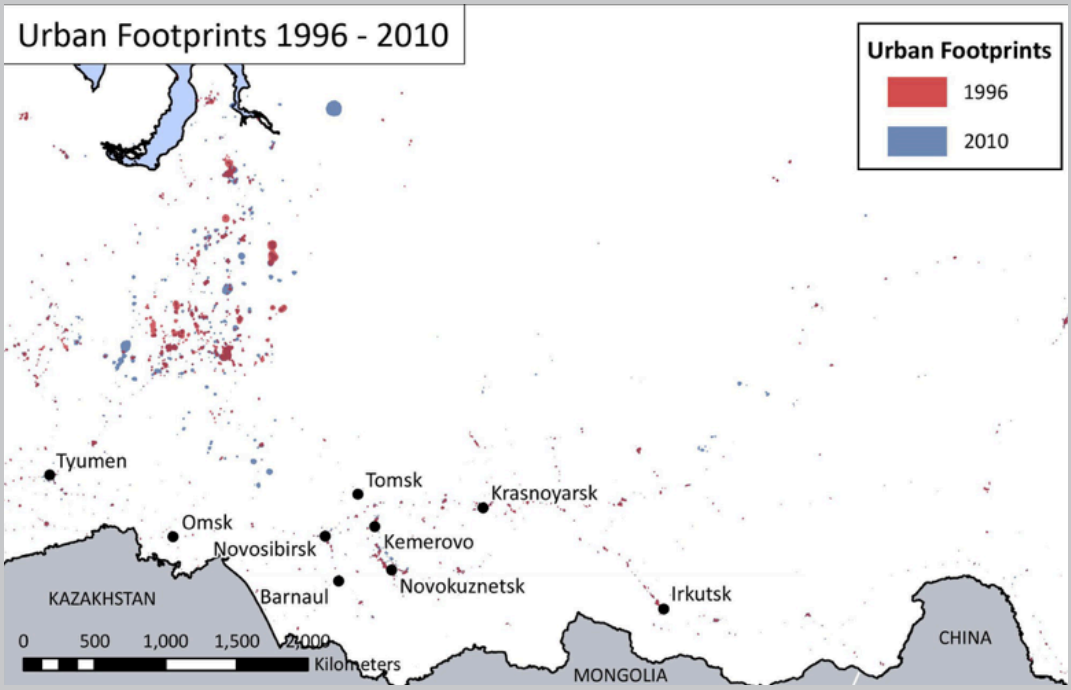
* Area growth is NLS footprint growth (1996–2010);
Population growth is annual average growth (1989–2010).

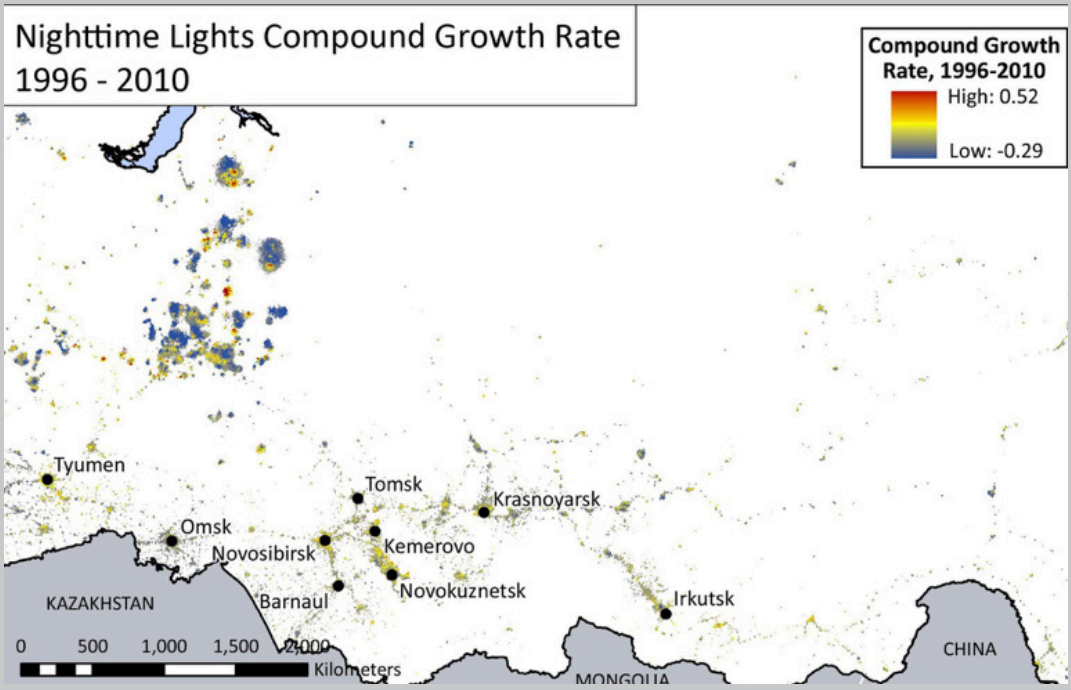
Type 1: Growing population, growing economic activity

