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UKRAINE

Urbanization Review

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List of Acronyms

CDS	City Development Strategy
CIS	Commonwealth of Independent States
CIT	Corporate Income Tax
DN	Digital Number
EBRD	European Bank for Reconstruction and Development
ECA	Europe and Central Asia Region
EU	European Union
FAOSTAT	Food and Agriculture Organization of the United Nations Statistics Division
FDI	Foreign Direct Investment
FSU	Former Soviet Union
GAWC	Globalization and World Cities (Research Network)
GDP	Gross Domestic Product
GHSL	Global Human Settlement Layer
GIS	Geographic Information System
GVA	Gross Value Added
ICT	Information and Communications Technology
ILO	International Labor Organization
IMF	International Monetary Fund
KM	Kilometer
MGI	McKinsey Global Institute
NLs	Night lights
OECD	Organisation for Economic Co-operation and Development
PIT	Personal Income Tax
PPP	Purchasing Power Parity
RPA	Recovery and Peacebuilding Assessment
SAR	Special Administrative Region
SME	Small and Medium Enterprises
SNG	Sub-national Public Expenditures
UAH	Ukrainian Hryvnya
UN	United Nations
UUR	Ukrainian Urbanization Review
USD	United States Dollar
USSR	Union of Soviet Socialist Republics
WDR	World Development Report (World Bank)
WWII	World War II

Acknowledgements

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It was initiated before the onset of the current conflict in Eastern Ukraine and prior to the referenda held in the Autonomous Republic of Crimea and the city of Sevastopol on 16 March 2014. The report uses historical data sets ranging between 1989 and 2013, as well as historical maps; further, the report does not intend to make any judgment as to the legal or other status of any disputed territories or prejudice the final determination of the parties' claims.

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The team that developed Chapter 1 was led by Paula Restrepo Cadavid and included Luis Eduardo Quintero, Benjamin Stewart (GIS analysis), Katie McWilliams (GIS analysis and maps), and Sofia Zhukova. Chapter 2 was prepared by Andrey Timofeev and Iryna Shcherbyna, and inputs from Sebastian Eckardt. Chapter 3 was prepared by Brent Ryan, Yarissa Lyngdoh Sommer, Olga Mrinska, Kate Owens, and Mariana Kuchlevska. Copyediting was provided by Will Ferroggiaro and graphic design additions by George Maier. The overall work on the Ukraine Urbanization Review was led by Kremena Ionkova and Tamara Sulukhia.

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Introduction

Objectives, Audience and Limitations

The present report is a diagnostic Economic and Sector Work (ESW) on the urban landscape in Ukraine. Its objective is to link population dynamics with economic dynamics, and to present emerging spatial characteristics and trends. Ukraine has experienced a dramatic population decline over the past two decades, which impacts the urban system. This ESW seeks to elicit a policy dialogue on opportunities to enhance efficiency through dedicated urban planning and fiscal instruments. The intended primary audience is the Government of Ukraine, including city mayors and city managers; international partners; and other stakeholders engaged in the area of urban development.

The Ukraine Urbanization Review (UUR) was initiated before the onset of the current conflict in Eastern Ukraine and prior to the referenda held in the Autonomous Republic of Crimea and the city of Sevastopol on 16 March 2014. The report uses historical data sets ranging between 1989 and 2013 as well as historical maps. Consequently, events related to the current conflict are not a part of the present analysis, although they are recognized in the concluding chapter of this report. This stems from the lack of recent, reliable data from the conflict areas as well as the continuously evolving and changing characteristics of the conflict. Despite this limitation, the UUR remains relevant and opportune in its findings on trends, challenges, and opportunities for the urban system in Ukraine.

Report Organization

The UUR is organized into three main Chapters and a concluding Chapter.

Chapter 1
outlines recent demographic changes, presents the urban system and its economic characteristics, and develops city typologies based on their economic, spatial and demographic patterns.

Chapter 2
offers an analysis of sub-national finance arrangements and examines tiers of government and the city typologies developed in Chapter 1 for discrepancies that could be explored to enhance efficiency in spending.

Chapter 3
discusses current urban and spatial planning practices and outlines shortcomings in view of changing demographics.

The **concluding Chapter** touches on the impact of the current conflict on the urban space and system.

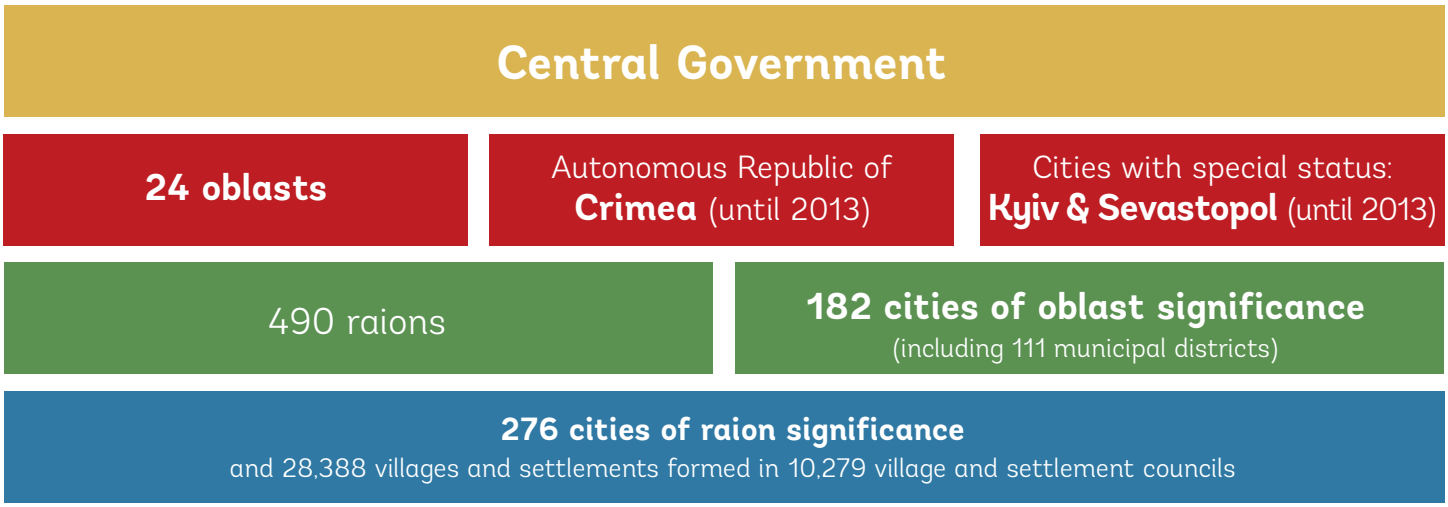
For clarity, the section immediately below describes the territorial administrative division of Ukraine as it is used throughout this report.

Territorial-Administrative System of Ukraine

Ukraine has inherited its territorial-administrative system from the Ukrainian Soviet Socialist Republic and it has not changed significantly since the 1950-60s when it was formed. Each of the 15 Soviet republics, depending on their territory and population, was divided into several sub-regional tiers of administration[1]. The larger republics— including the Russian Federation and Ukraine—had three territorial-administrative tiers.

According to Ukraine's constitution, the territorial–administrative system is as set forth below,

[1] Eurasian Cities: New Realities along the Silk Road, World Bank (2012).



TIER 1 — 24 oblasts, 1 Autonomous Republic of Crimea and 2 cities of state significance – Kyiv and Sevastopol (until 2013)

24 oblasts have elected councils, however they do not have own executive committees and all executive functions are delegated to oblast state administrations – representative body of the central government. Most of Ukraine's oblasts are named after their respective administrative centers. Cities of Kyiv and Sevastopol had (until 2013) special status and are regulated by separate laws. Cities have councils with executive committee, which at the same time performs functions of the regional representative of central government (city state administration). Kyiv as well as being a separate territorial-administrative unit serves as the administrative center for Kyiv oblast.

TIER 2 — 490 raions and 182 cities of oblast significance, which have equal status within oblast

Both raions and cities have their elected councils. However only cities of oblast significance have their own executive committees, which are responsible for implementation of municipal policies in the framework of their own powers. Raion councils do not have executive committees and delegate all their executive functions to raion state administrations, similar to oblast councils. In addition to 490 raions there are 111 municipal raions (districts) in larger cities of state and oblast significance. At the moment only 55 municipal raions have their own councils but all of them have raion state administrations. For example in Kyiv in 2010 ten raion councils were abolished by the decision of city council and approval of the parliament, and raion state administrations were left to manage raions' development. Also some cities might have separate settlements and villages within their geographical boundaries, which have a separate administrative structures (councils). The oblast significance status is usually granted to a city, which is an economic, administrative and cultural center. Each oblast has at least one city of oblast significance as its administrative center.

TIER 3 — cities of raion significance, urban and rural settlements, and villages (united into communities).

Urban populated places can be either cities or urban settlements, while rural populated places can be either villages or rural settlements. There are no state administrations below raion level and all basic tier territories are governed by their elected councils and executive committees.

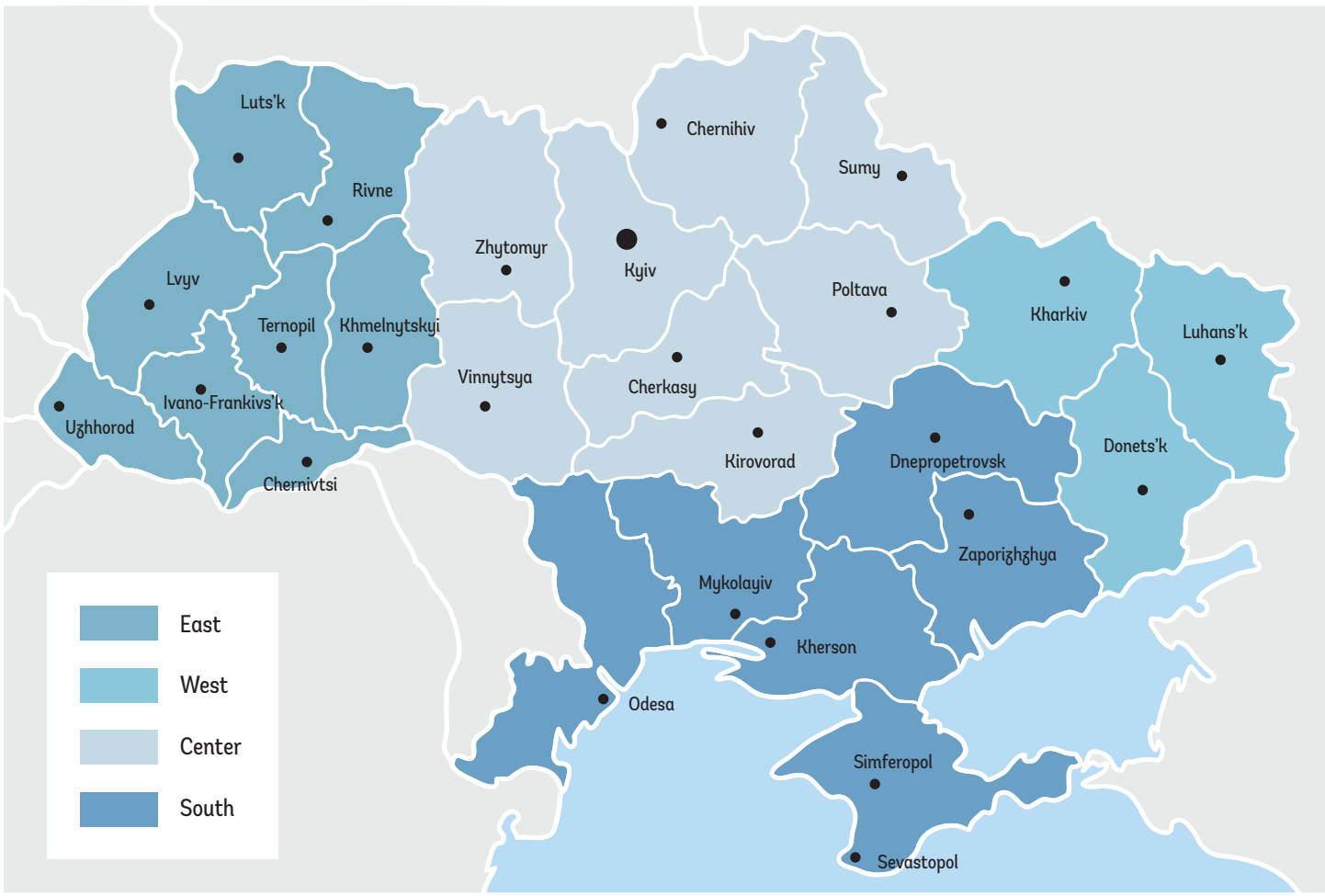
The total of 458 cities of state, oblast and raion significance is considered for the analysis presented in this Urbanization Review

These are 2 cities of state significance, 182 cities of oblast significance (both types administered by their own councils and executive committees) and 276 cities of raion significance that have their own councils and executive committees however are more dependent on oblast state administrations. In addition, there are two cities, Chernobyl and Pripyat that were abandoned after accident at Chernobyl nuclear power station in 1986 due to unsafe levels of radiation. Although they officially have the administrative status of a city, they are not considered in the current analysis as they do not have any population or economic activities and in practice are administered directly by the central government.

Due to the scale of the territory and population Ukraine is sometimes divided into macroregions and mesoregions – groups of oblasts – that are used for the planning, economic, social, political and other purposes. For example, in USSR era Ukraine officially had three economic macroregions, which were used for spatial planning of industrial development, infrastructure, agriculture and system of settlements. This system was effective for large-scale planning however not suitable for Ukraine when it became an independent state, as the scale of mobilization of resources and population has downshifted. Ukrainian researchers have been proposing different systems of socio-economic macroregions and mesoregions since the beginning of XX century, which would correspond to the spatial structure of Ukraine and would better reflect the potential of each territory.

In order to combine the different oblasts of the country and in order to facilitate the analysis of economic and demographic trends across the Ukraine territory macroregions have been identified in Ukraine. The model of regionalization used for this Review has been developed by Kiel Institute of Sociology. In this model Ukraine is divided into four macroregions: West, East, South and Central, as shown in the figure below. These macroregions do not have any legal or administrative significance in Ukraine's territorial-administrative system.

Macroregions of Ukraine



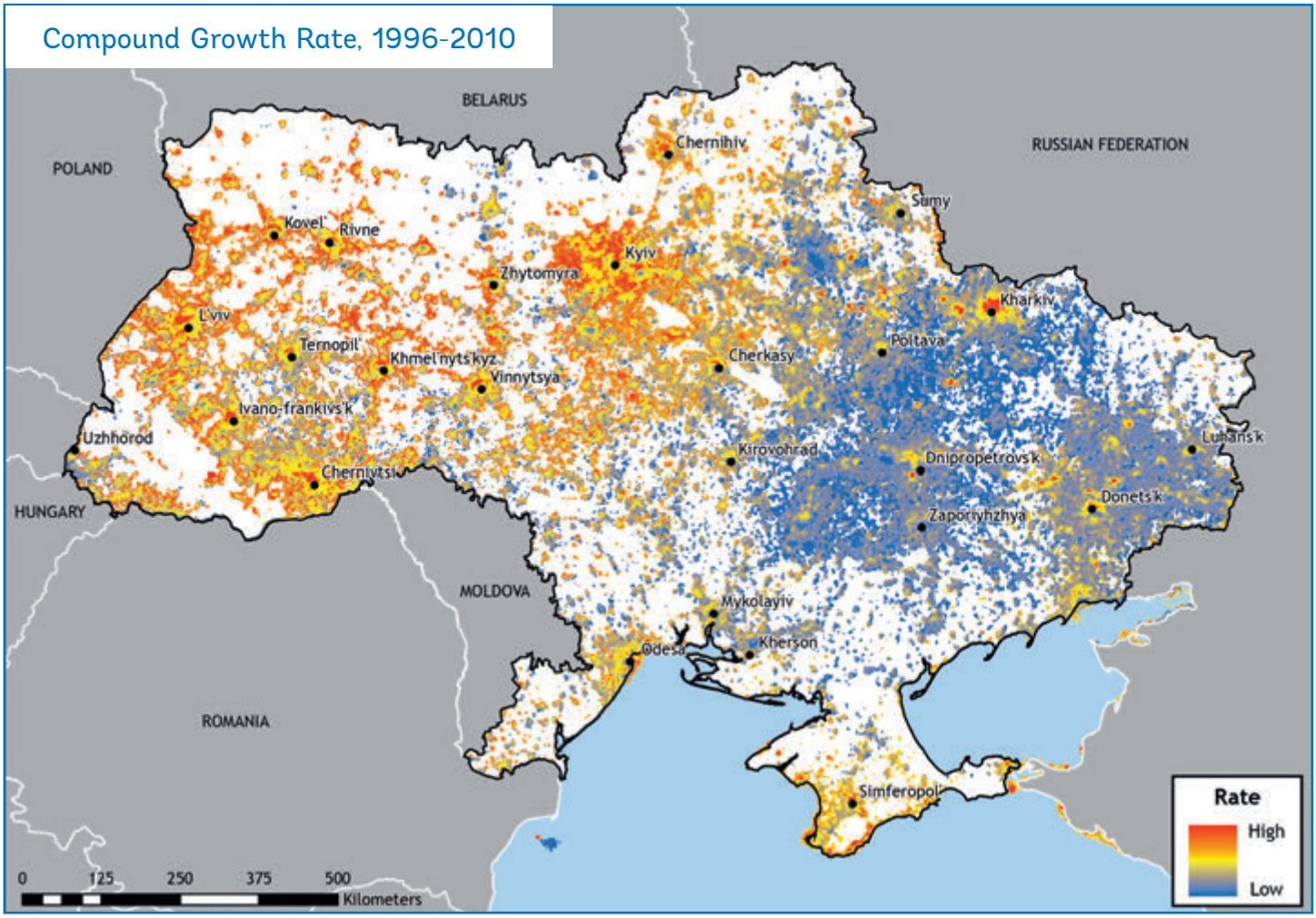
Source: Kiev Institute Of Sociology (2013)

Executive Summary

The **UKRAINE URBANIZATION REVIEW** is a DIAGNOSTIC REPORT on the URBAN LANDSCAPE, linking population dynamics with economic dynamics and presenting emerging spatial characteristics and trends. It was initiated before the onset of the current conflict in Eastern Ukraine and uses historical data sets ranging from 1989 to 2013. Consequently, events related to the current conflict are not part of the present analysis, although they are addressed in the concluding chapter. The Ukraine Urbanization Review is limited to data analytics rather than discussion of policy options and recommendations. Still, it outlines areas and implication for further policy work as well as areas that require further analysis.

The **CENTRAL FINDING** of this report is that, over the past two decades (prior to the conflict), demographic profiles and economic activities in Ukraine have been changing in a manner that has not been uniform across the territory. Meanwhile, urban public policy remained stagnant. Inter-governmental fiscal relationships as well as urban and spatial planning, two key public policy tools, continue the legacy of the past and have yet to be fully utilized in supporting economic growth and managing decline across the urban space.

The key findings of the report are further summarized below.



Shifting Economic Geography: from East to West[2]

Over the past two decades, Ukraine's population has been declining and aging, but not uniformly among regions. The sharp decline in population (13 percent nationally over two decades) is linked to an overall aging trend, a significant decline in fertility (below replacement levels since 1990), and, in part, out-migration. While population is declining across the territory, the demographic transition has not been uniform across the regions. There is significant variation – the Eastern Region has seen a sharper decline over the past two decades, while in the West the population decline has been lower and a few cities, including Kyiv, continue to grow. At the same time, although the urban population is increasingly aging across all regions, the Eastern Region is losing its youngest population at a faster rate.

Similarly, economic activity has been shifting within and across regions. This is confirmed by analyzing trends in regional Gross Value Added (GVA), firm-level and employment locational data, and night-lights data (NLs – used to analyze the dynamics of economic growth). Although the Eastern Region continues to play an important role in the economy, the Western and Central regions have been much more dynamic. This is partly explained by a combination of lower initial levels of economic activity in the West – compared to the East – and a faster transformation of the West from agriculture to more productive sectors. The Eastern Region is also less productive than its urbanization level would suggest. The shift can be observed clearly in the figure below, which compares night-lights data emissions between 1996 and 2010. The red- and orange-colored areas are those that have experienced the highest growth in night-lights (proxy for economic activity), while the blue areas are those with the lowest growth levels.

[2] In providing a regional overview of the country, this document uses the description of four geographic regions developed by the Kiev International Institute of Sociology: East, Center, South and West.

In terms of structural transformation, Ukraine's economy has moved slowly from an industrial enterprise-centered economy to a services-centered economy, with a finance sector at the forefront of this change. Services have grown significantly in a number of areas, including retail, property, and information and communications technology. Here too, progress has not occurred uniformly across the regions. Industry remains very important in the Southern and Eastern regions, while the Western Region has seen a slow increase in the importance of services as the agriculture sector's dominance wanes. Finance's share of national GVA has nearly doubled, but its share of the labor market is still minor and cannot be expected to replace jobs in traditional sectors.

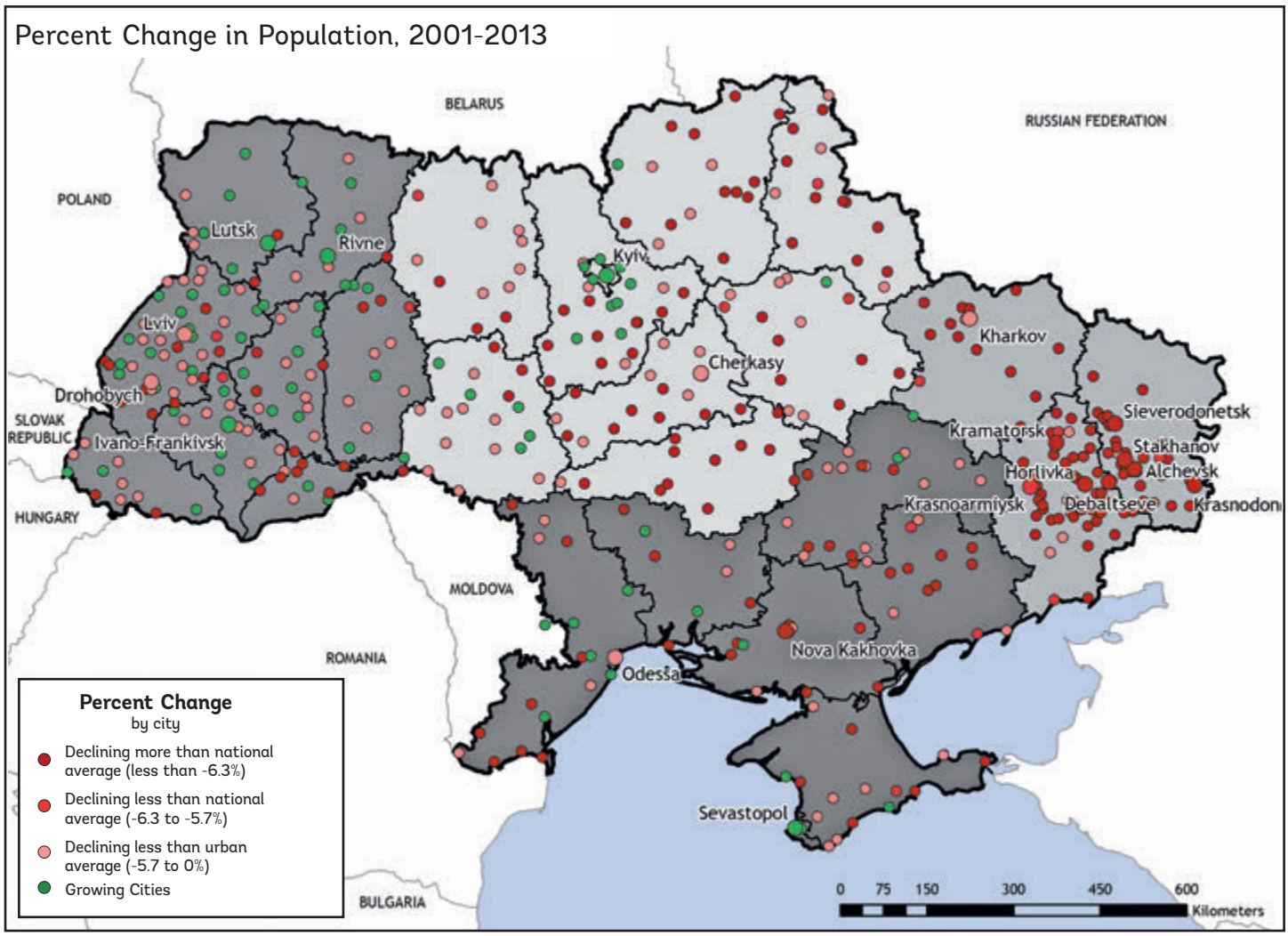
In the strict sense of the term, Ukraine continues to urbanize despite an overall decline in its urban population (as rural population has declined even faster). The Eastern and Southern regions, which at the time of the fall of the Soviet Union were already highly urbanized, have shown slower urbanization rates in the last two decades, while the historically rural Western Region and to a lesser extent the Central Region experienced higher urbanization rates. The rural population has migrated to urban areas at greater rates in the Western and Central regions, resulting in greater relative growth of urban production in the West.

More than 80 percent of the cities have experienced population decline, but shrinking cities are disproportionally concentrated in the East and growing ones are disproportionally concentrated in the West. An analysis of the evolution of cities reveals that the Eastern Region has the highest number of cities that in 1996 met the threshold to be classified as cities (in terms of the amount of night-light emitted), but had "disappeared" (i.e. were no longer classified as such) by 2010. By contrast, the Western Region has the highest number of "appeared" cities, i.e., cities that could not be classified as cities by night-lights standards in 1996, but passed the night-light threshold in 2010. A similar "disappeared-appeared" correlation with these regions is found when comparing population trends at the city-level between 1989 and 2013.

A large number of agglomerations are concentrated in the East; however, the agglomerations in the West and the Kiev agglomeration are more dynamic. Only one city in the Western Region is ranked among the fifteen largest individual cities. However, five agglomerations among the fifteen largest are located in this region, as well as four of the fastest-growing cities. This suggests that, despite having the lowest urbanization levels, the cities in this region are taking advantage of the economies generated by their agglomeration into large-scale urban regions. By contrast, the Eastern Region has five cities among the largest fifteen individual cities, but has none of the fastest-growing cities. Finally, the agglomeration patterns are much more concentrated in the Central Region, led by Kyiv's agglomeration. The figure below plots the location of Ukraine's cities and agglomerations (agglomerations are labeled with the name of the main city in them) with colors assigned according to their population growth rate. Again, this graph shows a strongly declining Eastern Region, despite the fact it contains a large number of agglomerations. The West, by contrast, shows a higher concentration of growing cities as well as cities that are at least declining less than the urban population and national population. The significance of Kyiv's agglomeration and its pattern of growth are noticeable.

Moving to Opportunity: Push and Pull factors

Observed economic geography shifts might have been even stronger if internal mobility was less constrained. Migration studies reveal that few people in Ukraine are moving to opportunities. Migration to and between urban areas is typically an indication that people are looking for better labor opportunities, and is a sign of an efficient re-organization of human resources within a country (pull factors). In Ukraine, however, studies indicate that few people are moving to seek new economic opportunities. Instead, their movement seems to be catalyzed by low levels of social spending in their home regions (push factors). Key barriers to internal migration include very high housing ownership rates and an underdeveloped rental market, the lack of access to credit and underdevelopment of the housing and mortgage market, the costs of moving to economically vibrant regions of the country, and high transaction costs. Nevertheless, agglomerations have been forming slowly.



Source: Ukraine Statistics Department

Agglomerations: Engines of Economic Growth

Ukrainian cities and agglomerations in particular, are important engines of economic growth. Not only is urban sector production much greater than rural sector production, in absolute terms, it is also much more productive in per capita terms. Agglomerations in Ukraine seem to be concentrating the little urban (population) growth currently witnessed in the country, but they are also engines of economic growth. Cities in all regions, especially smaller ones, have been losing population, mostly to the largest cities, and usually to those that have formed large urban centers, or agglomerations. Agglomerations, according to night-lights measurements, are more productive in both per capita and per km2 terms. Firm-level data also shows that larger cities had a higher concentration of both economic activity and productivity. The growth of agglomerations is indicative of a movement towards a more efficient urban system. Led by the Kyiv agglomeration, these city clusters hold the large majority of the cities that are actually growing in population (eleven out of fifteen fastest growing cities in the country belong to an agglomeration). This growth might be explained by the fact that these larger groups of cities can through their agglomeration increase productivity by sharing costs, increase access to and the size of their markets, and enhance interactions between citizens and firms. The agglomerations of Ukraine are therefore an important source of economic growth in the country.

Overall for Ukraine, steady progress has been observed in the main economic (GDP and GDP per capita) and poverty indicators over the last decade. However, continued progress in these areas is highly uncertain due to (i) the observed negative population trends; (ii) the current conflict; and (iii) the slow progress that Ukraine has made in terms of institutional adaptation and reforms. It is not uncommon that a declining population initially has a positive impact on

economic indicators, but its effect on economic performance over the long run is uncertain. The higher GDP per capita that is observed following population decline is generally linked to the fact that capital is durable. Such economies may experience an increase in their capital per worker ratio, which may render each inhabitant marginally more productive. Additionally, decreasing population causes an initial shortage of labor, increasing relative demand for it, and potentially resulting in a reduced unemployment rate as well as higher wages. The negative effects of population decline appear later, and are generally visible in the decline in demand for consumption. The effects over time of diminished demand as well as expectations of further population decline reduce incentives for investment and affect GDP growth negatively[3]. Additionally, fixed costs in the provision of services also become more burdensome as they are shared among fewer people. Overall, given the demographic trends, the observed increase in GDP per capita should be viewed with cautious optimism; if appropriate measures are not adopted, the increase may not be sustained in the mid-term or long term.

Ukraine's firms and institutions have been adapting slowly to a market economy system. Compared to other countries in the region, Ukraine lags behind in its transition from a centrally-planned economy to a market economy, as well as on its institutional and business environment reforms (for instance, in surveys on the ease of doing business, Ukraine ranks 96th worldwide and 22nd in the ECA region[4]). The EBRD transition index finds Ukraine doing poorly in several areas, including small-scale privatization efforts, enterprise restructuring, price liberalization, and trade and foreign exchange policy. Unless changes are made in these spheres, continued progress will be threatened.

Emerging City Typology: Growing and Shrinking Cities

An analysis of the urban system reveals the emergence and consolidation of three city types with contrasting economic, spatial, and demographic patterns. The typologies were constructed based on whether cities have growing or declining economic activity, growing or declining population, and expanding or shrinking urban footprints[5].

Cities growing in economic activity and expanding in footprint are also performing better in other indicators. These cities have on average significantly lower declines in population, higher concentrations of economic activity and higher rates of growth, and higher productivity. 22 percent of Ukrainian cities and the majority of the largest cities in the country fall within this category (Type 1). These cities are also overwhelmingly concentrated in the Western and Central regions. However, it is important to highlight that an important number of Type 1 cities continue to grow economically despite declining in population. This means that in these areas population decline is not necessarily coming at the expense of growth. While this might be a reflection of a temporal increase in productivity due to an increase in the capital per worker ratio – as observed at the national level – it might also be linked to a decline in congestion costs associated with the city moving toward a new population equilibrium.

On the contrary, cities that are declining in economic activity have experienced a sharper population decline. The majority of cities in Ukraine (68 percent) fall under this category. Compared to their thriving peers, these cities are smaller in size (averaging 50,000 inhabitants), are concentrated in the Eastern and Southern regions and to a lesser extent in the Central Region, and have much lower levels of productivity. Two distinct types can be found here: those that are declining in economic activity and shrinking in urban footprint (Type 2) and those that despite economic decline present an expanding urban footprint (Type 3). Type 2 and Type 3 cities are and will continue to experience important urban development challenges including financing and operating their infrastructure as economies of scale decrease with falling population density. These challenges are greater for declining and sprawling cities (Type 3).

Urban Public Policy Tools: Intergovernmental Fiscal Policy

Intergovernmental fiscal relations have lagged behind as a key instrument of urban public policy. Until 2014, the majority of fiscal revenues were not raised by city governments, but came from retained shares of national taxes and transfers. The allocation of these transfers was largely based on the existing network of service facilities and staffing rather than on the demand for services. The system of inter-governmental transfers has led to wide disparities across city types in per capita levels of expenditures per function. The highest per capita expenditures were observed in cities with declining cores and peripheries, while the lowest were observed in growing cities with expanding footprints. Such financial disincentives, combined with legal constraints on local government's discretion in downsizing the network of facilities and staff, impede the fiscal adjustments necessitated by Ukraine's demographic and economic changes.

In December 2014, the Budget Code was significantly changed; it is expected to help improve the alignment of resources to actual population as part of the ongoing decentralization reform in Ukraine. As a result, the new equalization system will factor in per capita revenue levels and thus significantly decrease the disincentive that focuses on infrastructure need. Such re-design of the transfer mechanism will likely realign resources among local governments, channeling more resources to large and growing cities. Derivation-based sharing of revenues, although partially mitigated with a new basic grant, will likely exacerbate the impact on shrinking cities. It will, however, improve the efficiency of spending. These changes are expected to improve fiscal autonomy and to better align public services with the needs of local communities.

Urban Public Policy Tools: Urban Planning

Planning has also lagged behind as a key instrument of urban public policy. Urban planning in Ukraine bears the legacy of a centralized planning system. It is not sufficiently flexible to respond to market conditions and to be an effective tool in developing the urban space. Centralized development of master plans and zoning plans is inefficient, costly, and distant from realities on the ground. It is also not sufficiently transparent or welcoming to public input and debate. In addition, the planning framework is not equipped to adequately support strategies that reflect the reality of population loss and economic decline. Existing urban plans are aligned with national growth policies, and so propose expansions of housing and economic activity across all cities despite different local contexts.

Recent steps outlined in the Government's ***Action Plan on Decentralization*** that orchestrate towards a planning reform, if implemented in full, have the potential to place planning at the local level, which will permit cities to correlate their own priorities with their economic and social needs. It will promote a more transparent system resulting in plans more closely attuned to the actual conditions of growing and shrinking cities. Such changes will require increased funding and intense capacity-building at the local level. In addition, there is an increased need to raise awareness about the scale and consequences of urban decline so that local governments start to reflect their population's realities in their urban plans.

[3] Markus Brückner and Hannes Schwandt, Income and Population Growth: Discussion Paper No. 7422, Bonn: Institute for the Study of Labor, May 2013, available at http://ftp.iza.org/dp7422.pdf.

[4] World Bank Group, Doing Business 2015: Going Beyond Efficiency, available at http://www.doingbusiness.org/data/exploreeconomies/ukraine/. Only Kiev is considered.

[5] A fourth city type (Type 4) with growing light intensity in the core but shrinking urban footprint was found. However, only two cities – Donetsk and Zaporizhia – comprised this classification.

What Does It All Mean for the Future? Implications for Further Analysis and Policy Work, and the Role of the Conflict

The overall decline and aging of the Ukrainian population poses important economic and urban development challenges with implications in terms of fiscal policy and demand for public services. Overall labor participation might decline, as older workers leave the labor force and become a larger share of the population. This aging may lead to a reduction of tax revenues due to a diminishing workforce and lower private savings of workers, while it is also expected to lead to an increase in demand for public expenditures related to healthcare, long-term care, and pensions. However, as argued in the recent World Bank Study "The Golden Age of Aging,"[6] an aging and declining population does not necessarily lead to economic catastrophe. For instance, a reduction of the labor force can make more capital available to existing workers and lead to increased productivity. To lessen the potential negative consequences of an aging population, the report recommends increasing the retirement age to better reflect gains in life expectancy; focusing on policies that increase fertility to sustainable levels; reforming health and long-term care systems to allow for healthier aging; and embracing migration as a part of the solution. Local governments have a key role to play in this.

As cities shrink, Ukraine needs to put in place the right national policies to better manage the population decline of most of its cities while managing population growth in the large agglomerations. The Central Government should create the right mechanisms and incentives (e.g., financial transfers) so that cities focus on declining efficiently and shifting their focus from existing infrastructure to future demand such as agglomerating schools when needed. Given the extent of urban decline, the country should explore the need for establishing national-level programs, such as technical assistance and funds for downsizing, that provide resources to better manage decline. There is also a need to increase awareness of the scale and type of urban decline as many cities continue to follow unrealistic population growth projections.

At the same time, local authorities will need to re-assess how infrastructure is planned and maintained and the way services are financed and delivered. Neighborhoods may need to be consolidated as cities lose density. Public service plans, designed for larger populations, may have to be re-considered to address lower demand. In addition, an aging urban population has consequences for the demand for and type of housing (e.g., long-term care facilities), the demand for public transportation (as elderly tend to commute less and have different design needs), and other basic services. The combination of an overall aging urban population and declining fertility rates will also likely shift demand from education to health services. Urban areas will, therefore, need to adapt their social and material infrastructure to better serve the changing needs and demands of their populations.

Ukraine should also recognize the role of urban areas in economic growth and make sure that they use the right tools to reach their full potential. To achieve increased productivity in urban centers, the right mix of good governance, a beneficial business climate, and an efficient provision of public goods, usually in the form of public services and infrastructure, is necessary so that agglomeration economies are fostered and congestion costs reduced. In urban areas experiencing population growth, cities should focus on adapting infrastructure and services to ensure that new-comers are well-absorbed and integrated into the city and manage peri-urban growth to avoid sprawl, etc. In addition, the realignment of city boundaries or introduction of metropolitan governance mechanisms might be needed to achieve an effective coordination of agglomerations which span across administrative units. This might require the involvement of the Central Government and is particularly important in the case of public transport. The country also needs to put in place the right policies in cities that continue to grow economically, but are experiencing population decline. In these cases, city administrators should aim at managing population decline in an efficient and harmonious way making the best out of it, for example, turning brownfields into public space and optimizing public transportation.

Ukraine should reduce barriers to move internally. The low mobility of Ukraine's internal population is an obstacle preventing the country from reaping the rewards of its urban potential. Improved mobility might further spur the growth of urban centers with emerging employment opportunities. However, increased mobility most likely will also deepen the decline of most Ukrainian cities, which will then require policies to protect the less mobile and more vulnerable population that is left behind. Increasing population mobility will require eliminating or reducing some of the obstacles to move including making the housing market more fluid and permeable (e.g., by increasing rental options and improving access to housing finance) and lowering the transaction costs of moving. In addition, as outlined in the *World Development Report 2009*[7], governments should be neutral in regards to the migration of unskilled labor: encouraging migration for economic reasons, discouraging migration in search of public services, and strongly supporting internal migration of skilled labor. The latter can be done through investment in services in lagging areas to build portable human capital and to increase the flow of labor market information, among other initiatives, so migrants arrive better informed of employment opportunities.

In terms of fiscal policy, Ukraine's policy makers might re-think the structure of functional sub-national expenditure in view of changing demographics. So far, expenditures for education have been steadily increasing despite the rapidly aging population, which itself has placed increasing demands on the health system. By earmarking new subventions separately for education and health, the new system can take advantage of under-utilized social infrastructure and focus on increasing capacity in places with growing demand. More generally, the focus of reforms in the short-term might be on increasing the yield of user fees and property taxes as a way to make cities assume their responsibility to collect own revenue. In the medium-term, some of these taxes could be re-assigned from national to the sub-national level as a way to increase horizontal accountability of local officials to their residents as well as fiscal responsibility. Addressing fiscal fragmentation and amalgamating the bottom tier should remain a priority for government as a way to improve fiscal efficiency in service provision.

Finally, urban planning and spatial development should take note of the continuing demographic changes and shifts in the country. Current mobility remains low and the high homeownership rate has prevented the widespread housing abandonment that characterizes typical shrinking cities in Europe and United States. Once mobility increases and people start migrating to opportunity, declining cities are likely to decline even faster, while the growing centers and agglomerations may experience peri-urban growth and sprawled development. In both cases, authorities will need to reassess how infrastructure is planned and maintained to ensure that shrinking cities continue to provide acceptable levels of service to their populations at reasonable cost, while growing urban centers are supported to foster further growth.

[6] World Bank Group, The Golden Age of Aging (2014).

[7] World Bank (2009), Reshaping Economic Geography – World Development Report.

CHAPTER 1
The Urban System: Demographics and Economic Trends

Key Highlights and Implications for Further Policy and Analytical Work

Over the past two decades, Ukraine has experienced population decline and aging trends, which have had important consequences at the city level. Over this time, national population has declined by 13 percent; urban population has declined by around 9 percent. In the strict sense of the term, the country continues to urbanize as its rural population is declining at faster rates than its urban population. However, more than 80 percent of its cities are losing population. There are important geographic differences in this demographic transition with the Eastern region observing a sharper population decline when compared to the Western and Central regions. In a similar way, shrinking cities are disproportionally concentrated in the East while growing ones are disproportionally concentrated in the West. The observed demographic shifts across the territory might have been stronger if mobility had been less constrained, as internal migration has been low. In fact, recent migration studies reveal that in Ukraine few people are moving to economic and social opportunity.

Economic activity has been shifting within and across regions, but Ukraine's firms and institutions have been slow in adapting to a market economy. This is confirmed by analyzing trends in regional Gross Value Added (GVA), firm-level and employment location data, and night-light (NLs) data (used as a proxy for economic activity). Although the Eastern region continues to play an important role in the economy, the Western and the Central regions have been much more dynamic. This is partly explained by a combination of lower initial levels of economic activity in the West – compared to the East – and a faster transformation of the West from agriculture to more productive sectors. The Eastern region is also less productive than its urbanization level would suggest. There has also been a shift in the structure of the Ukrainian economy with the service sector growing significantly in importance in the Western and Central regions. The structural shift has been accompanied by steady progress in the main economic indicators of the country (GDP, GDP per capita, and poverty). However, continued progress in these areas is highly uncertain due to (i) the observed negative population trends, (ii) the current conflict, and (iii) the slow progress that the country has made in terms of institutional adaptation and reforms towards a market-oriented system.

Ukrainian cities and agglomerations, in particular, are important engines of economic growth. The urban sector is more productive than the rural both in absolute and per capita terms. Agglomerations – cities whose NLs footprint merge – account for the little urban population growth currently witnessed in the country, and are more productive in both per capita and per km2 terms than their smaller peers. Firm-level data also show that larger cities have a higher concentration of both economic activity and productivity. This growth might be explained by the fact that these larger groups of cities can through their agglomeration increase productivity by sharing costs, increasing access to and the size of their markets, and enhancing interactions between citizens and firms.

Over the past decade, three City Types with contrasting economic, spatial and demographic patterns have emerged and consolidated in Ukraine. The first type corresponds to cities that are growing in economic activity and expanding in footprint (Type 1). Type 1 cities – which comprise 22 percent of the urban system – are also performing better in other indicators; they have, on average, significantly lower declines in population, higher concentrations of economic activity and rate of growth, and higher productivity. However, an important number of Type 1 cities continue to grow economically despite declining in population. This means that in these areas – at least in the short term – population decline is not coming at the expense of growth. The second and third types of cities correspond to cities that are declining in economic activity, but either shrinking (Type 2) or expanding (Type 3) in footprint. They have much lower productivity levels, have experienced a sharper population decline, are smaller in size (average 50,000 inhabitants), and are overwhelmingly concentrated in the Eastern and Southern regions. These cities are experiencing and will continue to experience important urban development challenges, including financing and operating their infrastructures as economies of scale decrease with falling population density.

[1] Figures that do not include a source in this Chapter were developed by World Bank staff working on the report.

Going forward, Ukraine needs to put in place the right policies to better manage urban population decline while managing growth in the number of large agglomerations. On the one hand, the overall decline and aging of the Ukrainian population poses important economic and urban development challenges with implications in terms of fiscal policy, infrastructure financing, and demand for public services. In shrinking cities, neighborhoods may need to be consolidated and public service plans designed for larger populations may have to be re-considered to address lower demand. The combination of an overall aging urban population and declining fertility rates will also likely shift demand from education to health services. The Central government should in turn create the right incentive frameworks so that cities focus on declining efficiently. Given the scale of urban population decline, the country should explore the need for establishing national-level programs, such as technical assistance and funds for downsizing. On the other hand, the country should recognize the role of urban areas in economic growth and make sure that growing urban centers have the right tools to reach their full potential. To increase productivity in urban centers, the right mix of governance, a beneficial business climate, and efficient provision of public services and infrastructure is necessary so that agglomeration economies are fostered and congestion costs are reduced. In the case of agglomerations that span across administrative units, the country might need to assess the benefits of realigning city boundaries or the introduction of metropolitan governance mechanisms.

In addition, to reach its full economic potential the country needs to reduce barriers so that people can move to opportunity. However, increased mobility will likely deepen the decline of most Ukrainian cities, which will then require policies to protect the less mobile and more vulnerable population that is left behind. Increasing population mobility will require eliminating or smoothening some of the obstacles to move, including making the housing market more fluid and permeable (e.g., increase rental options and improve access to housing finance) and lowering the transaction costs of moving.

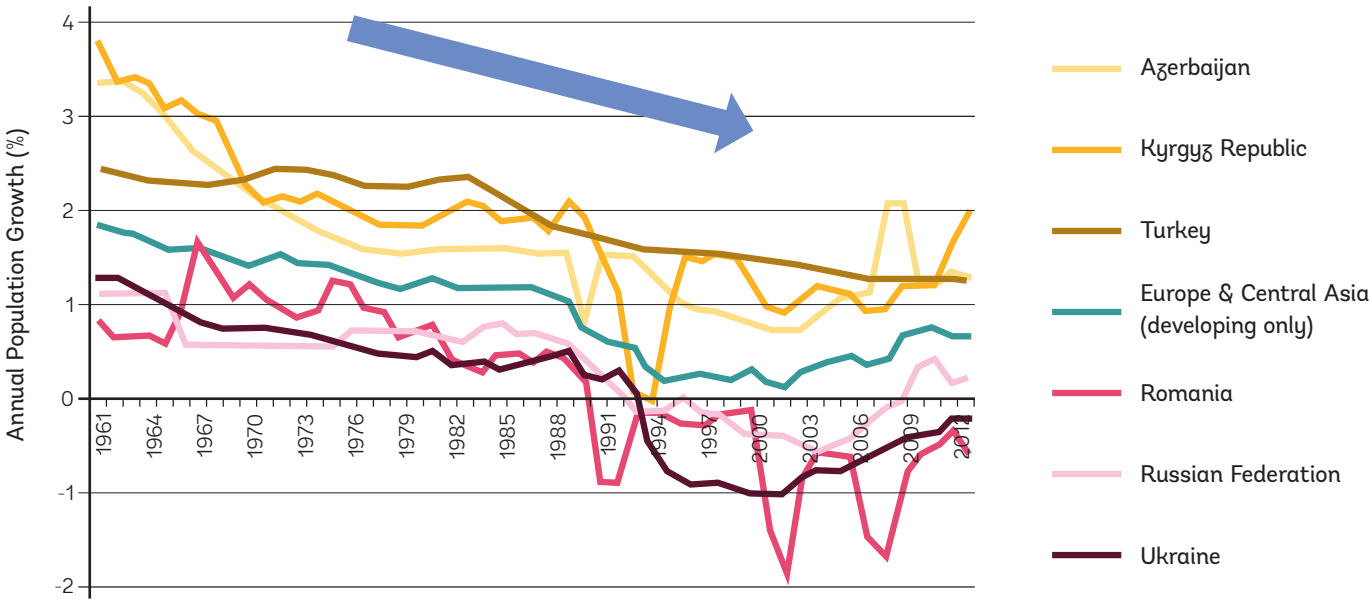
I. Demographics[2]

A declining and aging population presents challenges going forward

Over the past two decades Ukraine has experienced a dramatic population decline. In 1993, Ukraine had 52.2 million inhabitants while in 2013, it was estimated to have 45.5 million inhabitants. Over this period the country lost 13 percent of its population. While similar levels of population decline can be found in other countries in the region, such as Bulgaria (-14 percent) and Romania (-13 percent), the degree of decline in Ukraine's population growth rate is below the ECA regional average (Figure 1). The sharp decline in population growth rate observed in the decade after the fall of the Soviet Union – 1990 to 2000 – was partly the result of out-migration but was also very much linked to an overall aging trend of the population and a significant decline in fertility. However, the sharp decline in the growth rate appeared to be rebounding toward population stabilization prior to the current conflict.

[2] In order to provide a regional overview of the country, this document uses the definition of four geographic regions developed by the Kiev International Institute of Sociology: East, Center, South, and West.

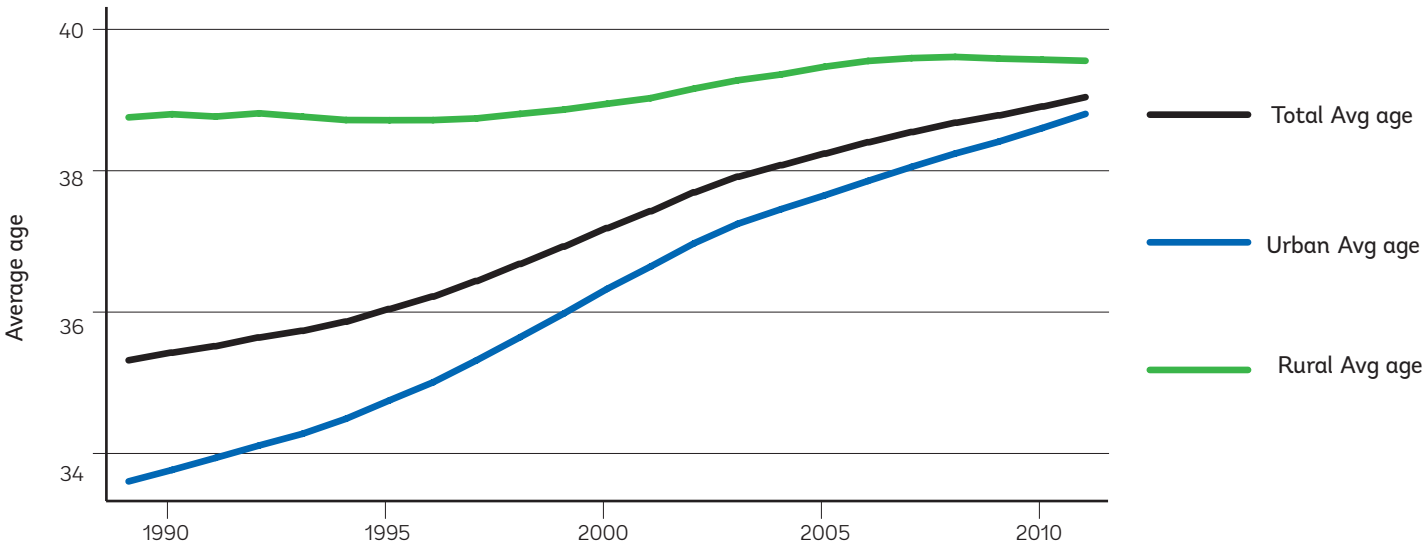
Figure 1 – Ukraine's population is declining faster than the ECA region average



Source: World Development Indicators

The overall decline in the population, much like in the region, is driven by a strong decline in fertility rates and a fast aging population, but it is also exacerbated by still high old-age mortality rates. The average age in Ukraine has increased from 33 to 39 over the last 20 years, led largely by a dramatic increase in the average age in urban areas. Measured by average remaining life expectancy, Central and Eastern Europe is by far the oldest region in the world, even significantly older than Western Europe. As in Ukraine, this is caused by low fertility rates and high old-age mortality rates. As an example, in France a 71-year-old man in 2009 had the same risk of dying as a 60-year-old man in 1959, while in Ukraine a 54-year-old man in 2009 had the same risk of dying as a 60-year-old in 1959.

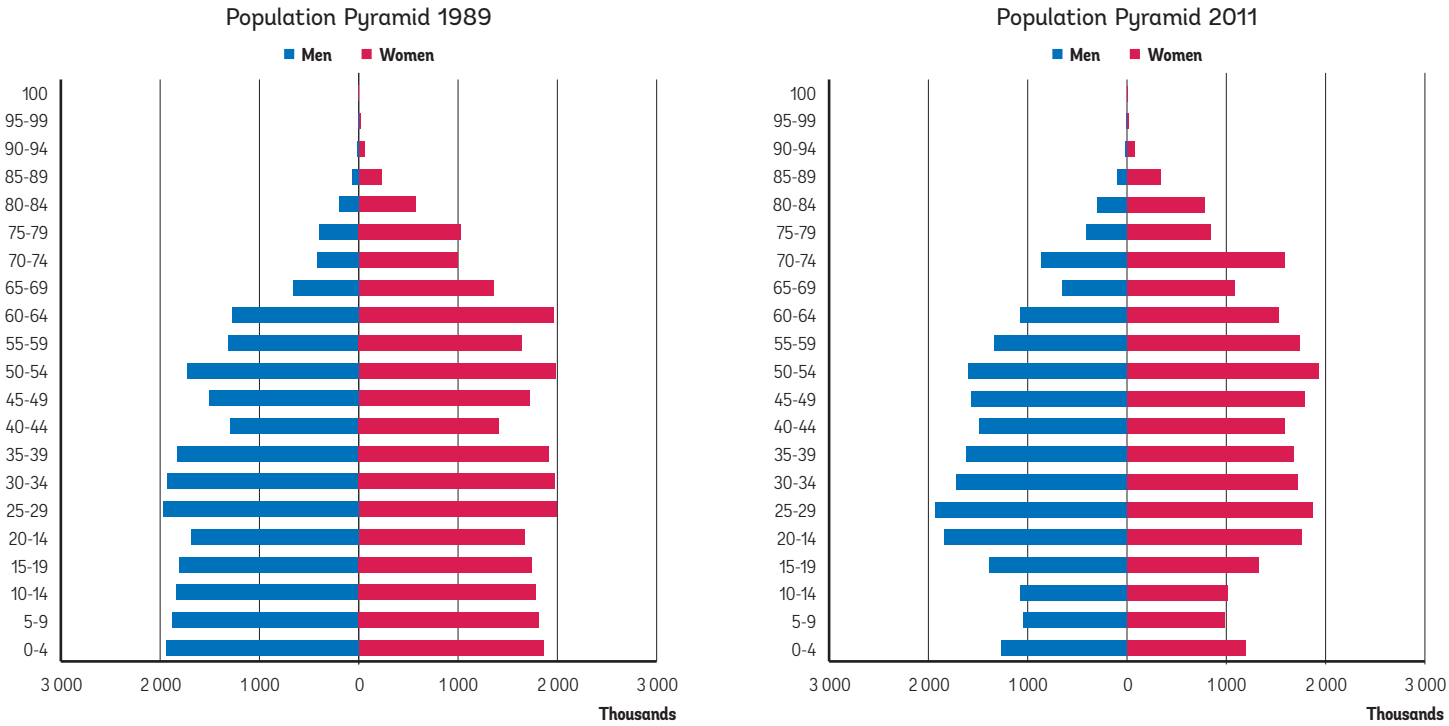
Figure 2 – Aging is increasingly an urban issue in Ukraine



Source: Ukraine Statistics Department

Ukraine's population dynamics are very different across the age distribution, with declining fertility rates creating a diamond-shaped population pyramid (Figure 3). Both Figure 3 and Figure 4 below suggest that the overall negative population growth is better demonstrated with data disaggregated by age. The decline in the 0-10 years cohorts is much sharper (-41 percent) than the one observed in the 11-39 years cohorts (-6 percent) between the years of 1989 and 2011. In addition, the decline of these younger cohorts is higher, in percentage terms, in urban areas (-42 percent) than in rural areas (-38 percent), which is probably due to lower urban fertility rates. This also supports our previous point of an increasingly accelerating average age in urban areas.

Figure 3 – Population dynamics flattened as the younger share of the population has decreased

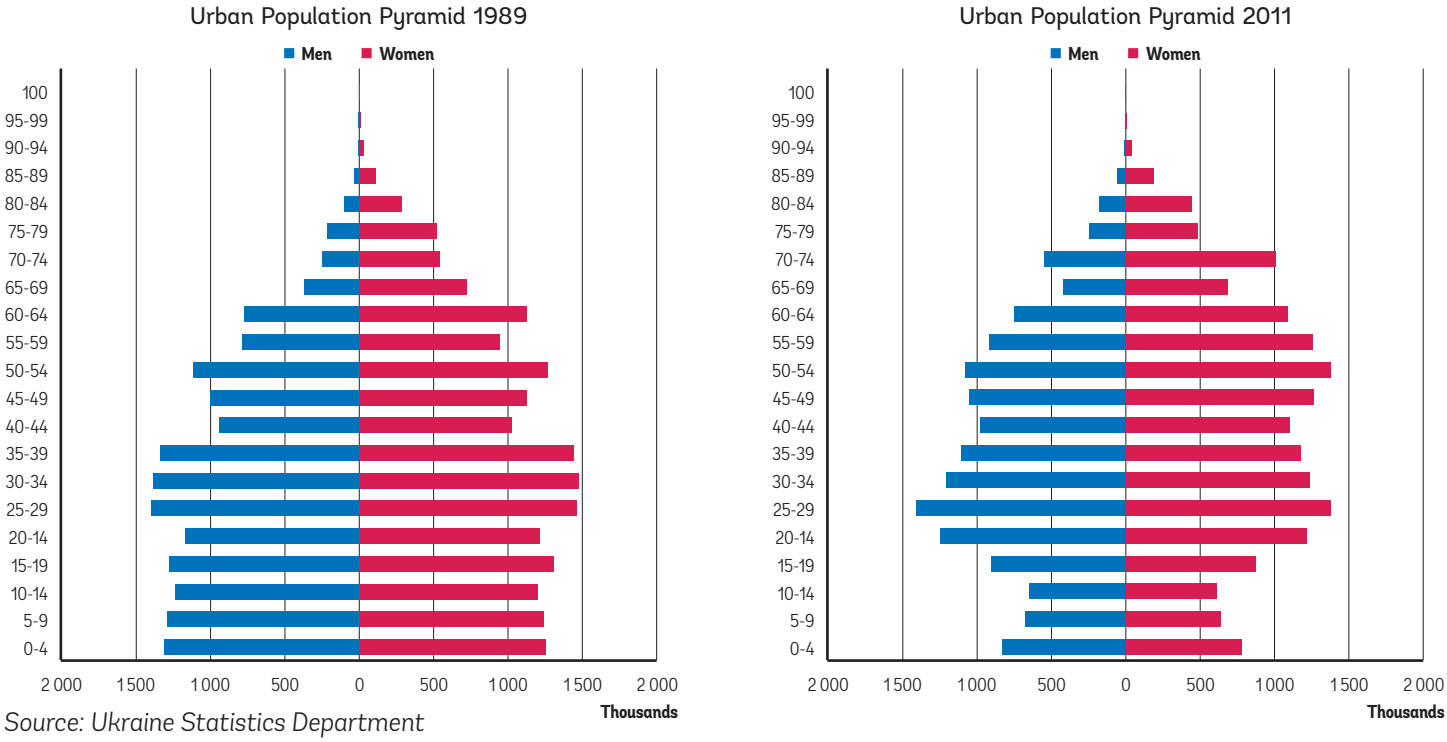


Source: Ukraine Statistics Department

The fastest growing segment of the population – by age cohort – is the 60+ cohort living in urban areas (Figures 4 and 5). Between 1989 and 2011, this age cohort grew 21 percent in urban areas. By contrast, a 19 percent decrease of this cohort in the rural areas offset the effect of this urban growth, such that national growth was 3 percent. The dynamics within this older age cohort are different between genders, with the 60+ overall population increasing 11 percent among men, while increasing less than 1 percent for women between 1989 and 2011. Some analysts suggest that the large number of men that died during the Second World War[3] could explain the low numbers observed in 1989 in this cohort and the subsequent large percentage increase in 2011. Large increases can be observed in the urban population of men in the 60+ age cohort, which grew 26 percent, and of women of the same age group, which grew 18 percent. In contrast, in the rural sector, population in this age cohort decreased for both men and women, but more than twice as fast for women than men (23 percent for women and 10 percent for men). These trends are a result of the combination of internal and external migration dynamics, where more men can be found migrating internally from rural to urban areas, and relatively more women migrating outwards.

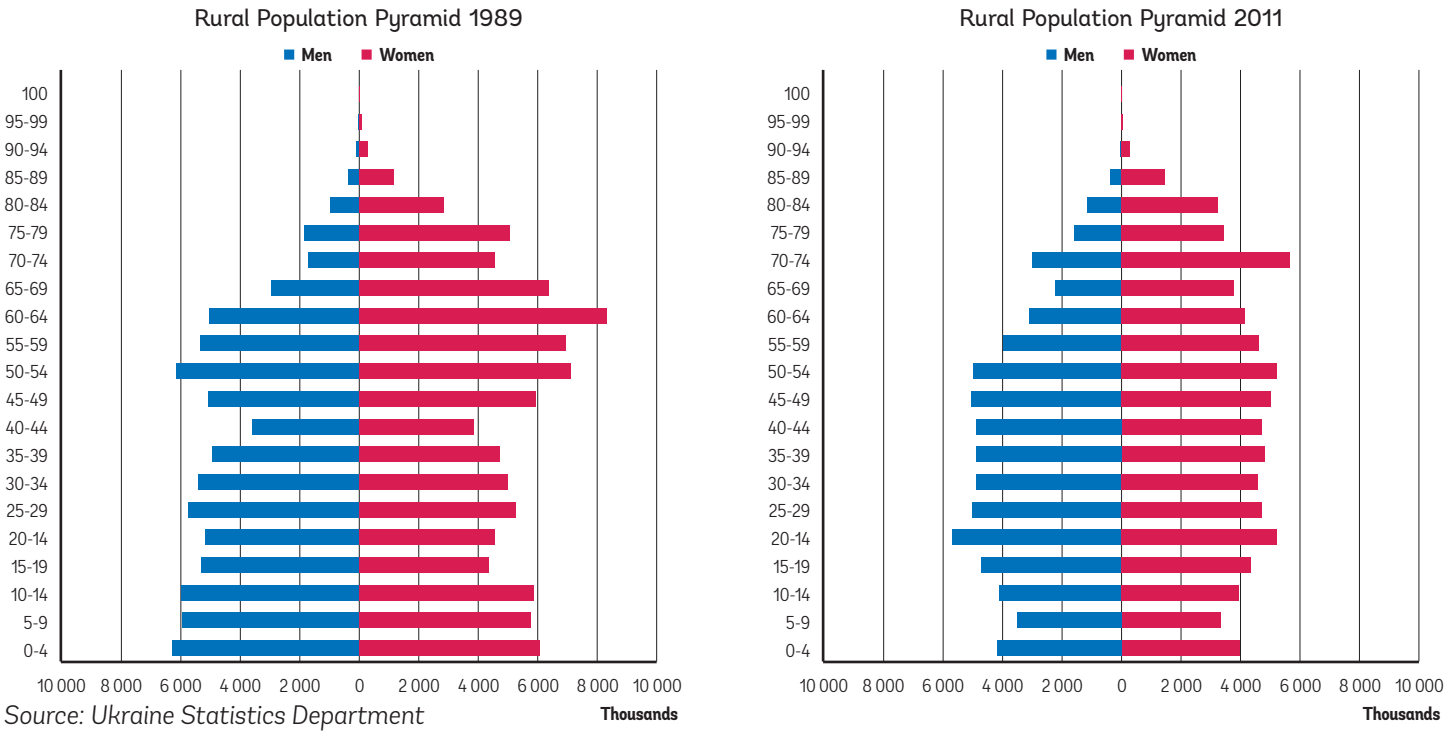
[3] It is estimated that around 7 million people died in this period (Andrew Gregorovich, World War II in Ukraine: Total Losses by Country).

Figure 4 – The urban population age mimics the flattening of the general population pyramids



Source: Ukraine Statistics Department

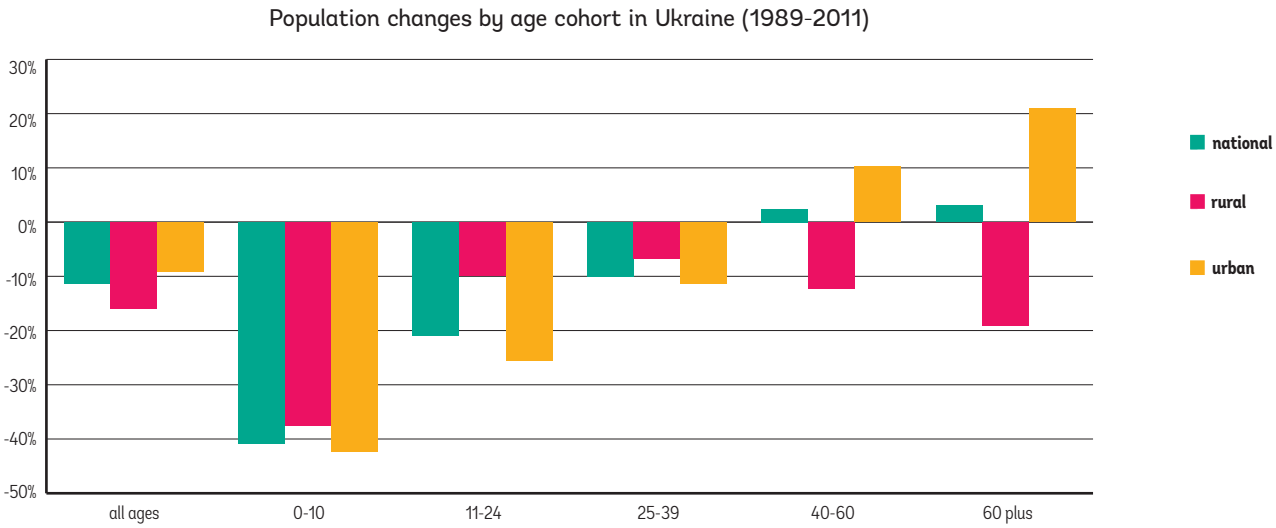
Figure 5 – The decrease in younger population is less in the rural areas. These areas also show a decrease in the older cohorts of the population



Source: Ukraine Statistics Department

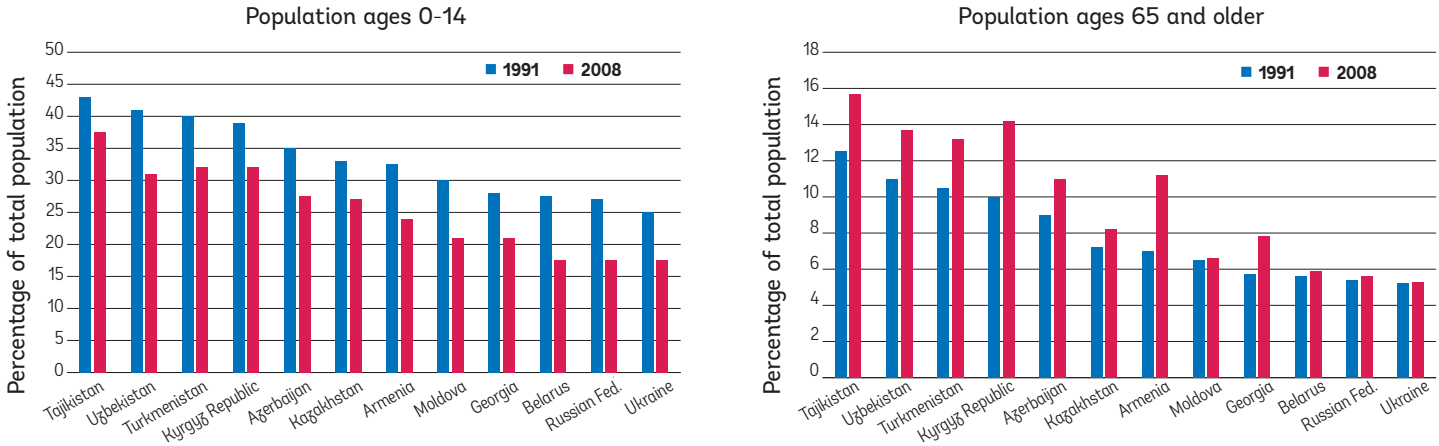
Despite its similarities to populations of other countries of the Former Soviet Union (FSU), Ukraine's population is aging more dramatically. As shown in Figure 7, for both 1991 and 2008, Ukraine had the lowest percentage of population aged 0-14 than any other country of the FSU. At the same time, Ukraine's share of population that is age 65 and older is the region's largest and is increasing. These trends are accompanied by a slightly recovering but still very low birth rate since 2001 (Figure 8). More importantly, fertility rates remain very low and under replacement levels at least since 1990.

Figure 6 – A sharp decline in fertility rates is leading to an important reduction of the young cohort



Source: Ukraine Statistics Department

Figure 7 – Ukraine is aging more dramatically than neighboring countries

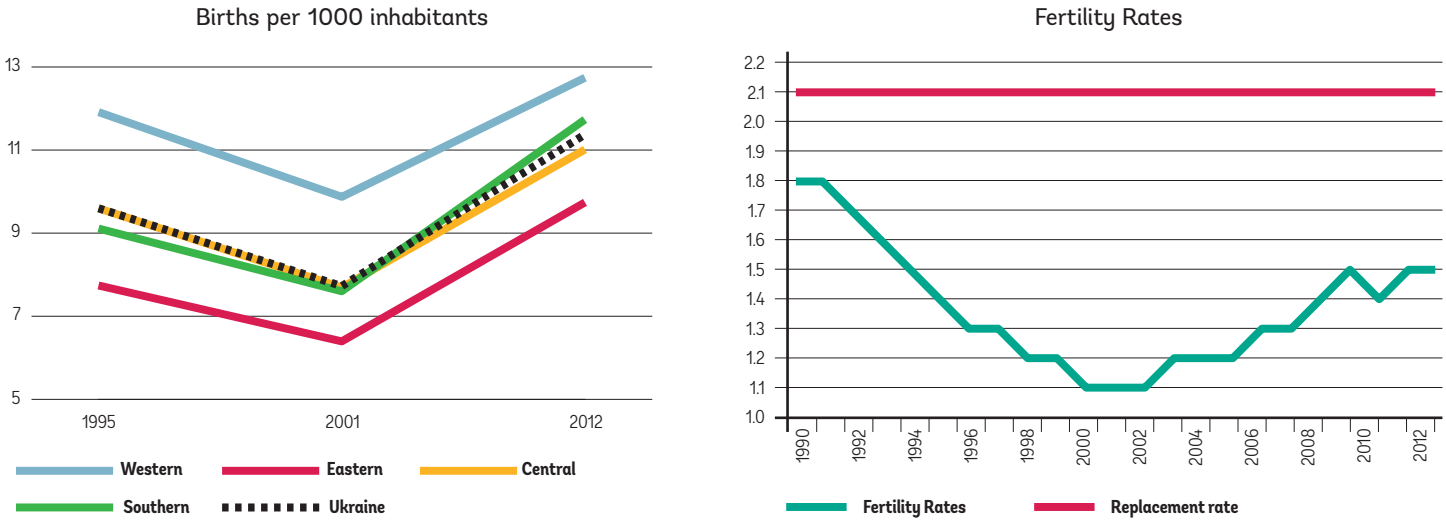


Source: Eurasian Cities 2012

Ukraine's population dynamics vary across its regions, with the Eastern region losing its youngest population at a faster rate than others. This region presents negative growth at all cohort levels, except for the 60+ age cohort (See Figure 9 below). By contrast, all of the other regions present positive growth of the 40-60 years cohort. The population in the Western region is declining at a slower pace; this is due both to its – on average – higher fertility rates (12.76 births per 1,000 inhabitants in Western versus 9.7 births per 1,000 inhabitants in the Eastern region) and lower mortality rates (13.62 per 1,000 inhabitants in the Western versus 15.56 per 1,000 inhabitants in the Eastern region) than Eastern, central and southern regions. Additionally, higher mortality rates in the Eastern region may be explained by a significant share of employment in the region in the mining sector, a sector that generally presents higher rates of employee mortality and disability[4].

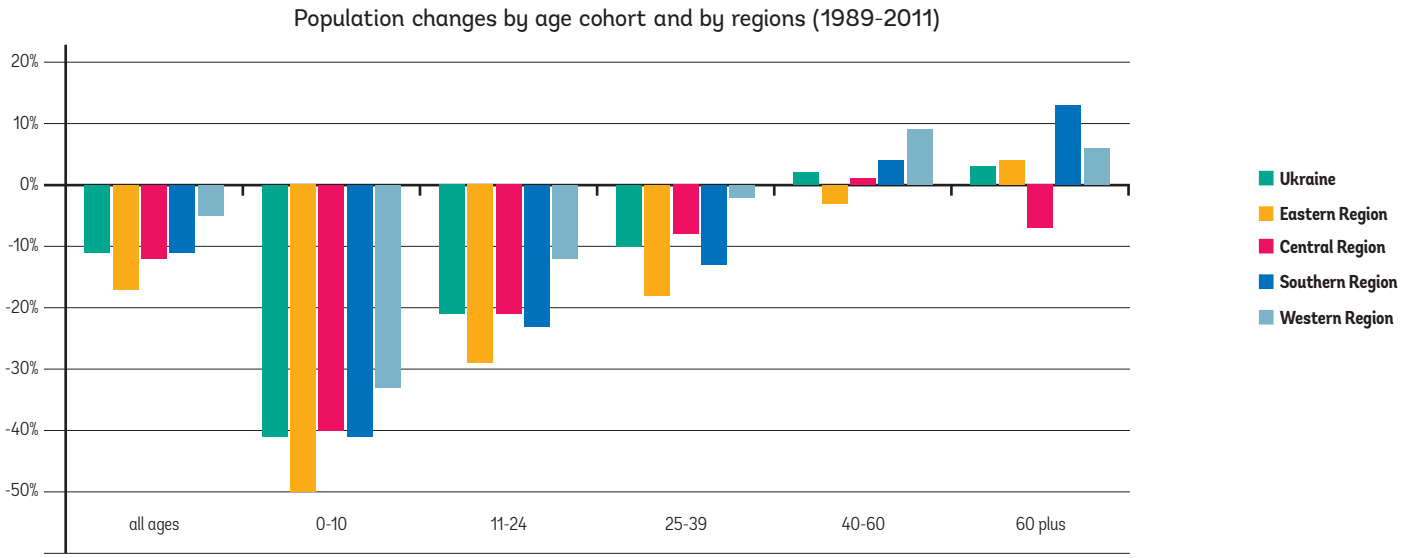
[4] The Jamestown Foundation states that Ukraine has the world's second-highest mining fatality rate, behind only China (Eurasia Daily Monitor Volume: 6 Issue: 167). This is a common trend worldwide. For example, mining has the second highest fatality rate among all sectors in the US (US Bureau of Labor Statistics; national census of fatal occupational injuries in 2006).

Figure 8 – The birth rate has recovered since 2001, but remains very low. Fertility rates follow similar trends, remaining under replacement levels at least since 1990



Source: Ukraine Statistics Department (left) and World Bank WDI (right)

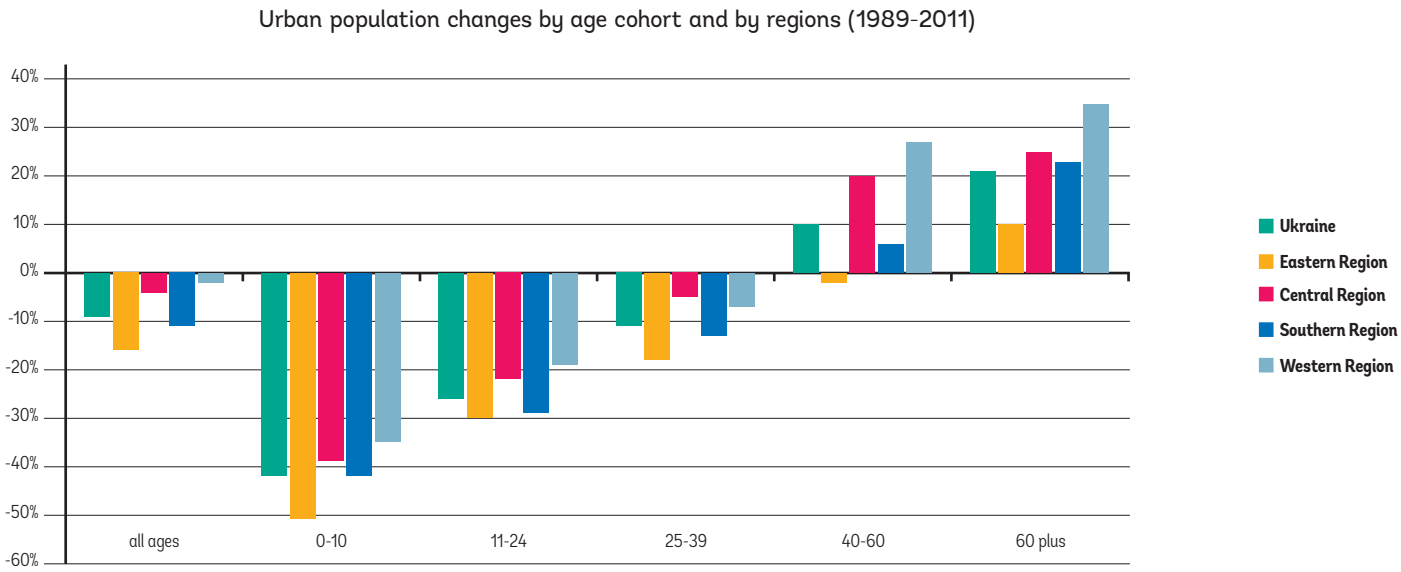
Figure 9 – Ukraine's eastern region has the highest rate of overall population decline



Source: Ukraine Statistics Department

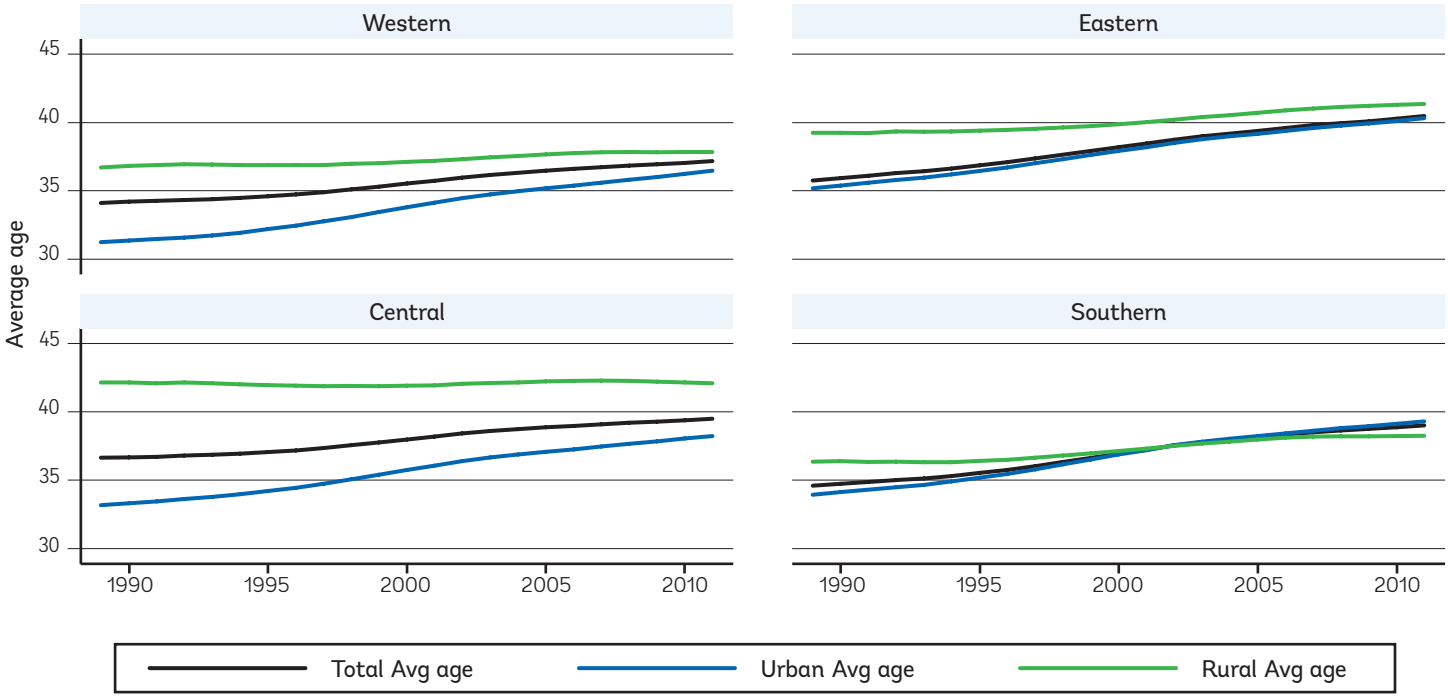
Urban areas are aging rapidly across all Ukraine's regions. While increases in aging in the urban population's first three age cohorts—0 to 10, 11 to 24, and 25 to 39—look very similar to those observed for all Ukraine, the 60+ urban cohort is growing at a much faster pace than other cohorts in urban areas (Figure 10). Among this cohort, the fastest growing population is in the Western Region, which is also observing a significant increase in its 40 to 60 age cohort. The fast-aging urban population, across all regions, is reflected in an increase in Ukraine's average age as shown below in Figure 11.

Figure 10 – The Eastern region has the highest overal decline in population in urban areas



Source: Ukraine Statistics Department

Figure 11 – The average age is increasing in all urban areas



Source: Ukraine Statistics Department

Although both a decline in fertility and aging play a central role in the overall population decline, out-migration is also playing an important role. An analysis of implied migration[5] data across regions suggests that a large part of the population decline is the result of net out-migration reveals the potential role that outmigration can be playing on the overall population[6] decline. In addition, the Western region presents an interesting shift in behavior when comparing annual data from 1995 to 2001 and from 2001 to 2010. As the analysis of implied migration is imperfect, secondary sources of information are used to further review migration patterns.

Recent studies confirm that negative net migration has contributed to further population decline, becoming one of the biggest challenges in the country. The International Labor Organization (ILO) estimated that between January 2010 and June 2012, 1.2 million people (or 3.4 percent of the population) were working or searching for employment abroad[7]. Additionally, according to the Ukrainian statistics bureau, in 2013 alone, 621,842 people left the country[8].

Labor migration from Ukraine is mostly of cyclical and seasonal character. According to the Modular Sample Survey on Labor Migration in Ukraine 2013, the average duration of stay abroad for migrants on their most recent labor trip taken was 5 months. Persons migrating to neighboring countries (Russia, Belarus, Poland, the Czech Republic, and Hungary) generally undertake periodic short trips with a permanent return to Ukraine. However, those travelling to the South European countries and Germany usually remain working there for longer periods of time.

Evidence suggests that most of the recent migration from Ukraine – prior to the current conflict – was to the countries of the Commonwealth of Independent States (CIS) countries and the European Union (EU). For the 2010-2012 period, the largest recipient countries were the Russian Federation (43.2 percent of Ukraine migrants), Poland (14.3 percent), Italy (13.2 percent), and the Czech Republic (12.9 percent). Spain, Germany, Hungary, Portugal, and Belarus also received significant influxes of migrants from Ukraine. Historically, there have been three distinct waves of migration from Ukraine: in 1890-1914, before and after WWII, and after Ukraine became independent. The Ukrainian diaspora abroad can be measured under different criteria of, one being the country of birth and country of nationality. Table 1 below presents the distribution of the Ukrainian diaspora according to both criteria by the Migration Policy Center. According to the official statistical institute of Ukraine, the following countries have the biggest stock of Ukrainians: the Russian Federation (1.93 million), Canada (1.2 million), the USA (893 thousand), Brazil (500 thousand), Kazakhstan (333 thousand), Moldova (477 thousand) and Argentina (250 thousand).

The vast majority of migrants in the wave of migration after Ukraine's independence but prior to the conflict came from oblasts located in the Western region (Figure 12 and Figure 13). According to the ILO's 2012 Modular Sample Survey on Migrations in Ukraine, in fact, 72 percent of migrants in the period of 2010-2012 were estimated to come from this area. It is important to note that official statistics may underestimate the real flow of migrants, many of whom may be illegal and undocumented. Specifically, the oblast with the highest migration rate was Zakarpattia, whose population is relatively young and diverse, with large shares of Hungarians (12 percent), Romanians (2.6 percent), Russians (2.5 percent), and Slovaks (0.5 percent). This is also the oblast with the highest percentage of Gypsy population (1.1 percent), whose mobility might add to the migration balance. The others regions contributed to a lesser extent to Ukraine's out-migration. Some patterns regarding migration destinations can be observed in the ILO sample; as expected, most of the Eastern region's migrants headed to Russia, while the Western region's migrants had a greater variety of destinations. Apart from Russia, Germany was a popular destination for migrants from the South, while nearby Poland attracted a significant number of migrants from the Western region.

[5] Implied migration is estimated as the residual after births and deaths are considered in population comparisons.

[6] International Organization for Migration, Migration in Ukraine: Facts and Figures, 2011.

[7] ILO, Modular Sample Survey on labor Migration in Ukraine (2013).

[8] Ukrstat.org – "публикація документів Державної Служби Статистики України"

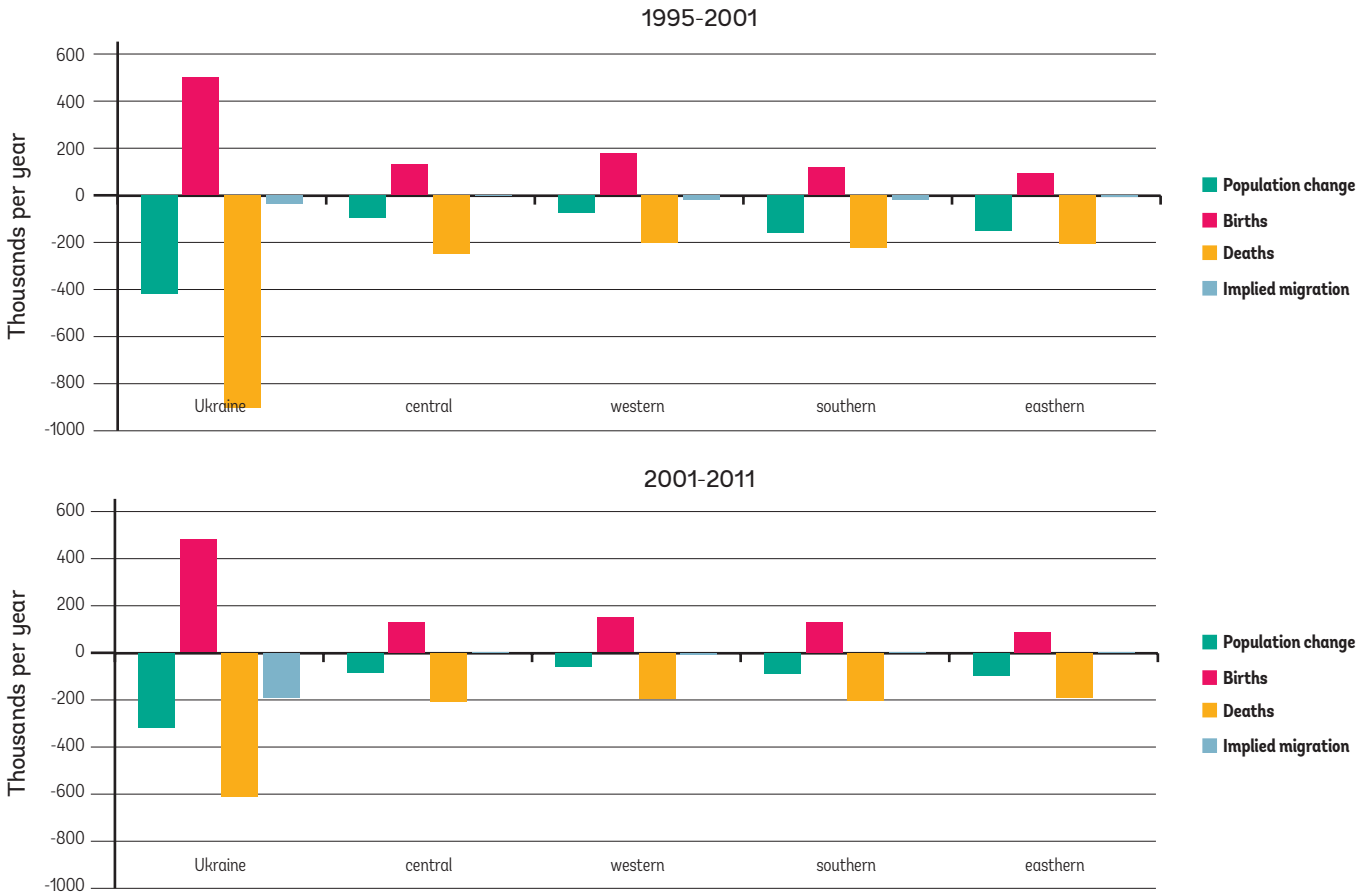
Table 1 – Ukrainian diaspora by country of residence (ca. 2012)

Country of residence	Definition	Reference date	Number (Russia –A)	Number (Russia – B)	% (Russia-A)	% (Russia B)
EU of which			1,052,184		19.7	53.3
Poland	(A)	2012	227,446		4.3	12.2
Italy	(A)	2012	201,830		3.8	10.8
Germany	(B)	2012	153,393		2.9	8.2
CSI Countries and Georgia			3,581,104	114,519	67.1	6.1
of which Russia	(A)	2002	3,581,104	x	66.7	x
Russia	(B)	2010	3,559,975	59,339	x	5.0
Belarus	(B)	2009	16,874		0.3	0.9
Moldova	(B)	2010			0.1	0.2
Other countries of which			702,551		13.2	37.6
US	(A)	2011	352,793		6.6	18.8
Israel	(A)	2005	258,793		4.9	13.8
Canada	(A)	2006	59,460		1.1	3.2
TOTAL			**5,335,840**	**1,869,255**	**100**	**100**

Definition: Depending on the country of destination, Ukrainian migrants are classified by country of birth (A) or country of nationality (B). As Russia reports numbers using both definitions, total estimations are used for Russia (A) and for (B).

Source: : Migration Policy Center, Mpc - Migration Profile: Ukraine (2013)

Figure 12 – Migration is increasingly a factor in Ukraine's population decline



Source: Authors' analysis of data from Ukraine Statistics Department

Figure 13 – Labour migration rate by regions

Source: Authors' analysis; ILO, Modular Sample Survey on Labor Migration in Ukraine (2012)

Table 2 – Between 2010 and 2012, migrants came mainly from Ukraine's western region

	Total (000)	Total (%)	Total (thousands)				Percentage by destination				Percentage by origin			
			Central	South	East	West	Central	South	East	West	Central	South	East	West
Russian Fed.	511	43.2	76,1	50,6	102,2	282,1	14.9	9.9	20.0	55.2	64.5	49.9	88.1	33.2
Poland	168,4	14.3	6,6	3,9	0,0	158,0	3.9	2.3	0.0	93.8	5.6	3.8	0.0	18.6
Italy	156	13.2	9,0	10,9	2,7	133,4	5.8	7.0	1.7	85.5	7.7	10.8	2.3	15.7
Czech Republic	153	12.9	10,3	0,0	0,0	142,7	6.7	0.0	0.0	93.3	8.7	0.0	0.0	16.8
Spain	52,6	4.5	1,3	10,0	0,0	41,3	2.5	19.0	0.0	78.5	1.1	9.9	0.0	4.9
Germany	27,8	2.4	2,0	11,8	4,5	9,5	7.2	42.4	16.2	34.2	1.7	11.6	3.9	1.1
Hungary	23	1.9	0,0	0,0	0,0	23,0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	2.7
Portugal	21,7	1.8	9,1	0,0	0,0	12,6	41.9	0.0	0.0	58.1	7.7	0.0	0.0	1.5
Belarus	21,5	1.8	2,4	0,0	0,0	19,1	11.2	0.0	0.0	88.8	2.0	0.0	0.0	2.2
Other Countries	46,6	3.9	1,3	14,1	6,7	29,1	2.8	30.3	14.4	62.5	1.1	13.9	5.8	3.4
TOTAL	**1181,6**	**100**	**118,1**	**101,3**	**116,1**	**850,8**	**10.0**	**8.6**	**9.8**	**72.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: ILO, Modular Sample Survey on Labor Migration in Ukraine (2012)

The Czech Republic and Hungary were the main recipients of migrants from Zakarpattia. This is primarily due to geographical proximity. Further, the Western region's ethnic specificity is a contributing factor – most Ukrainian Hungarians live there – and Zakarpattia was historically part of the Austro-Hungarian Empire. Other western oblasts generated a large number of migrants to Southern European countries such as Portugal, where in relative terms Ukrainians are the second biggest immigrant group after Brazilians – with about 44 thousand migrants officially registered.

The profile of Ukraine's migrants is diverse, but they are disproportionally young and approximately two-thirds of emigrants are male. However, certain distinctions can be observed among the emigrant populations of the destination countries. Some Southern European countries receive a larger share of women because of the demand for service-oriented jobs in those countries, whereas the Russian Federation receives a higher share of migrant men because of the demand for manual or mechanical jobs. Moreover, 45 percent of migrants are between 15 to 35 years of age, while this age cohort comprised 29% of Ukraine's total population, demonstrating an over-representation of young people among Ukraine's migrants. In addition, migrants' origins were almost equally divided between rural (55 percent) and urban areas (45 percent).

Regarding the educational level of migrants, an ILO study[9] concluded that for most European countries Ukrainian migrants are more educated than the local labor. Nevertheless, most of Ukraine's temporary migrants are from segments of the Ukrainian population with lesser educational achievement (e.g., construction workers going to Russia as well as service workers going to Southern Europe). By contrast, younger, highly-educated migrants are usually leaving permanently in order to find better opportunities professionally and financially.

Figure 13 shows that higher labor migration rates were in the Western region in Ukraine between 2010 and 2012. An analysis of the migration patterns since the conflict's onset is provided in the Conclusion Section. An analysis of internal labor migration patterns prior to the conflict has been included in Section 2 following the urbanization analysis.

Key messages and implications for further policy and analytical work

Over the past two decades Ukraine's population has been declining and aging. Over this period the country lost 13 percent of its population. The sharp decline in population was partly the result of out-migration but is also very much linked to an overall aging trend of the population in the country and a significant decline in fertility. Fertility rates remain very low and have been below replacement levels since 1990. Population dynamics differ across age cohorts, urban and rural, and regions. The decline in the youngest cohorts, from 0 to 10 years, is much sharper – at 41 percent – than the one observed in the 11 to 39 years old cohort. The youngest cohort is also declining more in urban areas than in rural areas. On the contrary, the fastest growing segment of the population is the 60+ cohort living in urban areas, which grew by 21 percent over the past two decades. Variation in population dynamics is also visible across regions, with the Eastern region losing its youngest population at a faster rate than others. In terms of out-migration, the vast majority of migrants – prior to the conflict – came from Oblasts located in the Western region; were disproportionately young and to a large extent male. As will be discussed in subsequent sections, the overall population decline is leading to an important decline of the population in the majority of urban centers in Ukraine, and even more dramatically since the conflict started in 2014.

The overall decline and aging of the Ukrainian population poses important economic and urban development challenges with implications in terms of fiscal policy and demand for public services. Overall labor participation might decline, as older workers leave the labor force and become a larger share of the population. This aging may lead to a reduction of tax revenues due to a diminishing workforce and lower private savings of workers, while it is also expected to lead to an increase in demand for public expenditures related to healthcare, long-term care, and pensions. However, as argued in the recent World Bank Study "The Golden Age of Aging"[10], an aging and declining population does not necessarily lead to economic catastrophe as the demographics observed in the region may prove temporary in nature. For instance, a reduction of the labor force can make more capital available to existing workers and lead to increased productivity. To lessen the potential consequences of an aging population, the report recommends increasing the retirement age to better reflect gains in life expectancy; focusing in policies that increase fertility to sustainable levels; reforming health and long-term care systems to allow for healthier aging; and embracing migration as a part of the solution. Local governments have a key role to play in this.

[9] Ganna Vakhitova and Tom Coupe, The Relations between Education and Migration in Ukraine, International Labor Organization, 2014.

[10] World Bank Group: The Golden Age of Aging, 2014.

Going forward, as cities shrink, local authorities will need to re-assess how infrastructure is planned and maintained, and the way services are financed and delivered. Neighborhoods may need to be consolidated as cities lose density. Public service plans, designed for a larger population, may have to be re-considered to address lower demand. In addition, an aging urban population has consequences for the demand for and type of housing (e.g., long-term care facilities), the demand for public transportation (as elderly tend to commute less and have different design needs), and other basic services. The combination of an overall aging urban population and declining fertility rates will also likely shift demand from education to health services. Urban areas will, therefore, need to adapt their social and material infrastructure to better serve the changing needs and demands of their population.

II. Urbanization and the Urban System[11]

Ukraine's cities during the soviet period

Large-scale urbanization in Soviet Ukraine commenced only after 1945 and resulted from an increase in the demand for labor by the country's industries and a massive housing production initiative. In 1945 only 34 percent of the population of Ukraine lived in urban areas and Ukraine was still predominantly rural. Rapid urbanization only came later and was caused by an increase in the demand for labor in the industrial centers in the cities of Soviet Ukraine and a large campaign for the construction of residential housing units driven by the housing reform of Nikita Khrushchev in the late 1950s. The growth of the urban population throughout the USSR was mainly due to a large-scale migration of rural population to the cities. In Ukraine, urbanization and industrialization went hand-in-hand; as the USSR restored infrastructure and factories demolished in the war and built new one and workers started arriving from the central parts of Russia and from further away in the USSR.

At the time, the majority of Ukraine's population lived in multi-family apartments, hostels, or barracks, and the drive for single-family dwellings with all basic amenities became an important national policy in the 1950s-1960s. Urban development policies were strongly linked to the decision to expand housing construction. The industrialization and standardization of housing construction made it possible to rapidly increase the supply of housing and played an elemental role in the growth of Ukrainian cities. The idea of simple and utilitarian blocks of flats came to the USSR from Germany and the US, where pre-fabricated construction took off in the 1930s and expanded significantly immediately after WWII (e.g., Concept of Plattenbau in Germany). New buildings were produced in factories using panel construction that could then be assembled on site. It was estimated that more buildings were built in Ukraine from 1956 to 1964 than in the previous 38 years of Soviet rule[12].

Urban development at the time was viewed through the perspective of achieving higher socio-economic equity across Ukraine's cities. The 22nd Communist Congress held in 1961 outlined a roadmap, which aimed to eliminate disparities in social infrastructure between cities and villages. However, officials were also instructed to avoid an excessive concentration of population in big cities, to promote the development of small cities and towns, and to transform farm villages into bigger town-like settlements. The optimal size for a city in terms of population was considered to be between 20,000 and 300,000 inhabitants[13]. The national policy was also influenced by meager per capita size of the housing stock, which was around 4-5 m^2 in cities like Moscow or Kyiv.

[11] In providing a regional overview of the country, this document uses the description of four geographic regions developed by the Kiev International Institute of Sociology: East, Center, South, and West.

[12] Yaroslav Hyrych, "Urbanization According to Plan," The Ukrainian Week, 26 September 2012, available at http://ukrainianweek.com/History/60924 .

[13] Urban Development Institute under the Academy for Construction and Architecture of Ukrainian SSR (1950).

The emergence and later obsolescence of Ukraine's cities was facilitated by the Soviet command-administrative system. Between 1956 and 1965 the number of cities increased substantially due in part to legal changes that allowed Oblast councils to grant city status to settlements – a power previously limited to Ukraine's central government (or Verkhovna Rada). While in 1946 Ukraine urban system was composed of 258 cities, by 1959 the number had grown to 331 and by 1970 to 385. Uzhhorod, for example, was a town that had only 17,000 inhabitants at the war's end, but experienced a population increase when it was granted oblast center status (in 1946) and a university opened there. By 1989, it counted more than 100,000 inhabitants. By contrast, settlements that lost their "city" status eventually declined.

Cities in the post-war era were developed around a core industry and guided by industrialization policies. The majority of these cities emerged in priority industrial areas identified and established by the central Government such as Donetsk, Luhansk, and Dnipropetrovsk oblasts and along the Black Sea coast. These policies produced flourishing, mono-functional cities[14], where the majority of the population was employed by one or few inter-connected industries and the city's economy was fully dependent on them. A more detailed review of the mono-functional cities system is described in Box 1 below.

BOX 1 – MONO-FUNCTIONAL CITIES SYSTEM

The term mono-functional city or mono-town refers to a city whose economic performance and employment is highly dependent on one or few industries. In Ukraine, this term is defined in law as cities where the employment of economically active population works in enterprises mainly focused on one or two main economic sectors that also support a substantial part of the city's budget and social infrastructure.

At present, there are 111 mono-functional cities in Ukraine: 32 are focused on coal extraction, 27 on the processing industry, 18 are agricultural centers, nine are focused on transport and nine on power engineering, seven focused on production of ore and non-metallic resources, six on chemicals and the oil refining industry, two on therapeutics, and one on art.

The Donetsk oblast counts with the highest number of mono-functional cities with 27 of them. This is partly explained by the decision to have eastern Soviet Ukraine specialize as a region in coal-mining, metallurgy, heavy machinery, chemicals, etc., based on the abundance of natural resources found in the Eastern Region. A mono-functional city approach was extensively used in the period of the centrally-planned economy as the instrument for implementing industrialization and the territory management policy, which was heavily oriented towards large-scale industry and its accompanying infrastructure. During the 1950s-1970s, the narrow industrial specialization of individual cities combined with large-scale infrastructure and intensive transport flows were features of the paradigm of 'territorial industrial complexes' implemented throughout the USSR.

Due to the heritage of this narrow economic specialization, mono-functional cities are highly vulnerable to the economic changes that have occurred in the country since the post-Soviet era. For example in the Donetsk and Lugansk oblasts, the economic performance of these cities is highly dependent on the status of the region's mineral reserves, the degree of their industrial development, and the competitiveness of enriched raw materials extracted by local enterprises. It is also dependent on the ability of new private owners to manage local enterprises in a way that enhances their competitiveness. Many of these cities, which are dependent on the coal mining industry, struggled to find new economic growth following the massive industry restructuring and closure of enterprises due to their low level of competitiveness in the post-Soviet era.

Source: L.M. Kuzmenko, M.O. Soldak, Mono-functional cities: Problems, support provision and development, 2010.

[14] Law on the Approval of the National Programme of Development of Small Cities # 1580-IV approved on 04.03.2004 (in Ukrainian) - http://zakon2.rada.gov.ua/laws/show/1580-15

Ukraine's major urban agglomerations emerged between 1957 and 1979. The city of Kyiv hit the one million-inhabitant mark in 1957, followed by Kharkiv in 1962 and Odessa in 1974. By 1976, Kyiv had already two million inhabitants, and by 1979, Dnipropetrovsk and Donetsk counted more than a million residents. Urbanization was rapid; while in 1959, Soviet Ukraine had only 25 cities with more than 100,000 inhabitants, by 1979 it had 46 such cities[15]. At the same time, internal migration was very restricted by regulations such as the "propiska" system, (name of the registration system during soviet times, a brief review is included in Box 2) which made it very difficult for residents of the former Soviet Union to move within the country. Internal migration policies were relaxed only after the country entered the post-Soviet transition. Between 1935 and 1974 there was a de facto ban on mobility of rural inhabitants. Only in 1974 were residents of collective farms that had the name of kolkhoz able to obtain passports. Prior to that date, they had no national documents and could not leave their place of residence without fear of criminal prosecution.

BOX 2 – EVOLUTION OF THE PROPISKA SYSTEM

One of the main restrictions for internal mobility in Ukraine was the propiska system, (the registration system in the Soviet countries) developed in the 1930s to serve as both a residency permit and a tool to monitor migration in the Soviet Union. The name propiska literally means an inscription and in this case, alludes to the inscription in a state internal passport permitting a person to reside in a given place. Propiska was documented in local police (Militsiya) registers and certified by a stamp made on internal passports. Official permission from local authorities was required to register one's residence or change of residence; residing anywhere without a propiska was prohibited until the collapse of the USSR.

Beginning in 1933, an additional feature of the propiska system was the existence of separate passports for residents of the so-called "regime" places, which were settlements where it was practically impossible for an outsider to receive a passport and, therefore, the required propiska. The state authorities exercised full control over the issuance of passports and propiska in this places. The first "regime" places were Kyiv, Odessa, Dnipropetrovsk, and Donetsk (then known as Stalino). Later on, other cities were added. By 1953, there were 340 "regime" cities, locations, and railway connections.