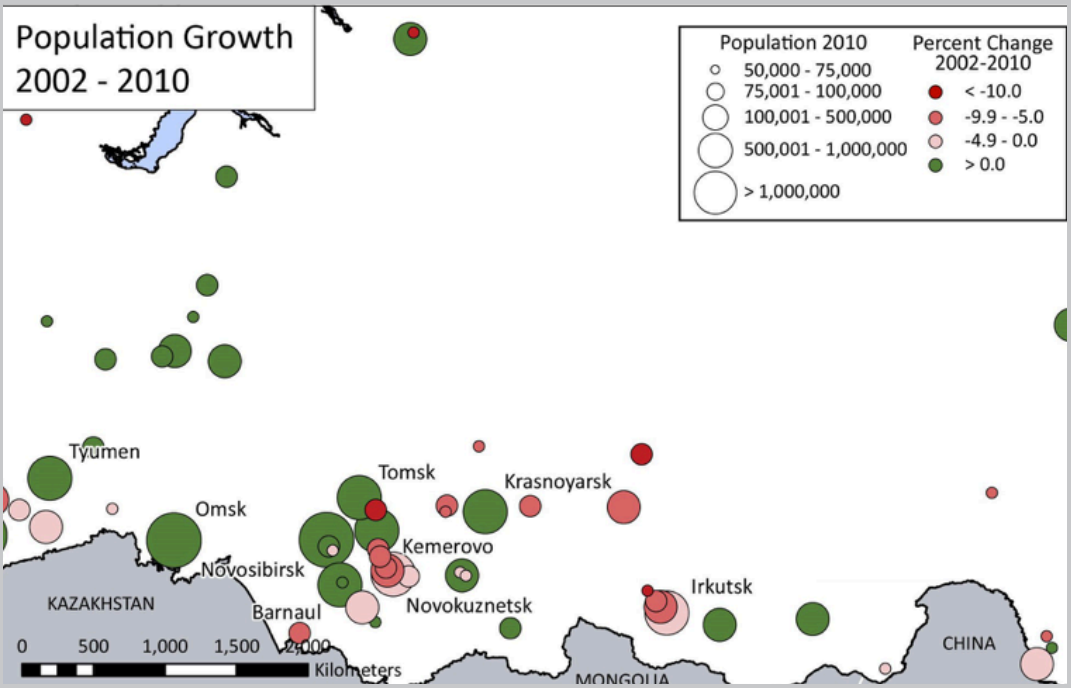
Type 2: Declining population, declining economic activity

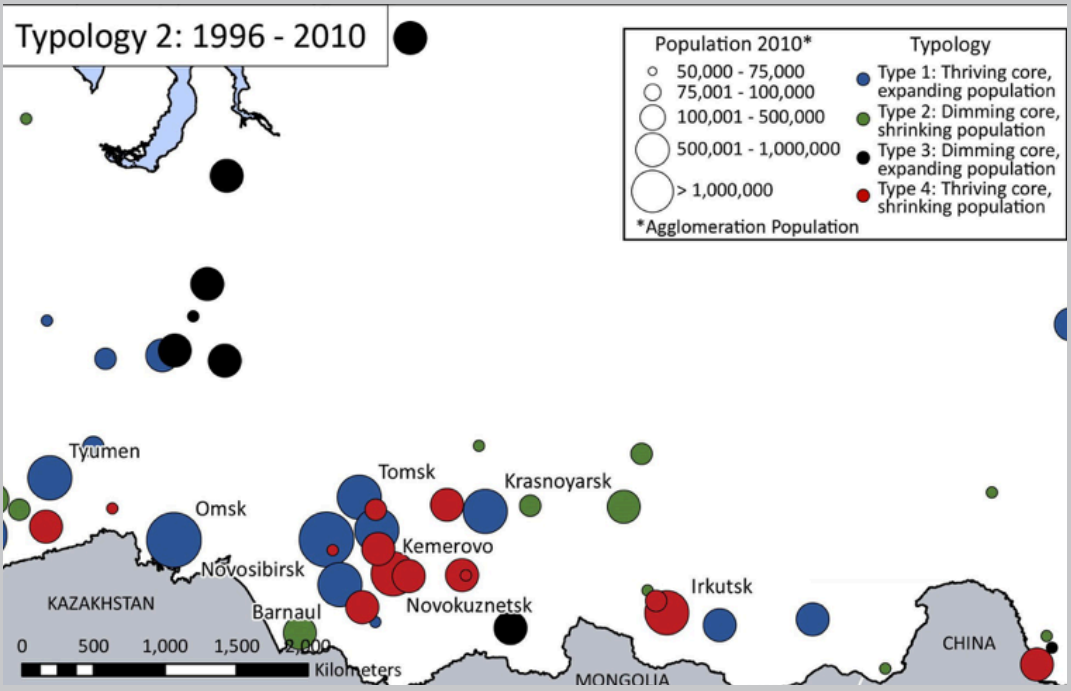
Type 3: Growing population, declining economic activity

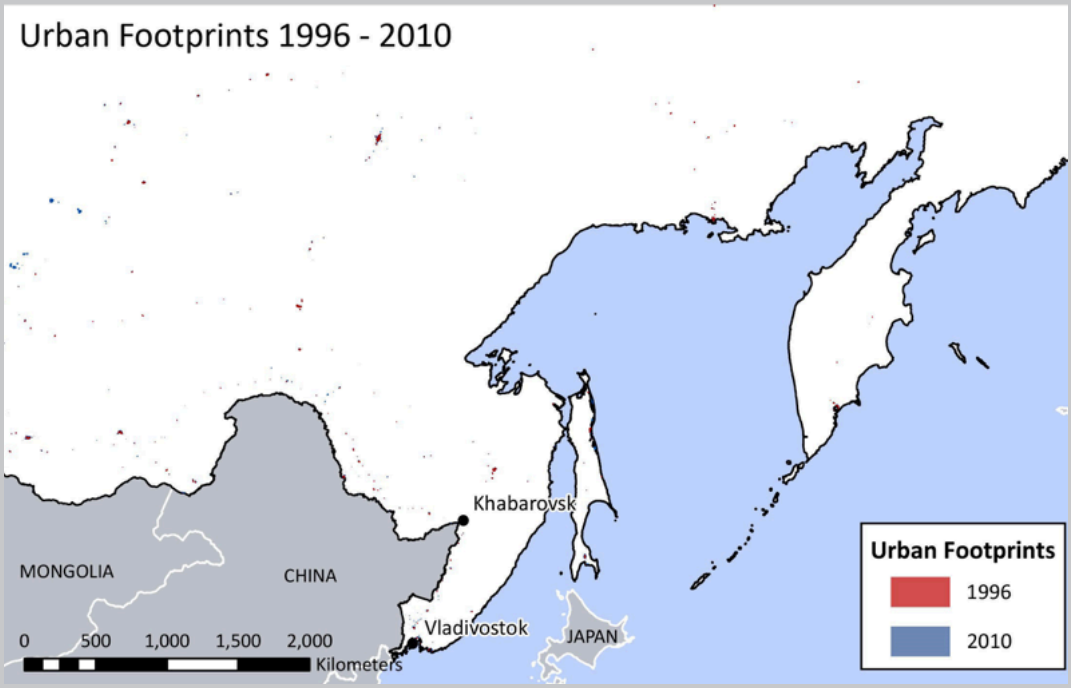
Type 4: Declining population, growing economic activity