Ukraine officially discontinued the institution of propiska with the adoption of a new regulation on identification documents on September 2, 1993. However, in practice there was little difference between the old Soviet system of propiska and the newly-adopted regulation system. In 2004, after years of debate, the Law on the Right to Freedom of Movement and Choice of Place of Residence came into effect replacing the old registry system. Human rights groups stressed that a major difference between the propiska system and the new system of registration, which is required by law, is that a person may live, work, and receive services anywhere in the country. The rationale for the law was not based on denial of services; there was no indication that individuals were denied access to services because they were not registered in the locality where they resided. However, the new system still has some rigidities that makes it difficult to "de-register" when selling property and "register" while buying new property (buyers need to present proof of prospective place of residence while receiving certificate of "de-registration" from the old residence, which is not always feasible).

Sources: Immigration and Refugee Board of Canada, Ukraine: Information on whether the residence permit (propiska) system still exists, 1992; Court Abolishes Propiska Law, Kyiv Post, 29 November 2001, available at http://www.kyivpost.com/content/ukraine/court-abolishes-propiska-law.html; Evgenija Navrotskaja, Roma and propiska in Ukraine, 3 April 1999, available at http://www.errc.org/article/roma-and-propiska-in-ukraine/593; Immigration and Refugee Board of Canada, Responses to Information Requests: UKR42598.E, available at http://www.irb-cisr.gc.ca/Eng/ResRec/RirRdi/Pages/index.aspx?doc=445385; United Kingdom, Home Office, Country of Origin Information Service, Country of Origin Information Report: Ukraine, available at http://www.justice.gov/eoir/vll/country/uk_cntry_assess/2006/ukraine0606.pdf

[15] Paul R. Magocsi, A History of Ukraine: The Land and Its Peoples, 2nd ed., 2010.

Ukraine's system of cities was developed during the Soviet period; as such, their emergence and growth was developed in a centralized way and was not based on market principles. The demand and supply of housing and other resources and services was rigid and highly regulated. The dominant approach was development based on economy of scale, narrow specialization of individual industrial cities, and extensive co-operation among cities and their metropolitan areas. The territory of the USSR was divided into economic macro-regions hosting a limited number of specialized industrial cities that would have self-sufficient industries and infrastructure (electricity, water, roads, etc.). With the fall of the Soviet Union and the introduction of market forces, it became evident that, from a spatial point of view, many of its cities had been developed in places where they should not have been. For example, many cities had no rural hinterland to rely on for daily food needs and therefore depended on the supply of subsidized goods. Further, many of the industrial cities in the Eastern Region were highly dependent on raw materials and subsidized energy provided by other Soviet Republics were not competitive internationally once borders were opened. Mono-functional cities, which depended economically on a single or a few industries, were particularly vulnerable to this.

While the fall of the Soviet Union brought the opportunity to move towards a more efficient settlement system, policies implemented during the transition period re-enforced barriers for internal mobility within Ukraine. During that period, ownership of dwellings was transferred to the occupants with little or no cost, resulting in a high home-ownership rate—occupants owned 95 percent of households in 2012, according to a World Bank estimate[16]. Ukraine's internal migration and urbanization process and the reorganization of Ukraine's urban system will be examined in the following sub-sections.

Ukraine's people do not always move to economic opportunity

Migration to and between urban areas is an indication that people are looking for better labor opportunities, and is a sign of an efficient re-organization of human resources within a country. Achieving economic growth and improving living standards require connecting or bringing people from places that are lagging or declining to places with economic opportunities[17], an essential element to promote Ukraine's development.

The most notable characteristic of internal migration after the collapse of the Soviet Union is a decrease in the volume of movement. However, a caveat is necessary when comparing internal migration in the USSR and subsequent internal migration in Ukraine, especially in the first several years after independence. The termination of the obligatory practice of distributing higher educational institutions' graduates across the USSR, as well as the broader economic troubles of the 1990s (unemployment, high housing prices, restriction of access to higher education due to high cost, increases in transport tariffs, etc.), led to a decrease in the number of internal migrants. In addition, there was a surge in external migration, mainly due to the relocation of people between the republics of the former Union, which was only recently classified as internal migration. After the mid-1990s, the country's economic performance improved and internal migration increased slightly[18]. A final caveat to consider about migration data is that official statistics might not show the entire picture of internal migration, as many people remained outside the radar of registration but moved through the country.

Recent studies of internal migration in Ukraine reveal that few people are moving to seek new economic opportunities. A 2012 World Bank report on that theme shows that Ukraine migrants are not leaving areas with lagging labor opportunities

[16] World Bank, In Search of Opportunities: How a More Mobile Workforce Can Propel Ukraine's Prosperity, 2012, available at https://openknowledge.worldbank.org/bitstream/handle/10986/12268/NonAsciiFileName0.pdf?sequence=1

[17] The World Bank's World Development Report 2009: Reshaping Economic Geography provides an extensive policy oriented discussion about the aspects that make urban conditions optimal for the increase of productivity.

[18] European Commission and GVG, Social Impact of Emigration and Rural-Urban Migration in Central and Eastern Europe, Final Country Report: Ukraine, 2012, available at ec.europa.eu/social/BlobServlet?docId=8820&langId=en

as fast as they should[19], and that they are not necessarily going to regions with better job conditions. Instead, their movement seems to be catalyzed by low levels of social spending in their home regions[20]. The study suggests that the internal migration rate is half of what might be expected from a country like Ukraine. In addition, an ILO study of migrants in 2013 found that those who are moving are predominantly male and young; although they make up only 22 percent of the population, migrants aged 15-29 years comprised over 50 percent of internal migrants that year[21].

In Ukraine, migrants are predominantly from the age cohort of 15-29 years. The number of people who have higher education in Ukraine is relatively high and migration to the main education centers of Kyiv, Kharkiv, Lviv, Odessa, and Donetsk is common as well as to several dozen smaller centers. These young educated people tend to stay in the big centers as they are attracted by bigger labor market and better opportunities. Further, as there is little support infrastructure for entrepreneurs beyond the large cities, it is easier to work in these centers with the minimum set of support instruments. The 2010 Housing Market and Labor Mobility study describes the average renter of accommodation in Ukraine as someone in their 20-30s, with one or fewer children, and an average salary of about 1200 USD. By contrast, people with families and generational obligations are more static, and in even more so in inter-generational settings, where earners take care of not only children but also elderly relatives.

Some of the main barriers to internal migration in Ukraine are: (i) the lack of access to credit and underdevelopment of the housing and mortgage market; (ii) the costs of moving to economically vibrant regions in the country; and (iii) the high transaction costs of moving. First, there are poor financial options and access to credit necessary to encourage internal labor migration. Well-functioning credit markets can help finance mobility and housing arrangements, but in Ukraine they are underdeveloped, leading to high out-of-pocket payments from households' savings or borrowing from relatives, friends, or informal intermediaries to cover the costs of migration from one place to another[22]. Second, there is a very limited rental market as well as significant price differentials across the regions of Ukraine, with considerably more expensive housing in the leading regions than in the lagging regions. This makes it difficult for people in lagging regions (e.g., Zaporizhzhya and Zakarpatska oblasts) to sell their houses and move to areas with improved job opportunities, but with higher housing costs[23]. Lastly, while the propiska registration process (described in detail in Box 2) was reformed in 2004, it is still difficult to obtain residency for migrants in their new destination.

Ukraine continues to urbanize despite its population decline

The limited internal movement is reflected in a continued but more or less static "urbanization" of the population. In fact, despite its rapid population decline, Ukraine continues to slowly "urbanize."[24] As discussed in the demographics section, both urban and rural populations have decreased over the past two decades. However, population decline has been higher in rural areas, which has caused urbanization levels to continue to slowly increase (see Figure 14 below). We need to distinguish between the level of urbanization and the share of population living in the cities, since this last one is the passive number which depends on the whole number of population, which is the case for Ukraine.

19 Based on the concept of efficient mobility of people for development.

20 In Search of Opportunities, 2012.

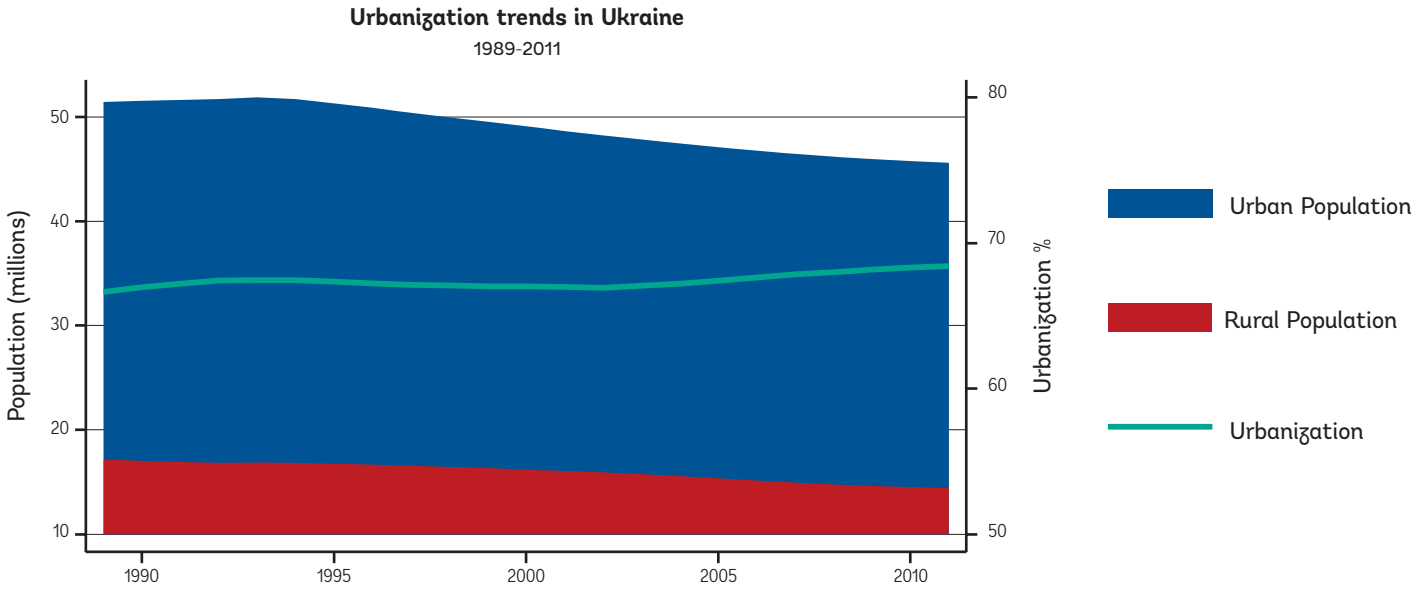
21 International Labour Organization, Report on the methodology, organization and results of a modular sample survey on labour migration in Ukraine, 2013.

22 Koettl, J., et. al., In Search of Opportunities? The Barriers to More Efficient Internal Labor Mobility in Ukraine, Institute for the Study of Labor, 2014.

23 As examples, leading regions include Kiev and Donetsk (before the conflict), while lagging regions include Zaporizhzhya and Uzhgorod.

In 1989, 66 percent of Ukraine's population lived in urban areas. Between 1989 and 2001, the rural population decreased from 17 million to 16 million (a 6 percent decline), while the urban population fell from 34 million to 33 million (a 4 percent decline). The interaction of these dynamics resulted in an increase of 1 percent in Ukraine's urbanization to 67 percent in 2001. Between 2001 and 2011, the rural population further dropped to 14 million (a 10 percent decline), while the urban population itself fell further to 31 million (a 4 percent decline). As a result, in 2011 the urbanization level rose to 68 percent. On average, this shows a steady growth of urbanization levels of approximately 0.15 percent per year since 1989.

Figure 14 – Both urban and rural populations declined between 1989 and 2011; yet the country continues to urbanize

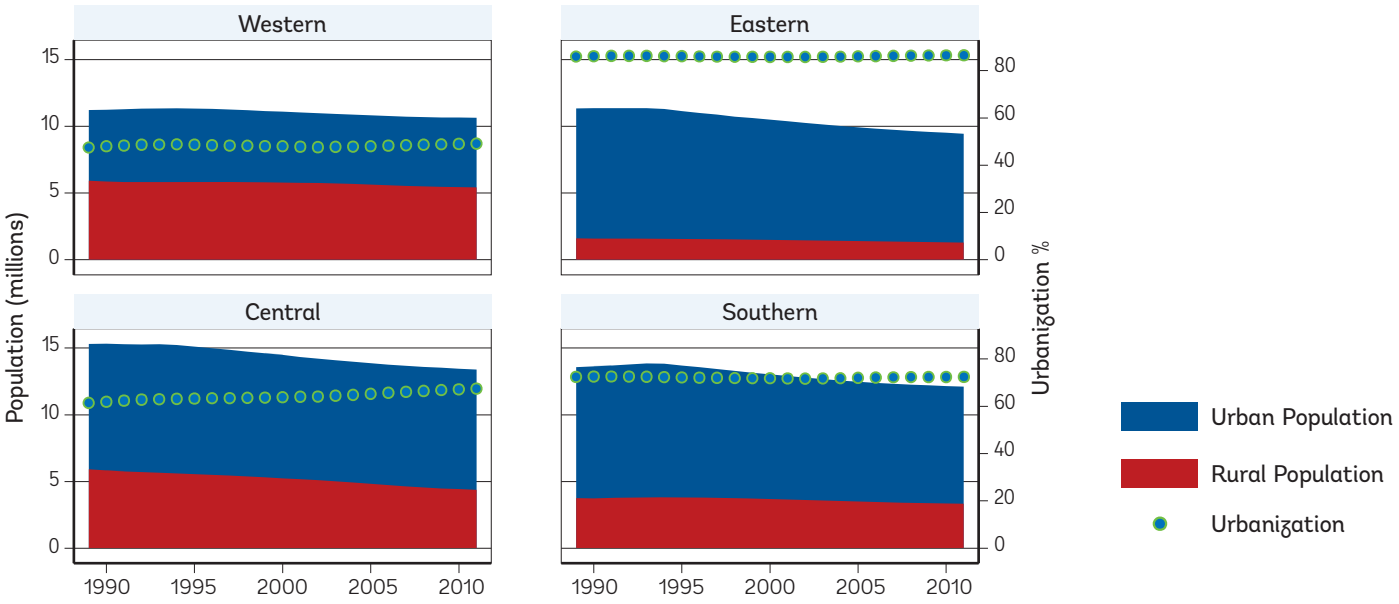


Source: Ukraine Statistics Department

However, there are some differences in urbanization trends among the regions over the past two decades (see Figure 16). The Eastern and Southern regions were already highly urbanized in 1989 – with 84 percent and 70 percent of their populations living in urban areas respectively. These regions maintained a more or less stable urbanization level over the 1989-2011 period as their urban populations declined at similar rates as their rural populations (See Figure 15). The Central and Western regions were the least urbanized in 1989 with 60 and 45 percent of their populations living in urban areas respectively. However, the Western region's urbanization levels remained more or less stable, while the Central region continued to slowly urbanize reaching 67 percent urbanization by 2011 (by contrast, the Western region shows the lowest urbanization level of all regions in 2011 at 49 percent). This was possible because the Central region's urban population remained more or less stable as its rural population continued to decline.

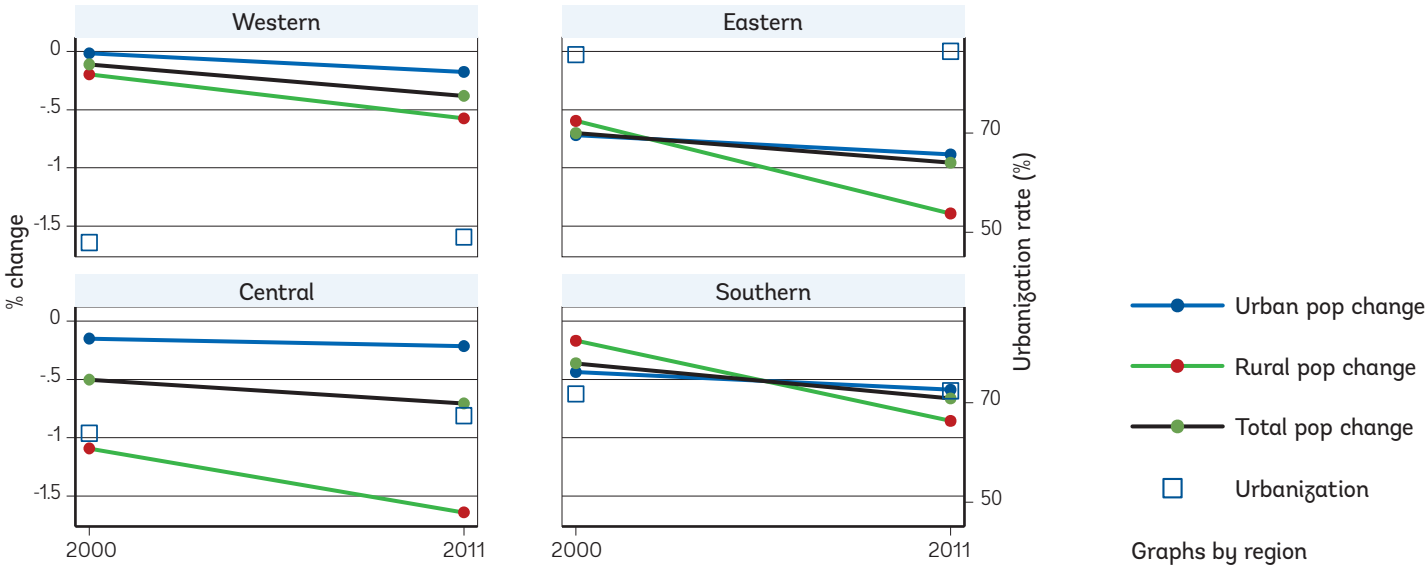
[24] Usually, urbanization is understood as growth in the urban population, which causes an increase in the urban/rural population ratio. In the case of declining population, like the case of Ukraine, urbanization can be understood as the increase of the urban/rural population ratio despite the decline of both urban and rural population—so long as the rural population is declining faster.

Figure 15 – There are strong differences among urbanization levels across the regions



Source: Ukraine Statistics Department

Figure 16 – Population dynamics are heterogeneous across Ukraine's regions. In all cases, however, population declines yield increased urbanization rates



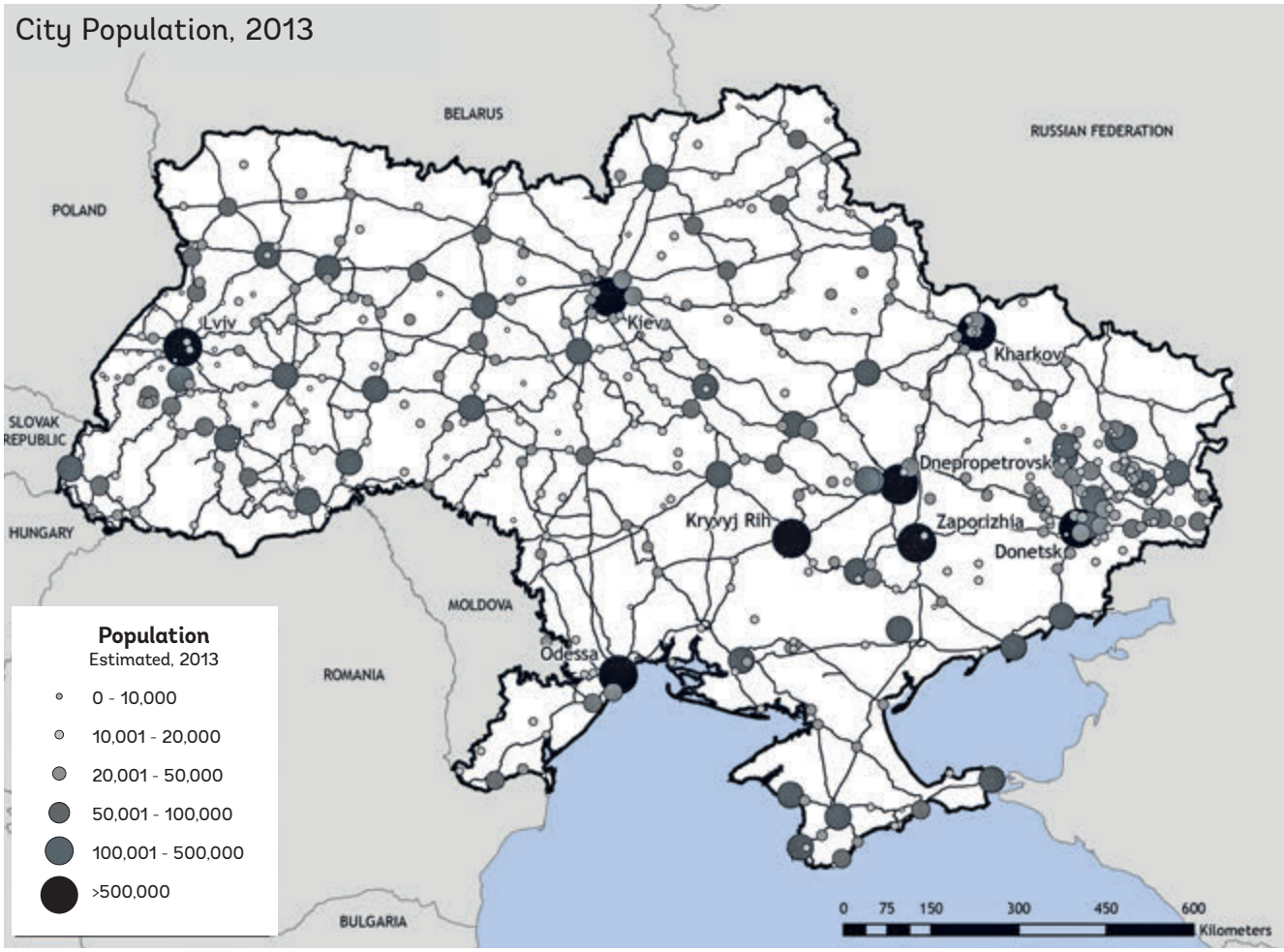
Source: Ukraine Statistics Department

A slowly evolving system of cities

Ukraine has 458 cities[25] that serve as the urban element of basis for an analysis of Ukraine's settlement system. As previously mentioned, of these, Kyiv and Sevastopol until 2013, had the same administrative status as the other 24 Oblasts; 182 are cities of Oblast significance, which have the same autonomy as Raions; and 276 cities are subordinated to Raions. Figure 17 below presents the spatial distribution of Ukraine's cities and their population in 2013.

Ukraine is much more densely urban in the Eastern region, which has a significant number of cities concentrated near the Russian border (see Figure 17). By contrast, the density of cities is much lower in the Western region, which also has a large number of small towns (less than 10,000 inhabitants). This is partly a reflection of the lower levels of urbanization of the Western region as well as the high levels of urbanization found in the Eastern region (as discussed in the previous sub-section). The Southern region has a significant number of cities with population between 50,000 and 100,000 as well as fewer smaller cities.

Figure 17 – Distribution of cities across Ukraine

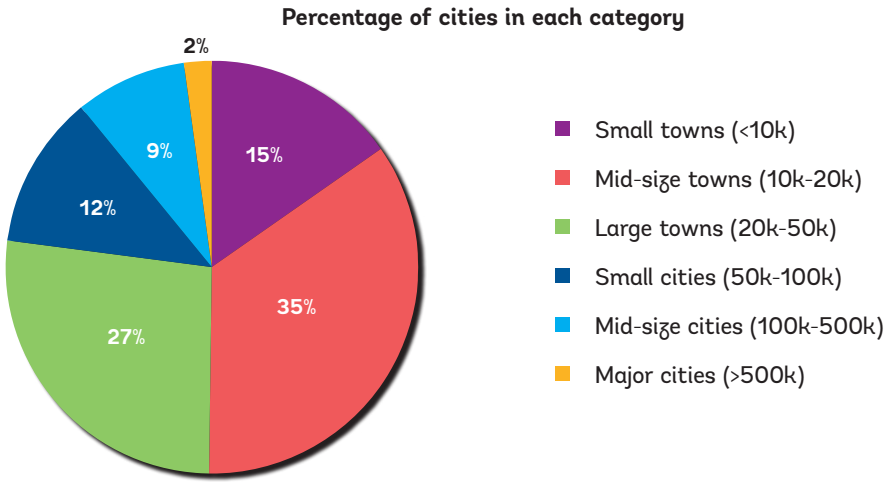


Source: Ukraine Statistics Department

[25] Two additional cities, Chernobyl and Pripyat, are not considered as part of the urban system as they have been abandoned due to radiation contamination in the aftermath of the accident at the Chernobyl nuclear power station in 1986.

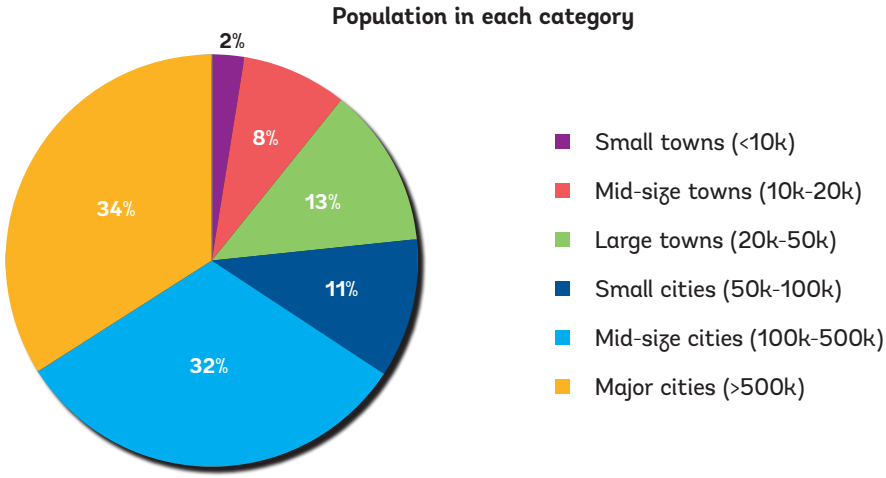
While most Ukrainian cities have less than 20,000 inhabitants, the majority of the urban population[26] lives in cities having more than 100,000 inhabitants (see Figure 18 and Figure 19). In fact, some 34 percent of the urban population is concentrated in just eight urban centers (Kyiv, Kharkiv, Odessa, Dnipropetrovsk, Donetsk, Zaporizhzhia, Lviv, and Kryvyi Rih). Moreover, if the population living in the functional urban area of these eight cities were counted, it would comprise an even larger percentage of Ukraine's urban population (62 percent), as each of these urban centers is at the core of significant urban agglomerations.

Figure 18 – Ukraine has a high percentage of small and mid-sized towns 2013



Source: Ukraine Statistics Department

Figure 19 – Most of the urban population is concentrated in eight major cities 2013



Source: Ukraine Statistics Department

The Western region has many small towns with less than 10,000 inhabitants (Figure 20), but most of the urban population lives in mid-sized cities. In the other three regions, major urban centers account for a larger amount of the urban population as they have a large number of mid-sized and large cities. Table 3 shows the five largest urban centers for each region. The Western and Central regions show a pattern where one city comprises a much larger percentage of the population than the next four largest of the region's cities[27]. A similar pattern is observed in the Eastern and Southern regions, but here the difference between the largest and the following cities is smaller.

[26] For this analysis, the urban population is the population located in the 458 cities identified in the Ukrainian urban system.

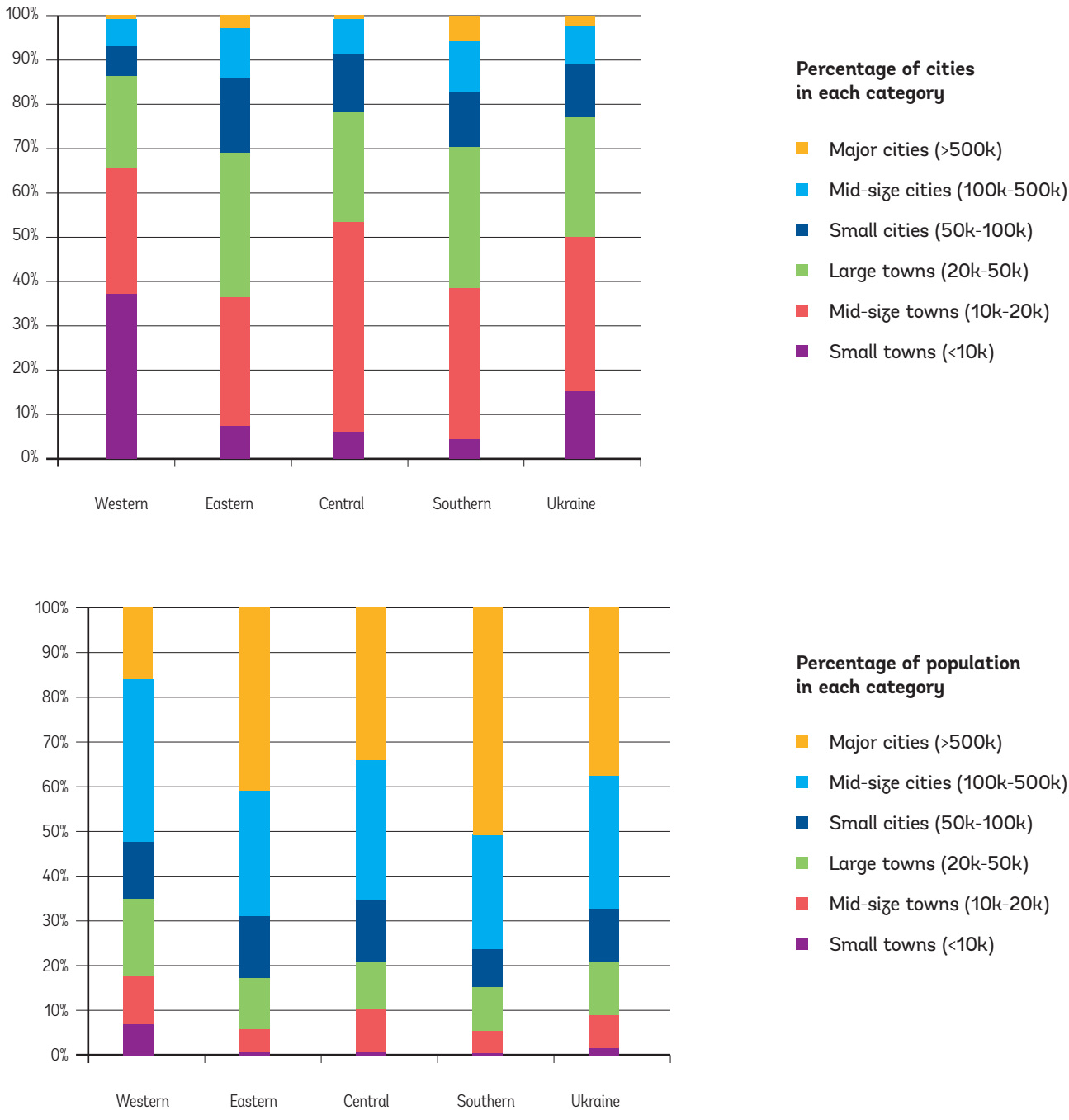
[27] TIn this case larger than what would be indicated by a Zipf law. See Gabaix, X. Zipf's Laws for Cities: An Explanation, The Quarterly Journal of Economics, 1999.

Table 3 – Five largest urban centers in each region by population in 2013

Oblast	City	Population 2013	Region	Percentage of region's population
Lviv	Lviv	730272	Western	16.0
Khmelnytskyi	Khmelnytskyi	264988	Western	5.8
Chernivtsi	Chernivtsi	258842	Western	5.6
Rivne	Rivne	250333	Western	5.4
Ivano-Frankivsk	Ivano-Frankivsk	226018	Western	4.9
Kharkiv	Kharkiv	1451028	Eastern	20.6
Donetsk	Donetsk	953217	Eastern	13.5
Donetsk	Mariupol	461810	Eastern	6.5
Lugansk	Lugansk	425848	Eastern	6.0
Donetsk	Makiivka	353918	Eastern	5.0
Kyiv	Kyiv	2757900	Central	34.0
Vinnytsia	Vinnytsia	371698	Central	4.5
Poltava	Poltava	296852	Central	3.6
Chernihiv	Chernihiv	296089	Central	3.6
Cherkasy	Cherkasy	285605	Central	3.5
Odessa	Odessa	1014852	Southern	13.1
Dnipropetrovsk	Dnipropetrovsk	997754	Southern	12.8
Zaporizhzhia	Zaporizhzhia	770672	Southern	9.9
Dnipropetrovsk	Kryvyj Rih	656478	Southern	8.4
Mykolaiv	Mykolaiv	496188	Southern	6.4

Source: Ukraine Statistics Department

Figure 20 – The Western region has the greatest number of small towns. Also, its urban population lives mostly in mid-sized cities (100-500k)



Source: Ukraine Statistics Department

Between 1989 and 2001, Ukrainian cities in all size categories saw a significant decline in their population, on average 6.3 percent of their population (See Figure 21). Small cities – having a population between 50,000 and 100,000 in 1989, were the most affected category over the 1989 – 2001 period, losing on average 7.4 percent of their population. Over this period, mid-sized cities with populations of 100,000-500,000 inhabitants fared better, losing less population than any of the other categories.

Over the subsequent 2001-2013 period, cities continued to lose population at more or less same rate, although the situation was worse for Smaller Cities. Also, over this period more Small Towns were shrinking and the category as a whole was losing population at a higher rate than the average across the urban system with 75 percent of small towns losing population. Mid-size towns also experienced greater declines than the urban system average.

On average, Major Cities did better than Small Cities or Small Towns, but the situation was mixed when looking at individual cities. In fact, when limiting the analysis to administrative divisions, among the 15 largest cities only Kyiv, Sevastopol, and Vinnytsia grew over the last decade. Among large cities, Kyiv consolidated itself as the country' growth center, and remains the main recipient of the cross-regional exchange of population. For Kyiv, the inflow of migrants provides enough of an increase in population to compensate for natural population decline. Population growth due to internal migration can also be observed in the largest industrial regions of Ukraine (Kharkiv and Dnipropetrovsk Oblasts)[28].

Kyiv Oblast and the neighboring Chernihiv and Zhytomyr Oblasts are the main suppliers of labor migrants to Kyiv city. Odesa oblast, known for its opportunities in seasonal employment in both agriculture and recreational spheres, also attracts a significant number of internal labor migrants. Among other regions supplying labor migrants (beside Kyiv, Chernihiv, and Zhytomyr oblasts supplying labor migrants for the capital), Ivano-Frankivsk Oblast yields a significant number of migrants for work in Lviv and Kyiv[29].

Relative to the population patterns observed in individual cities, agglomerations[30] fared much better. The largest agglomeration, formed around Kyiv, has grown steadily since 1989, so that it is the largest urban center in Ukraine. It is also the fastest growing one, with total population growth of 7.2 percent between 2001 and 2013. Tables 4 and 5 contrast the performance of the 15 largest individual cities in Ukraine, where three registered growth, and the 15 largest urban agglomerations, where six had positive population growth in the last decade.

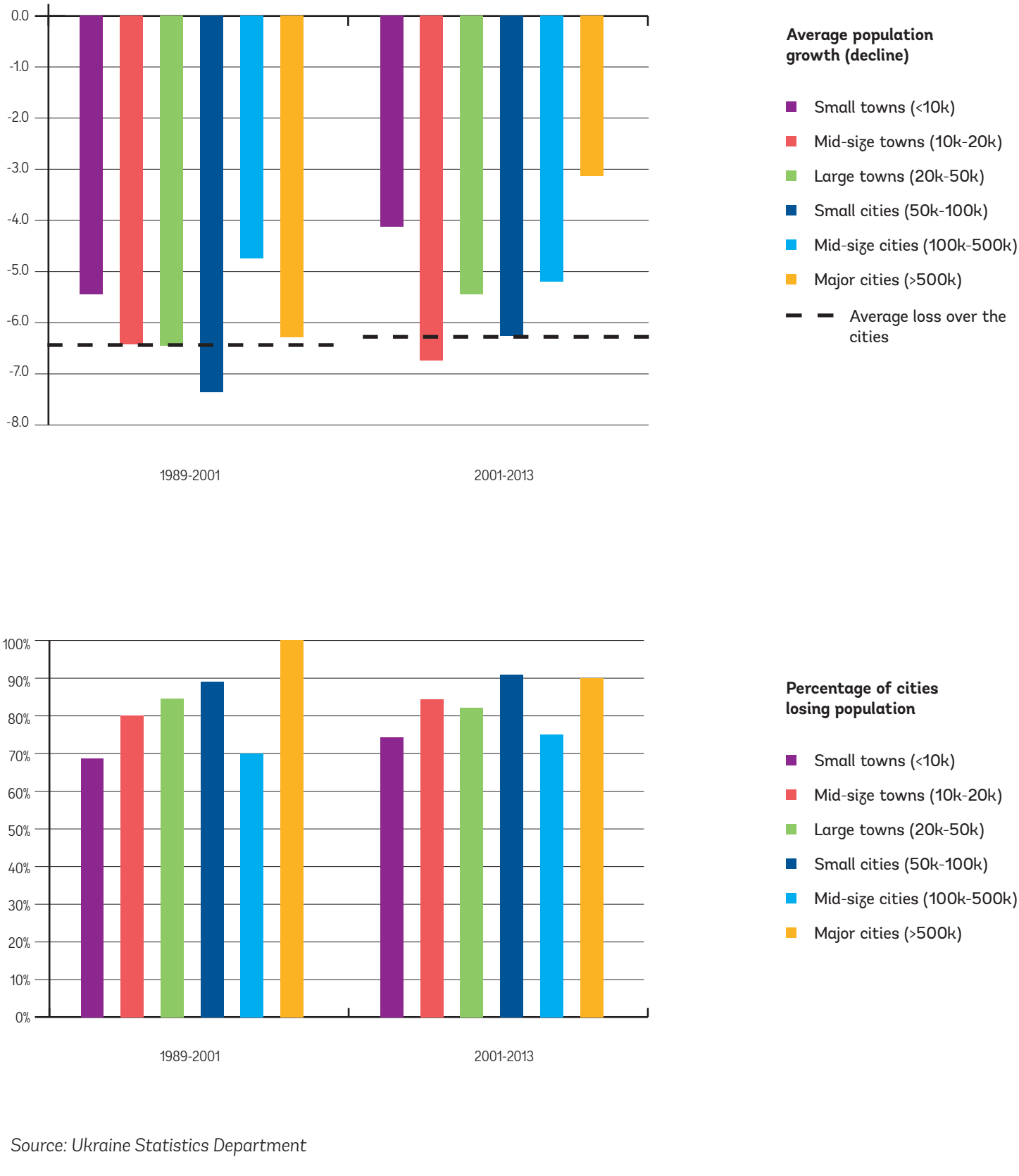
Even more important, if we look at all the cities in the country, individual cities that showed positive population growth are, in a significant majority of cases, cities that are part of a larger agglomeration - either as centers themselves or as part of an agglomeration's periphery. When ranked by order of population growth between 2001 and 2013 (see Table 6), eleven out of the fifteen fastest growing cities in the country were part of an agglomeration.

[28] European Commission and GVG, Synthesis Report: Social Impact of Emigration and Rural-Urban Migration in Central and Eastern Europe, VT/2010/001, June 2012.

[29] European Commission and GVG, Synthesis Report: Social Impact of Emigration and Rural-Urban Migration in Central and Eastern Europe, VT/2010/001, June 2012.

[30] Agglomerations are defined using Night Lights data and are formed by cities that in 2013 had a merged Night Lights urban footprint. See Box 3 and the subsequent discussion in Section 4.

Figure 21 – All categories of cities in Ukraine are losing population



Source: Ukraine Statistics Department

BOX 3 – DEFINITION OF AGGLOMERATION USING NIGHT LIGHTS SATELLITE IMAGING

Agglomerations are groupings of individual cities that function as a single city due to the proximity of and interaction between their housing, labor and commercial markets. People might work in one city in the agglomeration and live in another one. These cities usually have separate geographic and political boundaries and had their markets initially separate as well, but they became agglomerated as the cities grew. Satellite night lights can be used to trace the evolution of urban 'footprints,' which may merge and form an agglomeration (see Section 4 below). In total, Ukraine has 23 agglomerations that are composed of 79 cities, approximately four cities per agglomeration. The figure below presents Kyiv's agglomeration and the growth of its night light urban footprint between 1996 and 2010. Some of the cities separate from Kyiv in 1996 have grown to become a single urban footprint in 2010.

Figure – Kyiv urban agglomeration (between 1996 and 2010)

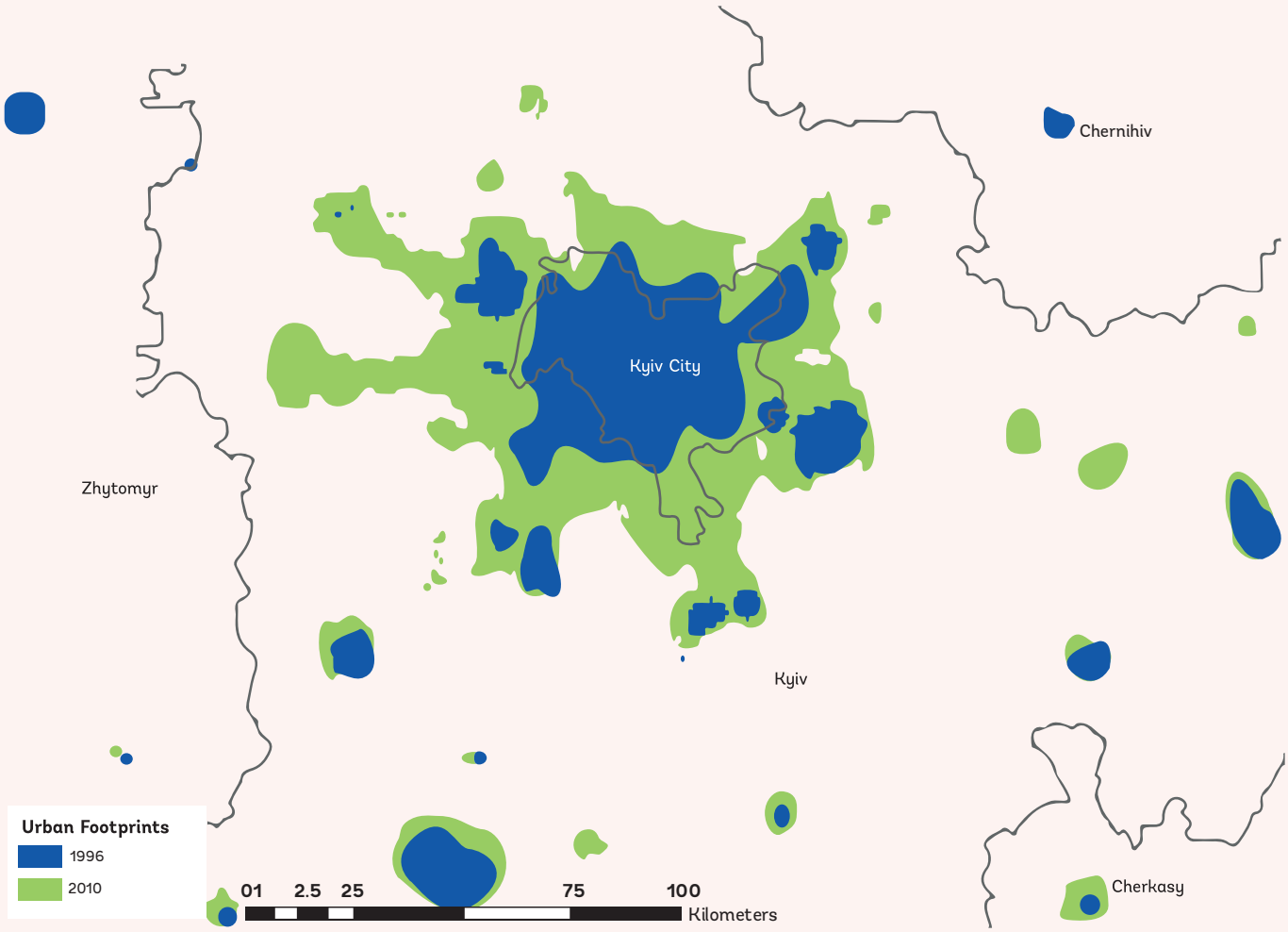


Table 4 – Ranking of Ukraine's 15 largest cities by population

City	Rank 2013	Rank 1989	Population 1989	Population 2013 e	Change 1989-2001	Change 2001-2013	Oblast	Region
Kyiv	1	1	2,572,212	2,757,900	-0.2	7.4	Kyiv	Central
Kharkiv	2	2	1,609,959	1,451,028	-8.6	-1.4	Kharkiv	Eastern
Odessa	3	4	1,115,371	1,014,852	-7.7	-1.4	Odessa	Southern
Dnipropetrovsk	4	3	1,215,941	997,754	-9.2	-9.6	Dnipropetrovsk	Southern
Donetsk	5	5	1,109,102	953,217	-8.4	-6.2	Donetsk	Eastern
Zaporizhzhia	6	6	883,909	770,672	-7.5	-5.8	Zaporizhzhia	Southern
Lviv	7	7	790,908	730,272	-7.3	-0.3	Lviv	Western
Kryvyj Rih	8	8	739,139	656,478	-7.2	-4.3	Dnipropetrovsk	Southern
Mykolaiv	9	9	522,343	496,188	-1.6	-3.5	Mykolaiv	Southern
Mariupol	10	10	518,933	461,810	-5.2	-6.2	Donetsk	Eastern
Lugansk	11	11	496,813	425,848	-6.8	-8.0	Lugansk	Eastern
Vinnytsia	12	13	374,304	371,698	-4.7	4.2	Vinnytsia	Central
Makiivka	13	12	430,201	353,918	-9.4	-9.2	Donetsk	Eastern
Sevastopol	14	14	356,123	342,580	-3.8	0.0	Sevastopol	Southern
Simpheropol	15	16	343,565	337,285	0.0	-1.9	Crimea	Southern

Source: Ukraine Statistics Department

Table 5 – Ranking of Ukraine's largest urban agglomerations

Agglomeration	Rank 2013	Rank 1989	Population 1989	Population 2013	Change 1989-2001	Change 2001-2013	Oblast	Region	# Cities
Kyiv	1	1	2946438	3171833	0.5%	7.2%	Kyiv	Central	11
Kharkiv	2	2	1818712	1620927	-8.8%	-2.2%	Kharkiv	Eastern	7
Donetsk	3	3	1783774	1506202	-8.9%	-7.3%	Donetsk	Eastern	8
Dnipropetrovsk	4	4	1648499	1369202	-9.2%	-8.5%	Dnipropetrovsk	Southern	4
Odessa	5	5	1170209	1074570	-7.4%	-0.8%	Odessa	Southern	2
Lviv	6	6	821698	765901	-6.9%	0.2%	Lviv	Western	4
Alchevsk	7	8	479787	447975	-1.3%	-5.4%	Lugansk	Eastern	3
Lugansk	8	7	504538	432483	-6.8%	-8.0%	Lugansk	Eastern	2
Sevastopol	9	10	368565	354565	-4.2%	0.4%	Sevastopol	Southern	2
Gorlivka	10	9	479181	353497	-13.6%	-14.6%	Donetsk	Eastern	3
Cherkasy	11	13	310702	303168	1.6%	-3.9%	Cherkasy	Central	2
Kramatorsk	12	11	359593	297665	-8.4%	-9.6%	Donetsk	Eastern	4
Sieverodonetsk	13	12	343124	281903	-9.8%	-8.9%	Lugansk	Eastern	4
Rivne	14	14	255523	274902	7.0%	0.5%	Rivne	Western	2
Ivano-Frankivsk	15	15	223660	235515	2.0%	3.2%	Ivano-Frankivsk	Western	2

Source: Ukraine Statistics Department

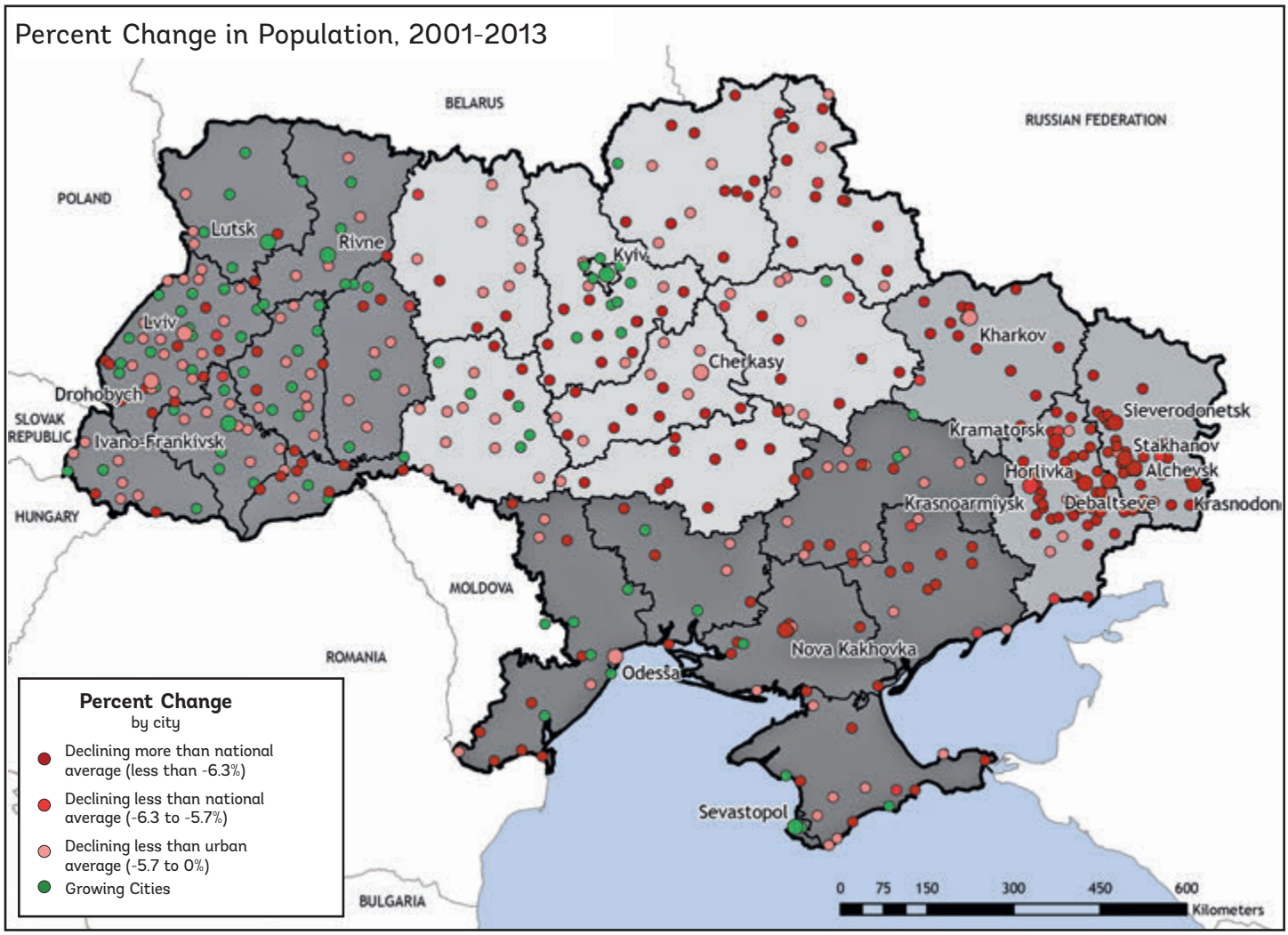
Table 6 – Ranking of the fastest growing cities in Ukraine

City	Population 2001	Population 2013	Change 2001-2013	Oblast	Region	Belongs to an agglomeration	Agglomeration
Dubliany	8469	10240	20.9 %	Lviv	Western	YES	Lviv
Vynnyky	13654	16278	19.2 %	Lviv	Western	YES	Lviv
Vyshhorod	22933	26536	15.7 %	Kyiv	Central	YES	Kyiv
Teplodar	8830	10204	15.6 %	Odessa	Southern	NO	
Novyi Kalyniv	3582	4105	14.6 %	Lviv	Western	NO	
Brovary	86839	98250	13.1 %	Kyiv	Central	YES	Kyiv
Inkerman	10628	11985	12.8 %	Sevastopol	Southern	YES	Sevastopol
Ukrainka	14163	15644	10.5 %	Kyiv	Central	YES	Kyiv
Boryspil	53975	59545	10.3 %	Kyiv	Central	YES	Kyiv
Illichivsk	54151	59718	10.3 %	Odessa	Southern	YES	Odessa
Rudky	4942	5434	10.0 %	Lviv	Western	NO	
Pidhorodne	17763	19498	9.8 %	Dnipropetrovsk	Southern	YES	Dnipropetrovsk
Vyshneve	34465	37457	8.7 %	Kyiv	Central	YES	Kyiv
Kyiv	2570000	2757900	7.3 %	Kyiv	Central	YES	Kyiv

Source: Ukraine Statistics Department

The largest cities and agglomerations are distributed differently across the country. Only one city in the Western region is ranked among the fifteen largest individual cities. However, five agglomerations among the fifteen largest are located in this region, as well as four of the fastest growing cities. This suggests that, despite having the lowest urbanization levels, the cities in this region are taking advantage of the economies generated by their agglomeration into large-scale urban regions. By contrast, the Eastern region has five cities among the largest fifteen individual cities, but has none of the fastest growing cities. Finally, the agglomeration patterns are much more concentrated in the Central region, led by Kyiv's agglomeration which gathers 11 individual cities. Figure 22 below plots the location of Ukraine's cities and agglomerations (agglomerations are labeled with the name of the main city in them) with colors assigned according to their population growth rate. Again, this graph shows a strongly declining Eastern region, despite the fact it contains a large number of agglomerations. The West, by contrast, shows a higher concentration of growing cities as well as cities that are at least declining less than the averages for urban population and overall national population. The significance of Kyiv's agglomeration and its pattern of growth are also noticeable here.

Figure 22 – Ukrainian cities with growing or declining population 2001-2013



Source: Ukraine Statistics Department

Key messages and implications for further policy and analytical work

The current dynamics in Ukraine's urban system remain highly influenced by its origins in the Soviet system. At the time, urban development was seen as a tool for the higher national objective of achieving socio-economic equality. This approach, however, had other consequences too. A rigid, centrally defined decision-making process led to situations where population was not always directed towards the most efficient cities. Many cities were developed based on industries that survived on demand by and subsidies from the central government. This system left many cities unprepared for the market economy system adopted following Ukraine's independence. The consequences of Ukraine's urban development policies implemented during the Soviet and transition period continue to affect the country and prevent its urban system from achieving its full potential. For example, extremely high home-ownership rates of the Soviet era limited the development of a rental market and, thereby, increased the relative cost of mobility. In addition, continued obstacles such as lack of access to finance and high transaction costs further threaten the benefits of potential efficiencies from internal migration. As a result Ukraine's people are not always moving to economic opportunities.

Urbanization in Ukraine continues to rise despite an overall decline in the urban population. This phenomenon is occurring because the country's rural population is decreasing at an even faster rate than its urban population. Yet urbanization patterns are not homogeneous across the territory of Ukraine. The Eastern and Southern regions are highly urbanized, but have shown slower urbanization rates in the last two decades, while the historically rural Western region currently shows faster urbanization rates.

Most cities in Ukraine are shrinking while urban agglomerations are concentrating the little urban growth currently witnessed in the country. Cities in all regions, especially smaller ones, have been losing population, mostly to the largest cities, and usually to those that have formed large urban centers, or agglomerations. The growth of agglomerations is indicative of a movement towards a more efficient urban system. Led by the Kyiv agglomeration, these city clusters hold the large majority of the cities that are actually growing in population (i.e., eleven out of fifteen fastest growing cities in the country belong to an agglomeration). This growth might be explained by the fact that these larger groups of cities can through their agglomeration produce efficiencies by sharing costs, increasing access to and the size of their markets, and strengthening productivity by enhancing interactions between citizens and firms.

Going forward, Ukraine should reduce barriers to move internally. Low mobility of Ukraine's internal population is an obstacle preventing the country from reaping the rewards of its urban potential. An improved mobility might further spur the growth of certain urban centers with emerging employment opportunities. However, increased mobility most likely will also deepen the decline of most Ukrainian cities, which would require policies to protect the less mobile and more vulnerable population that is left behind. Increasing population mobility will require eliminating or smoothening some of the obstacles to move including making the housing market more fluid and permeable (e.g. increase rental options, improve access to housing finance) and lowering the transaction costs of moving. In addition, as outlined in the *World Development Report 2009*[31] Governments should be neutral in regards to migration of unskilled labor, encouraging migration for economic reasons and discouraging migration in search of public services; and strongly supportive of internal migration of skilled labor. The later can be done through investment in services in peripheral areas to build portable human capital and increasing the flow of labor market information, among others, so migrants arrive better informed of employment opportunities.

[31] World Bank (2009), Reshaping Economic Geography – World Development Report.

In addition, the country needs to put in place the right policies to better manage the population decline of most of its cities while catering to manage growth in large agglomerations. On the one hand, shrinking cities will need to adapt their infrastructure, the way their services are financed and delivered, and consolidate their footprint. The Central Government should in turn create the right mechanisms and incentives (e.g. financial transfers) so that cities focus on declining efficiently (e.g. agglomerating schools when needed). Given the extent of urban decline, the country should explore the need of establishing national level programs, such as technical assistance and funds for downsizing, that provide resources to better manage decline. There is also a need to increase awareness of the scale and type of urban decline as many cities continue to follow unrealistic population growth projections. On the other hand, growing centers need to focus on adapting infrastructure and services making sure that new-comers are well absorbed and integrated in the city; manage peri-urban growth to avoid sprawl, etc. In addition, the realignment of city boundaries or introduction of metropolitan governance mechanisms might be needed to achieve an effective coordination in agglomerations which span across administrative units. This is particularly important in the case of public transport.

III. Regional Economic Trends[32]

Trends in Ukraine's economic performance

The economic conditions and institutions that Ukraine inherited from its time as a Soviet republic strongly influenced the evolution of its economy in the decades following the Soviet Union's collapse. As part of the Soviet Union, the country's economy was centered on the production of intermediate goods that used raw materials and energy from other republics. The major sectors were steel production, oil processing, coal mining, and other chemical industries. Agricultural production was also important, with wheat, corn, and sugar beets as the main crops. Almost all factories were state-owned and were very large, leaving an industrial infrastructure that was not competitive and quite inflexible when the market system was introduced in the 1990s. In the late 1980s, state enterprises accounted for almost 100 percent of all industrial production in the regions of Soviet Ukraine[33].

With the domestic and international changes in the Soviet Union from 1989, Ukraine's economy went into deep recession until 1998. This was mainly driven by radical changes in political governance, a market that struggled to adapt to new competition, sub-optimal macro-economic conditions, and an agricultural sector that declined despite the support of subsidies. Ukraine had large manufacturing plants, but suddenly no sure source of raw materials and energy. In addition, the demand for military goods decreased. Among the transformations faced by the country's economic institutions were more open borders and increased competition from international goods[34]. However, liberalization was not uniform; Eastern Ukraine kept a larger share of state-owned enterprises, while most private enterprises were located in the Western Ukraine[35]. At the same time, despite heavy government subsidies, agricultural output declined by 35 percent between 1990 and 1995. Collective cooperatives and state-owned farms, a legacy from the Soviet period, continued to dominate the sector; private ownership was allowed, but lack of capital, social attitudes, and the high cost of fuel discouraged it. These dynamics were exacerbated by a period of hyper-inflation during 1993-94[36].

Since 1998 and until the recent conflict, Ukraine has experienced a steady increase in its total GDP (See Figure 23). In 1998, supported by the devaluation of the Hryvnya, Ukraine's economy started to recover. This movement was led by growth in import-substituting (textiles and food) and export-oriented industries (metallurgy and chemicals). The recovery was interrupted in 2008, due to the effects of the Global Financial Crisis, but the halt lasted only one year[37], with GDP returning to growth until it was halted again by the recent conflict.

[32] In providing a regional overview of the country, this document uses the description of four geographic regions developed by the Kiev International Institute of Sociology: East, Center, South, and West.

[33] Ivan Katchanovski, Social Capital and Privatization in Regions of Ukraine, Paper prepared for Presentation at the Annual World Convention of the Association for the Study of the Nationalities, Columbia University, New York, April 5-7, 2001, available at http://individual.utoronto.ca/ikatcha1/PrivatizationASN.pdf.

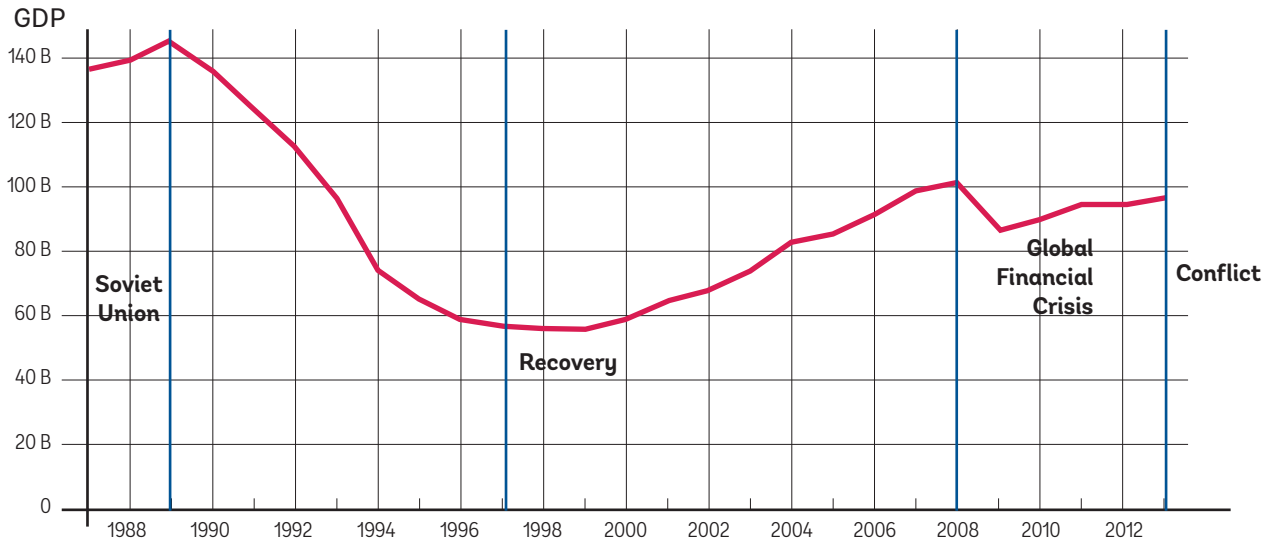
[34] Vlad Mykhnenko, The Post-Communist State and Capitalism in Transition: Towards a Complementary Relationship, Paper for the Havighurst Centre 4th Annual Young Researchers Conference, 'The Problems of the Post-Communist State', The Havighurst Centre for Russian and Post-Soviet Studies, Miami University, Oxford, Ohio, USA, 5-6 November 2004, available at http://www.cas.miamioh.edu/havighurstcenter/papers/Young%20Researchers%2004/Mykhenko.pdf

[35] Social Capital and Privatization in Regions of Ukraine, 2001.

[36] Andrey Androshchuk, "Transition Economies: A Look at Russia, Ukraine and Poland," Honors College Theses, Paper 32, 2006, available at http://digitalcommons.pace.edu/honorscollege_theses/32.

[37] The recovery was quicker than most expected; the World Bank forecasted a decrease between 9 to 15 percent in 2009 for Ukraine. It is important to note that most of the impact was in the area of foreign trade of goods and services, an area not reflected in the Gross Regional Product. This indicator is used to compare production levels at the regional or oblast level.

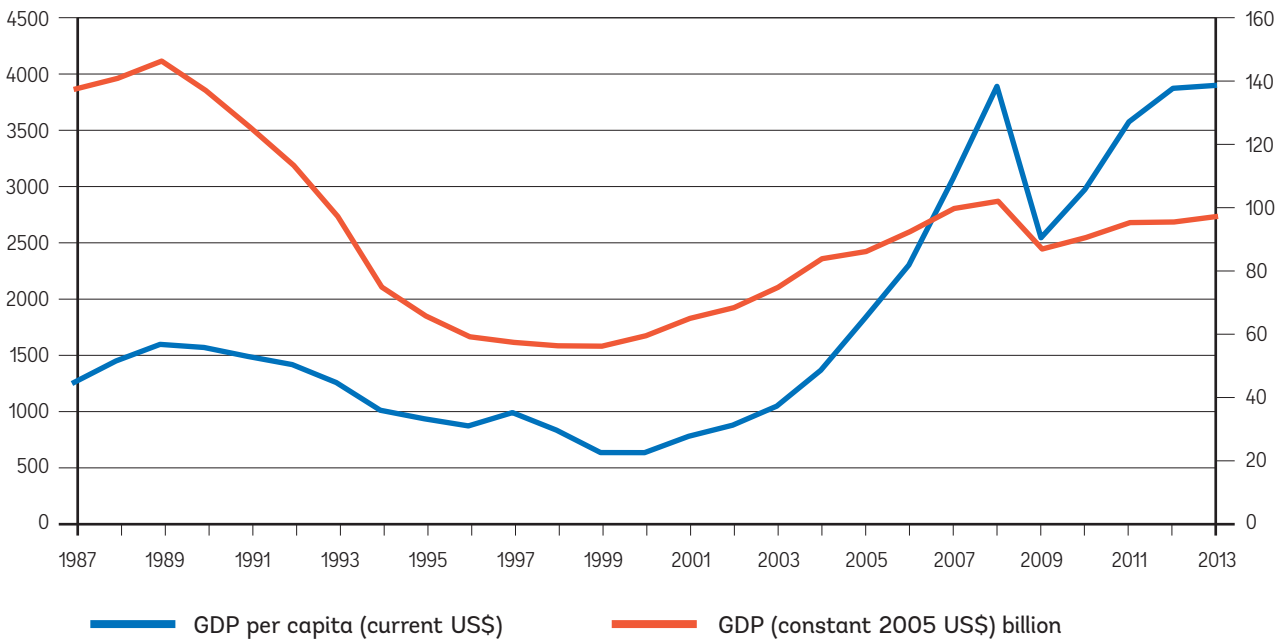
Figure 23 – Real GDP decreased sharply after Ukraine's departure from the Soviet Union (1991-1998) and experienced a slow recovery lasting until the recent conflict (1999-2012)



Source: World Development Indicators, 2015. The World Bank

GDP per capita also increased steadily from 1998 until the Global Financial Crisis (See Figure 24) but this is partly due to the decline in population over the analyzed period. In fact, after a short and sharp drop in response to the Global Financial Crisis of 2008, the growth in GDP per capita accelerated to return to pre-Crisis levels in 2012. This steep growth rate in GDP per capita – steeper than the one observed in the overall growth in GDP - is partly due to the overall decline in the country's population. However, given the demographic transition the country is experiencing (discussed in Section 1), the positive dynamics in GDP output per capita should be viewed with cautious optimism as the decline in population could reverse the trend in the medium and long term. A review of trends in poverty can be observed in Box 4.

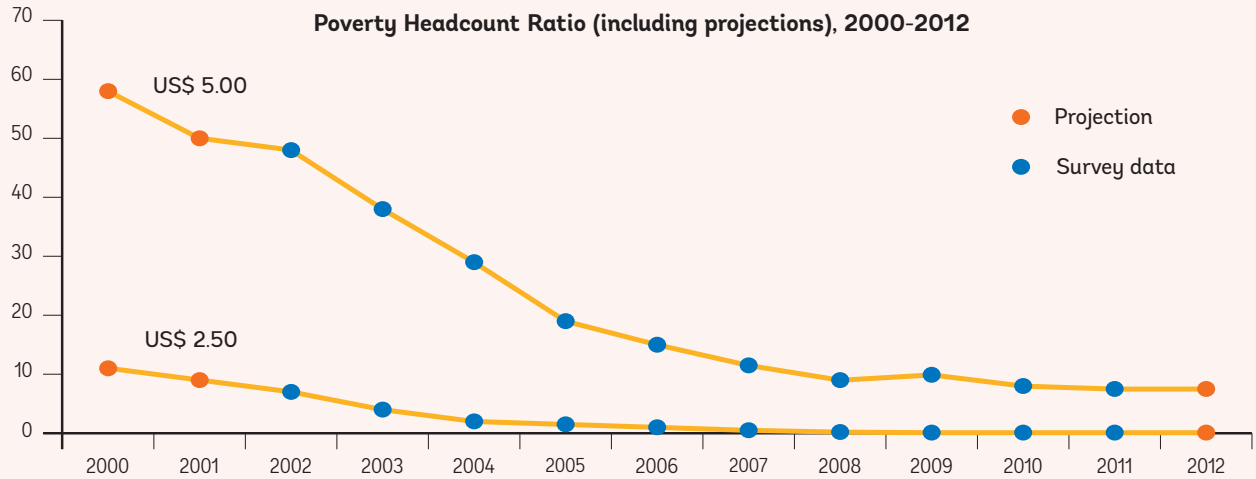
Figure 24 – GDP per capita grew steadily from 1998 until the global financial crisis



Source: Ukraine Statistics Department

BOX 4 – POVERTY IN UKRAINE

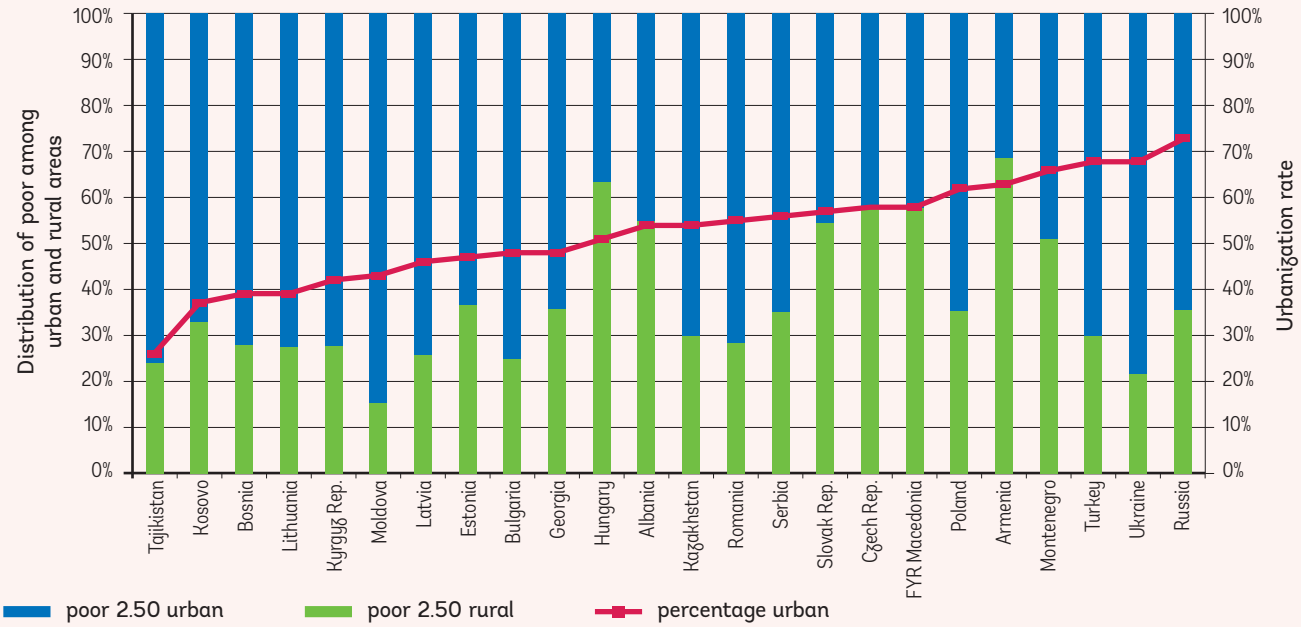
Poverty rates in Ukraine have decreased over the last couple of decades. This has been the result of higher GDP per capita growth, but also of policies to redistribute wealth among the population. In fact, between 2006 and 2011 around 75 percent of the poverty reduction was attributed to redistribution. However, inequality indices (Gini; Theil) have decreased only marginally in the last 10 years.



Source: ECATSD using ECAPOV. Azevedo and Lomaia (2013)

Poverty headcount ratio: the proportion of a population that exists, or lives, below the 'poverty line'. (% of population below the poverty line, vertical axis in this graph).

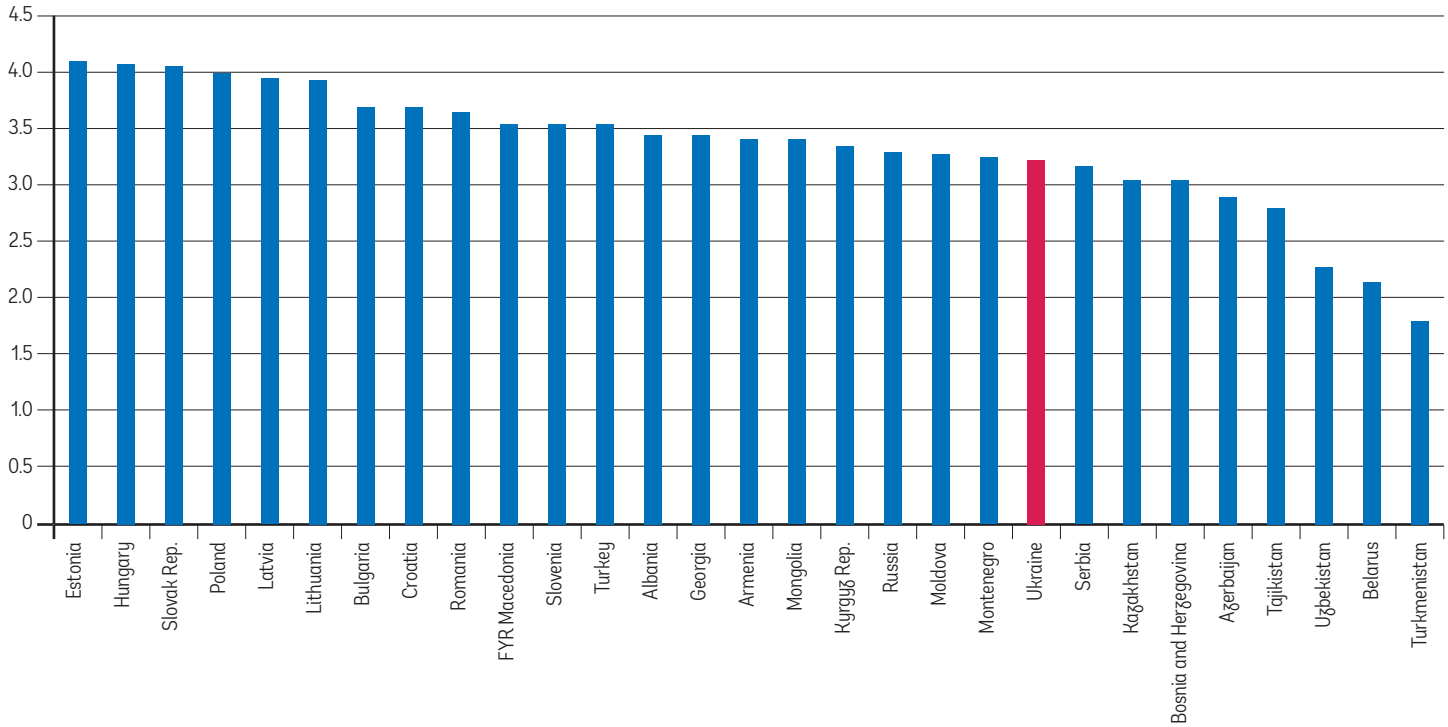
In Ukraine, poverty is mainly a rural phenomenon (80 percent of the poor are in rural areas). The bottom 40 are more equally distributed between urban and rural areas.
The decline in poverty in Ukraine, however, may be threatened in the near future by the impact of the recent conflict.



Note: Poor 2.5 urban/rural mean the percentage of people under 2.5 dollars/day poverty line.

Despite the steadily upward trend, Ukraine's GDP remains significantly below pre-1989 levels. Ukraine's GDP remains at 65 percent of its 1989 level, and its GDP per capita – standing at USD 6,596 (in 2005 PPP dollars) – is still about half of the Europe and Central Asia (ECA) region average as well as the lowest in Europe with the exception of Moldova. Ukraine has implemented policies and market-oriented reforms aimed at boosting investment, such as Special Economic Zones (See ANNEX 1 for further information on Special Economic Zones), a flat rate personal income tax, and a simplified taxation system for SMEs. However, the country still lags behind the scope and degree of reforms made in most other ECA countries. In particular, Ukraine lags behind peer countries in its transition from a centrally-planned economy to a market economy, as well as on its institutional and business environment reforms (See Figure 25 below).

Figure 25 – EBRD Transition Index (2012)



Note: The measurement scale of the indicator ranges from 1 to 4+, where 1 represents little or no change from a rigid centrally-planned economy and 4+ represents the standards of an industrialized market economy. The index covers reform efforts in several areas, including small-scale privatization efforts, enterprise restructuring, price liberalization, and trade and foreign exchange policy.

Source: World Bank, PCN For P148768: Ukraine: Skills For Employment And Productivity

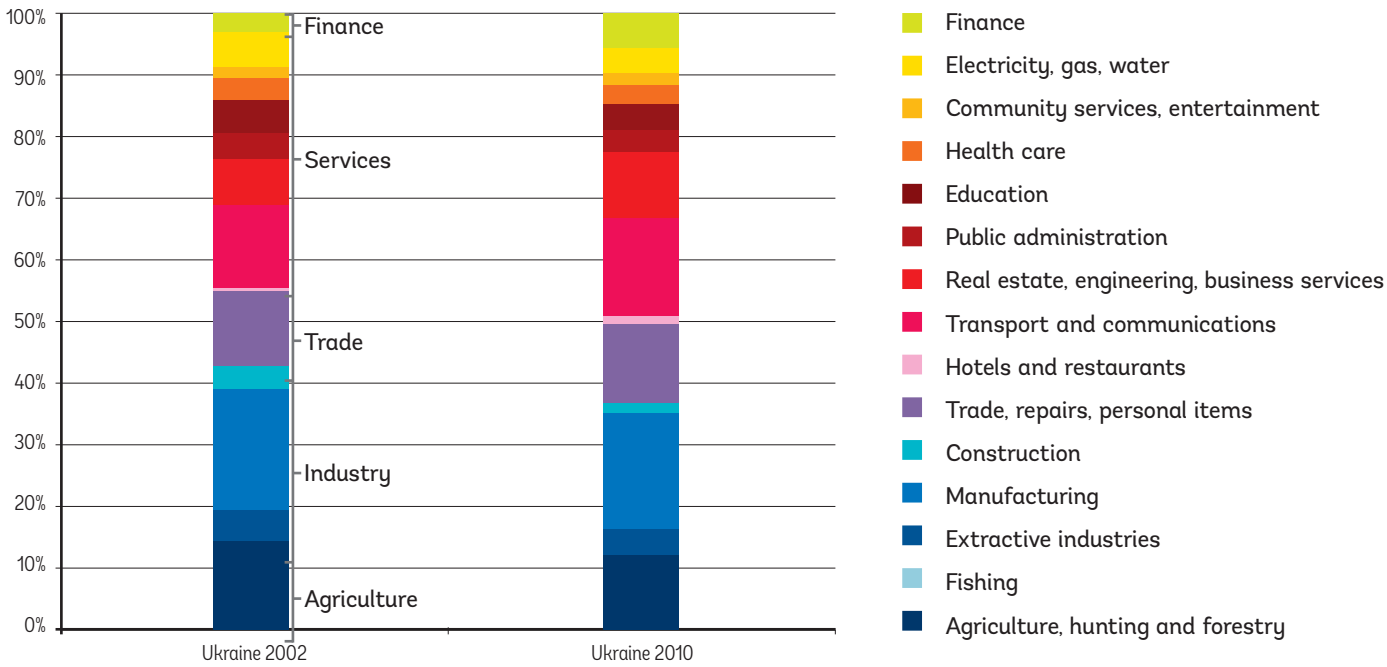
[38] Information obtained from Arias, Omar S., Carolina Sánchez-Páramo, María E. Dávalos, Indhira Santos, Erwin R. Tiongson, Carola Grun, Natasha de Andrade Falcão, Gady Saiovici, and Cesar A. Cancho, Back to Work: Growing with Jobs in Europe and Central Asia. Washington, DC: World Bank, 2014.

Ukraine's slow structural shift towards services

During the decade leading up to the conflict, the nation's major industries were consistently mining-related[39], industrial[40], or agricultural. Industrial production has maintained its importance in Ukraine, although its share of the economy has decreased since 2002, from 28 to 25 percent (see Figure 26). Mining, food processing, and machine-building are the dominant sub-sectors of industrial production in Ukraine, which together accounted for almost 60 percent of the total industrial gross value added (GVA) of the country.[41] Among these, coal has played a crucial economic role, and as such has been at the center of several important economic policies designed to stimulate the mining industry (See Box 5 below). The agricultural sector also plays an important role in the country's economic growth as well as its regional development as many small settlements are dependent on agricultural production and/or processing. However, in the 2002-2010 period it has slightly decreased from 14 to 12 percent of the total GVA of the country. In 2012, agriculture contributed nine percent of the Ukraine's gross GVA and was a significant share of the country's exports.[42] Overall, Ukraine has become one of the top 10 exporters globally for several agricultural commodities such as wheat, corn, sunflower oil, and honey.[43]

Recently, the services sector has come to lead the country's economy. The services sector now ranks first among economic sectors, having increased its share of the GVA from 42 to 45 percent from 2002 to 2010. If financial services were added, the services sector would have counted 51 percent of GVA in 2010. The financial services sector itself has become a very important player in the economy; its portion of GVA doubled over the 2002-2010 period from 3 to 6 percent (see Figure 26). Over the same period, the trade sector increased slightly from 12 to 13 percent of the total economy.

Figure 26 – GVA shares: the service and finance sectors now lead Ukraine's economy, but the industrial sector still occupies a prominent place



Source: Ukraine Statistics Department

[39] Coal and electric power, ferrous and nonferrous metals.

[40] Machinery and transport equipment, chemicals, and food-processing,

[41] Disaggregation into sub-sectors at the level of large-scale firms is possible using AMADEUS, a comprehensive, pan-European database containing financial information on over 11 million public and private companies in 41 European countries. AMADEUS contains data for Ukraine for the years 1997-2009,

[42] State Statistics Service, Statistical Yearbook of Ukraine: 2012, 2013,

[43] Food and Agriculture Organization of the United Nations (FAOSTAT), Website 2012 at http://faostat.fao.org/site/291/default.aspx,

BOX 5 – THE RISE AND FALL OF UKRAINE'S COAL INDUSTRY

In 2013, Ukraine produced 83.7 million tons of coal, ranking 11th in the world. Coal is mainly mined in the Donetsk and Lviv-Volyn basins. Donetsk Basin, located in Donetsk and Luhansk oblasts (in Eastern Ukraine), is the largest in Ukraine with 92 percent of Ukraine's coal reserves.

FIGURE: COAL BASINS IN UKRAINE (2013)

Source: Eurocoal Website

The coal industry was traditionally one of the main industries of Ukraine; however, the fall of the Soviet Union, the collapse of domestic demand, and the recession affecting heavy industry caused the coal industry to crash in the first half of the 1990s. Beyond the macro-economic factors, the industry suffered from inefficiency, low productivity, huge debts, corruption, and outmoded equipment that the country could not afford to improve. In addition, the industry was beset by labor strikes due to unpaid wages and hazardous working conditions. Between 1990 and 1995, coal output decreased by nearly 50 percent to less than 70 million tons/year. The productivity of Ukrainian coal miners – about 600 thousand workers were employed directly in coal extraction in 1995 – was low. Coal exports almost totally halted in 1995, while imported coal and other fuels captured a large share of the Ukrainian market as a result of high domestic coal prices maintained by the government, inefficient and delayed delivery, and poor coal quality. In addition, as mining companies – especially in mono-functional towns – continued to provide a wide range of public services to local communities, including pre-school education, health care, housing, recreation, these costs further reduced the competitiveness of Ukrainian coal mines.

A first wave of restructuring measures was carried out during 1996-2000 that focused on closing uneconomic coal mines with the target of 20 mines per year; by 2001, 90 mines had been closed and privatizations of many others had been undertaken. In 2001, a second wave of measures was adopted which reversed the previous policies target, and focused rather on supporting the privatization of profitable mines and using subsidies to increase productivity of others. Consequently, during this period 39 mines were modernized and the largest number of mine privatizations took place. Under the current Ukrainian Energy Strategy, revised in 2012, coal remains one of Ukraine's pre-eminent sources of energy while also maintaining its strategic role as Ukraine's main safeguard against excessive reliance on energy imports. Currently the power generation sector consumes about 25 to 30 million tons of coal annually, almost half of all processed coal production. The Ukrainian Energy Strategy anticipates a significant increase of coal-fired generation going forward, with power sector coal needs more than doubling by 2030. As approved by the Cabinet of Ministers, the Energy Strategy of Ukraine proposes three stages of reform and development through 2030: (i) Coal industry reform period with completion of the privatization of state enterprises, introduction of public-private partnerships, and closing of the most unprofitable mines (2011-2015); (ii) Modernization of mines by private investors (2015-2020); and (iii) Stable growth of the coal industry (2020-2030).

In 2012, there were 143 mines in Ukraine. State subsidies for the coal sector in 2013 amounted to 13.3 billion UAH (approx. 1.7 billion USD), which is comparable to the entire defense budget of the country. Coal industry has been dramatically affected by the current conflict, since three-quarters of all coal mines are located on the controlled territories of Donetsk and Luhansk oblasts. Coal production decreased by 20% in 2014 and by 60% in February 2015 relative to February 2014. No coal subsidies are stipulated in 2015 budget.

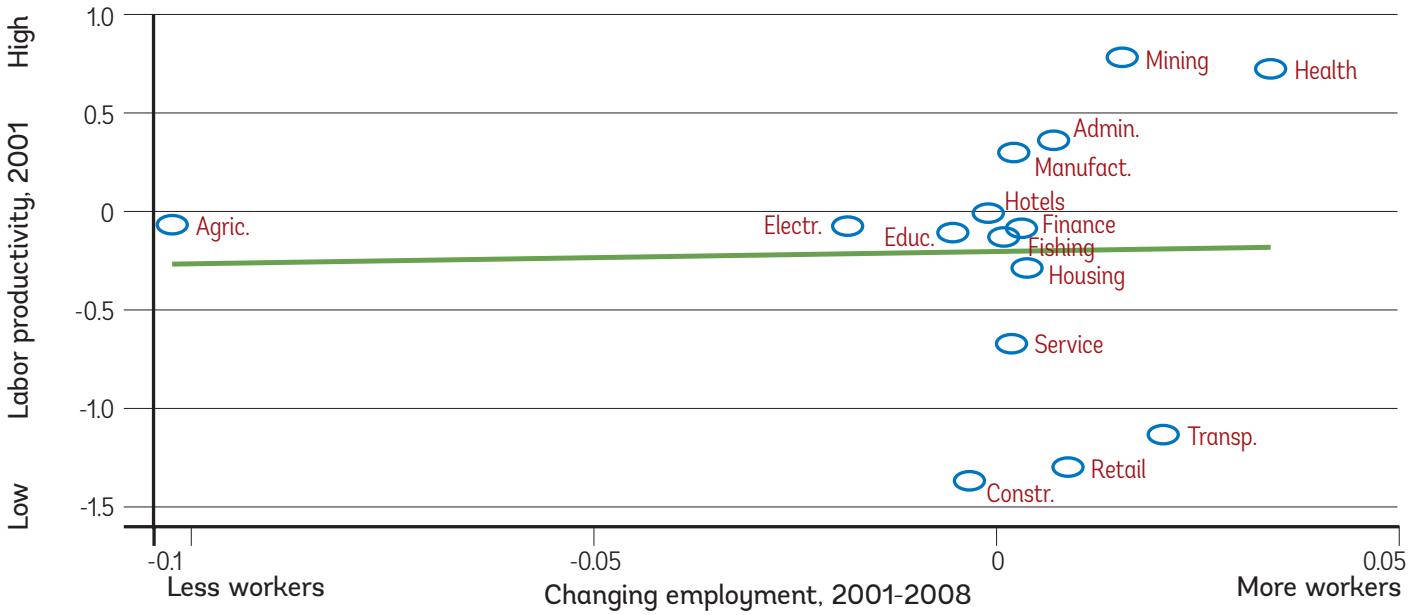
Sources: Institute for Economic Research and Policy Consulting, "Ukraine's Industrial Sector: Analysis and Latest Trends," February 2014. Viachaslau Herasimovich, "Ukrainian Coal Mining Sector Review," CASE Ukraine, September 21, 2008. World Bank, "Ukraine - Coal industry restructuring sector report," 1996

The economy's shift from heavy industry and mining to services has also been accompanied by a decrease in the role of agriculture. From 2002-2010, the contribution of agricultural production to the economy decreased from 14 to 12 percent, with declines in grains, sugar beets, sunflower seeds, vegetables, beef, and milk. This decline might reflect the impact of the overall shift of the population and economic activities from rural to urban areas (as discussed in Section 2), and from less to more productive sectors. However, with the recent decline of the ferrous and energy sectors, agribusiness' share in output as well as exports has increased again.

The structural transformation can also be observed in the shift in the employment distribution from industry and agriculture to services. According to the Background Paper for the World Development Report 2013: Ukraine Case Study: Jobs and Demographic Change, 2012. Compared to 2000s, for example, the share of total employment in agriculture fell from 21.6 percent to 15.3 percent in 2013, while the share employed in services (in the private sector) rose from 25.4 percent to 34.5 in 2010 (latest data available). Ahead of agriculture but a distant second place to the services sector, the industrial sector currently provides 17 percent of employment. The public sector as a whole represents the remaining 20 percent of employment[44], with public administration jobs making up six percent of the total.

However, employment has by and large not moved to the high-productivity sectors in Ukraine (Figure 27). While a significant number of workers have left the agricultural sector since the early 2000s – a sector with below-average labor productivity – they have not always moved to higher-productivity sectors. Instead, many workers have gone into **construction (which rose from 4.4 percent to 4.6 percent of total employment), transportation (from 6.7 to 6.8 percent)** and retail – the three sectors with the lowest overall labor productivity. Finance, a high-productivity sector, has strongly increased its participation in the GVA as shown in Figure 26. However, despite the doubling of its share of employment (from 0.8 percent to 1.6 percent), the number of employees in finance remains low compared to traditional sectors. Although other highly-productive sectors such as healthcare have expanded in recent years, they also remain a relatively small portion of overall employment.

Figure 27 – The change in the share of employment by sector between 2001 and 2008 in percentage points against sectoral productivity in 2001. The economy's average productivity rate is provided for comparison



Note: The trend line is depicted in green.

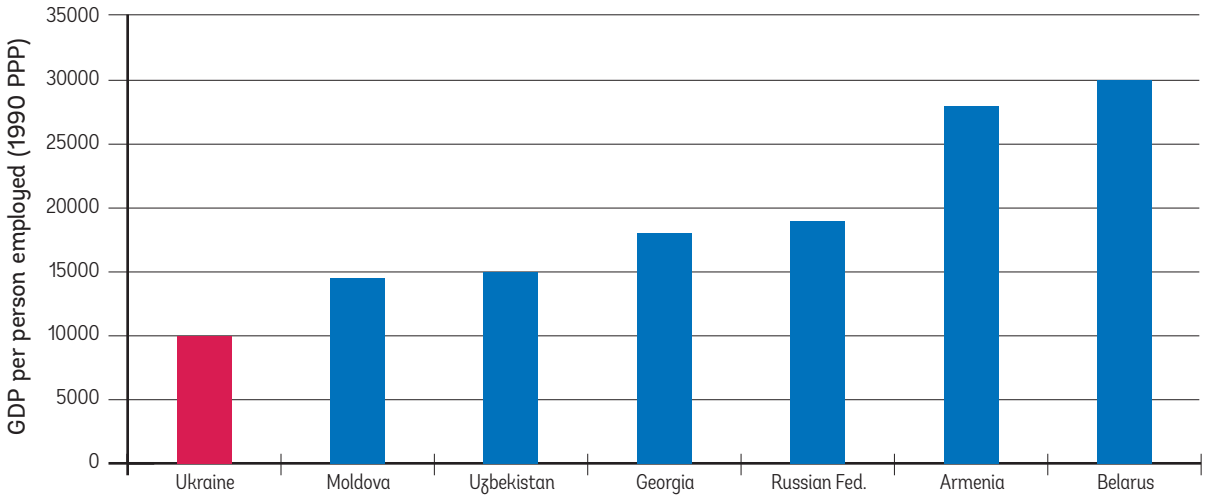
Source: World Bank, PCN for P148768: Ukraine: skills for employment and productivity, based on ILO and UN data [45].

[44] Kupets, Olga, et.al, Background Paper for the World Development Report 2013: Ukraine Case Study: Jobs and Demographic Change, 2012, 2.2. Description of the labor market situation, available at http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1320950747192/8260293-1320956712276/8261091-1348683883703/WDR2013_bp_Jobs_And_Demographic_Change.pdf.

[45] See McMillan and Rodrik (2011) for a methodological discussion on measuring structural transformation

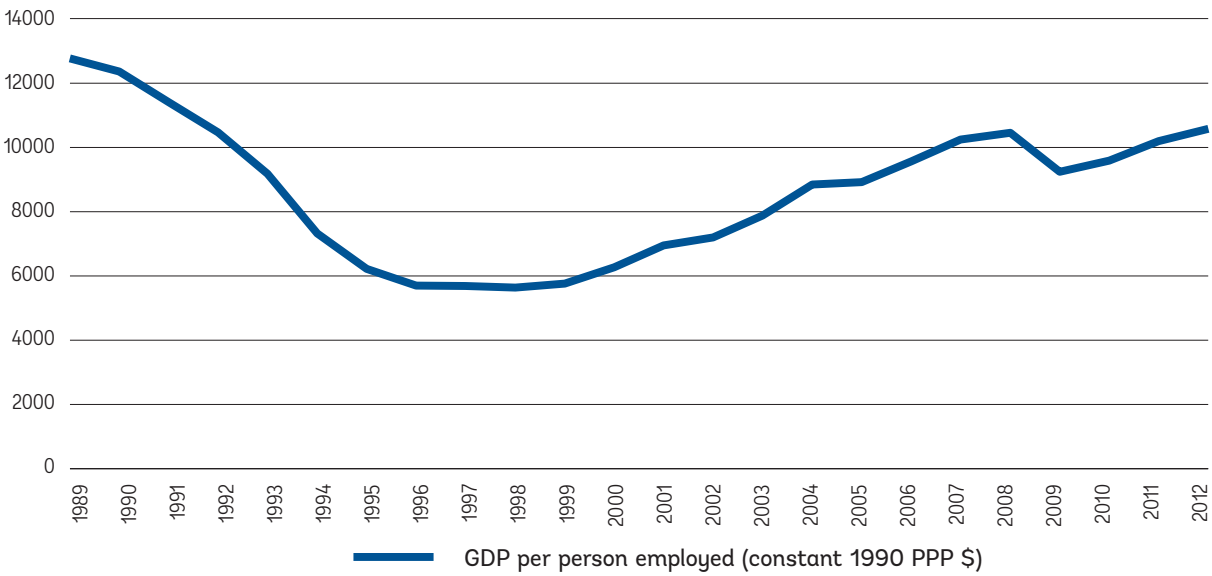
Among transition economies, Ukraine has the lowest level of labor productivity. In 2011, GDP per person employed was USD 10,098 in Ukraine (Figure 29)[46]. This rate is lower than the rate in most countries of the former Soviet Union, including Moldova, the Russian Federation, Armenia, and Belarus. In addition to this low baseline level, productivity growth has been slow over the years, albeit accelerating in the years before the Global Financial Crisis in 2008 (see Figure 28). The reasons for this slow growth in labor productivity are multiple, but a major impediment is the rigidity of the labor market. Currently, there is limited mobility for labor migration within the country as well as significant disparity between the growing demand for high-skilled service workers in the service sector and the limited number of high-skilled workers.[47]

Figure 28 – GDP per person employed in countries of the former Soviet Union 2001 (1990 PPP)



Source: World Development Indicators

Figure 29 – Trend of GDP per person employed in Ukraine (based on 1990 PPP)



Source: World Development Indicators 2015, The World Bank

[46] Measured in constant 1990 purchasing power parity (PPP) prices.

[47] Arias, O.S., C. Sanchez-Paramo, M.E. Davalos, I. Santos, E.R. Tiongson, C. Gruen, N. de Andrade Falcao, G. Saiovici, and C.A. Cancho, Back to Work: Growing with Jobs in Europe and Central Asia, Washington, DC: World Bank, 2014.

Remittances are increasingly important to the Ukrainian economy

As a consequence of increased migration outflows (discussed in Section 1), remittances have become a growing element of the economy. According to World Bank data, remittance inflows to Ukraine increased from USD 829 million to USD 5,607 million between 2006 and 2010 (Figure 30) – a factor of almost seven[48]. In 2013, the National Bank of Ukraine reported that the amount of remittances transferred to Ukraine was USD 8.5 billion, representing 4.7 percent of Ukraine's GDP for that year[49]. However, the actual amount of remittances may be twice the size of the reported number[50], given that many Ukrainians opt for unofficial means for transfers. It is estimated that nearly 60 percent of overall remittances are not transferred through the banking system.

In fact, in 2010, official remittances were nearly equivalent to the amount of Foreign Direct Investment (FDI). In addition, they represent an important source of foreign currency for Ukraine, with 4.67 and 4.43 billion received in 2007 and 2010 in US Dollars, respectively. Consequently, personal remittances have become a large part of the balance of payments of the country and helped ameliorate the trade deficit that widened considerably during 2005-2008. The growth of the deficit was caused by higher prices in imported oil and gas, growth in domestic demand for goods exceeding growth of exports, and the Global Financial Crisis.

In the short run, remittances are being used fundamentally for domestic consumption. Remittances are an increasingly important source of extra income for migrants' families[51]. A recent study shows that almost all of remittances are used for living expenses (73 percent) and consumer goods (26 percent), whilst only 3.3 percent is used for setting up a business. Anecdotic evidence suggests that remittances are often being sunk into real estate investments. However, while in the short term remittances can stimulate the local economy through consumption, over the longer term they are best used by nations to enhance investments (i.e. human capital) and thus boost productivity, which is especially needed in Ukraine given the current demographic trends of population decline and aging.

Over half of all remittance-receiving households in Ukraine are concentrated in the Western region. This region is followed by the Eastern region, where 20 percent of households receive remittances. The Central and Southern regions have much lower shares. 56 percent of remittances come from countries in the EU, with Poland and the Czech Republic as the largest contributors; 40 percent from Russia; and the remaining four percent from a variety of countries. Most remittances flow to middle class and lower middle class households[52] and to urban areas[53].

[48] O. Kupets, The Development and the Side Effects of Remittances in the CIS Countries: the Case of Ukraine, CARIM-East Research Report 2012/02, European University Institute Robert Schuman Center for Advanced Studies, 2012, available at http://www.carim-east.eu/media/CARIM-East-2012-02.pdf.

[49] National Bank of Ukraine; see http://www.bank.gov.ua/doccatalog/document?id=80651.

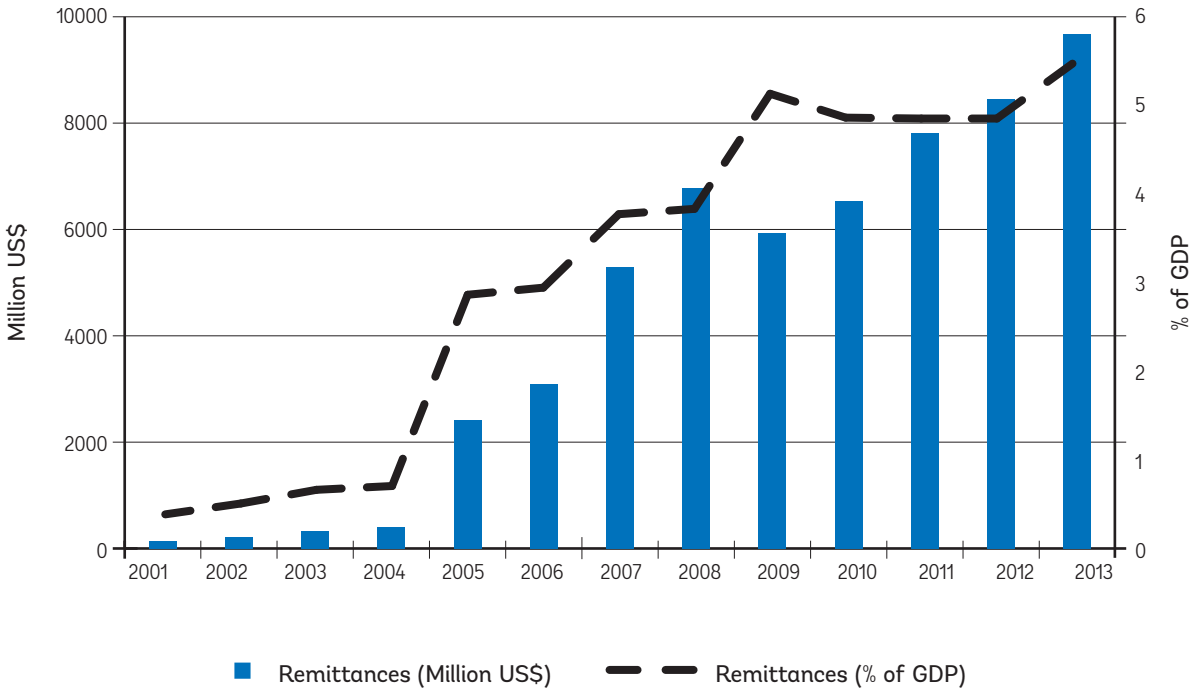
[50] Fedorak, Z., "Nashi sered chuzyh (Ours Among the Aliens)," Economic News, 2007 (in Ukrainian).

[51] International Organization for Migration, Migration in Ukraine: Facts & Figures, September 2011, available at https://www.iom.int/jahia/webdav/shared/shared/mainsite/activities/countries/docs/Ukraine/Migration-in-Ukraine-Facts-and-Figures.pdf.

[52] Modular Survey on Labor Migration in Ukraine, 2012, International Labour Organization

[53] Kupets, O., The Development and the Side Effects of Remittances in the CIS Countries: The Case of Ukraine, 2012

Figure 30 – Remittances to Ukraine by expatriates, 2001-2013



Source: Authors' analysis based on World Development Indicators Data, The World Bank

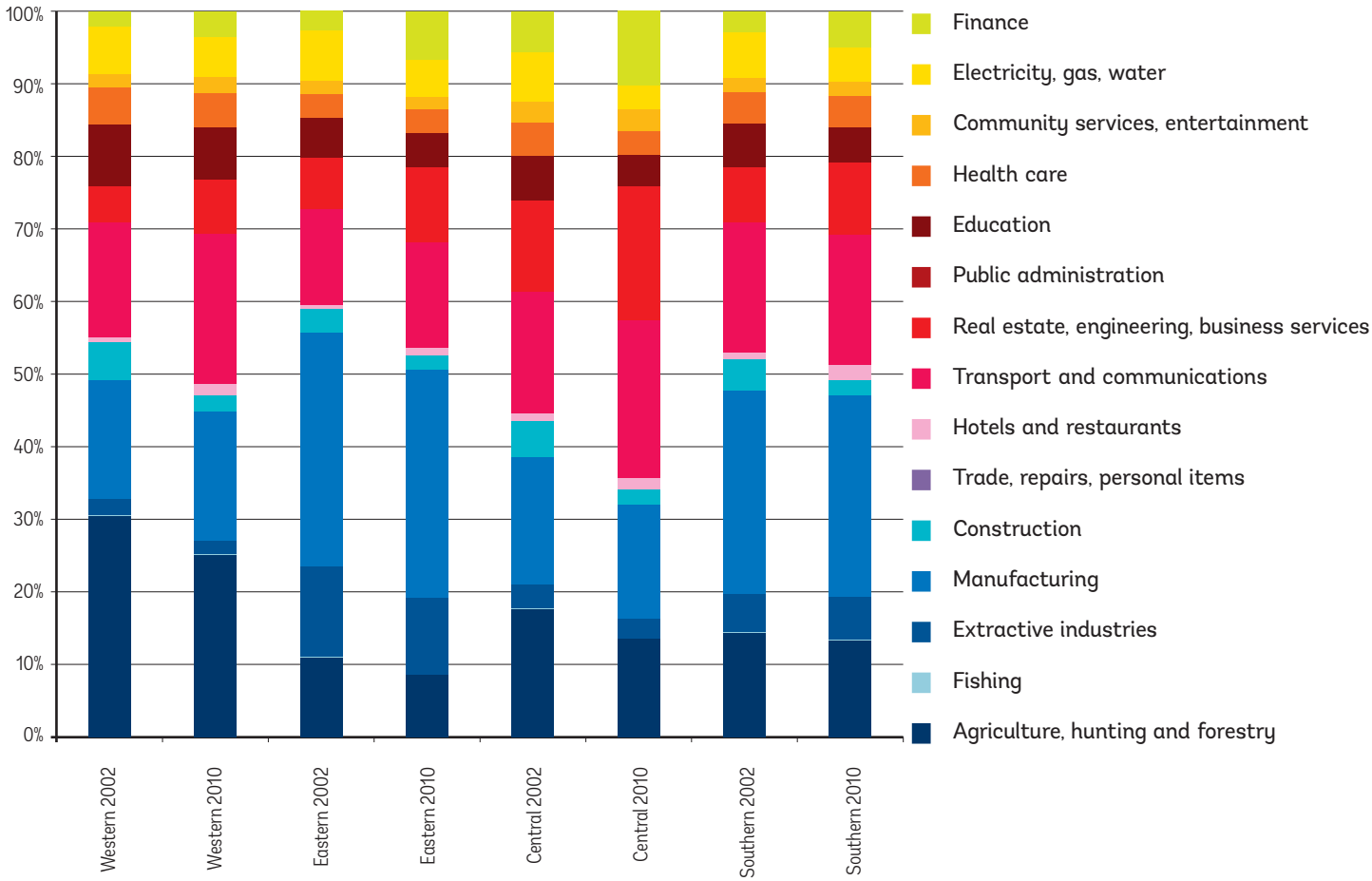
A diverse set of economic regions

There are important differences in the economic structures of the regions of Ukraine. As previously mentioned, the Eastern region is a traditionally industrial area, while the Central region is the country's leader in the financial, trade, and services sectors. The Southern region is also an important industrial center, while the Western region, as it is less urbanized, has the greatest concentration of agricultural activities in the country (See Figure 31).