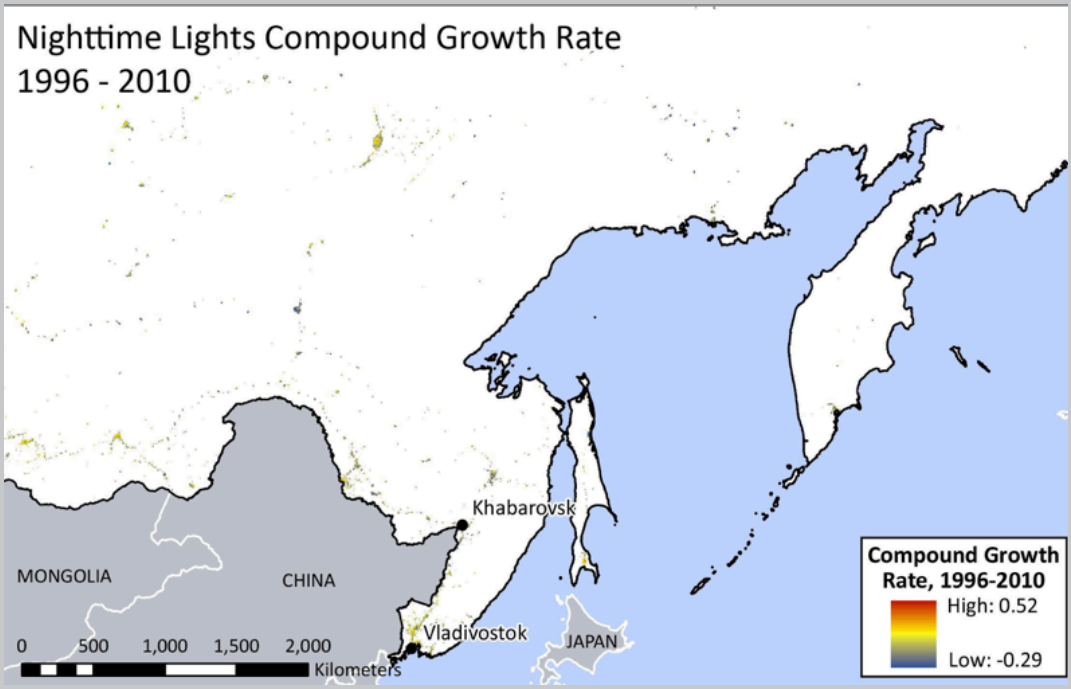

Urban Footprints 1996 - 2010
Urban Footprints
1996
2010
Tyumen
Tomsk
Krasnoyarsk
Omsk
Novosibirsk
Kemerovo
Novokuznetsk
Barnaul
Irkutsk
KAZAKHSTAN
CHINA
MONGOLIA
0 500 1,000 1,500 2,000
Kilometers