The evolution of the economic sectors has been different across regions, with the financial sector growing with particular strength in the Central region. In the Central region, the financial sector's share rose from 4 to 8 percent from 2002 to 2010, surpassing the share of the industrial sector, which lost three percentage points. The services sector, which is heavily concentrated in Kyiv, occupied approximately 50 percent of the central region's economic activity. The Southern region also registered a notable increase in financial services' share of the economy, rising from 2 to 4 percent. If financial services are included with other service industries shares, the service sector accounted for 48 percent of the Southern region's economy, followed by the industrial sector, which decreased from 33 to 31 percent from 2002 to 2010.

The Eastern region also saw a significant shift towards the financial sector, although industrial activities remain secondary only to services; meanwhile, the Western region also increased its share of production in the financial and service sectors. Industry's share of the Eastern region's economy fell drastically from 38 to 20 percent over the 2002-2010 period. The decrease was mostly due to displacement caused by the rise of the financial sector. In the Eastern region, the financial sector's participation more than tripled, from 2.5 to almost 6 percent. In the Western region, the agricultural sector decreased five percentage points from 2002-2010; however, the trade sector grew nearly that amount (3 percentage points) over the period.

Figure 31 – GVA shares: Eastern and Southern regions remain more industrial, the Central region is predominent in trade, services and financial sector



Source: Ukraine Statistics Department

Overall, industrial activity continues to be highly concentrated in a few oblasts. The clear leader is Donetsk Oblast, which accounts for 21 percent of Ukraine's total industrial output, followed by Dnipropetrovsk with 16 percent. Thus, these two oblasts account for some 36 percent of Ukraine's industrial production. Adding Luhansk (8 percent), Zaporizhia (5 percent), and Kharkiv (5 percent) oblasts, all of which are located in the Eastern region, increases the share to almost 55 percent. Donetsk and Luhansk oblasts are home to major elements of the metallurgical, chemical, power, and heavy engineering industries. These two oblasts are the industrial heartland of Ukraine, and were estimated to host about 900 large-scale industrial plants before the conflict, including 140 collieries, 40 metallurgical plants, and seven thermal power stations, as well as 177 operations involving hazardous chemicals, including 113 operations using radioactive materials.

A more disaggregated analysis of sectoral employment supports the conclusions previously discussed and sheds light on some important trends. Box 6 presents the methodology used and Table 7 presents a summarized version of the results. The first four columns ("Growth 2002-2010") of the table present the results from a comparison of the regions' location quotients in 2000 and 2010 for each sector (see explanation of the term in Box 6. An upward-pointing arrow indicates that the quotient has grown, i.e., the sector has increased in importance in that region. The following four columns ("Importance 2010") show whether the quotient in 2010 was above or below 1. A plus mark (+) represents a value that is higher than 1, while a minus mark (-) represents a value lower than 1. Quotients above 1 indicate that the sector's share of employment in the region is greater than the sector's share of employment at the national level.

BOX 6 – LOCATION QUOTIENT ESTIMATES OF SECTOR EMPLOYMENT IN THE REGIONS

Location quotients are used to determine the relative importance of each sector in different regions. The location quotient determines whether the fraction of people employed in a sector is larger or smaller relative to the national average. If we define φ^s_{rt} to be the share of the total workers in region r at time t who work in sector s, and define φ^s_t to be the share of the total national employment at time t that is due to employment in sector s, we can write the location quotient for sector s , region r, and time t, LQ^s_{rt} as:

$$LQ^s_{rt} = \frac{\varphi^s_{rt}}{\varphi^s_t}$$

This location quotient reveals the extent to which the share of an industry's employment in a given location is larger or smaller than that sector's share of overall national employment. For example, if manufacturing employs 40 percent of the country's workforce and a location quotient for manufacturing is 1.1, then manufacturing employment in that location is 44 percent of that location's workforce. In general, if $LQ^s_{rt} > 1$, then the sector s is over-represented in terms of employment relative to the country's employment in that sector. The opposite happens if $LQ^s_{rt} < 1$.

Table 7 – Growth of sector employment in regions and relation of that sector employment against the sector's employment nationally using location quotients

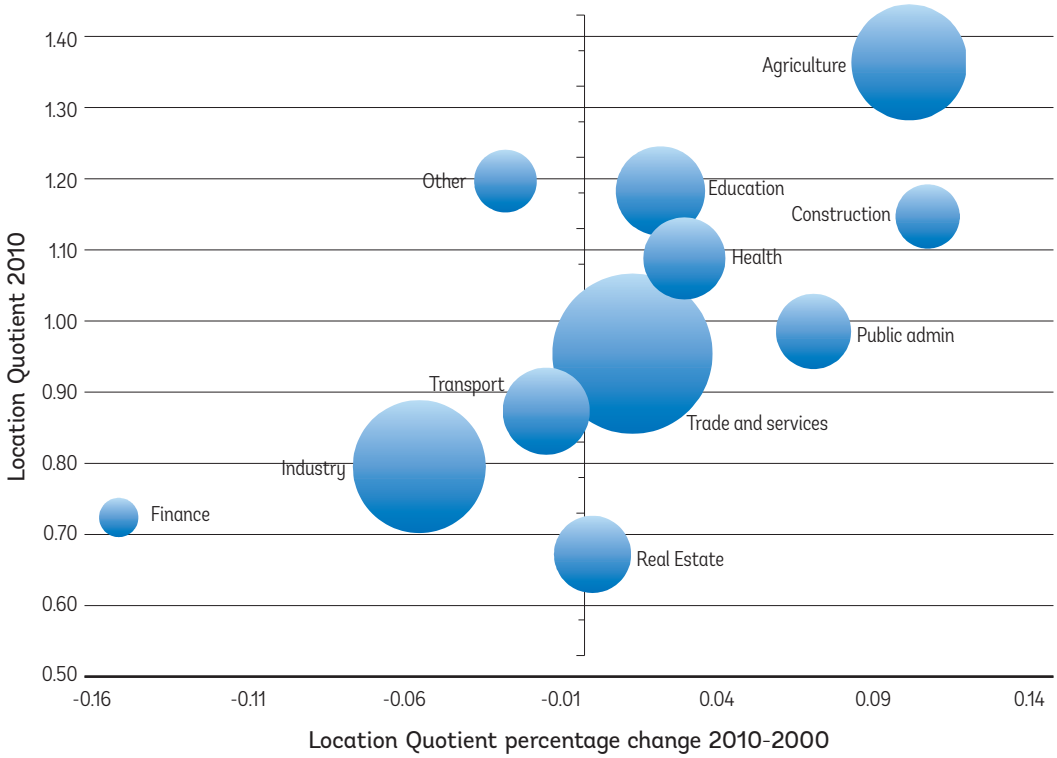
Sector	Growth 2000-2010				Importance 2010			
	Western	Eastern	Central	Southern	Western	Eastern	Central	Southern
Agriculture, hunting and fishing, forestry	⇧	⇧	⇩	⇩	+	–	–	–
Industry	⇩	⇧	⇩	⇧	–	+	–	+
Construction	⇧	⇧	⇩	⇩	+	+	–	–
Trades; repair of motor vehicles, household goods and personal uses; hotels and restaurants	⇧	⇩	⇩	⇧	–	+	–	+
Transport, storage, and communication	⇩	⇩	⇧	⇩	–	+	+	+
Finance	⇩	⇩	⇧	⇩	–	–	+	–
Real Estate	⇧	⇩	⇧	⇩	–	–	+	–
Public Administration	⇧	⇩	⇧	⇩	–	–	+	–
Education	⇧	⇧	⇩	⇩	+	–	+	–
Health care	⇧	⇧	⇧	⇩	+	–	+	–
Other community and personal services; activities in the field of culture and sports	⇩	⇩	⇧	⇧	+	–	–	+

Source: Ukraine Statistics Department

Figure 32 to Figure 35 below show the three dimensions highlighted by the location quotient derived for employment activity in each region: change, importance in each region, and size of the market. The vertical axis shows the location quotient in 2010, the horizontal axis shows the location quotient change in percentage between 2000 and 2010, and the relative sizes of the bubbles in the plot represent the number of workers in that sector in the region.

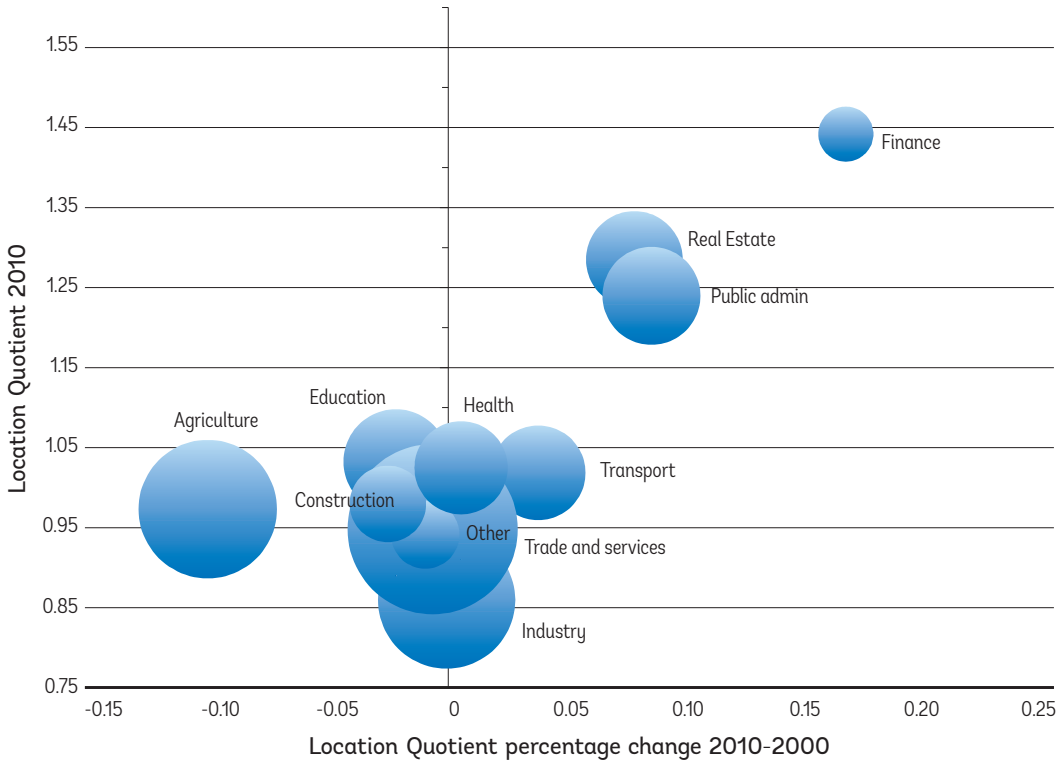
Agriculture is still very important in the Western region, although services have been increasing. The sector still plays a leading role in employment in the Western region, at nearly 25 percent, and a location quotient larger than 1 (1.33). Furthermore, Figure 32 shows that services, such as public administration, health, and education, are increasingly important. Finance, one of the leading sectors in other regions, remains lagging in terms of the employment it generates, despite the growth in output by this sector (Figure 31).

Figure 32 – Sectoral employment in the Western region by location quotient



Source: Ukraine Statistics Department

Figure 33 – Sectoral employment in the Central region by location quotient



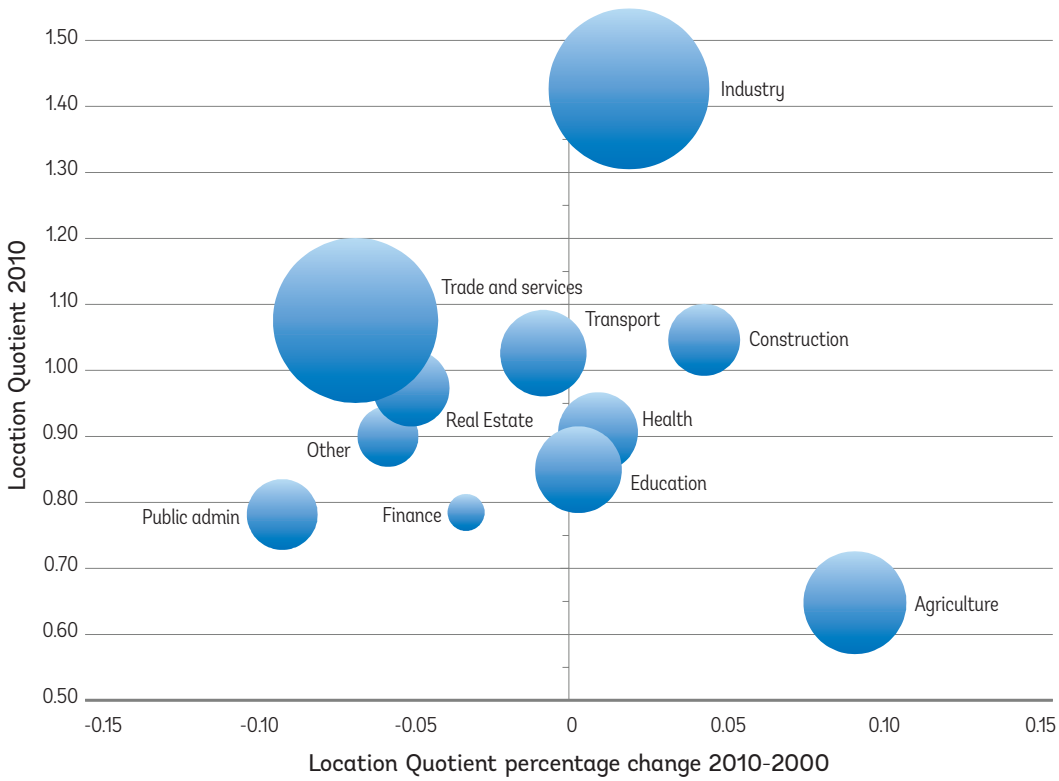
Source: Ukraine Statistics Department

As shown in Figure 33 the Central region is strongly focused on high skill services, while employment in more traditional sectors like industry and other services has stayed fairly stable and at levels similar to the country's average. Finance and public administration show a strong growth in their quotients, although, as in other regions, there are few people employed in these sectors. The presence of a strong finance sector, as well as other high output sectors like health, is to be expected as this region hosts Kiev, Ukraine's capital and largest city, and one of the few cities growing in the country. Possibly as a consequence of new migrants, employment in construction is more important here in relative terms than in the rest of the country. However, it has been decreasing in the region over time. Finally, despite a large number of people employed in agriculture, the relative importance of this sector is low, and it too has been decreasing over time.

The industrial sector remains predominant in the Eastern region (Figure 34); however, other high skill sectors, such as trades and services, have not grown much in relative terms despite being the second largest sector in terms of employment. This region has slowly evolved, but the industrial sector remains at the core of its economic activity. For instance, the coal industry, despite having gone through severe crises, still makes up a large portion of the production portfolio of the region (see Box 5 above). As the most urbanized region in the country (see Section 2: Urbanization and the Urban System above), it is not surprising that trade and services, as well as construction, occupy an important place in employment. Yet trades and services have not been growing, while construction and agriculture have seen increases. Similarly, high skill sectors, like public administration and finance, have been decreasing and occupy low levels of importance relative to the rest of the country.

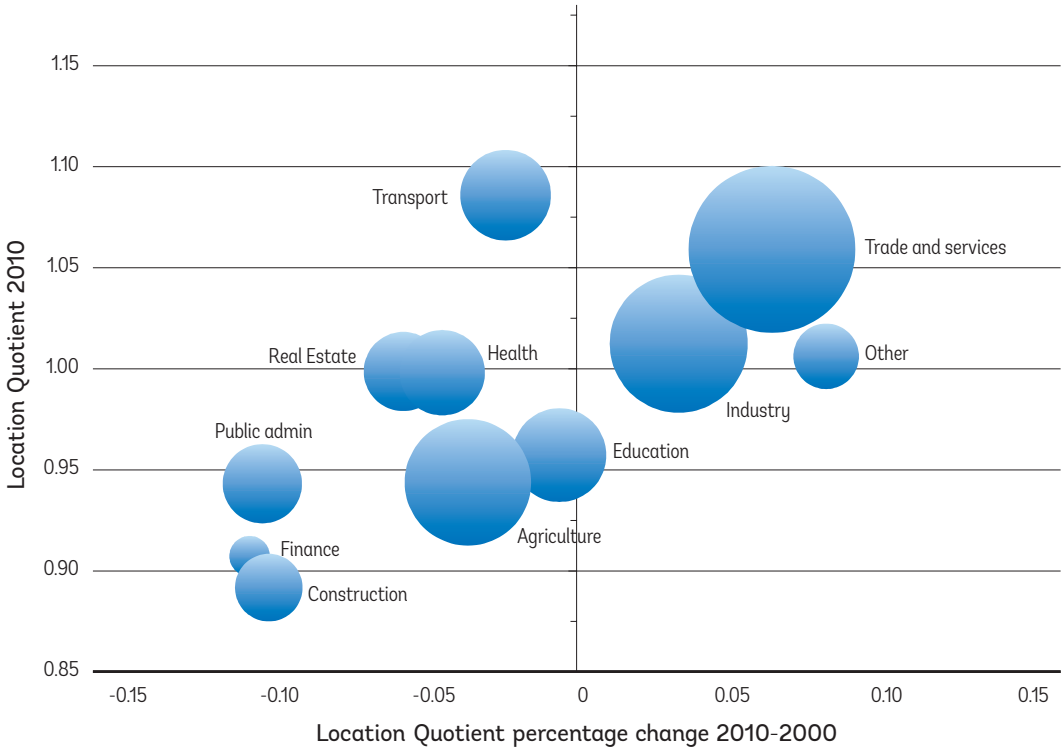
The industrial sector also plays a key role in the Southern region (Figure 35), as does the trades and services. The Trades and Services sector is gaining in importance, particularly in the area of tourism services. Manufacturing and manufacturing-related activities like transportation and storage, water supply, and management are also playing an increasing role. Growth in this region is the most concentrated of all the regions as only two main sectors are growing in importance according to the location quotients. Other high skill sectors, like finance and public administration, remain small and are decreasing. This may be an indication that the region's economy has been having difficulties in its evolution into a services-oriented economy.

Figure 34 – Sectoral employment in the Eastern region by location quotient



Source: Ukraine Statistics Department

Figure 35 – Sectoral employment in the Southern region by location quotient



Source: Ukraine Statistics Department

Key messages and implications for further policy and analytical work

Overall, Ukraine presents some indicators (GDP, GDP per capita, and poverty) that show steady progress over the last decade. However, continued progress in these areas is highly uncertain due to (i) the observed, negative population trends; (ii) the current conflict; and (iii) the slow progress that Ukraine has made, in terms of institutional adaptation and reforms, in moving toward a market-oriented system.

It is not uncommon that a declining population initially has a positive impact on economic indicators, but its effect on economic performance over the long run is uncertain. The higher GDP per capita that is observed following population decline is generally linked to the fact that Capital is durable. Such economies may experience an increase in their capital per worker ratio, which may render each inhabitant marginally more productive. Additionally, decreasing population causes an initial shortage of labor, increasing relative demand for it, and potentially resulting in a reduced unemployment rate as well as higher wages. These dynamics have been observed in countries that have experienced sharp population decline such as Japan[54]. The negative effects of population decline appear later, and are generally visible in the decline of demand for consumption. The effects over time of diminished demand as well as expectations of further population decline reduce incentives for investment and affect GDP growth negatively[55].

[54] OECD, "Regional factors: Population and GDP per capita," in OECD Regions at a Glance 2009, OECD Publishing, 2009, available at http://dx.doi.org/10.1787/reg_glance-2009-26-en.

[55] Markus Brückner and Hannes Schwandt, Income and Population Growth: Discussion Paper No. 7422, Bonn: Institute for the Study of Labor, May 2013, available at http://ftp.iza.org/dp7422.pdf.

Additionally, fixed costs in the provision of services also become more burdensome as they are shared among fewer people. Overall, given the demographic trends, the observed increase in GDP per capita in Ukraine should be viewed with cautious optimism; if appropriate measures are not adopted, the increase might not continue over the mid-term or longer term.

The current conflict can bring a halt in the steady progress achieved in economic and poverty indicators over the last decade. From destruction of capital to institutional destabilization, the effects of the current conflict could cause lasting damage to economic activity. Furthermore, the conflict pushes people from unsafe areas, causing large costs to households and disrupting economic activity. Unless these movements somehow allocate households to more productive areas that are also well-prepared to receive them, it is very likely that the costs for these displaced households will be high and the adaptation process will be long.

Another red flag is the slow adaptation of Ukraine's firms and institutions to a market economy system. Compared to other countries in the region, Ukraine lags behind in its transition from a centrally-planned economy to a market economy, as well as on its institutional and business environment reforms (for instance, in measures of the ease of doing business, Ukraine ranks 96th worldwide and 22nd in the ECA region[56]). The EBRD transition index finds Ukraine doing poorly in several areas, including small-scale privatization efforts, enterprise restructuring, price liberalization, and trade and foreign exchange policy. Unless changes are made in these spheres, continued progress will be threatened.

In terms of structural transformation of the economy, Ukraine has moved slowly from an industrial enterprise-centered economy to a services-centered economy, with a finance sector at the forefront of this change. Services have grown significantly in a number of areas, including retail, property, and information and communications technology (ICT). However, progress has been slow and has not occurred uniformly across the regions. Industry remains very important in the Southern and Eastern regions, while the Western region has seen a slow increase in the importance of services as the agriculture sector's dominance wanes. Finance's share of national Gross Value Added (GVA) has nearly doubled, but its share of the labor market is still minor and should not be expected to replace jobs in traditional sector. Overall services grew 40 percent from 2002-2010. Ukraine will need to increase the skills of its labor force to take advantage of this growing economic sector. Information-based sectors could have a wider employment potential in the country.

International migration has been an important phenomenon that has affected not only population but also economic dynamics. Resources provided by remittances are large in magnitude, but their effects appear most likely beneficial only in the short term. Remittances provide short-term benefit by alleviating income problems of local consumers. However, data indicate that they are mainly used for consumption and not for long-term investments in human capital or entrepreneurship activities. Additionally, they can have medium- and long-term negative consequences, such as exchange rate appreciation and resultant negative effects on exports; linking the local economy to negative global shocks; and in some cases, hysteresis[57], as some people may forego work in favor of relying on remittances and lose their labor skills over time.

As discussed in the previous sections, going forward, the country should aim at increasing labor mobility and accelerate institutional and business environment reforms. Facilitating increased labor mobility could further increase the gains from rising productive sectors (finance, information and communication technologies, education, and medicine). This will be especially beneficial if it is focused on facilitating population movements from low productivity rural sectors to high productivity urban sectors, or from low productivity to high productivity urban areas.

[56] World Bank Group, Doing Business 2015: Going Beyond Efficiency, available at http://www.doingbusiness.org/data/exploreeconomies/ukraine/. Only Kiev is considered.

[57] Fajnzylber, P., and J. Humberto Lopez, eds., Remittances and Development: Lessons from Latin America, Washington, DC: The World Bank, 2008, available at http://siteresources.worldbank.org/INTLAC/Resources/Remittances_and_Development_Report.pdf

IV. Cities of Ukraine: Engines Of Economic Growth

The roles of cities in economic growth

Cities, under the right conditions, can be true engines of economic growth. Cities provide a common space for collaborations and interaction for both firms and workers, providing an essential stage for agglomeration economies to occur through better sharing, matching and learning mechanisms[58]. Agglomeration economies refer to the benefits of locating close together; this applies to both firms and workers. As firms cluster together, they broaden the market for their suppliers. With more buyers, suppliers' average cost of production goes down and this leads to a drop in prices as well. Sharing increases profits through this lowering of costs as well as through allowing suppliers to provide highly-specialized goods[59]. Another dynamic of larger market scale brought by agglomeration is an increase of the matching probability between demand and supply. For example, workers more easily find suitable jobs and firms more easily find the supplies they need. Finally, as both firms and workers aggregate in cities, they learn from each other more efficiently simply by their proximity and interactions. This learning channel yields increased productivity, especially in sectors like modern industry and services, in which high skills and innovation are more important. The learning mechanism not only affects actors in the same industry or sector (localization economies)[60], but also spurs innovation across sectors and between workers with different skills (urbanization economies). Also, spatial concentration of activities is conductive to the spillover of knowledge and innovations across industries and sectors of the economy.

These benefits can spread to the country as a whole if cities are positioned to take advantage of a regional network, or, if they engage with global system of cities[61], and they can offer a gateway to the global economy for the entire national economy. Concentrations of offices of global companies, financial market institutions, large-scale infrastructure, and world-class education and cultural institutions enable cities to attract global partners and global markets and potentially bring benefits to their metropolitan areas, broader region, and the entire country.

The positive impact of agglomeration economies on economic growth may be undercut by congestion costs such as traffic congestion and air pollution, which, if growth is not properly managed, can increase as cities become larger and denser. However, with sustainable management, agglomeration economies exceed congestion costs, and the overall net effect is an increase in productivity. To achieve increased productivity, the right mix of good governance, a beneficial business climate, and an efficient provision of public goods, usually in the form of public services and infrastructure[62], is necessary.

Understanding the evolution of a country's system of cities, as well as their role in economic growth, is fundamental for sound policy formulation. This section will explore the role of cities in Ukraine through two dimensions: first, by looking at the aggregate contribution of the urban sector to Ukraine's economy, second, by making a city-level assessment of the demographic, economic, and spatial evolution of Ukrainian cities over the past two decades. For the first assessment,

[58] Duranton, et. al., provide a review of the formal treatment of these ideas in urban economics (Duranton, G., and D. Puga, "Micro-Foundations of Urban Agglomeration Economies," in Henderson, J. Vernon, and Jacque Thisse, eds., Handbook of Urban and Regional Economies, Vol. 4, Amsterdam: North-Holland, 2004). These ideas have been widely studied since their initial articulation by Marshall (Marshall, A., Principles of Economics, London: Mac-Millan, 1890).

[59] World Development Report 2009: Reshaping Economic Geography. (2009).

[60] Jacobs, J., The Economy of Cities, New York: Vintage, 1970, and McCann, P., Urban and Regional Economics, Oxford, U.K.: Oxford University Press, 2001.

[61] For example, per the Globalization and World Cities Research Network Kyiv is classified as a Beta world city..

[62] This not only ensures taking full advantage of agglomeration, but also that benefits of rapid urbanization are more widely shared. Kuncoro, Ari, "Spatial Agglomeration, Site Productivity and Local Governance: Indonesian Experience from 1980 to 2003," In Yukon Huang and Alessandro Magnoli Bocchi, eds., Reshaping Economic Geography in East Asia, Washington, DC: World Bank, (EAP Companion Volume to the WDR 2009), forthcoming.

different aspects of urban and rural economic activity will be contrasted using both aggregated regional data and firm-level data. For the second, night light (NLs) data will be used to track trends in economic activity at the city level, both spatially (i.e., the evolution of the night lights footprint and light intensity) and through time by drawing on demographic data analyzed in Section 2. The use of NLs as a proxy for economic activity is based on empirical evidence that they are correlated with economic activity (Henderson, et. al., 2009). On this basis, two city typologies are developed to assess how cities evolved in economic, demographic, and spatial terms over the past two decades. The first city typology compares Ukraine's cities against a benchmark that defines urban as those cities emitting NLs of intensities higher than urban threshold, which in the case of Ukraine is 19.5[63]. This analysis identifies settlements that grew enough in light intensity over the period to be considered to have met the urban threshold. Others, by contrast, are shrinking to the point that they are no longer considered urban by the standard of NLs. The second typology focuses on settlements that met this urban threshold over two periods of time. This typology analyzes cities across two dimensions: changes in urban footprint (defined by NLs), and changes in light intensity. Finally, these two typologies are triangulated with geographic and demographic data to further illuminate the evolution of the urban system in Ukraine and its main challenges.

Urban economic activity in Ukraine

In Ukraine, the predominant share of economic activity is concentrated in urban areas, significantly exceeding the share of rural areas. Figure 36 shows how urban production in Ukraine is much higher than rural production measured by GVA over the period 2002-2010. Regional differences can also be observed. The Central region has the highest production for both rural and urban areas[64]. This region, in which Kyiv plays a leading role, has the greatest urban GVA in the country[65], followed by the Southern and Eastern regions, respectively. As expected, the Western region ranks last in terms of urban production. The ranking is similar for rural GVA, except for the period 2002 to 2004, where the rural production in the Eastern region was higher than in the Southern region.

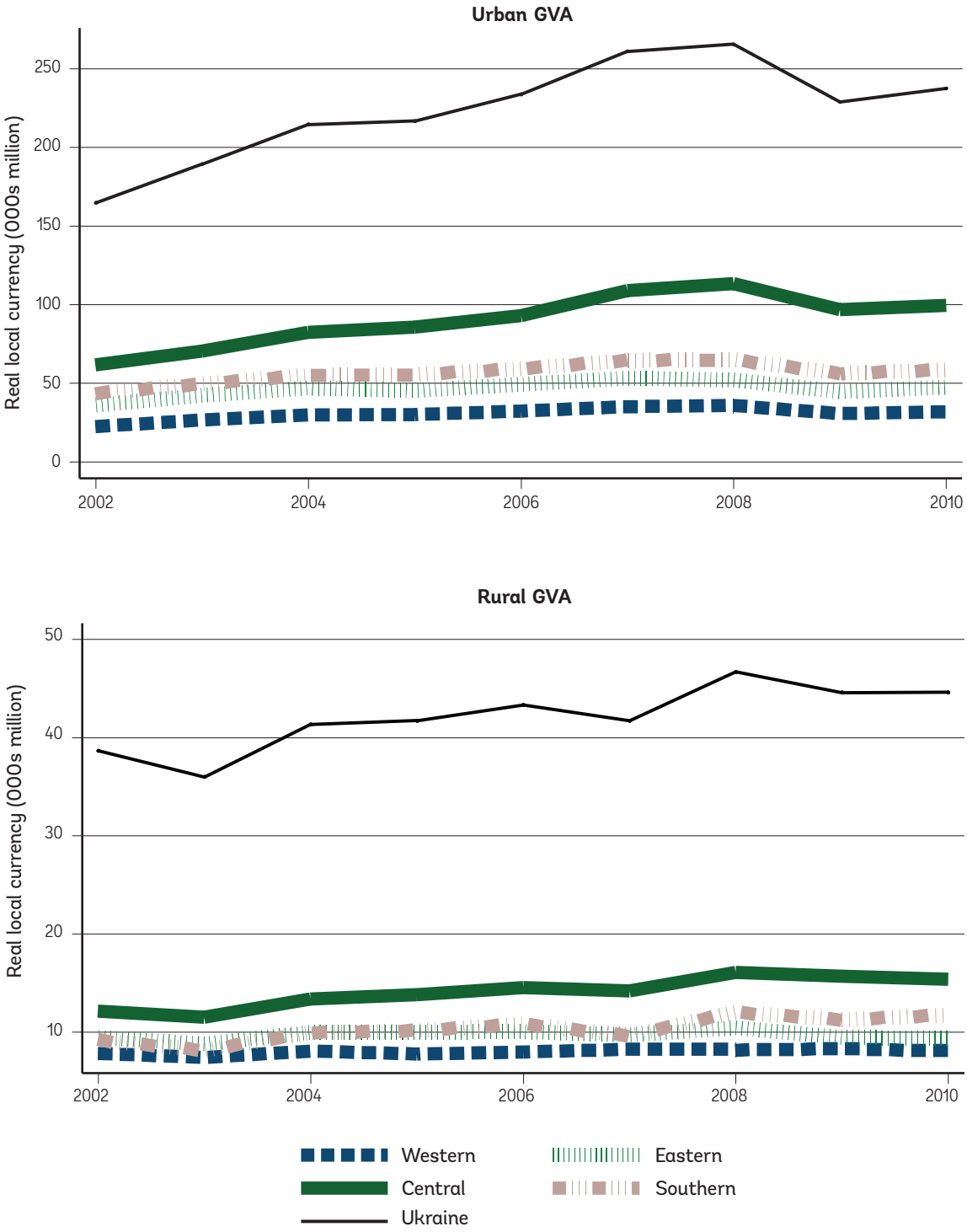
Urban sectors are much more productive than rural sectors. As discussed in Section 1, Ukraine's population has decreased overall, but the decline has been sharper in rural areas than in urban areas. This pattern, together with internal migration to large urban areas, has increased the share of the population that resides in cities. If agglomeration economies discussed above were not present (or were offset by congestion costs), labor productivity measured in GVA ratios for urban and rural sectors would closely follow urban-rural population ratios as shown in Figure 37. However, urban production grew, relative to rural production, at a much faster rate than urbanization during the period 2002-2010.

[63] For Ukraine, this threshold was determined to be 20.94 DN. Intensity of night-time light here is measured on a "Digital Number" (or DN) scale This threshold has been selected by calibrating the lights data against higher resolution land use cover maps for the region – in particular, the European Space Agency's GlobCover 2009 map and the MODIS Collection 5 Land Cover Type map. See the SAR Urbanization Flagship for a discussion of the data. It is important to note that this differs from the product that forms the basis of Henderson et al.'s research (See Measuring Economic Growth from Outer Space, American Economic Review ,102), as well as that used by most other researchers, in that it does not suffer from the saturation problem.

[64] For rural production, this is due mainly to climate conditions and a larger concentration of the most fertile black soils, especially compared to the Eastern and Southern regions.

[65] Gross Value Added (GVA) data by sector, as reported by the State Statistics Service of Ukraine, is used to measure urban production for the years 2002-2010. The sectors can be divided into those that are typically urban and those that are typically rural according to the following classifications: Agriculture, Hunting, and Forestry, and Fishing are elements of rural production, and Manufacturing, Construction, Trades, Repairs, Personal Products, Hotels and Restaurants, Mining, Transport and Communications, Real Estate, Engineering, Business Services, Public Administration, Education, Health Care, Community Services, Entertainment, Electricity, Gas, Water, and Finance are elements of urban production. These groupings are a simplification of the urban and rural divide, which is more complex. For example, the legal residence of businesses may be located in cities, where they report their employment and overall economic production, although their main economic activity occurs in rural areas. The city of Kyiv is emblematic of this; as a region, it is one of the largest exporters of agrarian products in Ukraine and hosts the headquarters of most of the large agro-holdings groups. See for example the case study for the grain sector in The EBRD's Experience with Policy Dialogue in Ukraine (2014).

Figure 36 – Ukraine's urban GVA (upper graph) is much greater than its rural GVA (lower)*

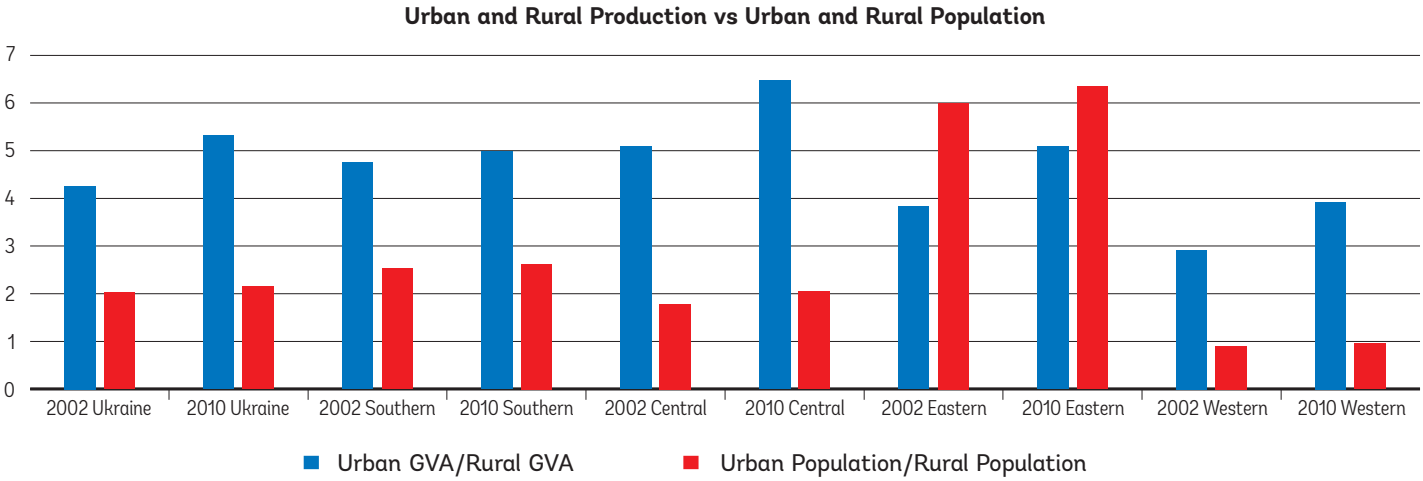


*The scale of the y-axis differs between graphs for purposes of illustration

Source: Ukraine Statistics Department

In fact, urban production was between four and five times higher than rural production in Ukraine. This ratio has increased steadily in the last decade, except for a mild decline between 2007 and 2009. By contrast, the dotted lines below, representing the ratio between urban and rural population in each of the regions, shows that urban population is about twice the size of the rural population and its increase has been much less steep.

Figure 37 – Urban-rural GVA ratios are much greater than urban-rural population ratios, indicating much higher productivity in the urban sector



Source: Ukraine Statistics Department

Figure 37 also shows that the impact of urban areas in production differed significantly between regions during 2002-2010, with the Central region showing the highest ratio of urban to rural production and the Western showing the lowest. Production in the Central region was predominantly urban relative to the other regions. In 2008, for instance, the region's urban production was almost eight times as great as its rural production. Urban population was nearly twice that of rural population in this region, but was significantly lower than the ratio of production and much more stable than other regions. By contrast, the Western region had the lowest urban production relative to its rural production in the period. Still, even in this relatively more rural region, urban production was not only more important than rural (note the line above is >1), but the ratio of urban to rural production was also higher than the urban to rural population ratio. This dynamic was found in all regions, except for the Eastern region. The Eastern region had the highest urban to rural population rates – higher even than the urban to rural GVA ratios – suggesting that urban productivity in this region was lower than in the other regions.

Firm-level data[66] shows how the largest cities in Ukraine acted as magnets for growth, continuing to attract workers and firms. Table 8 shows the cities[67] with the greatest concentration of firms. The first noticeable pattern is that the largest cities held the largest number of firms. This happened not only because they offered the largest markets, but also because of the location and urbanization economies mentioned earlier. The table also shows that the ranking of cities in terms of the number of firms they host is quite stable; among the largest 15 cities in 2000, all but one ranked in the top 15 locations in 2008. This is consistent with the idea of agglomeration economies, as the largest cities provided a better economic environment for firms. There are several Western cities, such as Ivano-Frankivsk, that ranked much higher in the number of firms than their population ranking would suggest. This would suggest that these cities might have possessed characteristics that made them attractive for firms to locate there[68]. This trend could be due to the convenient location for new firms of the Western region in terms of its proximity to the large market of Western Europe. By contrast, the opposite reasoning could be applied to those cities whose rank in number of firms was lower than their population ranking; in relative terms, they may have been less attractive for firms than their population would suggest.

[66] Firm-level data was obtained from AMADEUS, a large-scale, firm-level survey. AMADEUS is a comprehensive, pan-European database containing financial information on over 11 million public and private companies in 41 European countries. There is data for a representative sample of firms in Ukraine for the years 1997-2009 in an unbalanced panel.

[67] These correspond to individual cities and not to agglomerations.

[68] In particular, Ivano-Frankisk presented one of the most intense growth rates, 122 percent over the period, which suggests that economic activity was very robust and that firms located there were of significant size. Similarly, Lviv presented exceptional growth of nearly 90 percent.

Table 8 – 20 cities with the highest number of firms in 2000 and 2008

Region	CITY	Population (2013 estimated)	Population Ranking (2013)	Firm Ranking in 2000	Firm Ranking in 2008
Central	Kyiv	2,757,900	1	1	1
Eastern	Kharkiv	1,451,028	2	2	2
Western	Lviv	730,272	7	3	6
Eastern	Donetsk	953,217	5	4	5
Southern	Odesa	1,014,852	3	5	4
Southern	Dnipropetrovsk	997,754	4	6	3
Southern	Zaporizhzhya	770,672	6	7	7
Southern	Mikolaiv	496,188	9	8	9
Southern	Simferopol	337,285	15	9	8
Eastern	Lugansk	425,848	11	10	10
Central	Vinnitsya	371,698	12	11	13
Southern	Kriviy Rig	656,478	8	12	12
Western	Ivano-Frankivsk	226,018	28	13	17
Southern	Kherson	299,052	16	14	14
Central	Poltava	296,852	17	15	11
Western	Rivne	250,333	25	16	23
Central	Sumi	269,177	21	17	15
Western	Chernivtsi	258,842	23	18	26
Western	Chmelnitskiy	264,988	22	19	22
Eastern	Mariupol	461,810	10	20	21

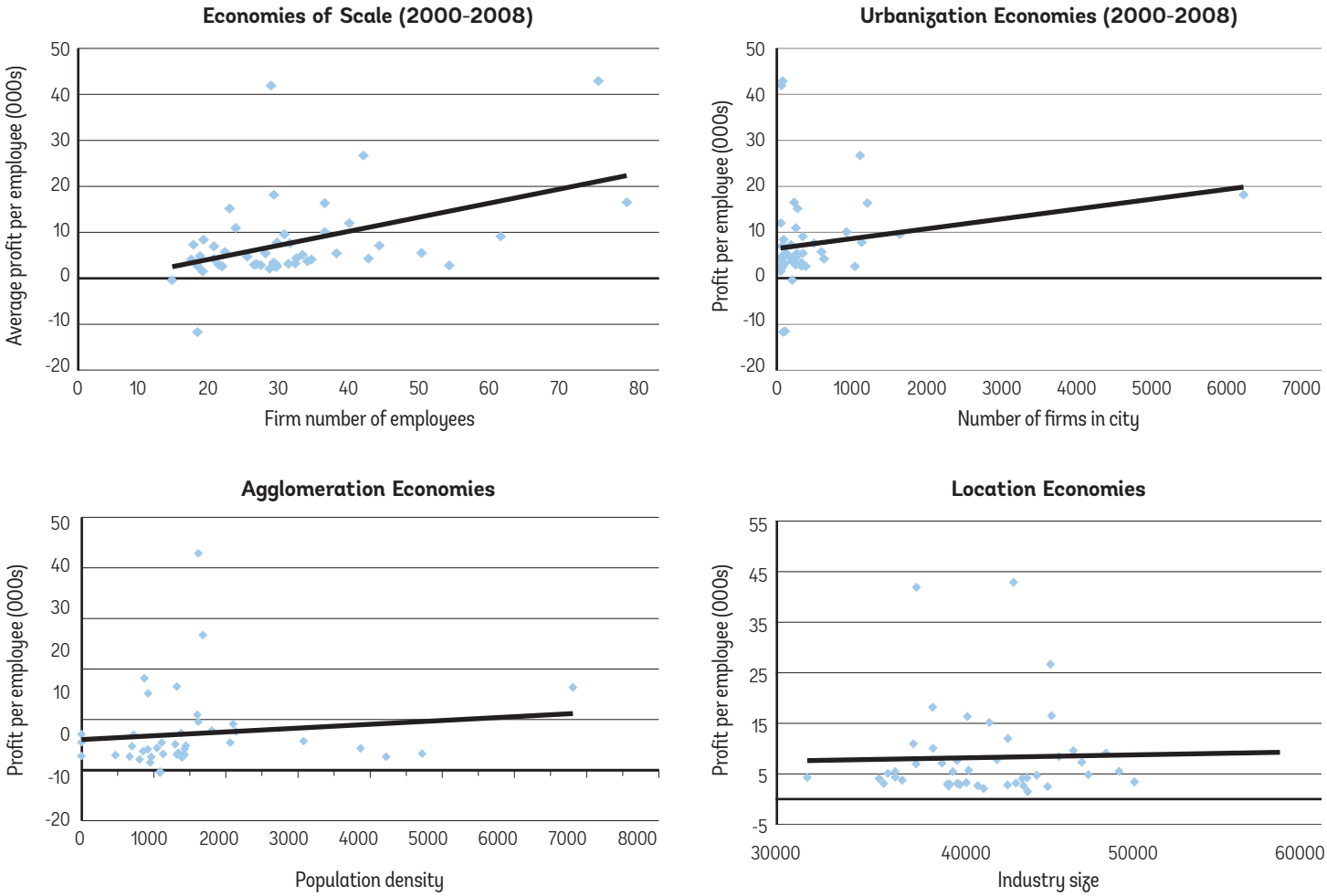
Source: AMADEUS data

This firm-level survey also suggests that economies of scale, urbanization economies, and agglomeration economies play important roles in the economic performance of firms in cities in Ukraine. Location economies, although weaker, are also supported by the data. The upper left panel of Figure 38 shows a positive relationship between the productivity of firms and the number of employees in the firm. This is a sign of (internal) economies of scale, which arise from the ability of larger firms and plants to better exploit fixed costs[69]. Urbanization economies arise from the dynamics of a large number of different industries and firms located in the same place. The upper right panel of Figure 38 suggests that there is

[69] According to the World Development Report 2009, internal economies of scale come mainly from technological factors as well as pecuniary (being able to purchase inputs at discount values for example).

indeed a positive relationship between the number of firms in a city and a firm's profits per employee[70]. Urbanization economies highlight the importance of the sharing mechanism and how knowledge generated in one industry goes beyond it to improve the performance of firms in other industries as well. The lower right panel shows the relationship between the average profit per employee of firms and their average industry size[71]. The relationship is weaker than the previous ones, but still positive, suggesting the presence of localization economies, which arise from a high number of firms in the same industry. Finally, the lower left panel shows a positive relationship between the population density of the city and firms' average profit per employee. This is a sign of overall agglomeration economies mentioned previously. These agglomeration economies most likely come from a combination of the analyzed localization economies, urbanization economies, and internal economies of scale. These effects have been assessed in the economics literature as potentially important determinants of development[72].

Figure 38 – The performance of firms based on firm, city, and industry characteristics[73]



Source: Data from AMADEUS on Ukraine firms from 2000-2008

[70] Profits per employee reported throughout Figure 39 are city-wide averages at the firm level.

[71] AMADEUS calculates industry size using both the total number of employees and the size of firms assets in the same industry at the national level. This is an approximation to a measurement of localization economies, which would optimally show the size of the industry in a single location. Due to data limitations, we have only industry size at the national level.

[72] Bazoglu, Nefise. 2008. Cities in Transition: Demographics and the Development of Cities. Philadelphia: Pennsylvania State University, and Ciccone, Antonio, and Robert E. Hall. 1996. "Productivity and the Density of Economic Activity." American Economic Review 86 (1): 54–70.

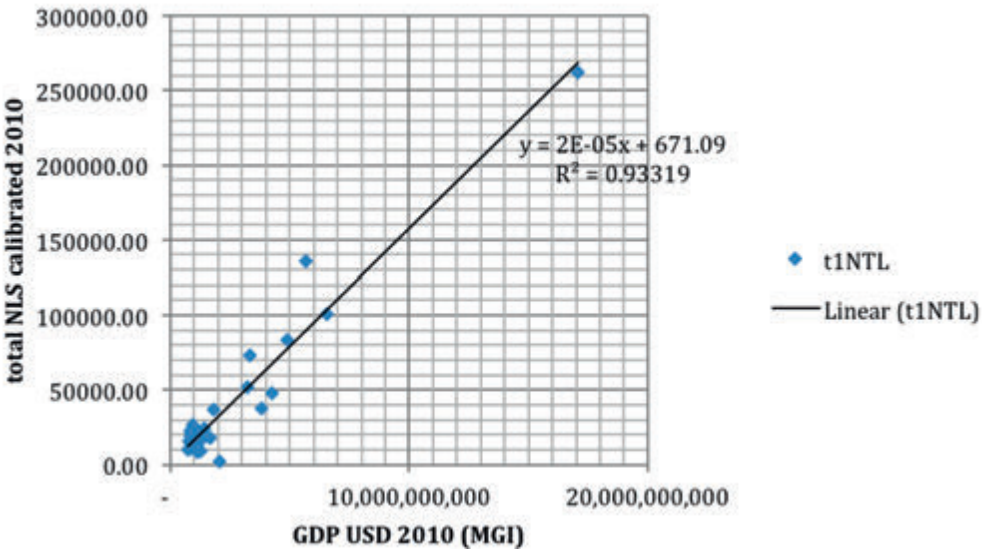
[73] The figures used are derived from averages at the city level using the 50 cities with the largest number of observations, as these provide the least statistical 'noise' and greatest reliability

Analysis of dynamics of economic growth using night lights data

Urban production has played a fundamental role in the recent economic growth of Ukraine, but from aggregate data it is difficult to assess how particular cities have performed. No country has been able to achieve prosperity without both strong urbanization and strong urban economic growth. In Ukraine, this process has not been uniform, and much economic activity has usually been concentrated in a small number of cities. However, measuring economic activities at the city level in Ukraine has been challenging, as city level economic activity data has rarely been available. Along with demographic indicators, this section will use the empirical regularity that there is a strong correlation between emitted night lights and the economic activity of an urban location in order to illustrate trends about economic production by Ukrainian cities (and their night lights footprint)[74]. This is especially useful since no official city-level GDP data is available for all cities. Using a subset of 31 cities for which the McKinsey Global Institute reports estimated GDP, the positive correlation between GDP and night lights for the city is evident (Figure 39). Annex III provides more details on the utility of using this methodology in the Ukrainian context, while Annex IV presents an additional growth robustness analysis with variations based on the urban threshold.

Night lights data possess useful analytical characteristics related to their availability, their granularity, and the fact that they provide information on brightness and location dimensions. The night lights (NLs) data used covers the 1996-2010 period and is based on spatial observations of Ukrainian cities and the lights they emitted at night. Light is determined to be urban when it goes beyond a brightness threshold, and this is used to determine urban footprints.