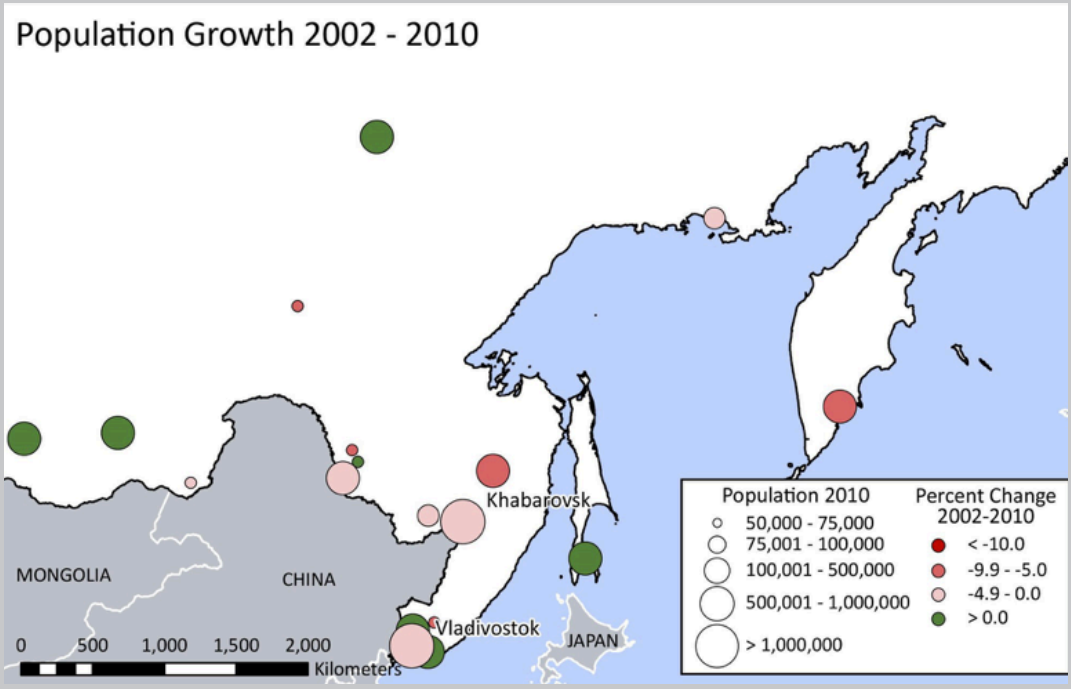

Nighttime Lights Compound Growth Rate 1996 - 2010
Compound Growth Rate, 1996-2010
High: 0.52
Low: -0.29
Tyumen
Tomsk
Krasnoyarsk
Omsk
Novosibirsk
Kemerovo
Novokuznetsk
Barnaul
Irkutsk
KAZAKHSTAN
CHINA
MONGOLIA
0 500 1,000 1,500 2,000
Kilometers

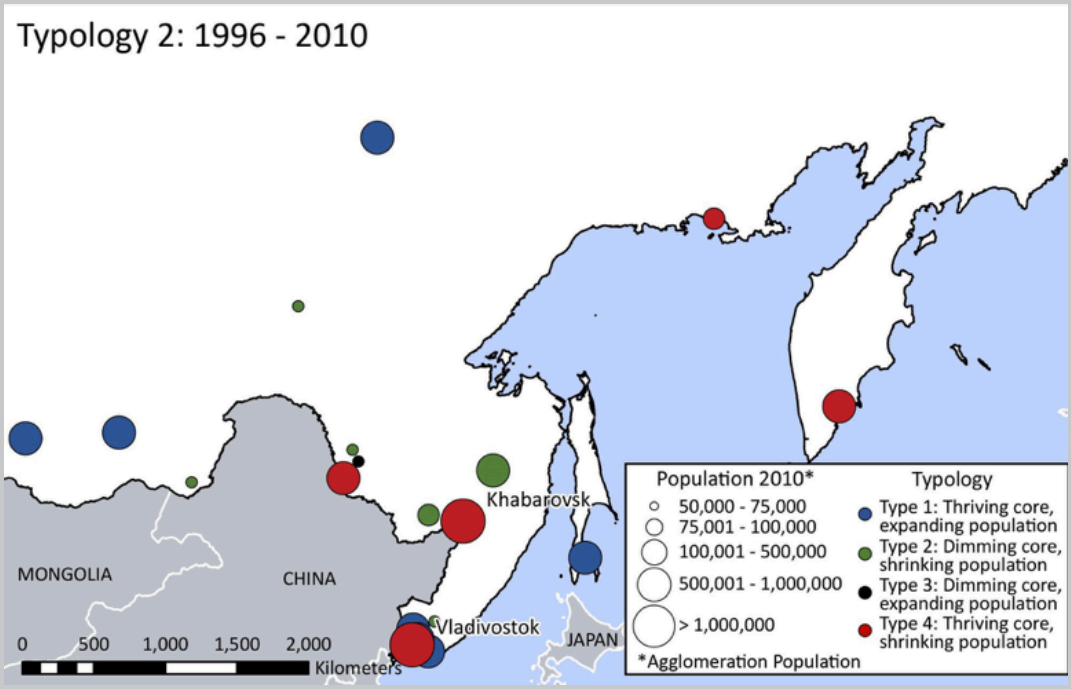

Population Growth
2002 - 2010
Population 2010
50,000 - 75,000
75,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
> 1,000,000
Percent Change
2002-2010
< -10.0
-9.9 - -5.0
-4.9 - 0.0
> 0.0
Tyumen
Omsk
Tomsk
Krasnoyarsk
Kemerovo
Novosibirsk
Barnaul
Novokuznetsk
Irkutsk
KAZAKHSTAN
CHINA
MONGOLIA
0 500 1,000 1,500 2,000
Kilometers


Typology 2: 1996 - 2010
Population 2010*
50,000 - 75,000
75,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
> 1,000,000
*Agglomeration Population
Typology
Type 1: Thriving core, expanding population
Type 2: Dimming core, shrinking population
Type 3: Dimming core, expanding population
Type 4: Thriving core, shrinking population
Tyumen
Omsk
Tomsk
Krasnoyarsk
Kemerovo
Novosibirsk
Barnaul
Novokuznetsk
Irkutsk
KAZAKHSTAN
CHINA
MONGOLIA
0 500 1,000 1,500 2,000
Kilometers


Urban Footprints 1996 - 2010
Khabarovsk
MONGOLIA
CHINA
Vladivostok
JAPAN
0 500 1,000 1,500 2,000
Kilometers
Urban Footprints
1996
2010


Nighttime Lights Compound Growth Rate
1996 - 2010
Khabarovsk
MONGOLIA
CHINA
Vladivostok
JAPAN
0 500 1,000 1,500 2,000
Kilometers
Compound Growth Rate, 1996-2010
High: 0.52
Low: -0.29


Population Growth 2002 - 2010
Khabarovsk
Vladivostok
MONGOLIA
CHINA
JAPAN
0 500 1,000 1,500 2,000
Kilometers
Population 2010
50,000 - 75,000
75,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
> 1,000,000
Percent Change 2002-2010
< -10.0
-9.9 - -5.0
-4.9 - 0.0
> 0.0


Typology 2: 1996 - 2010
Khabarovsk
Vladivostok
MONGOLIA
CHINA
JAPAN
0 500 1,000 1,500 2,000
Kilometers
Population 2010*
50,000 - 75,000
75,001 - 100,000
100,001 - 500,000
500,001 - 1,000,000
> 1,000,000
*Agglomeration Population
Typology
Type 1: Thriving core, expanding population
Type 2: Dimming core, shrinking population
Type 3: Dimming core, expanding population
Type 4: Thriving core, shrinking population

CONCLUSIONS

Russia's population has been declining over the past two decades. Major cities like Nizhniy Novgorod, Saratov and Ulyanovsk, with populations above 500 thousand inhabitants have faced population decline above 3 percent between 2002 and 2010. Despite Russia's declining population, the country continues to slowly urbanize reaching levels that are on par with ECA's average urbanization level in 2010. At the city-level, demographic trends suggest that population decline has concentrated in cities below 100 thousand inhabitants, while larger cities continue to attract population.

In Russia, the majority of nighttime lights activity is concentrated in the West although the Southern part of Siberia also contains major cities and pockets of economic activity. Nighttime lights analysis shows a split between cities that are growing in area *(51.18 percent of identified cities)* and those that are declining in area (*48.82 percent of identified cities)*. In addition, type 4 cities that are declining in population but growing in economic activity have on average grown in area by 113.46 percent, which suggest urban sprawl. These sprawling cities include Kaluga, Blagoveshchensk and Izhevsk. In contrast, type 2 cities, like Troitsk and Apatity, which are also losing population, have on average declined in area by 20.35 percent.

Our estimates suggest that urban sectors are a critical component of economic growth in Russia and contribute to a large share of GVA growth. Furthermore, urban sectors are estimated to be more than three times more productive than rural sectors. According to the nighttime lights threshold used in this analysis, most cities in Russia continue to thrive economically despite two decades of population decline.

Russia has a high density of cities —a majority of which are concentrated in the west. Additionally, the country has undergone a period of population decline that has recently begun to stabilize. While an important share of cities in Russia are declining in population and in economic activity, some cities continue to grow economically despite population decline; which suggest that urban population decline is not always linked to economic decline. Given diverging trends within Russia's urban system, there is a need to develop a dual approach to urban development. This dual approach must adequately address cities that are growing in population and economic activity while als o addressing those cities that are declining in population.

WORLD BANK GROUP
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