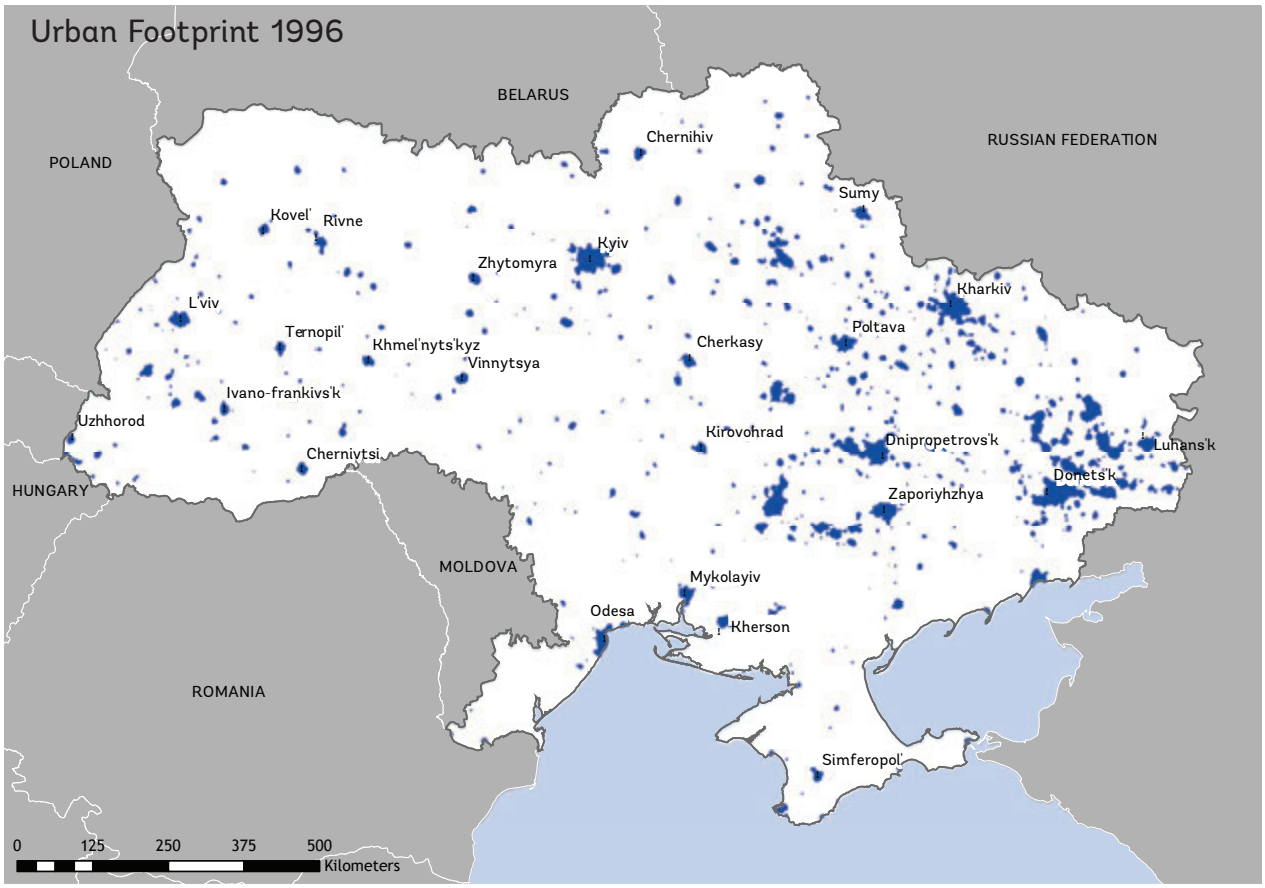
Figure 39 – There is a strong positive correlation between urban GDP and night lights

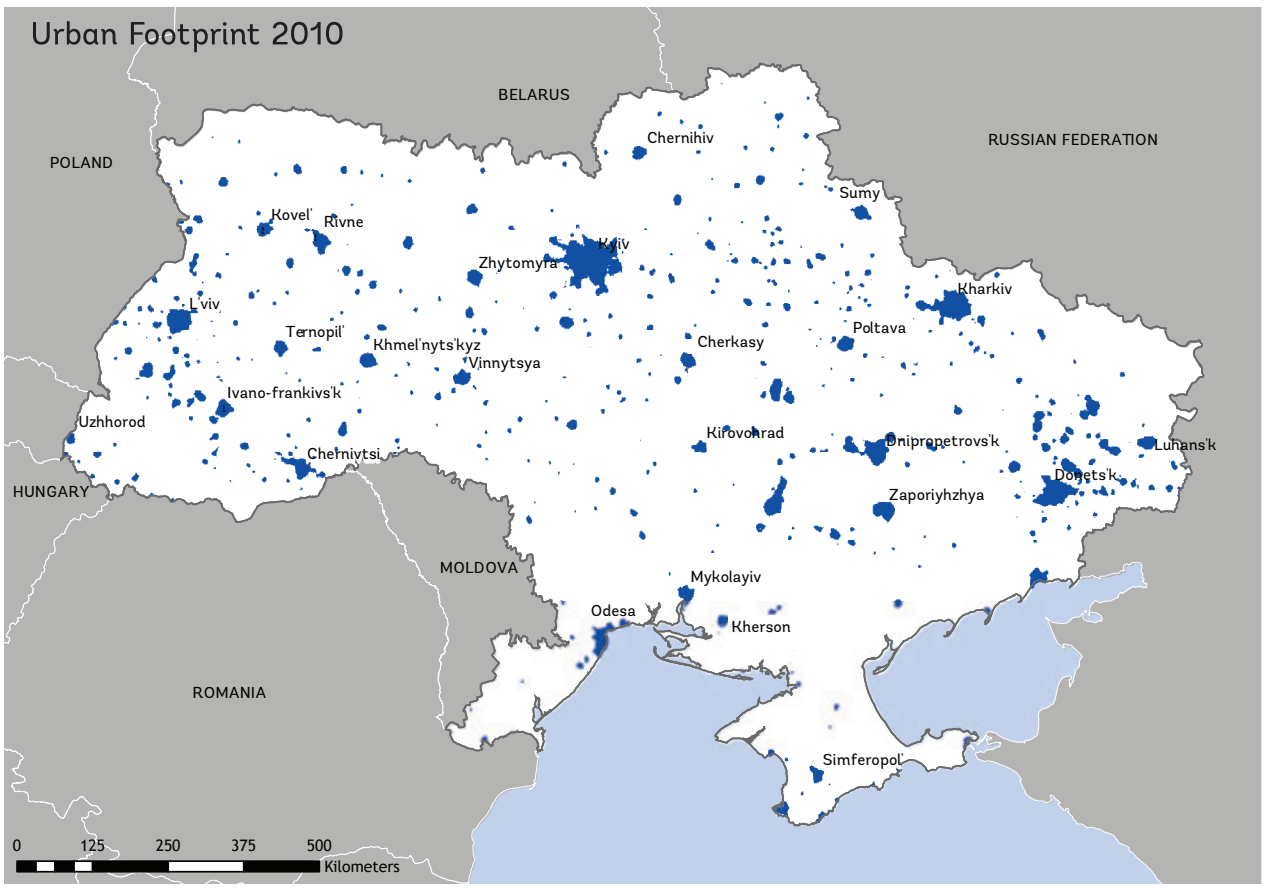


Source: McKinsey Global Institute (city GDP data) and author's calculations.

[74] Henderson, et al. (2012) (Measuring Economic Growth from Outer Space, American Economic Review, 102) develops a theoretical model that suggests an optimal way to combine night lights data and available GDP data. It is based on the idea that both pieces of information can exhibit measurement error, but that there is no reason to assume these errors will be correlated with each other. Henderson, et al. (2011) applies this to a sample of 170 countries, while Henderson, et al., (2012) (A Bright Idea for Measuring Economic Growth, American Economic Review: Papers & Proceedings, 101) further develops the approach by providing additional examples of how night lights readings react to documented economic and social phenomena, and suggests a model that focuses on night lights density. Based on this, Henderson, et al. argues that the night lights data can be used to proxy GDP growth in settings where GDP data is either of poor quality or entirely unavailable. This approach has been recently expanded upon in several other papers that confirm the positive relationship between observed night lights and economic activity (See Alder, 2013; Baum-Snow and Turner, 2012; Baum-Snow, Brandt, Henderson, Turner and Zhang, 2013; Pinkovskiy, 2013; and Storeygard, 2013).

Figure 40 – Night lights and urban footprints in Ukraine 1996 and 2010





Source: McKinsey Global Institute (city GDP data) and author's calculations.

NLs measurements are available at a very fine scale in two dimensions: light intensity and location of that intensity. As a consequence, they are very useful in analyzing the evolution of economic activity over time and space. Additionally, as indicated in Section 2, as individual cities in close proximity grow towards each other to constitute an agglomeration, their NLs footprints can likewise merge and reflect that agglomeration. NLs analysis treats agglomerations as a single city or urban entity. In 2010 Ukraine had 23 agglomerations based on the NLs definition.

Visual analysis of NLs urban footprints at the national level provides insights about the location of major urban centers and their dynamics over time. Figure 40 shows the urban footprints detected by NLs in 1996 and 2000 in Ukraine. Three patterns can be observed: (i) a strong concentration of the urban centers in the East of the country; (ii) the growing and expanding footprint of the Kyiv agglomeration; and (iii) a growth in the number of urban areas – measured by NLs – in the West and a decline in the East. This tracks with the demographic analysis presented in Section 2 showing a sharp population decline of cities located in the Eastern region and a population increase in the concentration of cities around Kyiv and in the Western Region.

A visual representation of compound growth of NLs suggests an important shift from the Eastern and Southern Regions towards the Western and Central Regions.[75] Figure 41 shows the percentage growth of night lights in the Ukrainian territory between 1996 and 2010. This shift of lights from East to West might have multiple causes. First, as discussed in Sections 1 and 2, two decades ago, the East of the country presented high urbanization levels (more than 70 percent), as well as a concentration of most of the country's industry. By contrast, the West presented lower urbanization levels (around 50 percent) and remained a predominantly rural region. These characteristics, especially in the West, have been changing. Both the Western and the Central region have had Ukraine's greatest urbanization rates. This does not mean that they are currently more urbanized than the Eastern and Southern regions in absolute terms; rather, while starting at lower urbanization levels, their rates of urbanization have been greater. Second, the rural population has migrated its economic activity from rural to urban at greater rates in the Western and Central regions too (see Section 3). As a result, the relative growth in urban production has been much greater, which could explain, at least partially, the striking change observed in Figure 41.

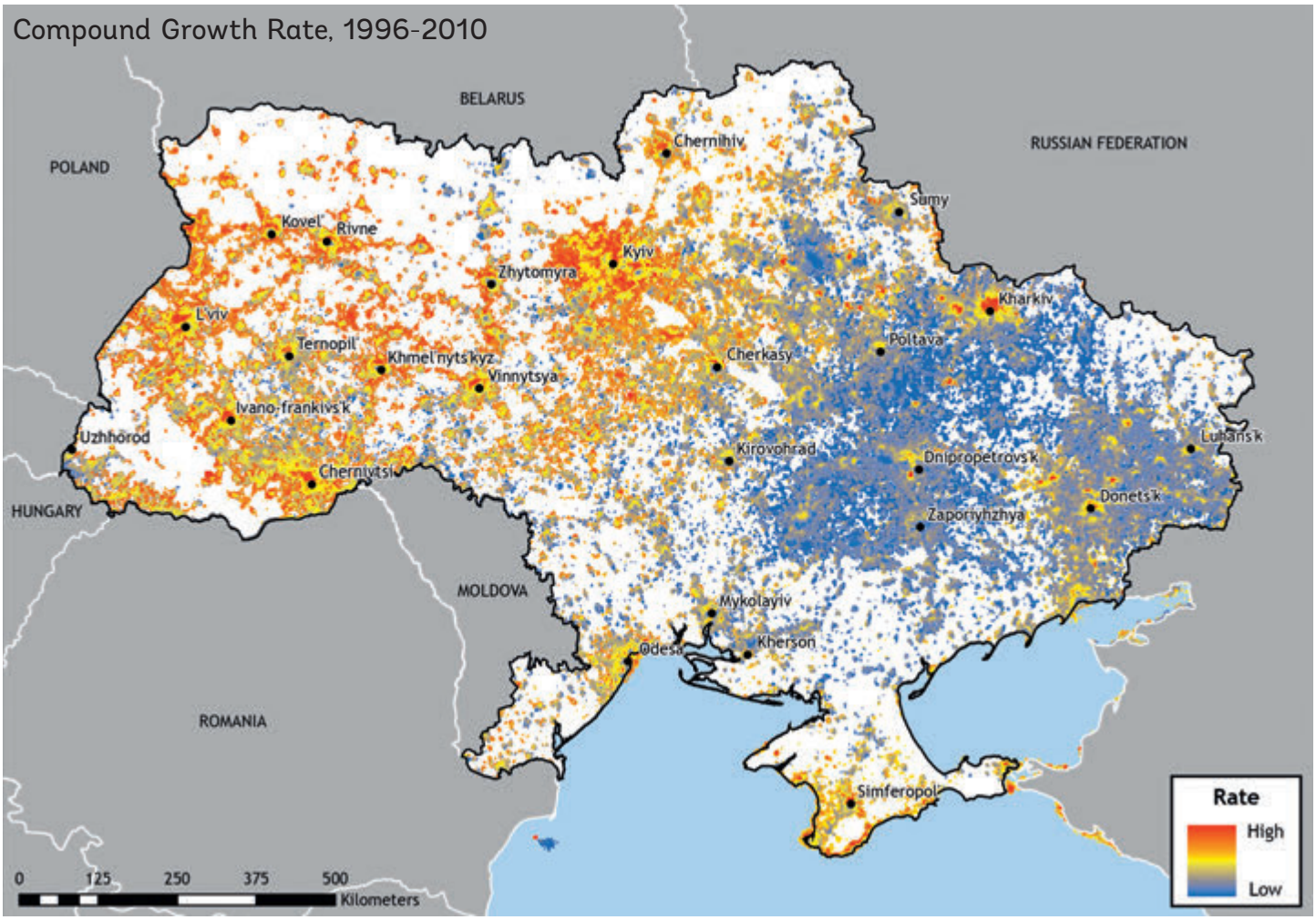
Another important aspect of this observed shift is the heterogeneous relationship found between night lights levels and economic activity across regions. The second column of Table 4 of Annex III shows that, when elasticity is allowed to vary across regions[76], it is significantly different between them. This shows that, all else being equal, the region where a city is located affects the relationship of NLs to economic activity (i.e., how much light a city emits per unit of economic activity). For example, a city in a region with a higher NLs GVA elasticity will exhibit higher growth in GVA for a given growth in NLs compared to a city in a region with lower NLs GVA elasticity. The regional differences in NLs and GVA elasticity can be explained by differences in sector composition, population and production density, and policies related to energy. Regional differences also show up when considering only urban economic activity and lights.

The elasticity between NLs and economic activity was largest for the Eastern and Southern regions[77], i.e., for similar growth in NLs levels, economic activity was higher in the East and South. The opposite was the case for the West and Central regions; for these regions, an additional unit of light yielded fewer units of economic activity. This explains statistically why the higher compound growth in lights in these two regions (see Figure 41) was not necessarily accompanied by higher growth in economic activity. As discussed previously, one economic reason for this heterogeneity is likely due to the differences in the initial distribution of sectors (the East being initially much more urban and industrial while Central region being more service-oriented).

Observing the evolution of economic activity at the oblast level also sheds some light on how the sector and urban population distribution shifts might have affected the NLs trend from East to West observed in Figure 42 (left panel). This figure shows that the urban production, as measured in GVA, is still concentrated largely in the oblasts of the Eastern region. However, over the period 2002-2010, growth is clearly evident in the oblasts of the Western and Central

[75] Notice that in Figure 42 each pixel shows compound percentage growth relative to an initial condition, rather than absolute growth or absolute levels.

Figure 41 – Compound growth/decline in NLs in Ukraine between 1996 and 2010

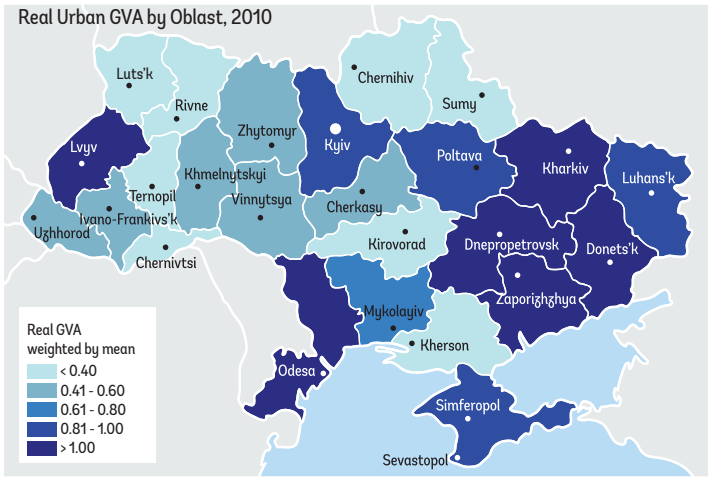


regions (Figure 42 right panel). At the same time, urbanization rates showed steady growth since 1989 in the Central and Western regions (See Figure 43). Urban production as a measure of GVA is often higher than rural production. Thus, urbanization may bring an increase in production. Again, despite the fact that oblasts showing higher labor productivity are concentrated in the Eastern part of the country(Figure 42, left panel), as captured by real GVA per worker, Central and Western regions have shown the greatest increases (Figure 44, right panel). Overall, these data suggest that the East to West trend observed in Figure 44 is mainly dynamic (corresponds to changes over time), and that these dynamics might be driven by an increasingly important urban sector in the West and Central regions. Still, the West has quite a ways to go before it reaches the East's levels of production and urbanization.

[76] Bickenbach, et. al. (2013) (Night Lights and Regional GDP, Kiel Institute for the World Economy Working Papers) uses data on Brazil, India, United States and some countries in Western Europe to show that the relationship between economic activity and night lights is not unchanging when looking at sub-national or regional units.

[77] Comparisons between regions are made with respect to an omitted category, in this case the Southern region.

Figure 42 – Urban GVA production at the oblast level



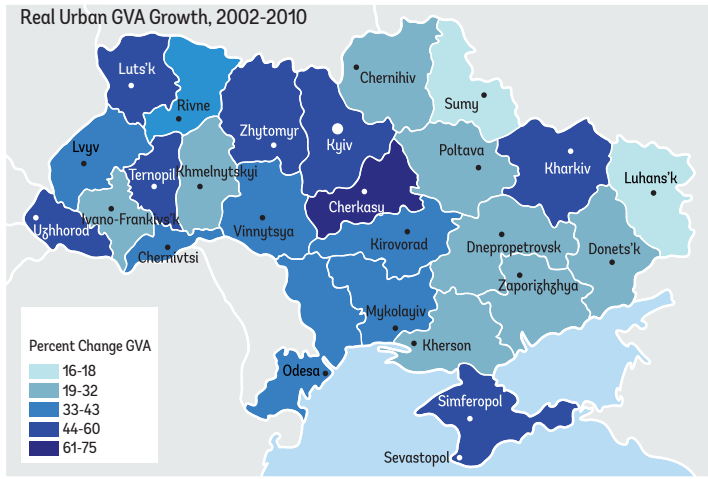
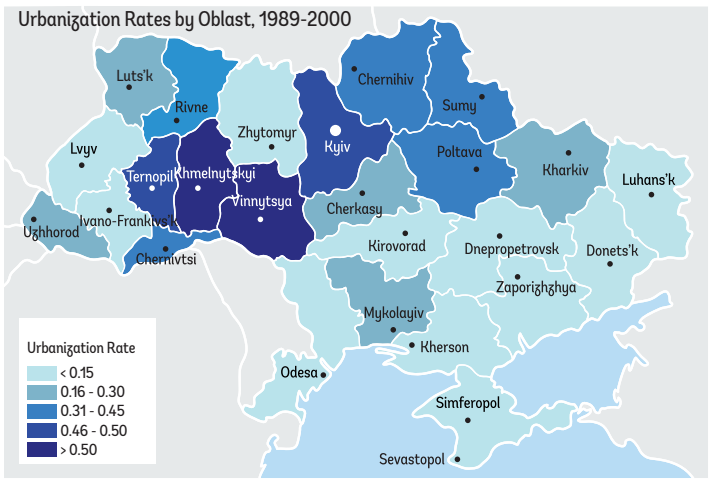


Figure 43 – Urbanization shows steady growth mainly in the Central and Western regions



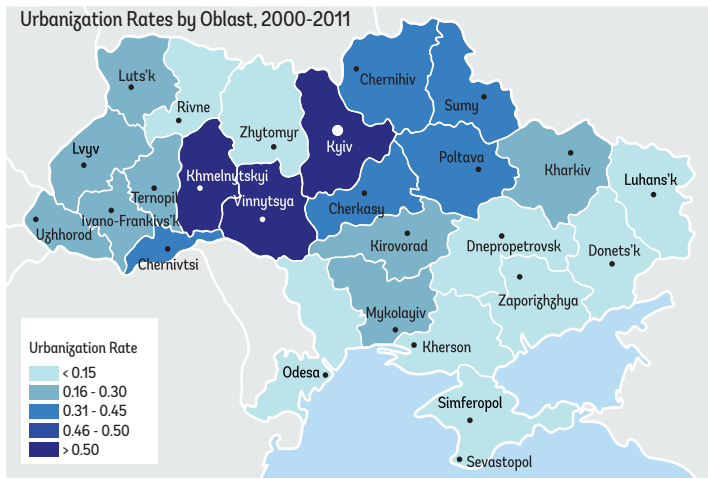
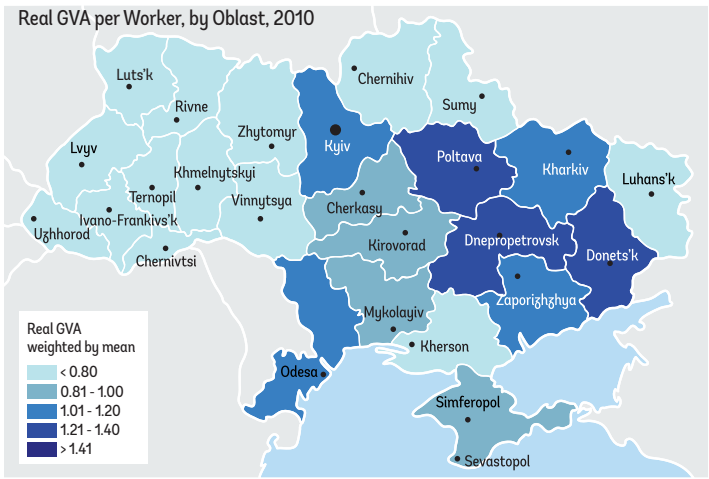


Figure 44 – Real GVA growth per worker shows strongest increase in the Western and Central region



First typology of Ukrainian cities using NLs: found, appear, disappear, and missed cities

A first typology of cities was created by matching urban footprints – based on NLs data – and the official location of Ukraine's 458 cities using data for 1996 and 2010. Of those settlements defined as cities by the Ukrainian government, most produce enough light to go beyond the urban threshold (discussed in Footnote 17 above). Others, however, due to their relative low scale of economic activity, did not pass this threshold in the two years analyzed. Based on this threshold, a first typology of cities was created which classified all 458 cities into one of four categories: Found, Appear, Disappear, or Missed (refer to BOX 7 below for detailed definitions). Two caveats are necessary concerning conclusions reached from this typology classification. First, the analysis is made using night lights as a proxy for economic activity, although the night lights data is not used to forecast individual, city-level GDP[78]. Annex III shows that night lights data and economic activity have a strong relationship, but the correlation is not exact. As such, additional demographic and economic city-level indicators, such as firm-level data, are used to complement the analysis. Second, the elasticity between night lights and economic activity is estimated to be different between the regions (also discussed in Annex III). As a consequence, conclusions drawn from comparisons of cities in different regions based solely on night lights data are less reliable than comparisons for a single city across time.

BOX 7 – A FIRST TYPOLOGY OF UKRAINE'S CITIES

Found cities **are settlements that produced NLs in both 1996 and 2010 that go beyond the urban threshold; as a consequence, they are considered cities in both periods. We can calculate a series of indicators for these Found cities that allow us to get a better sense of the spatial and total evolution of their economic activity over time. 254 (55%) of Ukraine's 458 cities were classified in this category; their average population was 93,445 in 2013.**

Appear cities **are settlements, which at the first date (1996) did not meet the "city" threshold by NLs standards, but had done so when measured in 2010. They were 50 such cities in 2013. Conversely, Disappear cities are settlements, which in 1996 were classified as cities by NLs standards, but by 2010, no longer fit the standard. 37 (8%) of the cities were classified in this category.**

Missed cities **are settlements which did not meet the threshold for classification as cities by NLs standards in 1996 or 2010. 116 (25%) cities were in this category. These cities may be growing or declining in terms of economic activity, but do not produce enough light to be considered an urban area. The average population of these Missed cities was 18,000 in 2013, which indicates that this category comprises many small towns (small towns refers to settlements with less than 10,000 inhabitants. See Section 2 for these definitions).**

According to these criteria, 55 percent of Ukrainian cities were classified as *Found*, 11 percent were *Appear*, 8 percent were *Disappear*, and 25 percent were *Missed*. Missed cities are small – with populations ranging from 1,000 to 31,196 – which suggests that the NLs basis for the typology's "city" standards is valid and that these are not important economic centers (See Figure 45 and Figure 46). By comparison, Found cities have an average population of 97,663, which suggests that NLs data indeed represents the urban settlements in the country.

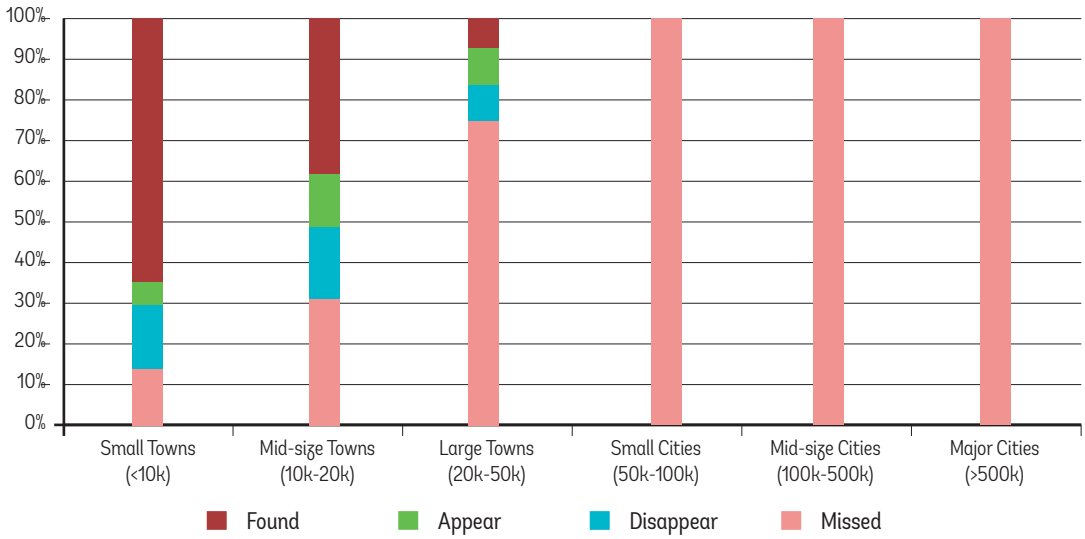
[78] Forecasting GDP for specific cities can be problematic because the methods used to derive the urban boundaries for individual cities ignore the problem of "overglow" (which causes light from a city to appear to bleed out beyond the boundary itself). This problem is a potential source of measurement error, which can become exacerbated the more fine the spatial resolution employed to obtain night lights data to derive GDP growth estimates.

Missed cities are spread across all regions, but the Eastern region held the lowest number. Most of the Missed cities are located in Lviv and Odessa. Some examples of Missed cities are: Bilozerske (Donetsk) in the Eastern region, Nosivka (Cernihiv) in the Central region, Rozhyshche (Volyn) in the Western region, and Nova Odesa (Mykolaiv) in the Southern region.

The Eastern region has the highest number of *Disappear* cities (45 percent of all Disappear cities), followed by the Central and Southern regions with 27 and 24 percent, respectively (See Figure 47 and Figure 48). Some oblasts have been hit harder by the decline of cities than others. Luhansk Oblast alone has 24 percent of all Disappear cities, Donetsk has 19 percent, and Zaporizhia 11 percent. Some examples of Disappear cities are: Zymohiria (Luhansk) in the Eastern region, Ochakiv (Mykolaiv) in the Southern region, Khyriv (Lviv) in the Western region, and Dovbysh in the Central region.

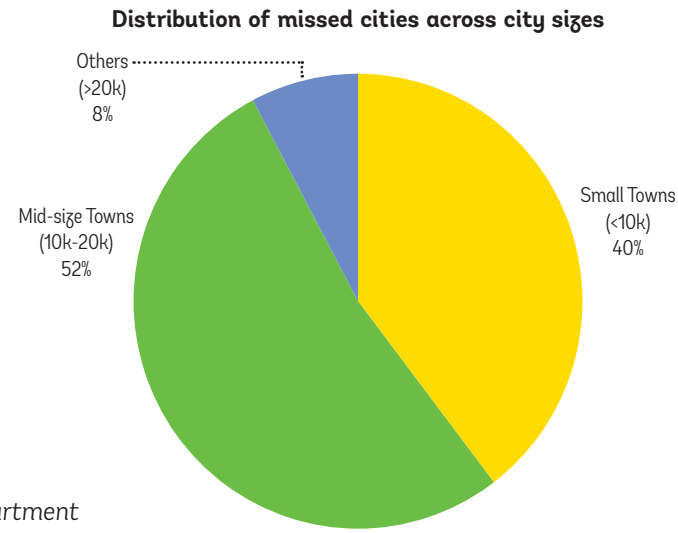
The Western region dominates in terms of *Appear* cities, having 31 of Ukraine's 50 such cities (60 percent) based on NLs standards in 2010. The Central region has the next highest amount, with 17 Appear cities. In the Western region, the cities are concentrated in a few oblasts—10 cities in Lviv oblast alone, six in Ivano-Frankivsk, and five in Chernivtsy. Some examples of Appear cities are: Gorokhiv (Volyn) and Novoselytsia (Chernivtsy) in the Western region, and Biliaivka (Odessa) in the Southern region.

Figure 45 – Distribution of found, appear, disappear, and missed cities by population in 2013



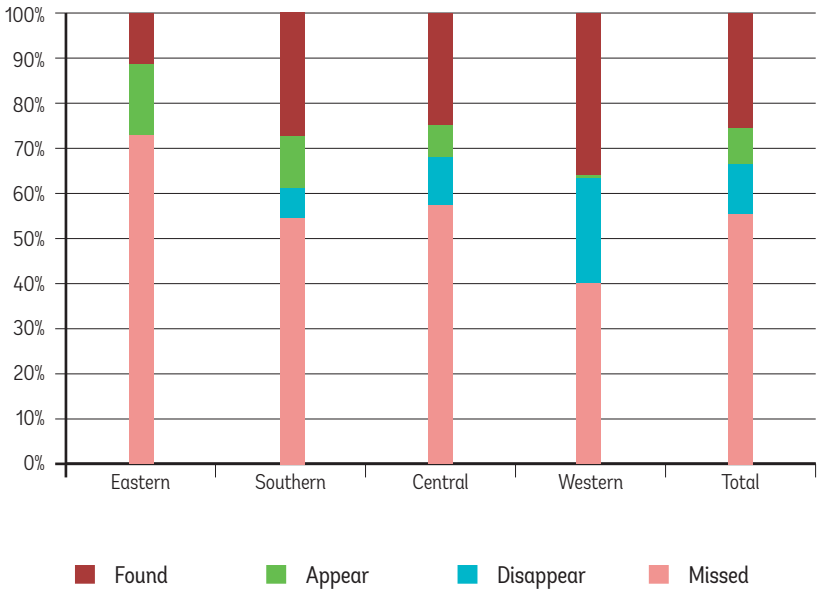
Source: Ukraine Statistics Department Data

Figure 46 – Distribution of missed cities by population in 2013



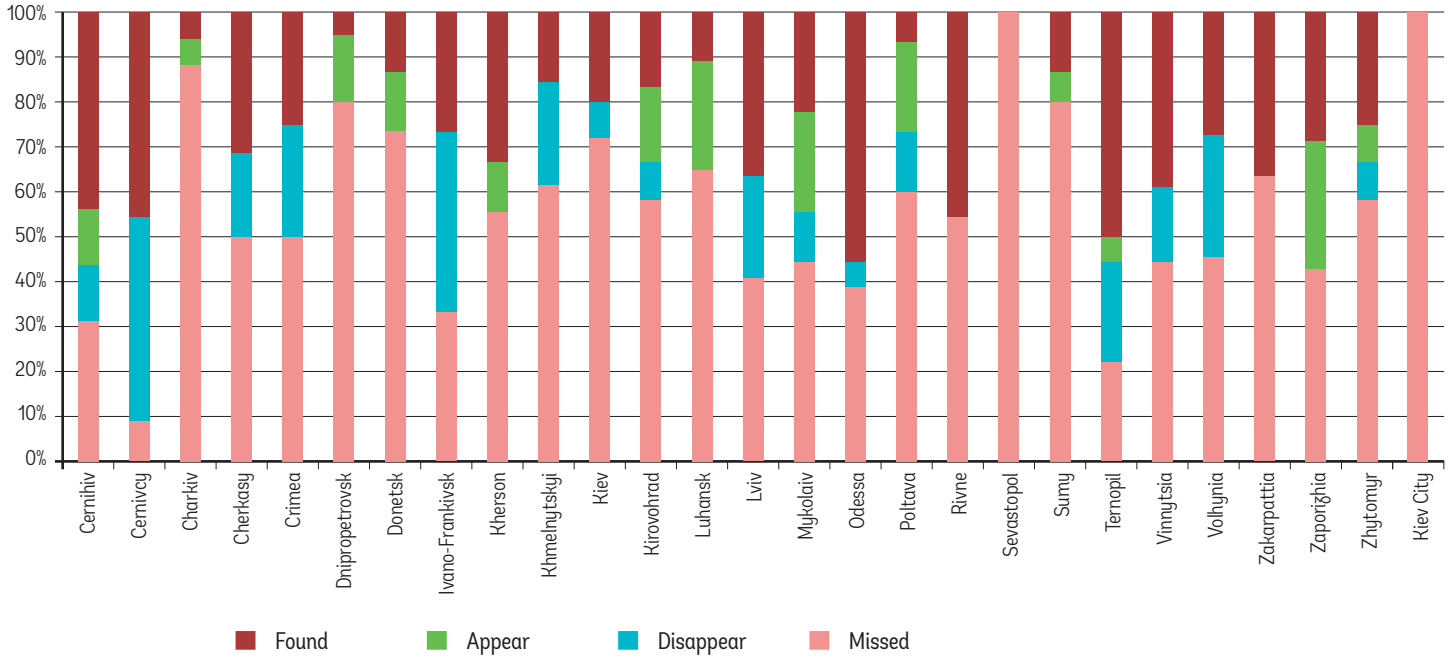
Source: Ukraine Statistics Department

Figure 47 – Distribution of found, appear, disappear, and missed cities by geographic location (2013)



Source: Ukraine Statistics Department

Figure 48 – Distribution of found, appear, disappear, and missed cities (2013)



Source: Ukraine Statistics Department

Second typology of Ukrainian cities using NLs: identifying growing and declining cities

A second city typology classified cities across two dimensions – change in their NLs urban footprint and change in their NLs intensity – as a proxy of economic activity.[79] NLs data was used to assess whether economic activity was increasing or decreasing, as well as to determine whether a city's footprint was growing or shrinking in area. These two dimensions make the analysis using NLs unique and were the basis for a second typology of cities. For this typology, a city's "baseline" footprint and light intensity was compared to that of a following analyzed year. In this case the comparison was made between 1996 (T0) to 2010 (T1)[80]. The typologies were built as described in BOX 8, and cities were classified according to the following types:

Type 1 cities (in BLUE) are cities presenting a thriving urban core (growing light intensity) and growing urban footprint.

Type 2 cities (in GREEN) are cities presenting a dimming urban core (declining light intensity) and shrinking urban footprint.

Type 3 cities (in BLACK) are cities presenting a dimming urban core and expanding urban footprint.

Type 4 cities (in RED) are cities presenting a thriving urban core and shrinking urban footprint[81].

BOX 8 – A SECOND TYPOLOGY OF UKRAINE'S CITIES

The second typology was calculated by looking at the combination of light intensity change and urban footprint area change for each city, as explained below, between 1996 and 2010:

- Urban footprint area change corresponds to the change in area of what is considered the urban footprint by NLs standards in T0 against what is considered the area of urban footprint in T1. Area Change is estimated as (B – A) / A.

- Intensity change refers to the change in brightness in the urban core (footprint in T0) between these two years. Intensive change is estimated as Y – A.

CITY FOOTPRINT (1996 - 2010)

	T0NTL	T1NTL
T0footprint	A	Y
T1footprint	Z	B

The columns represent the summed nighttime lights values for the identified footprint

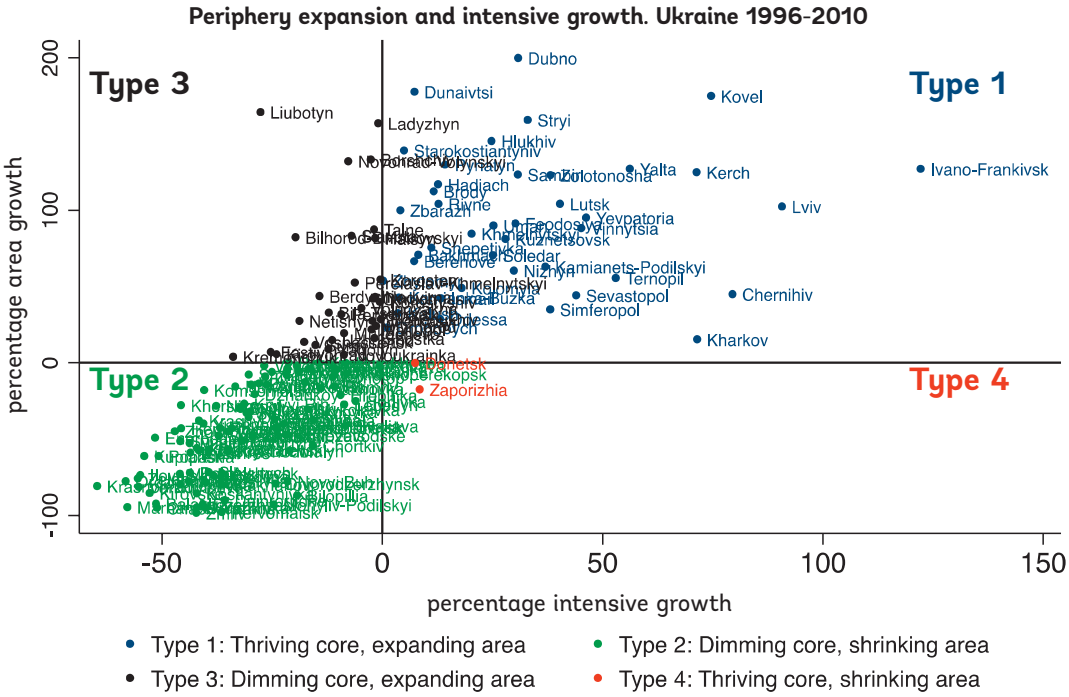
[79] A third dimension is determined by "extensive growth," which measures the growth of lights in the periphery. It is calculated by establishing the periphery as the portion of the urban footprint that exists in the second period but did not exist in the first, and then comparing the amount of light emitted by this periphery in both periods. This interpretation, however, is a little less intuitive for the case of shrinking cities, in which the periphery is disappearing as the city shrinks. An analysis employing this fourth dimension can be found in Annex VI.

[80] Two years of NLs are required to do this analysis, so cities classified as Disappear, Missed, and Appear are excluded from it.

[81] This type only includes two cities: Donetsk and Zaporizhia. Thus, the section abstains from drawing strong conclusions about this type since they would only be based upon two observations.

There is a strong positive correlation between area growth and intensive growth, which is exactly what the second typology intends to capture (See Figure 49). A strong correlation means that in most cases when economic activity increased in the city's core, cities also tended to grow in area or that when economic activity decreased in the city's core, cities also tended to shrink in area. The first case, corresponding to Type 1 cities, are cities that are both growing in area and in the amount of lights emitted by their cores. Again, this implies a thriving core and a spillover effect that leads to a growing periphery. The second case, corresponding to Type 2 cities, are those which have a core with dimming NLs intensity and a shrinking urban NLs footprint. For Type 2 cities, not only are NLs values in the city's core declining, but their area is also shrinking; i.e., in 2010 some of the urban footprint no longer has NLs above the urban threshold. The positive correlation is not observed in Type 3 cities, which present a decrease in NLs activity in the core of the city, but an expansion of this activity in the new surrounding areas. This is a sign of sprawl, but also of a growing importance of areas that previously were considered urban by NLs standards. Finally, Type 4 cities show a densification of its economic activity, represented by a thriving core, in terms of night lights, but a shrinking NLs footprint. Table 9 presents summary statistics for each city type. Annex V presents the full list of Ukrainian cities classified according to this typology.

Figure 49 – Changes in NLs urban footprint vs. changes in NLs intensity in the urban core



Type 1 cities – with a thriving core and expanding urban footprint – are on average larger, declining less in population terms, and more productive than other types. They have on average 176,300 inhabitants and although – on average – they are still experiencing demographic decline, their decline is the lowest compared to the other types. They present also the highest levels of economic activity per capita, as measured by night lights divided by the city population, suggesting that these cities are most productive. Once more, recall that night lights are used to determine typologies, but that they also portray economic activity to some extent. In addition, these cities have a higher average total economic growth (585 percent), captured by night lights data than the rest suggesting that these cities are the true growth engines in the country. However, the simultaneous growth of the urban footprint with the observed demographic decline suggests that these cities are sprawling[82]. Examples of Type 1 cities are: Odessa, Lutsk, Kyiv, Kharkiv, and Lviv. Around 22 percent of cities in Ukraine fall under this type.

[82] Sprawling is a hypothesis based on the growth of the urban footprint despite population decline. However, the NLs footprints do not correspond to the city's boundaries and therefore population data might not correspond to the population living inside the urban footprint defined through NLs.

Type 2 cities are, on the contrary, declining in all aspects – with decreasing economic activity - as captured by night lights in both the core and the periphery – a shrinking urban footprint, and declining population. These cities are smaller than thriving Type 1 cities; their average population is 54,000 inhabitants. In addition to experiencing a decline in economic activity, these cities present a sharp decline in population – with 0.54 percent annual decline on average – and have lowers levels of productivity than thriving Type 1 cities measured by NLs per capita. Examples of a Type 2 city are: Dnipropetrovsk, Hirnyk, and Kramatorsk. The majority of cities in Ukraine (53 percent) fall under this type.

Table 9 – Typology of cities based on NLs observations between 1996 and 2010: selected statistics

	Growing area	**Shrinking area**
+ Intensity growth	**Type 1: Thriving core, expanding area**	**Type 4: Thriving core, shrinking area**[44]
	Mean (Std dev)	Mean (Std dev)
Population 2013 (000s)	176.3 (411.1)	861 (129)
Average annual population growth (1989-2013)	-0.20 % (.477)	-0.59% (0.041)
Total NLs value (000s of NLs units) in 2010.	13.49 (37.01)	69.11 (44.80)
NLs per capita (000s of NLs units) (2010)	0.065 (.062)	0.077 (0.048)
NLs growth (% Growth of NLs units) (1996-2010)	321% (4.36) Examples: Odessa, Lutsk, Kyiv, Kharkiv, Lviv	142.6% (1.23) Examples: Donetsk, Zaporizhia
- Intensity growth	**Type 3: Dimming core, expanding area**	**Type 2: Dimming core, shrinking area**
	Mean (Std dev)	Mean (Std dev)
Population 2013 (000s)	49.1 (80.4)	54.0 (115.3)
Average annual population growth (1989-2013)	-0.56% (.584)	-0.57% (.541)
Total NLs value (000s of NLs units) in 2010.	2.62 (5.89)	2.72 (8.68)
NLs per capita (000s of NLs units) (2010)	0.032 (.069)	0.043 (.102)
NLs growth (% Growth of NLs units) (1996-2010)	142% (.056) Examples: Mykolaiv, Sumy, Kirovohrad	-15400% (314) Examples: Dnipropetrovsk, Hirnyk, Kramatorsk.

[83] Only one city, Donetsk, located in the oblast of the same name, is not in this typology as it presents a negative area change and a positive intensity growth.

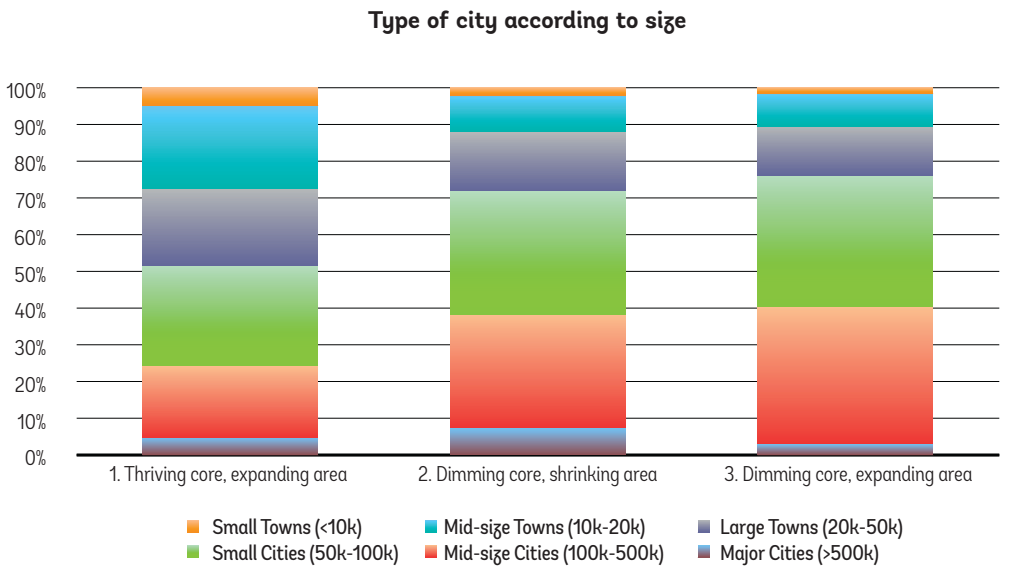
[84] This type only includes two cities: Donetsk and Zaporizhia. Thus, the section abstains from drawing strong conclusions about this type since they would only be based upon two observations.

Type 3 cities, which represent a dimming core and an expanding NLs footprint, have experienced the fastest population decline and present the lowest levels of productivity. These cities show a 0.63 percent annual population decline on average (while numerically close, the statistical impact of this rate is significantly lower than that observed in cities of Type 2). The growth of the urban footprint accompanied by the observed demographic decline suggests that these cities are sprawling. Examples are Mykolaiv, Sumy, and Kirovohrad. Approximately 24 percent of cities in Ukraine fall under this type.

There are only two cities in the final category of Type 4 cities: Donetsk and Zaporizhia. These cities are historically large cities that have recently seen their footprint shrink. At the same time, economic activity, as captured by night lights data, has increased in the core. This suggests a densification of economic activity. Despite showing declining population, this densification could induce agglomeration economies that further improve their economic performance.

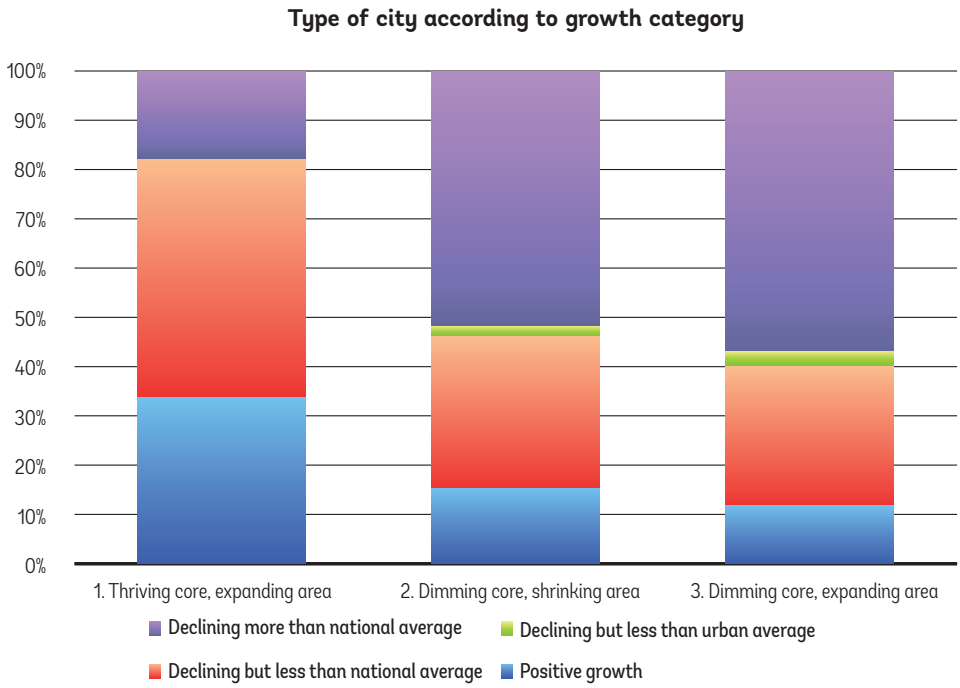
There are important demographic and economic differences captured by this second typology. Table 9 shows the averages of indicators for each city type. The differences suggest that the combination of night light intensity and growth that determine this second typology may also correspond to its population and economic dynamics. Figure 50 shows that the distribution of city sizes is different between types. Type 1 cities are overall larger, while Type 2 has the largest share of small towns. The dynamics among the types also vary. Figure 51 shows that Type 1 cities have more cities with positive growth, while many Type 2 and Type 3 cities are declining in population more than even the national average.

Figure 50 – The distribution of city sizes varies across types in the second typology; type 1 cities are overall larger[85]



[85] Type 4 is excluded as it has only two cities, Donetsk and Zaporizhia. However, both are major cities.

Figure 51 – The distribution of cities by economic growth varies across types in the second typology; type 1 cities have more cities with positive growth[86]



The characteristics used to identify this second typology also have a strong relationship to population dynamics. Figure 52 shows that almost all Type 2 cities are experiencing negative population growth as well as negative area growth. The other two types are split between negative and positive population growth, meaning that some cities continue to expand in area despite their population decline. Similarly, Figure 52 shows that cities of Type 2 show overall negative growth in intensity[87] and negative growth in population.

The other two types are split between positive and negative population growths. Figure 52 and Figure 53 show that a classification based on NLs groups cities into meaningful clusters in the sense that they also share some demographic characteristics. Overall, the shrinking footprints imply a loss of population. However, in some cases there could be population loss despite increases in area (in Types 1 and 2), which suggests a sort of sprawling; this dynamic affects a fairly large number of cities. Similarly, although a minority, some cities show population growth accompanied by a decline in economic activity in the core as measured by reduced intensity growth, as well as some cities that present population decline with a significant increase in the light emitted at the core (mainly cities of Type 1). In the later, shrinking does not seem to come at the expense of economic growth. One possible explanation for this is that the city was oversized and is moving towards a new population equilibrium (lower population) that is linked to lower congestion costs which in turn lead to an increased productivity.

[86] Type 4 is excluded as it has only two cities, Donetsk and Zaporizhia. Both are in the growth category of declining but less than national average.

[87] Recall that growth in night lights intensity tends to also reflect growth in intensity of economic activity in the city.

Figure 52 – The distribution of cities by economic growth varies across types in the second typology; type 1 cities have more cities with positive growth

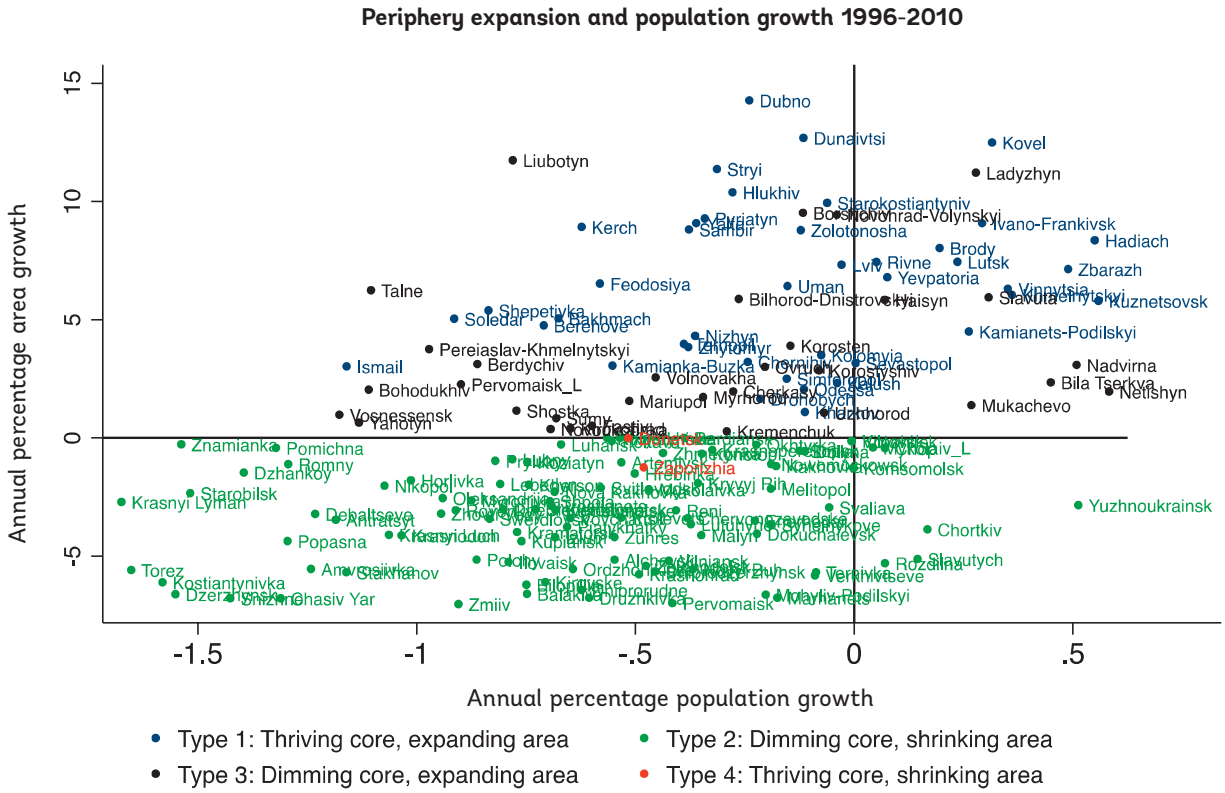
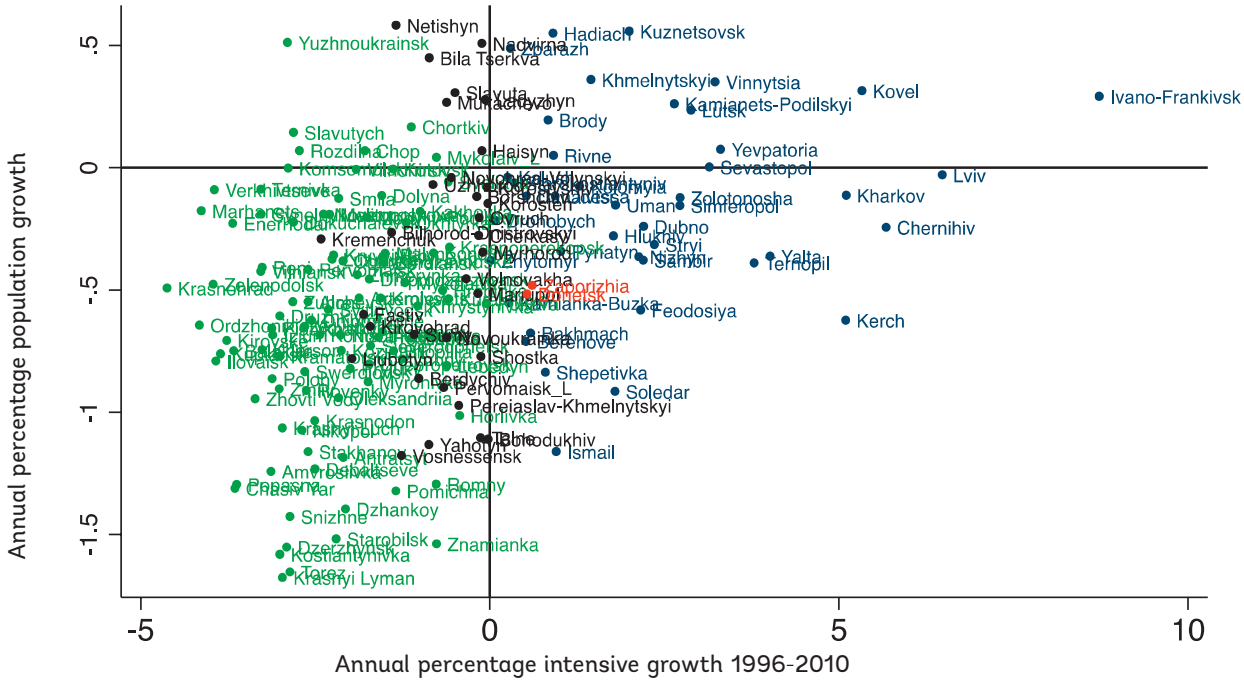
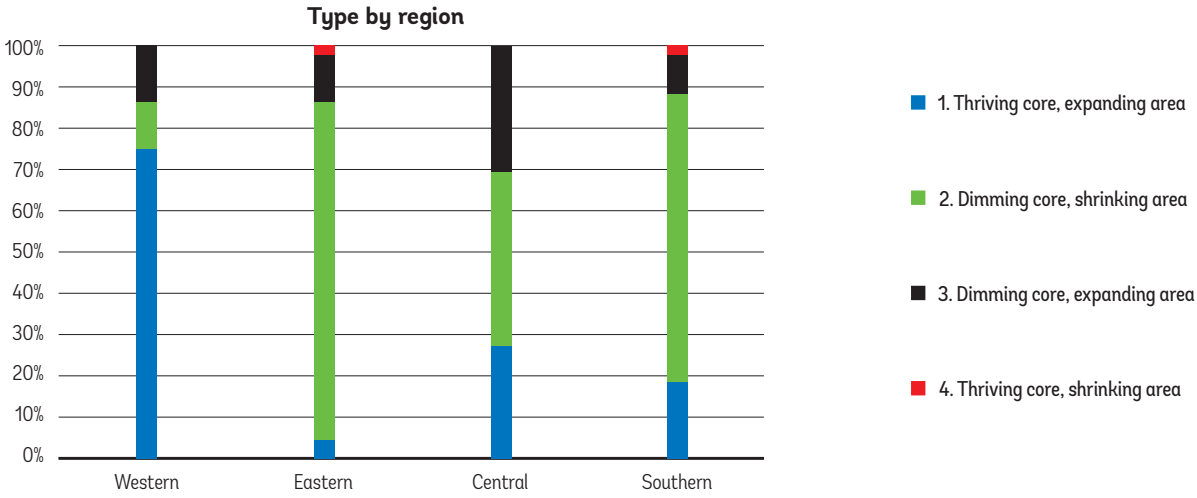


Figure 53 – Intensity of night lights has a strong relationship to population dynamics



As expected, the second city typology also reveals differences in the distribution of city types across regions (Figure 54). While 76 percent of the Western region's cities are thriving (Type 1), only 7 percent of Eastern region cities can be classified as such. In contrast, 81 percent of the Eastern region's cities are in the Type 2 category. The southern region also has many cities in that category, and has the least Type 3 cities. The Central region has the largest share of Type 3 cities, where economic activity is declining in the core but growth is occurring in the urban footprint.

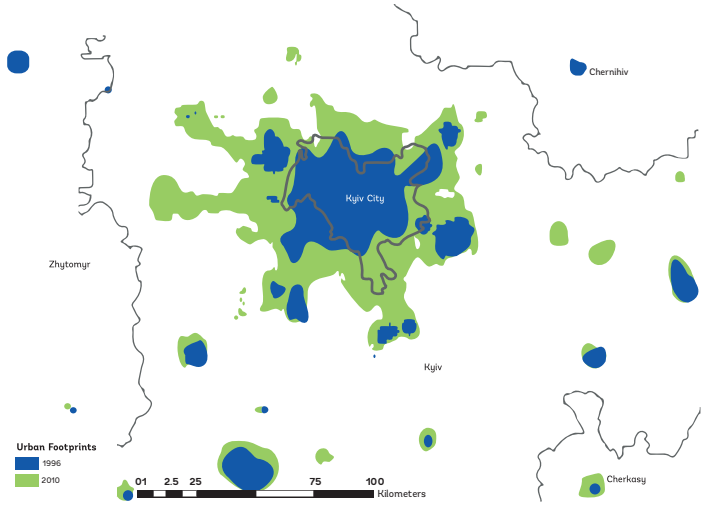
Figure 54 – The distribution of types of cities varies by region;the western region has the majority of thriving (type 1) cities[88]



Agglomerations: important engines of growth

Agglomerations – groupings of individual cities that function as a single city due to the proximity of and interaction between their housing, labor, and commercial markets and whose NLs footprints merge – are considered as one urban entity under the NLs analysis. In total, Ukraine has 23 agglomerations that are composed of 79 cities, an average of four cities per agglomeration. The figure below presents Kyiv's agglomeration and the growth of its NL urban footprint from 1996 until 2010. As can be seen, some cities that were separate cities surrounding Kyiv in 1996 merged to produce a single urban footprint by 2010. Table 10 below presents the full list of Ukraine's agglomerations and their respective population totals.

Figure 55 – Kyiv's agglomeration 1996-2010



88 Type 4 has only two cities, Donetsk and Zaporizhia. Donetsk is in the Eastern region, while Zaporizhia is in the Southern region.

Table 10 – Ukraine's agglomerations: merged NL urban footprints (2013)

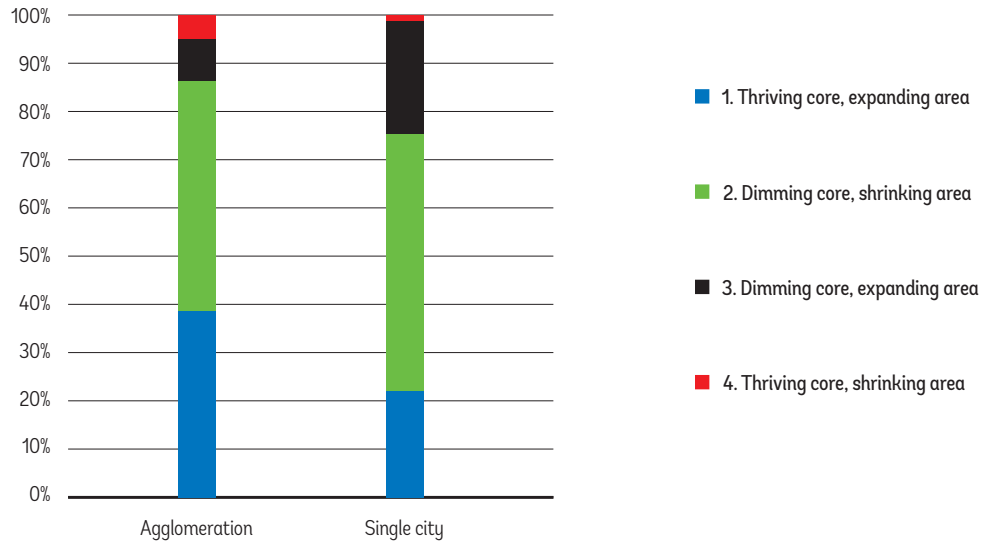
Main City	Oblast	Cities in Agglomeration	Population of agglomeration 2013e
Kyiv	Kyiv	9	3171830
Kharkiv	Charkiv	6	1620930
Donetsk	Donetsk	8	1506200
Odessa	Odessa	2	1074570
Dnipropetrovsk	Dnipropetrovsk	2	1017250
Lviv	Lviv	4	765901
Luhansk	Luhansk	2	432483
Sevastopol	Sevastopol	2	354565
Horlivka	Donetsk	1	353497
Dniprodzerzhynsk	Dnipropetrovsk	2	351950
Cherkasy	Cherkasy	2	303168
Kramatorsk	Donetsk	4	297665
Sieverodonetsk	Luhansk	4	281903
Rivne	Rivne	2	274902
Ivano-Frankivsk	Ivano-Frankivsk	1	235515
Lutsk	Volhynia	2	234147
Drohobych	Lviv	4	162527
Alchevsk	Luhansk	3	144807
Stakhanov	Luhansk	3	139474
Krasnoarmiysk	Donetsk	3	125239
Krasnodon	Luhansk	2	65344
Nova Kakhovka	Kherson	2	58853
Debaltseve	Donetsk	2	38126

Agglomerations are particularly important engines of growth. 43 percent of Ukraine's agglomerations experienced positive economic growth according to NLs data compared to only 22 percent of individual cities. Total production (as measured by total NLs in the urban footprint) of agglomerations was 14 times higher - on average – than that of individual cities. Part of this is of course due to their relative greater scale. However, labor productivity (measured by NLs per capita) is also much higher on average (17 percent higher in agglomerations than in individual cities) with a significant difference between the means; and spatial productivity (measured by NLS by km2) is also higher (100 percent higher in agglomerations relative to individual cities). All of these differences are statistically significant. Additionally, almost all urban economic growth – as measured by total NLs – is concentrated in the growing agglomerations, suggesting they are the true engines of growth in the country. Kyiv, Kharkiv, Donetsk, and Lviv are the fastest growing agglomerations of NLs; Dniprodzerzhynsk, Dnipropetrovsk, and Kramatorsk are the fastest declining.

There is also a close correlation between agglomerations and types of cities (See Figure 56). 40 percent of agglomerations are Type 1, as opposed to 22 percent of individual cities. By contrast, cities are more likely to be classified as Type 3, i.e., dimming and expanding, if they are individual cities: nine percent of agglomerations are Type 3, while 24 percent of individual cities are. Type 2 cities are a little more evenly distributed (50 percent of agglomerations and 53 percent of individual cities). Of the two cities categorized as Type 4, Donetsk is an agglomeration. Consequently, in this case, the analysis utilizing night lights data strongly supports the conclusions made in Section 2 that agglomerations are the country's centers of growth.

Figure 56 – Distribution of agglomerations and individual cities by city type; agglomerations are disproportionately thriving (type 1)[89]

Type of city for individual cities and cities that belong to an agglomeration



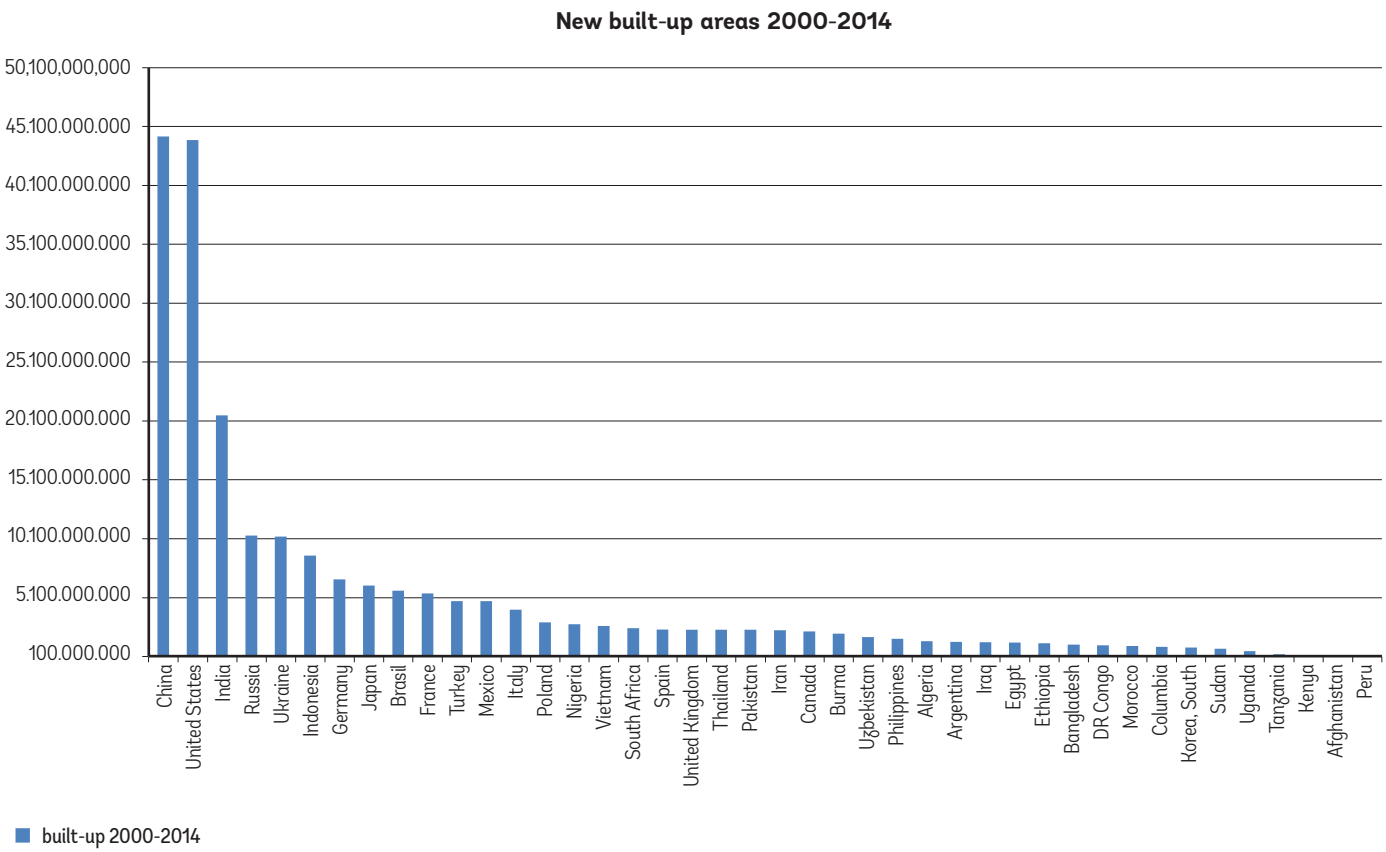
[89] Type 4 has only two cities, Donetsk and Zaporizhia. Donetsk is part of an agglomeration (it is also its main city); Zaporizhia is an individual city.

Built-up areas

Built-up areas are another spatial measure of economic growth of great importance. These areas indicate the presence of population and corresponding economic activity, although the dynamics of built-up areas may not follow these others. For example, since built residences and infrastructure is durable, it can remain even after population has declined. Similarly, policies that support building could increase the observed built-up area, while the same area sees its economic activity move away.

Ukraine has shown a large increase in built-up areas despite its population decline. The Global Human Settlement Layer, developed by the GLOB-HS and E-URBAN teams, provides accurate measurements of built-up areas. Based on this data, Table 11 shows information on built-up areas for the 40 countries with the highest increases over the last 40 years. Ukraine ranks 5th, with 76,202 square kilometers added to the built-up area foundation. This is striking, given that during the same period the country experienced negative population growth; in fact, Ukraine and Romania are the only two countries in this ranking that registered negative population growth. As a consequence, Ukraine presents the highest rate of built-up area per person. Some of the policies that motivated the building of homes during the Soviet era have been previously discussed in Section 2, but the growth of these built-up areas in Ukraine continued after independence. This is demonstrated by the fact that Ukraine occupies 4th in the world in producing new built-up areas over the last 15 years (See Figure 57)

Figure 57 – Ukraine is 4th in absolute number of new built-up areas over the last 15 years



Source: Global Human Settlements Layer – European Commission

This striking growth in construction could represent a response to the lifting of long-standing limitations on construction as well as a strong focus of household investments in the real estate sector. Current economic trends (Figure 58) do not seem to justify the strong growth in built-up areas, suggesting that this growth is happening as a consequence of institutional changes and current policies. Several characteristics of the Ukrainian housing market are relevant here. First, the many restrictions on construction that existed during the Soviet era prevented Ukrainians from having access to a wider array of housing choices. Despite high urbanization levels, many families still shared residences at the beginning of the 1990s. Construction followed the elimination of many of these restrictions, which included limitations on the size of structures built in rural areas, on construction of new urban residential units outside of the cooperative system, and on construction of commercial buildings. Second, the influx of remittances provided a new source of capital to finance new housing projects to meet public demand. Finally, with a local financial sector that does not provide abundant investment opportunities, real estate has been the main sector of investment or households in Ukraine. This reality further motivated residential and commercial construction.[90]

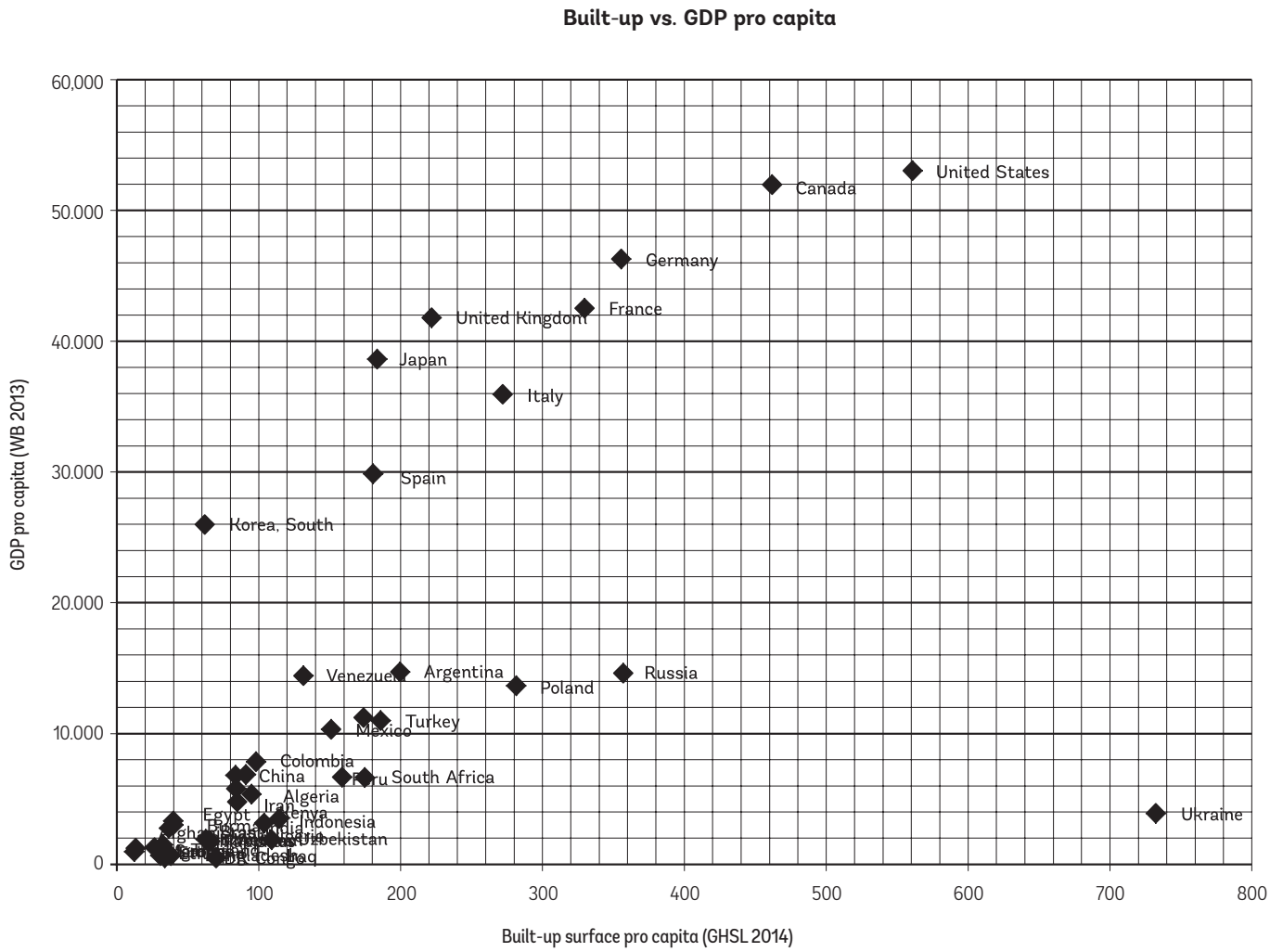
Table 11 – Top global increment of built-up last 40 years

Country	GHSL built-up areas (sq km)					WB population (millions of persons)					BU surface per capita (m^2/person)			
	1975	1990	2000	2014	2014-1975	1975	1990	2000	2013	2013-1975	1975	1990	2000	2004
United States	66,522	93,653	128,794	171,857	**105,335**	215.97	249.62	282.16	316.13	100.16	*308.0*	*375.2*	*456.5*	*543.6*
China	33,580	47,251	66,370	109,782	**76,202**	916.40	1135.19	1262.65	1357.38	440.99	*36.6*	*41.6*	*52.6*	*80.9*
India	10,176	14,051	19,285	39,898	**29,722**	622.23	868.89	1042.26	1252.14	629.91	*16.4*	*16.2*	*18.5*	*31.9*
Russian Federation	21,139	29,997	40,147	50,479	**29,340**	134.20	148.29	146.60	143.50	9.30	*157.5*	*202.3*	*273.9*	*351.8*
Ukraine	12,018	16,367	22,937	33,239	**21,222**	48.76	51.89	49.18	45.49	-3.27	*246.5*	*315.4*	*466.4*	*730.7*
Germany	11,875	16,423	21,983	28,633	**16,758**	78.67	79.43	82.21	80.62	1.95	*150.9*	*206.8*	*267.4*	*355.2*
Brazil	16,797	19,950	27,572	33,159	**16,362**	108.22	149.65	174.50	200.36	92.14	*155.2*	*133.3*	*158.0*	*165.5*
Indonesia	11,532	14,078	18,789	27,218	**15,686**	129.21	178.63	208.94	249.87	120.66	*89.3*	*78.8*	*89.9*	*108.9*
France	8,245	11,714	15,894	21,256	**13,020**	54.03	58.41	60.91	66.03	12.00	*152.6*	*200.5*	*260.9*	*322.1*
Japan	9,335	12,483	16,294	22,106	**12,771**	111.94	123.54	126.87	127.34	15.40	*83.4*	*101.0*	*128.4*	*173.6*
Mexico	6,343	9,350	13,295	18,047	**11,704**	61.71	86.08	103.87	122.33	60.62	*102.8*	*108.6*	*128.0*	*147.5*
Italy	5,826	8,333	11,568	15,533	**9,707**	55.44	56.72	56.94	59.83	4.39	*105.1*	*146.9*	*203.2*	*259.6*
Turkey	4,250	6,155	8,831	13,540	**9,290**	39.19	53.99	63.17	74.93	35.75	*108.5*	*114.0*	*139.8*	*180.7*
Canada	6,756	9,522	13,146	15,317	**8,560**	23.21	27.79	30.77	35.16	11.95	*291.1*	*342.6*	*427.2*	*435.6*
Australia	6,306	8,882	12,257	14,605	**8,299**	13.89	17.07	19.15	23.13	9.24	*453.9*	*520.5*	*639.9*	*631.4*
Romania	4,265	5,762	8,093	12,559	**8,293**	21.29	23.20	22.44	19.96	-1.33	*200.3*	*248.3*	*360.6*	*629.1*
United Kingdom	6,648	8,864	11,436	13,813	**7,165**	56.23	57.25	58.89	64.10	7.87	*118.2*	*154.8*	*194.2*	*215.5*
Poland	3,740	5,516	7,740	10,743	**7,004**	34.02	38.11	38.26	38.53	4.52	*109.9*	*144.7*	*202.3*	*278.8*
South Africa	3,321	4,819	6,457	8,969	**5,648**	24.73	35.20	44.00	52.98	28.25	*134.3*	*136.9*	*146.8*	*169.3*
Spain	2,902	4,059	5,661	7,972	**5,071**	35.53	38.85	40.26	46.65	11.12	*81.7*	*104.5*	*140.6*	*170.9*
Nigeria	1,893	2,769	3,830	6,615	**4,723**	63.57	95.62	122.88	173.62	110.05	*29.8*	*29.0*	*31.2*	*38.1*
Argentina	3,471	4,849	6,532	7,885	**4,414**	26.07	32.62	36.90	41.45	15.38	*133.1*	*148.6*	*177.0*	*190.2*

Source: Global Human Settlements Layer – European Commission

[90] Monitoring of Execution of the Master Scheme of Territorial Development of Ukraine (Law).

Figure 58 – Prosperity is not pushing the massive addition of built-up areas in Ukraine



Source: Global Human Settlements Layer – European Commission

Key messages and implications for further policy and analytical work

Ukrainian cities are important engines of economic growth. Not only is urban sector production much greater than rural production in absolute terms, it is also much more productive per capita. Agglomeration economies have yielded higher productivity as cities offer settings for firms and workers to take advantage of sharing, matching, and learning mechanisms. Firm-level data showed that larger cities attracted more firms and cities with higher population density hosted more productive firms.

Nightlights (NLs) patterns exhibited by cities are also quite different across Ukraine's regions, with a noticeable shift of NLs growth from East to West. Urban footprints captured by NLs are growing rapidly in the West while they are either declining or growing significantly slower in the East. One possible explanation is the stronger growth of the urban sector in the West (Western and Central regions) relative to 1996 levels. The East (Eastern and Southern regions), while starting at a higher level of urbanization, has further urbanized more slowly, resulting in a slower growth of NLs. Similar dynamics show up in the first city typology[91] of NLs urban footprints and city location dynamics.

The Eastern region has the highest number of Disappearing cities, followed by the Central and Southern regions. By contrast, the Western region had the most Appearing cities, followed by the Central region.

Cities that increase in brightness and expand in footprint are on average performing better in other indicators (i.e., population decline, total economic activity and productivity). These cities (Type 1) have significantly lower declines in population and higher concentrations of economic activity as measured by light emissions per capita as well as rate of growth. The majority of the largest cities of the country are Type 1. Among the cities whose core is declining in night lights, results are mixed. Those with expanding footprints (Type 3) seem to be growing more rapidly in economic terms. However, they are also losing population more rapidly than those cities that have a dimming core and whose footprint is shrinking (Type 2). Only two cities comprise Type 4. These are large cities that, despite losing population, present growing economic activity.

Built-up areas in Ukraine have grown significantly, at a pace that does not seem to correspond to economic or demographic indicators. Despite its decline in population, Ukraine ranked 4th globally - in terms of growth of built-up area - over the past 15 years. Consequently, it presents the highest rate of new built-area per person. These trends are most likely a result of long-suppressed housing demand that motivated construction upon the lifting of Soviet-era construction limitations, as well as a result of a strong focus of household investments in the real estate sector.

Finally, agglomerations are particularly important engines of economic growth in the country. Agglomerations constitute a majority of the few urban centers that are actually growing in population in Ukraine. In addition, according to NLs measurements, agglomerations are more productive in both per capita and per km^2 terms. There are also close correlations between agglomerations types of cities (for example, all major cities are in the Found category), and more agglomerations are thriving and growing (Type 1 in the second city typology).

Going forward Ukraine should recognize the role of urban areas in economic growth and make sure that they count with the right tools to reach their full potential. To achieve increased productivity in urban centers, the right mix of good governance, a beneficial business climate, and an efficient provision of public goods, usually in the form of public services and infrastructure is necessary so that agglomeration economies are fostered and congestion costs reduced. In urban areas experiencing population growth, cities will to focus on adapting infrastructure and services making sure that new-comers are well absorbed and integrated in the city; manage peri-urban growth to avoid sprawl, etc. In addition, the realignment of city boundaries or introduction of metropolitan governance mechanisms might be needed to achieve an effective coordination of agglomerations which span across administrative units. This is particularly important in the case of public transport. The country also needs to put in place the right policies to better manage urban population decline. As observed in this section an important number of cities – despite declining in population – continue to grow economically. This means that in these areas, shrinking is not necessarily coming at the expense of economic growth. While this might be a reflection of a temporal increase in productivity due to an increase in the capital per worker ratio - as observed at the national level – it might also be linked to a decline of congestion costs associated with the city moving towards a new population equilibrium. In these cases, city administrators should aim at managing population decline in an efficient and harmonious way making the best out of it (e.g. turning brownfields into public space, optimizing public transportation).

[91] The first typology of cities is defined based on whether cities emit enough light to be considered urban areas in the initial and subsequent years analyzed. The second typology based on the growth of the light emitted in the core of the city and whether the city's NLs footprint grew or shrank.

CHAPTER 2
Cities and the Inter-Governmental Fiscal System

Key Highlights and Implications for Further Policy and Analytical Work

Ukraine is undergoing a major reform of its inter-governmental fiscal system. Until 2014, the majority of fiscal revenues were not raised by city governments but came from retained shares of national taxes and transfers. The allocation of these transfers was largely based on the existing network of service facilities and staffing as opposed to the demand for services. The system of intergovernmental transfers has led to wide disparities across city types in per capita levels of expenditures per function. The highest per capita expenditures were observed in cities with declining core and periphery, and the lowest – in growing cities with expanding footprint. Such financial disincentives, combined with legal constraints on local government's discretion in downsizing the network of facilities and their staff, impeded fiscal adjustments necessitated by Ukraine's demographic and economic changes.

In December 2014, the Budget Code was significantly changed. As a result, the new equalization system will factor in per capita revenue levels and thus significantly decrease the disincentive that focuses on infrastructure need. Such re-design of the transfer mechanism would likely realign resources among local governments, channeling more resources to large and growing cities. Derivation-based sharing of revenues although partially mitigated with a new basic grant, will likely exacerbate the impact on shrinking cities. It will, however, improve the efficiency of spending. These changes are expected to improve fiscal autonomy and to better align public services with the need of local communities.

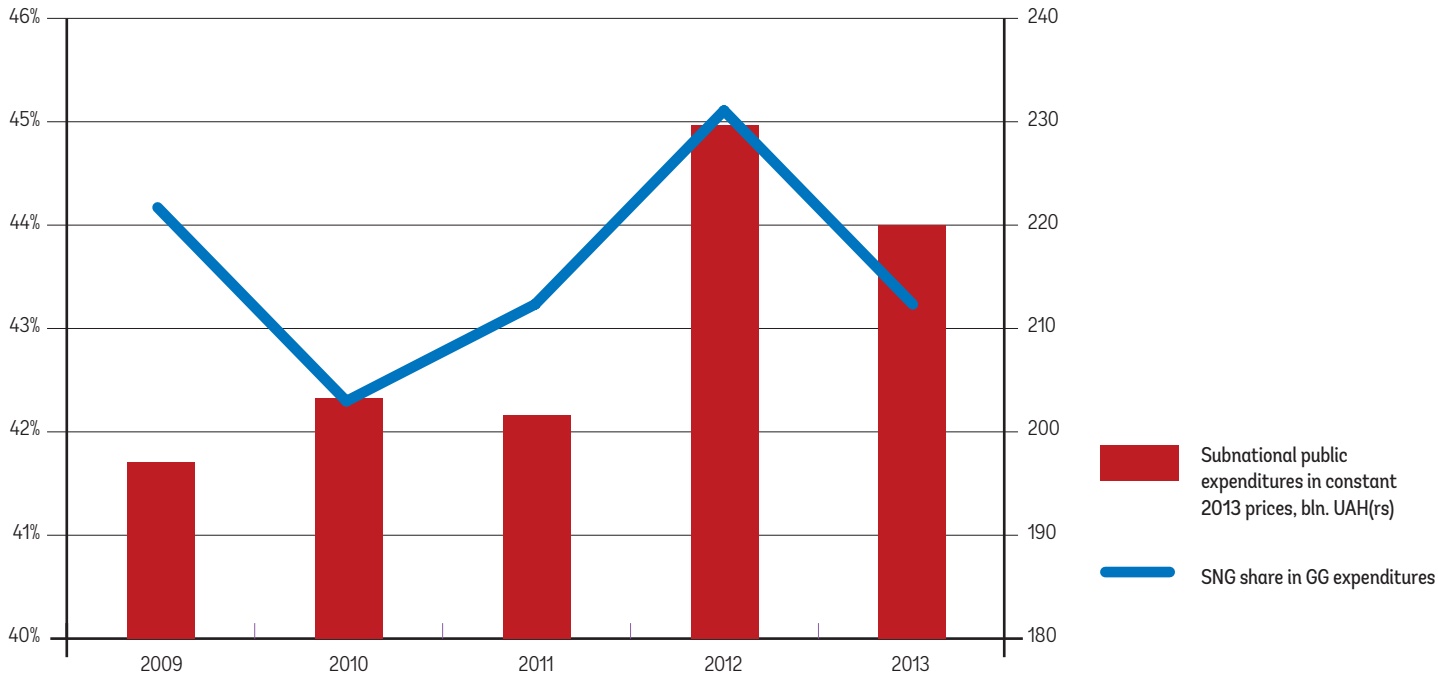
Going forward, in addition to operationalizing the new Budget Code, Ukraine's policy makers may rethink the structure of functional sub-national expenditure in view of changing demographics. So far, expenditures for education have been steadily increasing despite the rapidly aging population placing increasing demands on the health system. By earmarking new subventions separately for education and health, the new system can further entrench under-utilized social infrastructure. More generally, the focus of reforms in the short-term could be on increasing the yield of user fees and property taxes as a way to make cities assume their responsibility to collect own revenue. In the medium term, some of these taxes could be reassigned from national to the subnational level as a way to increase horizontal accountability of local officials to their residents as well as fiscal responsibility. Finally, addressing the fiscal fragmentation and amalgamating the bottom tier should remain a priority for the government as a way to improve fiscal efficiency in service provision.

I. The Inter-Governmental System

Ukraine is a unitary state with three tiers of sub-national government as presented in the introduction section of this study. Its current territorial division suffers from excessive fragmentation at the bottom tier. This is common in other post-Soviet countries, where local self-government was established in pursuit of greater democracy and local control rather than efficiency of public services. Given that local authorities bear responsibility for major social services, such as education and health care, the average locality's size of 1,400 residents at the lowest administrative level of government is too small to achieve the minimum efficient scale of provision[93]. Addressing the fiscal fragmentation issue has been attempted in several administrative-territorial reform proposals aimed at amalgamating the bottom-tier municipalities in order to increase their average size and reduce disparities in population size. However, none of those reforms has been fully implemented. The recently-adopted Law on Voluntary Amalgamation of Territorial Units, which is accompanied by new Budget Code provisions, is the first sound step towards re-starting such reforms, but it still has to be implemented.

About 70 percent of the national population resides in urban areas. This share is higher than the 50 percent average of the world's middle-income countries, but on par with the 70-percent average in Europe and Central Asia[94]. Of the total urban population, 27.5 million reside in cities while the remaining 3.8 million reside in town-lets. (The distinction between a city and a town-let designation is not entirely determined by population size as there are five town-lets with population over 15,000 people while at the same time almost a quarter of cities have populations under 10,000).

Figure 59 – Sub-national governments account for almost half of public expenditures[92]



92 Figures that do not include a source in this Chapter were developed by World Bank staff working on the report.

93 World Bank. 2008. Ukraine - Improving Intergovernmental Fiscal Relations and Public Health and Education Expenditure Policy: Selected Issues. Washington, DC: World Bank.

94 World Bank. 2014. World Development Indicators. Washington, DC: World Bank.

All local governments combined (at all three tiers covering both rural and urban settlements) account for almost half of total national public expenditures and are responsible for the majority of public expenditures on essential social services (see Figure 59 above). In particular, in 2013 sub-national governments accounted for 80 percent of public expenditures in health and 70 percent of public expenditures in education in 2013. In fact, the three social sectors (education, health care, and social welfare) accounted for over 80 percent of sub-national expenditures (See Figure 60 below). While showing some fluctuation from year to year, on average total sub-national expenditures have increased in real terms by 12 percent over 2009-2012. This is roughly proportional to Ukraine's GDP growth.

Figure 60 – Sub-national expenditures are dominated by the three social sectors

Given the sub-optimal size of local governments, it is not surprising that other studies have found under-utilized social infrastructure in Ukraine. Ukraine has one of the lowest student/teacher ratios in the world, combined with a low teaching load per teacher[95]. Similarly, more health care inputs (hospitals, beds, doctors, nurses, and non-medical staff) per 10,000 residents are used in Ukraine than in in the new EU member states and the EU countries in general; this dynamic is further aggravated by an inflated average length of stay in public health care facilities[96]. In addition to the fragmented territorial structure, the efficiency of service delivery is further undermined by demographic changes combined with legal constraints on local governments' discretion in closing health facilities and schools or firing personnel. Despite Ukraine's aging population, the structure of sub-national expenditure has not shifted from education to health care. In fact, sub-national expenditures on education have been steadily increasing from 4.5 percent of GDP in 2009 to 5 percent of GDP in 2013 (see Figure 61 above).

Sub-national governments have little authority to increase their revenues. The limited revenue rate- setting discretion that they have only applies to the short list of their own sources of local revenues, which accounts for only 10 percent of sub-national budgets. Over 80 percent of sub-national revenues come from retained shares of national taxes and other transfers (see Figure 62 below). While the sub-national revenues from all property taxes combined are on par with other countries in the region (0.78% of GDP in 2012), most funds for sub-national expenditure come from the national taxes on land and vehicles over which local governments have no rate-setting or collection authority. By contrast, taxation of structures (the only local property tax) generated less than 0.01% of GDP in both 2012 and 2013.

The low level of revenue autonomy at the sub-national level allows sub-national governments to avoid deprives the system of an appropriate level of accountability and fiscal responsibility for subnational governments. The heavy dependence on shared tax revenues and all other transfers from the national budget (see Figure 61) has stood at above 80 percent

[95] Id. World Bank. 2008.

[96] Ibid.

of total local revenues over the last five years. Even the City of Kyiv, the wealthiest local government, receives almost a quarter of its revenues in the form of grants from the national budget and another 40 percent from national taxes collected in its territory. It is not surprising to see that the steady increase in the total volume of grants over the years coincided with increasing expenditures on education despite a decline in school-age population. For other countries, Figure 63 below reveals high transfer dependence in countries where sub-national governments play a larger role in the provision of health care and education. Given that Ukraine's local governments play a larger share in the provision of social services, such as general education and health care, than most other countries in the region, such high transfer dependence is unavoidable.

Figure 61 – Composition of sub-national revenues, 2005-2012

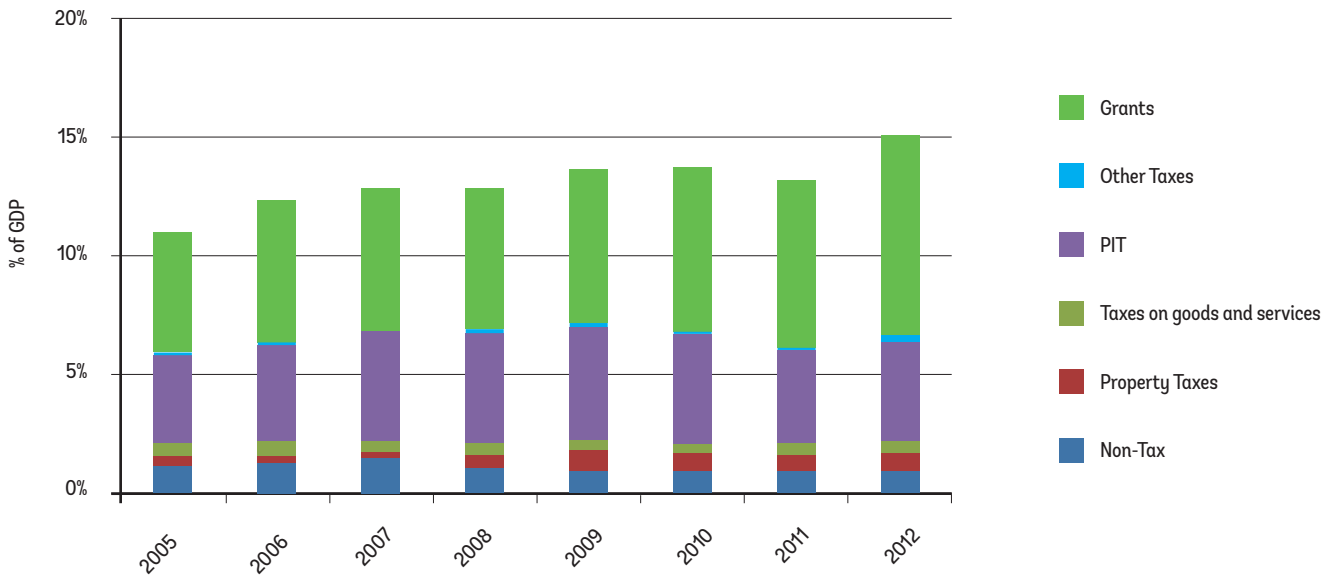
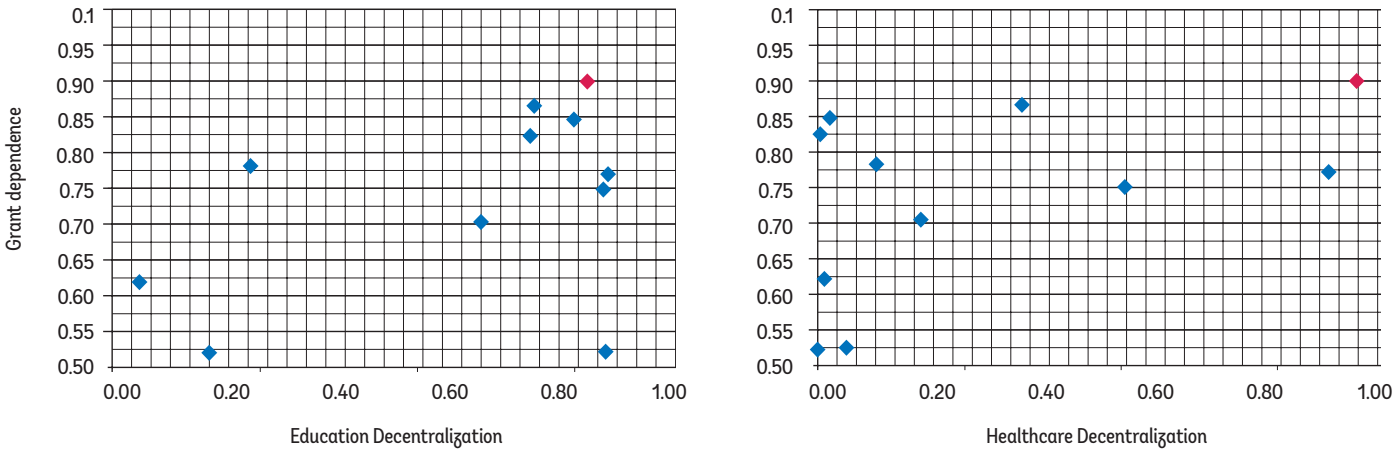


Figure 62 – Decentralization of social services is associated with transfer dependence



Note: Transfer dependence is measured by the share of total sub-national revenues accounted for by all kinds of transfers, including sharing of revenues from national taxes obtained at the source. In the case of Ukraine, transfers include all sub-national revenues except those from local taxes and non-tax sources.

To reinforce incentives for fiscally responsible behavior under such high transfer dependence, local government financing of its spending decisions—at least at the margin—becomes critical.[97] Additional spending should require raising additional tax revenue (rather than seeking higher transfers from the central government). A key problem with transfers is that the local governments receiving them are likely to perceive the additional funds as having a zero marginal cost to them in political and economic terms. In contrast, the use of local revenues is likely to make local governments face the real economic as well as political costs of obtaining and expending additional public funds, thus increasing fiscal responsibility and political accountability of local officials. In addition, financing local government expenditures via transfers can reduce the predictability of funds and therefore the ability of local governments to plan and budget; this is especially the case when the transfers are determined on an ad hoc basis, as in the case of additional grants described later in this chapter.

The Budget Code of Ukraine was significantly changed in December 2014. According to the explanatory notes accompanying the legislative amendments, one of the main objectives was to implement a new model of inter-governmental relations and strengthen the financial basis of local government. Thus, the amendments include a number of provisions to bring public services closer to their users, improve fiscal autonomy of local governments, and strengthen their local governments' financial independence.

Recent amendments to the Budget Code call for earmarked subventions to fund education and health care while revising the formula for equalization grants covering the remaining functions of sub-national governments.[98] Among other provisions, the amendments established a legal framework for financing amalgamated sub-national units. However, most of the amendments concerned the revenue side, reducing the share of revenues from the Personal Income Tax, and natural resource royalties previously decreed for sub-national budgets.

Inter-Governmental Structure

In Ukraine, the right to self-government is articulated in terms of "territorial communities," which do not have to coincide with the statistical definition of a settlement or administrative division. Local self-governance has been guaranteed beginning with the 1996 Constitution (Article 140) and the subsequent Law on Local Self-Governance in Ukraine adopted in 1997. Even in the case of cities, a unit of local self-government can include a bigger city and several other adjacent settlements.

In terms of fiscal analysis, however, Ukraine's governance features cities from all three tiers of sub-national government with different assignments of revenue sources and expenditure responsibilities. Thus, many subventions from the national budget are allocated only to the sub-oblast cities, which are mandated to fulfill the social entitlements for which these monies are earmarked. Equalization grants from the national budget only extend to the sub-oblast level, while for sub-district cities the equalization grants are allocated by their respective districts. As inter-governmental revenues – constituting the bulk of city revenues – are passed on to the 275 sub-district cities (out of a total of 458 cities reviewed in this study) by their respective districts, the analysis of patterns in city finances has to be placed within the context of Ukraine's overall system of inter-governmental relations.

In addition to the flow of inter-governmental revenues, the administrative status of a city also appears to be related to its demographic characteristics. There appears to be a close relationship between the 2001-13 annual percentage population decline and the administrative type of cities: the highest annual percentage population decline of 1.27% is observed in the bottom-tier cities and a lower rate of 0.47% is observed at the intermediate tier, while top-tier cities

[97] Thus revenue autonomy does not require that local governments control (i.e., determine bases and rates for) all their revenue sources. It would be sufficient if they could substantially increase or decrease rates for a few taxes accounting for a meaningful share of their revenues, while the rest continued to come from a predictable and stable sharing of national tax revenues. However, there would be little revenue autonomy achieved if any additional revenue from higher local taxes was almost entirely offset with reduction in grants from the central government.

[98] Adopted by the Parliament on December 28, 2014 and January 15, 2015.

experienced a positive growth of population over the same time period. In addition to higher rates of population decline, bottom-tier cities are characterized by having the smallest populations among the tiers as of 1989: more than half fell into the category of mid-size towns (10-20,000 residents), with the rest of bottom-tier cities equally split between the small town category (under 10,000 residents) and the large town category (between 20-50,000 residents). Therefore, the excessive territorial fragmentation of sub-national government is not entirely a rural problem, but might also lead to sub-optimal efficiencies in service provision in the bottom-tier cities.

Ukraine's previous system of inter-governmental fiscal relations was shaped by the adoption of the Budget Code in 2001. At that time, the main political impetus for change was the discontent and political pressure exercised by local governments in response to the poor management and alleged abuses by regional governments during the years of transition prior to the reform. Among other provisions, the 2001 Budget Code made distinctions between delegated and own responsibilities and provided different "revenue baskets" from revenue-sharing to ensure that enough funding was present to finance the delegated responsibilities. Nevertheless, the Budget Code allowed sub-national governments to spend any revenues from the delegated basket in any sector they wished as long as higher priority was given to the core ("protected") economic items.

As part of the reforms initiated with the adoption of the 2001 Budget Code, the non-transparent discretionary system of inter-governmental revenues was supposed to be replaced with a formula-driven equalization system. The major changes brought by the Budget Code included re-assignment of expenditure responsibilities among different levels of government; long-term assignment of revenues from national taxes to local budgets; formula-based calculation of equalization transfers; clear and transparent structure for the earmarked transfers; and delineation of conditions and limits on local borrowing. The equalization grant determination was expected to be based on objective, neutral criteria applying a uniform formula across the country to assess the revenue capacity and expenditure needs of sub-national units. That system still employed negative transfers for rich jurisdictions while increasing objectivity in the sub-national budget process and increasing budget predictability for local governments.

However, the predictability of the formula-driven system was compromised by a dozen new allocation factors that had been added to the formula over the years. Furthermore, the ad hoc nature of these changes entrenched inefficiencies by basing financing on characteristics of networks of local facilities and their staffing levels, thus implicitly financing the existing network of service facilities and staffing as opposed to funding an objectively-determined demand for services.

The recent amendments to the Budget Code attempt to move away from financing existing infrastructure. The new system of grants entirely disregards expenditure needs in the allocation of general-purpose grants, which are now called "basic grants" instead of "equalization grants" in the past. The new general-purpose grants only aim to equalize disparities in the revenues from the national PIT and CIT taxes that are decreed for local budgets on a derivation basis.

The recent amendments also encourage voluntary amalgamation of bottom-tier jurisdictions. A mechanism has been developed in the Budget Code amendments for moving amalgamated communities into direct inter-governmental fiscal relations with the national government, and granting them powers equivalent to those of sub-oblast-significant cities. Similar to previous arrangements with national government provided for oblasts, sub-oblast cities and raions, it will establish such direct inter-governmental fiscal relations also for amalgamated communities. The Government of Ukraine declared that such changes represent a starting point for a transition from a three-tier to a two-tier system of local self-government.

Functional Responsibilities

In the assignment of functional responsibilities to local governments, a distinction is made between so-called "own functions" versus "delegated or obligatory functions." Obligatory functions are mandatory for all local government units at the given level (see Table 12 below). "Own functions" include "hard" municipal services, such as local roads and transport infrastructure, municipal transit, solid waste management, housing, and utilities. While the Law on Local Self-Government does not differentiate functional responsibilities among types of cities, the Budget Code delegates responsibilities in an asymmetric way with a larger portion being delegated to the higher-tier cities (see Annex VII).

While the average city size of 60,000 residents makes it viable for an average city to provide major social services, including education and health care, almost a quarter of cities have fewer than 10,000 residents, which may be too small to achieve the minimum efficient scale of provision.[99] This is somewhat mitigated with the asymmetric delegation of expenditure responsibilities in the Budget Code (see Annex VII). Thus major social services – including education, health care, and social welfare – are mostly delegated to the top- and intermediate-tier cities, while bottom-tier cities are only responsible for pre-school education and cultural/recreational centers. However, even among the intermediate-tier cities there are four that have fewer than 10,000 inhabitants, indicating size alone isn't determinative of responsibilities.

There are legal constraints on local government discretion in closing or rationalization of social infrastructure. Thus, Article 26 of the Local Self-Government Law requires a local referendum to close a pre-school institution. Reportedly, local governments are also bound by physical norms, such as staffing levels and other inputs mandated on the basis of facility characteristics[100]. For example, the number of doctors is mandated based on the existing number of beds in health facilities, or non-teaching staff based on the number of square meters of a school. Under current law, these physical norms for decision-making have to be applied to the existing oversized and underutilized network of service facilities, rather than have such decisions based on the actual demand for services.

Recent amendments to the Budget Code assigned some additional expenditure responsibilities to sub-national governments. Expenditures for certain activities in social and cultural sectors were shifted to the oblast and local levels. Previously such responsibilities (and related facilities) were all funded from the State budget. Furthermore, now sub-national governments have to finance construction and maintenance of roads from the local budget; prior to 2015, they drew from the national Road Fund.

[99] A large number of empirical studies that have sought findings regarding economies of scale for local government services show that most economies of scale are exhausted for local governments with populations over 10,000 residents. Economies of scale means the average cost decreases as the volume of service provision increases; for example, per-student costs of education are lower in municipalities with more students.

[100] Id. World Bank. 2008.

Table 12 – Functional responsibilities

Function	Own Responsibilities	Delegated Responsibilities
General public services	Self-administration powers; municipal archives	None
Defense, public order and safety	Civic defense; municipal police	Residence registration; emergency response; permits for demonstrations and recreational events; administrative courts; civil registration
Economic affairs	Land use management; urban planning; construction and maintenance of local public roads; transit fares, routes and schedules; public parking; markets and fairs; licensing of outdoor advertising	Price control; consumer protection; investment promotion; identification of non-residential properties; enforcement of building and land codes; land titles
Environmental protection	Licensing the use of natural resources of local significance; preservation; solid waste management; local programs of environmental protection	Re-forestation; enforcement of waste management laws
Housing and communal services	Utility rates; public housing; water supply and sewage systems; residential fuel supply; upkeep of public spaces and landscaping; upkeep of cemeteries	Free housing for entitled individuals
Health	Maintenance of municipal institutions	Subsidized medicine and supplies
Recreation, culture, and religion	Maintenance of municipal institutions	Preservation of cultural and historical heritage
Education	Provision of general education; school transport; maintenance of municipal institutions	Free textbooks
Social welfare	Targeted assistance for disabled; municipal welfare programs; housing assistance for disabled, veterans and other entitled individuals; burial of indigent persons	Child protection; municipal and regional programs of labor protection and employment; long-term care

Source: Law of Ukraine on local self-government (no. 280/97-vr, articles 25-41)

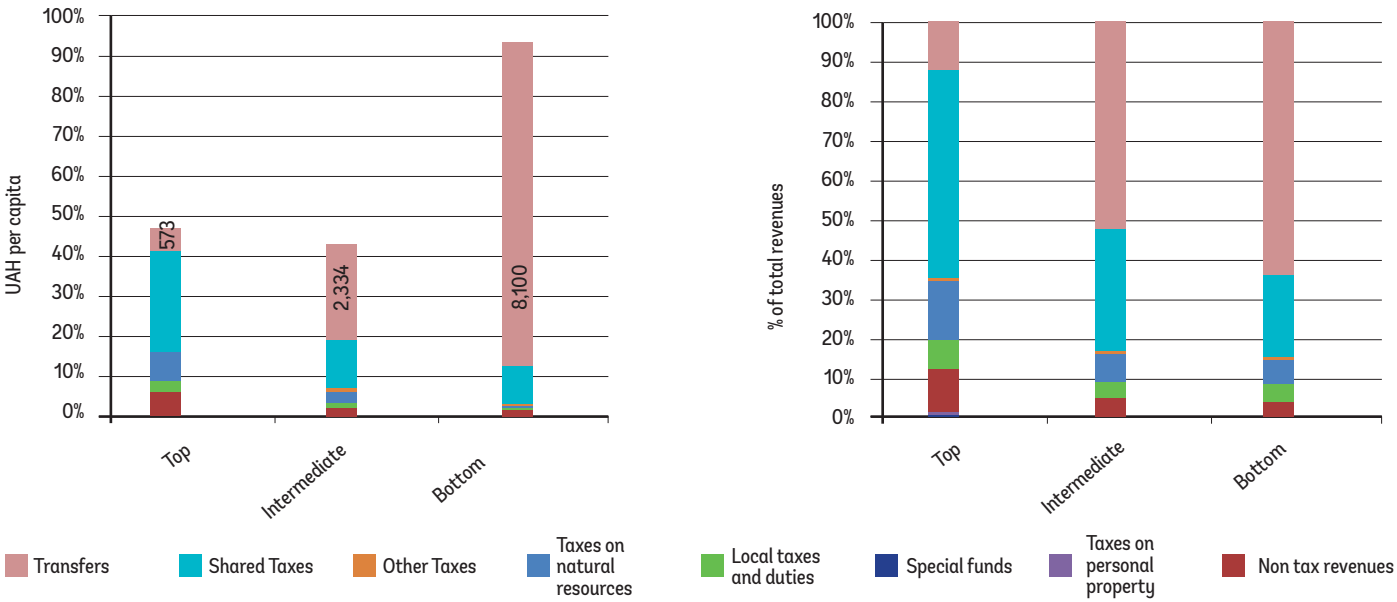
II. Revenue Sources

Local government revenue sources fall into three main categories: (i) Own-source revenues (including property taxes and other local taxes, charges and fees); (ii) Shared revenues (e.g., PIT, excises, environmental tax, land fees, license fees, royalties for common natural resources)[101]; and (iii) Vertical transfers from higher-level governments (from the central, oblast and raion governments to cities). Similar to consolidated sub-national revenues, over 80 percent of city revenues come from retained shares of national taxes and other transfers (Figure 63). On average, less than 10 percent of total city revenues come from own sources, such as local taxes and non-tax charges.

As can be expected from the asymmetrical allocation of revenues sources, there are clear differences in the composition of revenues among cities at different tiers of government (Figure 63). In 2013, cities at higher tiers of government were less dependent on explicit grants while relying more on non-tax revenues and locally retained shares of national taxes. This is likely to be a reflection of the arrangements for derivation-based sharing of revenues from national taxes, which had a larger share of tax collections (e.g., PIT) allocated to the budgets of higher-tier governments. Since, until 2015, equalization grants were filling the gap between projected revenues and expenditures of cities, higher revenues from shared taxes in higher-tier cities were associated with smaller allocations of equalization grants. One has to note that in per capita terms bottom-tier cities received almost four times more in explicit grants than the intermediate-tier cities while having more than half of the amount of revenues from other sources. As will be later corroborated in the analyses of expenditures, this is likely to be related to the sub-optimal scale of service provision at the bottom tier.

For the most part, there were no major differences in revenue composition observed among the night light categories of cities[102] (Figure 64). This not surprising as each night light category includes cities from both bottom and intermediate tiers of government (the two top-tier cities belong to sub-type A: Growing light intensity in expanding periphery).

Figure 63 – Type of city revenues and % of total provided by different tiers of government, 2013

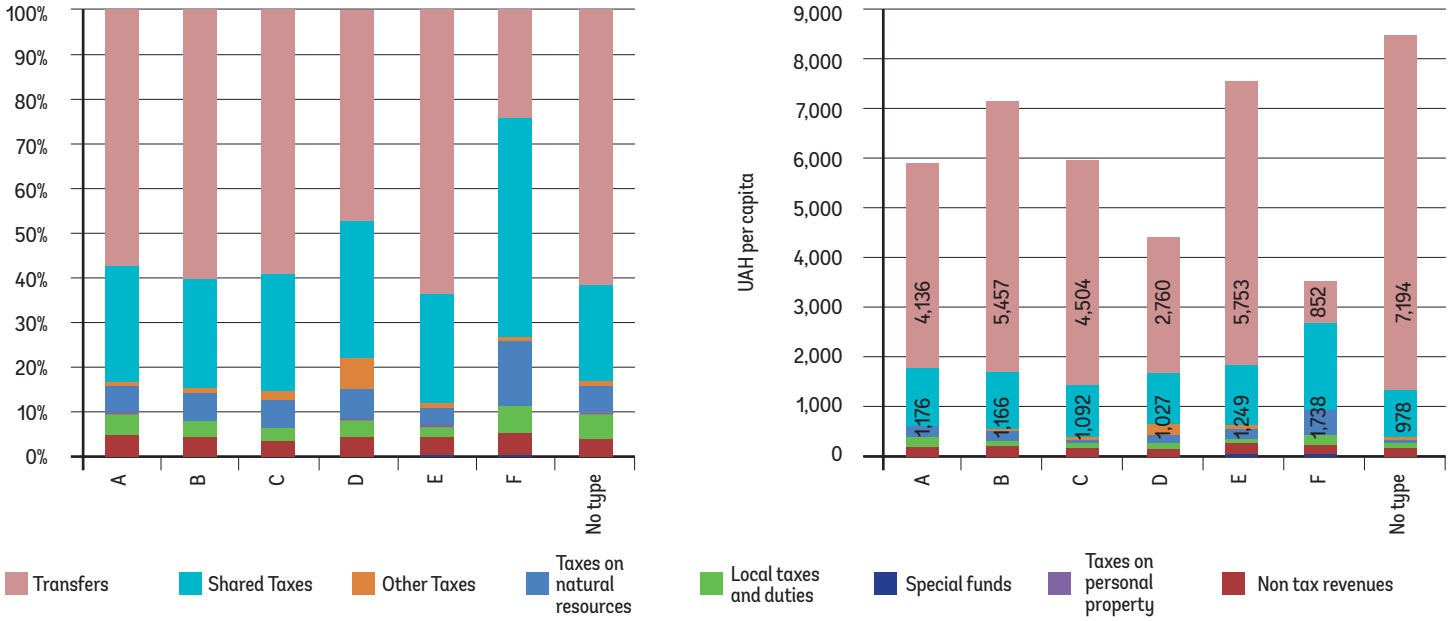


[101] Under derivation-based sharing, national government taxes are collected by the national tax authorities and then partially (or in some cases, fully) allocated to the budget of the local government in whose territory collection takes place. As it is a form of inter-governmental transfer, derivation-based sharing of revenues from national taxes is discussed in the corresponding section below.

[102] The night light categories used for this Chapter are the six categories presented in the Annex VI. Extensive growth.

However, bottom-tier cities are more likely to be among the Missed Disappear and Appear categories and thus have no type assigned in the second night light typology. This explains a higher dependency on explicit grants for cities with no type, given that such transfer dependency was common for bottom-tier cities. For the same reason, in the sub-type F (thriving core, shrinking footprint), explicit grants accounted for a smaller share of revenues than shared tax revenues as both cities comprising this sub-type belong to the intermediate tier, and were thus less dependent on transfers[103]. However, this pattern cannot explain the lower transfer dependence in sub-type D cities (growing light intensity in shrinking footprint), even though it has the highest proportion of the bottom-tier cities (70 percent). The low amount of transfer dependency in sub-type D is due to one of the lowest per capita allocations of explicit grants, rather than higher revenues raised locally. Note that sub-types B (Declining in all aspects) and E (Growing light intensity in an expanding periphery) received among the highest amounts of grants per capita despite also having average levels of locally-derived revenues. As we will see later, this translated into the highest per capita expenditures on social services among categories of cities.

Figure 64 – Composition of city revenues by night light type as % of total, 2013

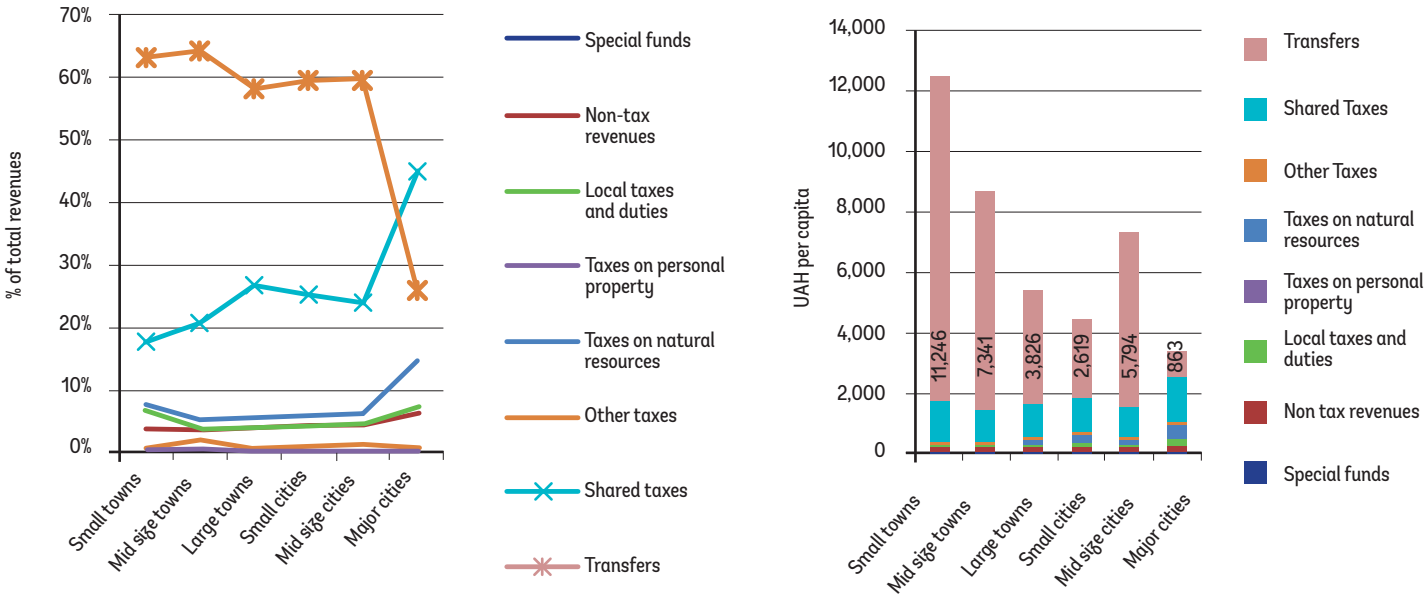


Notes: : These figures only include transfers received by the city proper, but not its subdivisions.
A: Growing light intensity in expanding periphery;
B: Declining in all aspects;
C: Dimming periphery;
D: Growing light intensity in shrinking footprint;
E: Declining economic activities in the core, growing area with stronger peripheries;
F: Thriving core, shrinking footprint.

As with the administrative tiers of cities, the patterns in revenue composition show a similar relationship to city population size (Figure 65 below). Larger cities tend to depend less on explicit grants while relying more on non-tax revenues and locally-retained shares of national taxes. Again this appears to be driven more by differences in per capita amounts of explicit grants rather than per capita yield of locally-derived revenues (own-source and shared at source). In per capita terms, small towns received over ten times more in explicit grants than major cities, while the difference in locally-derived revenues was less than two-fold.

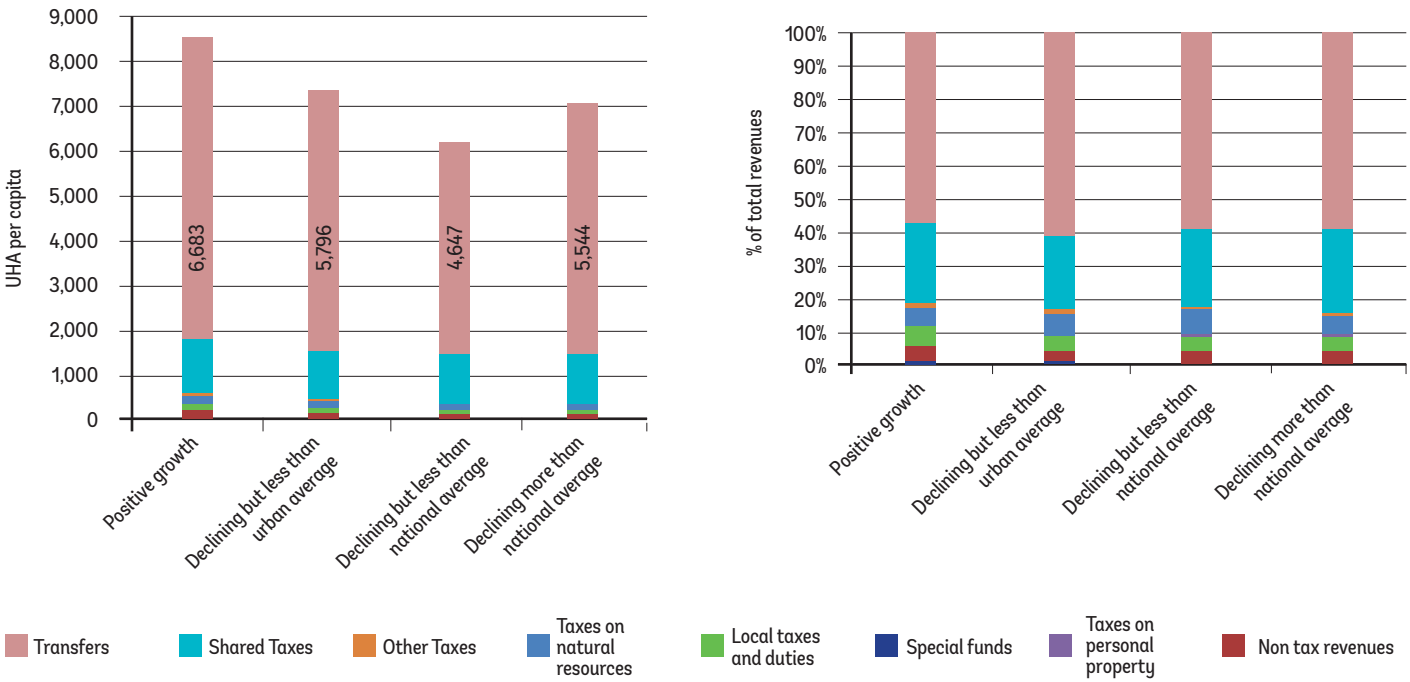
[103] As type 4, coinciding with sub-type F, is comprised of just two major cities (Donetsk and Zaporizhia), we do not attempt to find any generalized patterns for this type/sub-type of cities.

Figure 65 – Composition of city revenues by population size as % of total, 2013



Furthermore, the relationship between transfer dependence and population size does not seem to stem from population decline (Figure 66 below). While the per capita yield of locally-derived revenues was inversely related to population decline, this dynamic did not hold for the per capita amount of grants. The amount of grants decreased with population decline up to the national average rate, possibly reflecting the use of a smaller client population size in the determination of expenditure needs in the equalization grant formula. However, for cities with population declining at a rate above the national average, more resources were allocated in grants per capita than for cities with population declining more than the urban average but less than the national average. The greater allocation of grants per capita to cities with population declining more than the national average might have been due to adjustments for under-utilized social infrastructure in the calculation of expenditures needs.

Figure 66 – Composition of city revenues as % of total relative to population decline, 2013



Own Sources of Revenues

Until 2015, the Tax Code authorized just five revenue instruments for own sources of local government revenues (Table 13). Recent amendments abolished one of the five revenue instruments (the fee for the certain business activities), while extending the coverage of the local property tax to include land and movable property. For the items on the list of authorized local revenue instruments, local authorities have some discretion in setting the rates subject to nation-wide ceilings or floors. However, the tax base is defined in national legislation and the actual administration of these revenue instruments is carried out by the national revenue authority. Further, with respect to the portion of the revenues from the national land tax that is shared with local budgets, sub-national governments can offer tax exemptions and other kinds of preferential tax treatment and hardship relief. With respect to non-agricultural land plots with no appraised value, local councils are to set land tax rates in UAH per square meter differentiated by location with a ceiling of three times the base rate prescribed for the respective locality in the Tax Code.

Table 13 – Own sources of local government revenues

Tax name	Who can introduce	Who defines the base	Who sets the rate
Tax on real estate other than land	Mandated by national legislation	National legislation (total area of a residential property)	For each type of property and ownership, national legislation sets the rate ceiling in % of the minimum wage per 1 sq. meter of tax base while local councils can adopt a reduced rate for apartments under 240 sq. m. and houses under 500 sq. m.
Single tax	Mandated by national legislation	National legislation (duration of business activity in months or in business income)	For businesses with fewer than 10 employees and less than 1mln UAH in income, local councils set the rate within the range set by national legislation (10-20% of minimum wage per month); for larger businesses, rates are set by national legislation as % of business income
Fee for certain business activities	Mandated by national legislation	National legislation (days of business activity)	Local councils within the range set by national legislation for each type of activity (% of minimum wage per day)
Fee for parking of vehicles	Local councils	National legislation (area of public parking spots)	Local councils within the range set by national legislation (0.03 to 0.15% of minimum wage per 1 sq. meter per day)
Tourist tax	Local councils	National legislation (value of accommodation services rendered)	Local councils within the range set by national legislation (0.5 to 1%)

Source: Tax Code

Note: To index for inflation, tax rates are set not in nominal amounts, but as a fraction of the minimum wage, which is periodically adjusted by the national government.

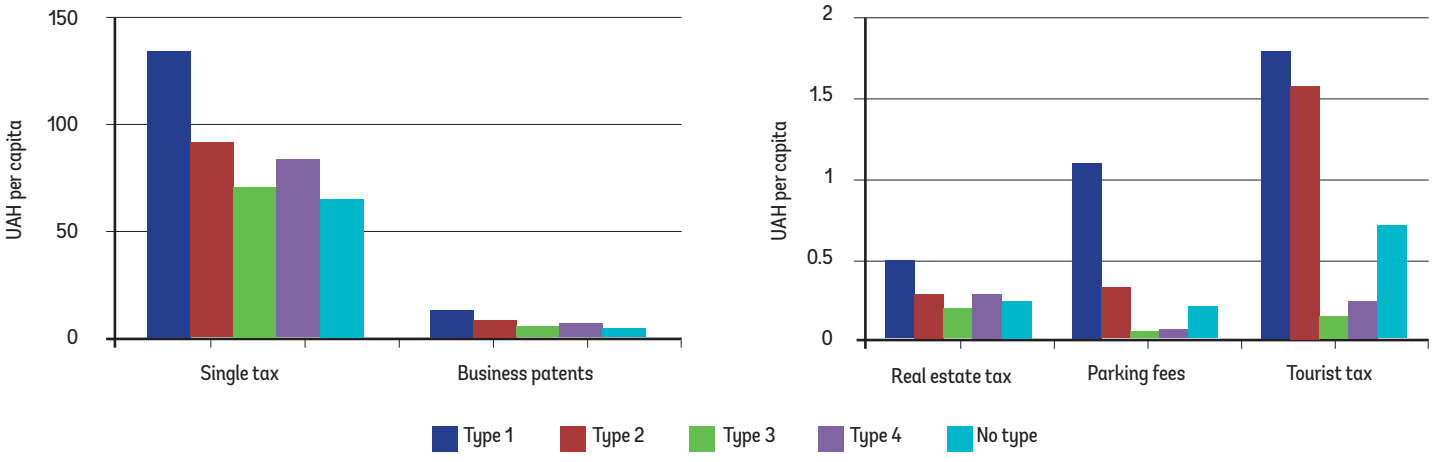
Until 2015, business taxes were the most utilized of all own revenue instruments available to local governments in Ukraine.[104] By far the largest per capita yield was recorded for the Single Tax, which is paid by small business in lieu of the income tax and other national taxes. The next most utilized own source of local revenues were fees for certain business activities (essentially a business license with an element of imputed income taxation). The least utilized revenue instrument was the property tax on structures, on average generating only 28 *kopiyok* (cents) per person. For any category of cities, the Single Tax accounted for more than 80 percent of own tax revenues.

Table 14 – Utilization of local revenue instruments by cities as % of UAH per capita, 2013

Revenue source	% of own tax revenues	Average	Minimum	Maximum	Coef. of variation
Tax on real estate, other than land	0.3%	0.28	0.00	9.59	2.78
Single Tax	90.9%	97.57	0.00	420.52	1.04
Fee for certain business activities	7.2%	9.12	0.00	82.63	1.35
Fee for parking of vehicles	1.1%	0.78	0.00	11.96	2.89
Tourist Tax	0.6%	1.05	0.00	61.85	5.90

There is a strong relationship between the night light topology and the utilization of own sources of revenues. Cities that are thriving in all respects (type 1 or sub-type A) generated at least 50 percent more revenue than the average per capita revenue from each own revenue instrument except for the Tourist Tax[105] (Figure 67). This is particularly true for parking fees. Similarly, the Found and Appear night light typologies have higher per capita revenues from own taxes than Missed and Disappear cities. A possible explanation might be the creation of small businesses – part of the positive relationship between night lights and economic activity previously discussed in Section 4.

Figure 67 – Utilization of local revenue instruments by cities, UAH per capita, 2013

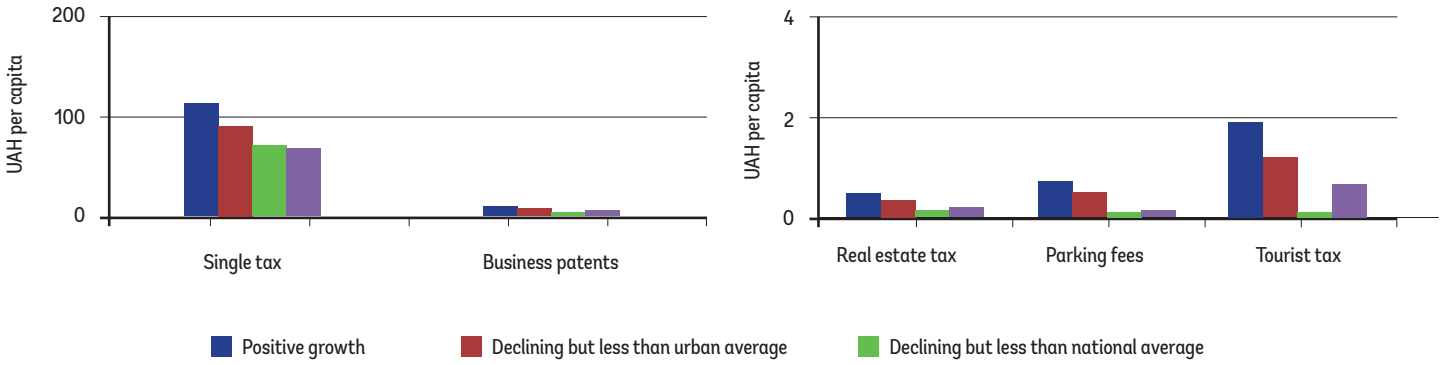


[104] These relative contributions of businesses vis-a-vis residents in the total revenues from local taxes might look different in 2015, after property taxes on land and vehicles have been moved from the list of national taxes to the list of local taxes. When the vehicle tax was still a national tax in 2013, ninety percent of its revenues came from individual car owners while the rest came from corporate entities. Similarly, two thirds of the land tax revenues came from individual owners and only one third came from corporate entities.

[105] The more nuanced approach to the typology reveals that high per capita amount of revenues from the Tourist Tax found for type 2 is actually driven by sub-type B (declining in all aspects).

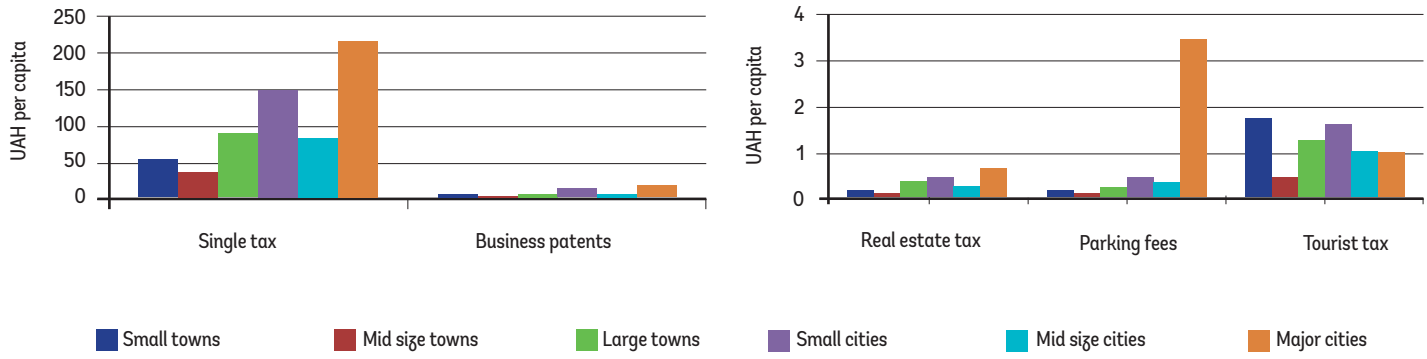
There is also a noticeable association between population decline and the yield of local taxes (Figure 68). Cities with higher population decline appear to raise less revenue per capita from own taxes relative to the yield of national taxes shared with local governments.

Figure 68 – Utilization of local revenue instruments by city night light typology, UAH per capita, 2013



There is only a weak association between population size and per capita revenues from own taxes, but which does not hold at all for the Tourist Tax (Figure 69). Major cities have particularly high per capita revenues from parking fees and the Single Tax.

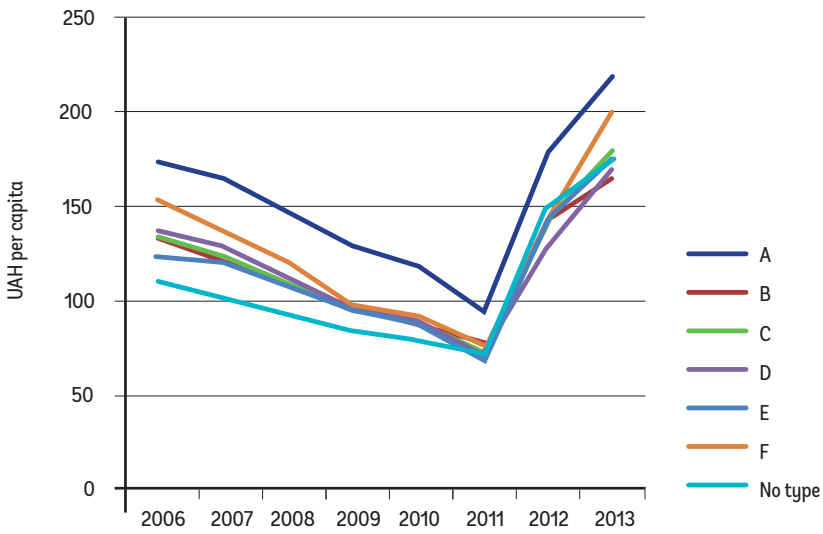
Figure 69 – Utilization of local revenue instruments by city population size, in UAH per capita, 2013



Before the revamping of the list of local tax handles with the introduction of the 2011 Tax Code, per capita revenue had been steadily declining capita terms (Figure 70). This might be explained in part by the economic crisis. The decline in per capita revenues had been larger in cities with declining population.

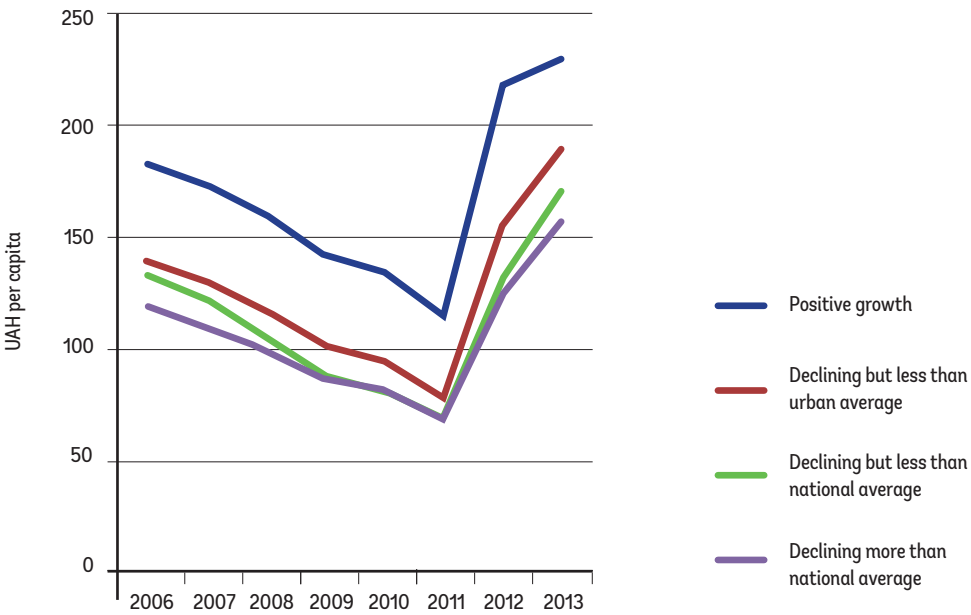
Abolishment of a plethora of unproductive local taxes with the 2011 Tax Code coincided with a dramatic increase in per capita revenues. Cities that had experienced a larger revenue loss before 2011 also saw larger revenue increase in the years after. Throughout this up-and-down cycle, there is a noticeable association between the rate of population decline and the levels of local tax collection (Figure 71).

Figure 70 – Per capita revenue from own taxes and the night light typology of sub-oblast cities, in UAH, 2013



Note: Due to lack of data, bottom tier cities are not included.
A: Growing light intensity in expanding periphery;
B: Declining in all aspects;
C: Dimming periphery;
D: Growing light intensity in shrinking footprint;
E: Declining economic activities in the core, growing area with stronger peripheries;
F: Thriving core, shrinking footprint.

Figure 71 – Per capita revenue from own taxes and population decline of sub-oblast cities, in UAH, 2013



Note: Due to lack of data, bottom tier cities are not included.

Shared Tax Revenue and Other Transfers

Local governments are assigned a share of revenues from national taxes (e.g., PIT) on a derivation basis. That is, these revenues are (partially) shared with the locality where they are collected. In addition to the PIT revenues, until 2015 top-tier local governments also received 50% of the revenue from royalties on forests, water, and mineral resources of national significance (except oil and gas), and 100% revenue from other common natural resources (including land) and excise taxes. The 2015 amendments to the Budget Code changed sharing rates for many of these taxes. In addition, the national property taxes on land and vehicles, the revenues from which had been previously allocated to local budgets, now have become entirely local taxes.

Under this derivation-based sharing, national government taxes are collected by the national tax authorities. Then they are partially (or fully in the case of the land tax) allocated to the budget of the local government in whose territory collection takes place. This revenue-sharing occurs based on uniform sharing rates (so that all lower-level government jurisdictions receive the same share of revenues collected within their jurisdiction as in the case of excise tax revenues) or based on a differentiated sharing rate structure in which different jurisdictions receive a different percentage of the shared revenue source, as in the case of PIT.

Until the recent amendments to the Budget Code, the rates of derivation-based sharing of revenue from the national PIT were as following[106]: Up to year 2014, the City of Kyiv received 50% of the PIT revenue collected in its territory (40% stating in 2015), (i) Up to year 2014, The City of Sevastopol received 100% of the PIT revenue collected in its territory, (ii) 75% of the PIT revenue was allocated to the budget of the districts and sub-oblast cities where collection takes place (60% starting in 2015), (iii) 25% of the PIT revenue was allocated to the budget of the bottom-tier jurisdiction where collection takes place (ending in 2015).

The derivation-based sharing of revenues from national taxes is complemented by explicit grants from the national government to oblasts and districts and from there passed on to constituent cities and rural municipalities. As can be seen from Figure 61 above, grants from the central budget to sub-national levels have been steadily increasing from a 5.95 percent share of GDP in 2007 to 8.53 percent in 2012 and then slightly reversing to 7.70 percent of GDP in 2013.

This non-transparent discretionary process was replaced with a formula-driven equalization system for local government finances as part of substantial reforms initiated with the adoption of the Budget Code in 2001. The major changes brought by the Budget Code included reassignment of expenditure responsibilities among different levels of government; long-term assignment of shares from national tax revenues to local governments at the point of collection; formula-based calculation of the equalization grants; clear and transparent structure of the earmarked transfers; and the articulation of the conditions and limits on local borrowing. As a result, the formulation of local government budgets started being based on more objective, neutral criteria using a uniform formula across the country to compute revenue capacity and expenditure needs.

The legal basis for the present system of inter-governmental transfers is provided by the Budget Code (Article 96). Before changes in 2015, the 2001 Budget Code envisioned four types of transfers: equalization grants, (i) subventions, (ii) additional grants, (iii) other funds transferred to the state budget and local budgets from other local budgets (mutual settlements).

[106] The sharing rates are mostly an outcome of political bargaining. Thus, the recent reduction of Kyiv City's share in the PIT revenues from 50 to 40 percent was initially proposed as 20 percent.

Equalization grants aim to cover the gap between assessed expenditure needs and "potential" revenue from own and shared taxes. Until the recent amendments to the 2001 Budget Code, the total pool of equalization transfer funds had been comprised of negative transfers from rich jurisdictions and topped up with annual appropriations from the national budget. Thus, the overall size of the available pool of funds had been arbitrary and non-fixed. Currently, some of these central government grants are passed by districts to sub-district municipalities. The additional equalization transfers are allocated among regions based on specific features of depressed and mountainous areas, and areas with low population levels and the network of public institutions. Thus, no less than three-quarters of additional equalization grants has to be passed on by oblasts to the sub-oblast units.

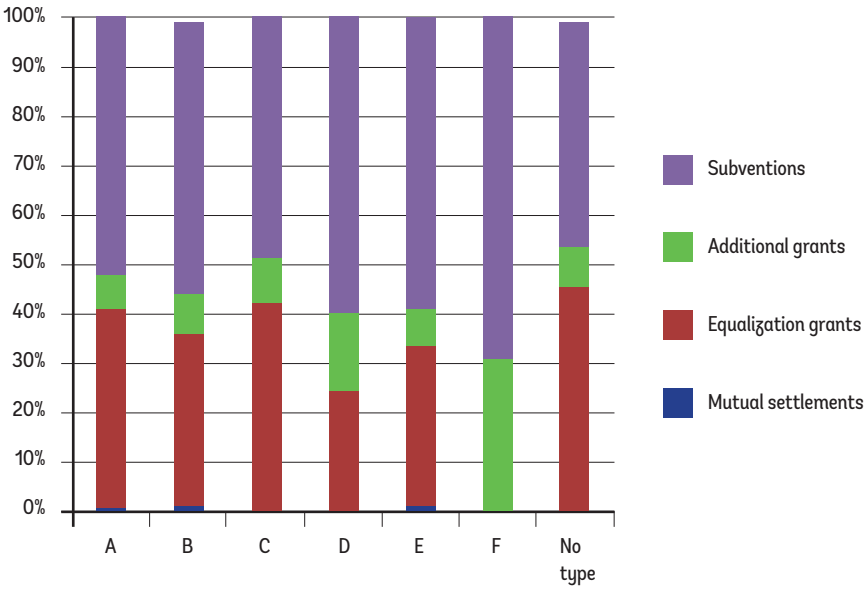
Subventions are used to transfer funds to be used by the recipient government for the purpose – and in the manner – specified by the grantor. They are mostly used to fund social entitlements delegated to sub-national authorities for fulfillment. Subventions can also be used to fund other earmarked uses such as public investment projects.

Additional grants are unplanned transfers allocated in the course of the fiscal year. They can be used to compensate local governments for revenue losses resulting from changes to national government policies, such as tax preferences. They are also used as a mechanism to share with local governments any over-collection of revenues from national taxes.

Other funds (mutual settlements) can be transferred between different governments in exchange for mutually-agreed public services provided by the recipient of the transfer. For example, one local government can provide services to the residents of other local governments.

In 2013, less than half of overall transfers came through equalization grants, which offered local governments both predictability and discretion in allocating these resources according to local priorities (Figure 72). The rest came through subventions, which were earmarked for specific uses, mostly to fulfill social entitlements.

Figure 72 – Composition of inter-governmental transfers to cities by type, 2013

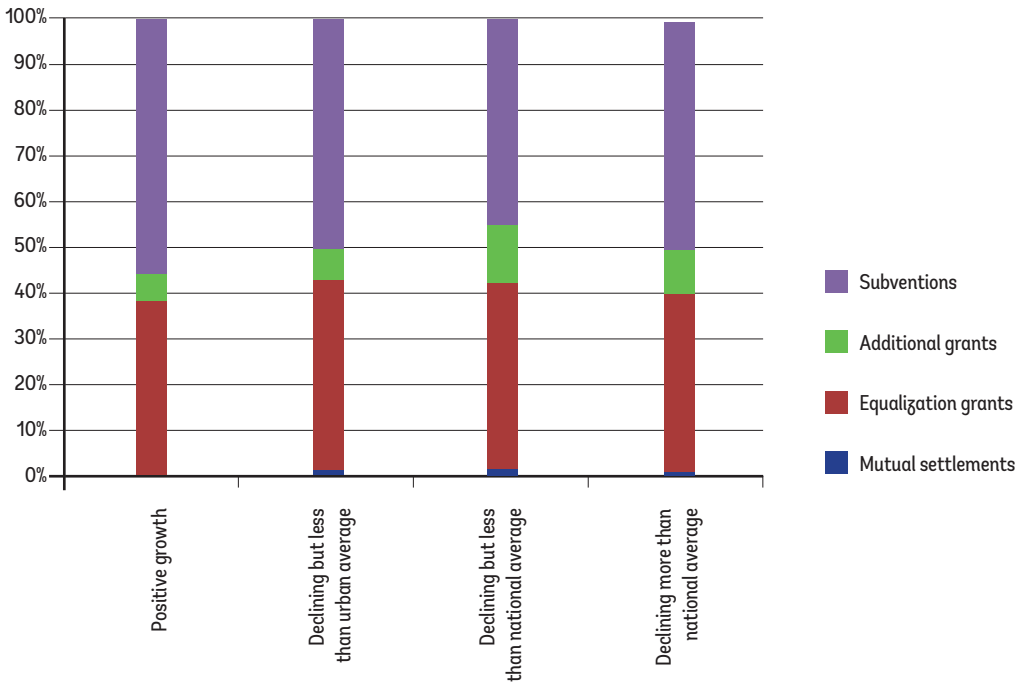


Note:
A: Growing light intensity in expanding periphery;
B: Declining in all aspects;
C: Dimming periphery;
D: Growing light intensity in shrinking footprint;
E: Declining economic activities in the core, growing area with stronger peripheries;
F: Thriving core, shrinking footprint.

In terms of the composition of inter-governmental revenues, there are no major differences observed among the night light types of cities (other than a higher share of subventions in total transfers received by sub-types D and E). The high transfer-dependency previously found for the no-type cities appears to be due to larger allocations of equalization grants. Similarly, small allocations of equalization grants appear to be behind the lower transfer-dependency exhibited by sub-types F and D.

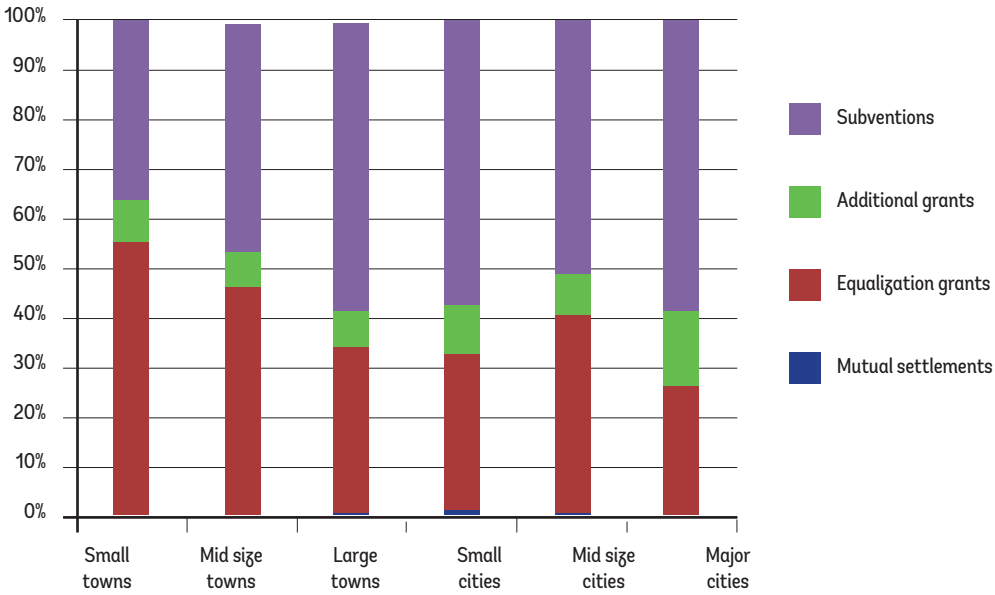
Cities with larger population declines were associated with a smaller share of subventions, but a larger share of additional equalization grants. This is not surprising given that the 2001 Budget Code required oblast governments to take into account "specific features of depressed and mountainous areas, and areas with low population levels and a widespread network of government-funded institutions" (Article 97). As the additional grants were more discretionary and ad hoc, this suggests softer budget constraints for cities with larger population decline. Thus, larger allocations of grants per capita to cities with population declining more than the national average were more likely to be related to under-utilized social infrastructure than to a greater presence of a population entitled to social benefits – which would be funded with subventions from the central government.

Figure 73 – Composition of inter-governmental transfers to cities by population trend, 2013



Larger cities received a larger share of inter-governmental grants in the form of subventions and additional grants while their share of equalization grants was smaller (Figure 74). This reduced allocation of equalization grants to major cities might reflect both higher yield of locally-derived revenues and smaller estimates of expenditure needs due to better utilized infrastructure. At the same time, larger per capita allocations of additional grants to bigger cities might reflect their better bargaining power before the central government.

Figure 74 – Composition of inter-governmental transfers to cities by population size, 2013



Conceptually, the amount of equalization grants from the national budget to local government budgets (which in reality were originally derived from local government contributions to the equalization pool) was calculated as the difference between estimated expenditure need of the given local government and the forecasted (by a uniform formula) amount of revenues to be collected in the respective territory. The expenditure need for each local government was equal to the product of three items: a) the basic expenditure norm (per capita, or per student, etc.); b) the population or the number of students, etc. in the locality; and c) a set of coefficients that worked to adjust the expenditure need up or down for special needs and/or differential costs of service provision. Among other things, the adjustment coefficients were based on the target ratio of the number of employees of local self-government bodies in relation to the population level (Budget Code, Article 98).

The dozens of new adjustment factors that had been added to the formula over the years are believed to have undermined the formula's predictability while also entrenching inefficiencies. This is because the subsequent adjustments tie financing to facility network characteristics and staffing levels; thus, they implicitly finance the existing network of service facilities and staffing as opposed to funding an objective demand for services[107].

[107] Id. World Bank. 2008

In addition to allocating equalization grants for oblast and sub-oblast units, the national government also set minimum per capita (per client) norms to be used by district governments in allocating equalization grants among constituent units. The allocation of intra-district equalization transfers had to be approved by the respective oblast government; if the district budget was not adopted on time, the allocation of intra-district equalization grants was to be decided by the oblast government.

In 2015, the system of equalization grants was substantially revamped. According to the explanatory note accompanying amendments to the Budget Code, the new equalization grants (now called "basic grant") will be of a compensatory nature and aim at bridging disparities in revenue capacity of local governments related to derivation-based sharing of the personal income tax and corporate income tax. A new equalization system will be based on the per capita level of revenues. By contrast, the previous system was based on the gap between per capita expenditure needs and revenue projections. Now, if the local yield of the shared tax exceeds the national average by 10 percent or more, half of this surplus revenue is withdrawn into the State budget (a negative grant). In the opposite case of a below-average yield of the shared tax, the State will only compensate 80% of the shortfall.
Local revenues from other sources are not subject to equalization and shall remain at the complete disposal of local budgets.

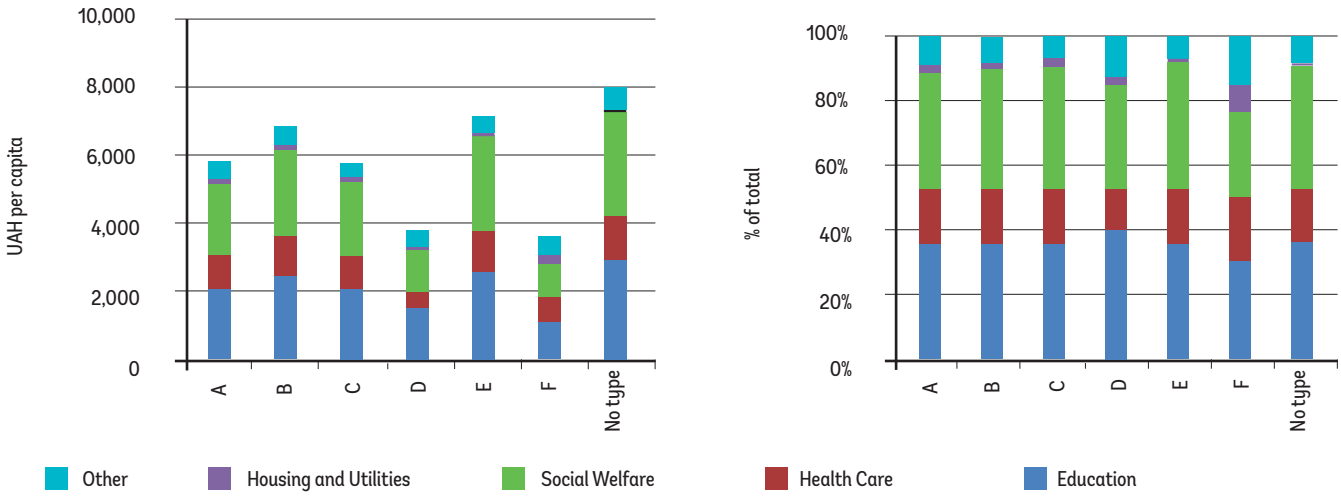
Since education and healthcare expenditure needs are no longer covered by the equalization grants, a new system of earmarked subventions will be implemented, also based on a formula approach (to be established by the Cabinet of Ministers of Ukraine)
At the same time, the amendments to the Budget Code mandate that the purpose of the funds from these new subventions will be for long-term programs and projects. In addition, funds remaining at the end of the fiscal year will no longer be withdrawn into the State budget, but can be used for renewal of the material and technological base of relevant institutions. This dramatic departure from the previous system is expected by the Government, among other goals, to help improve the efficiency of using budgeted funds since local governments will no longer try to expend subvention resources "at any price" at the end of the year without regard for whether an expenditure is an efficient one.

III. Analysis of Expenditures

While cities account for over 60 percent of total national population, in 2013 they accounted for 57 percent of sub-national expenditures on education and 46 percent of sub-national expenditures on health care, but 77 percent of sub-national expenditures on housing and utilities. This suggests that in per capita terms, cities spend on health care less than two-thirds of the amount spent on these services provided to the population outside of cities. Similar to the consolidated sub-national expenditures shown in Figure 61, in 2013 the three social sectors (education, health care, and social welfare) accounted for over 80 percent of city expenditures (Figure 75 below).

In terms of functional composition of city expenditures, there are no major differences among night light types. The only exception is sub-type F (thriving core, shrinking footprint), where a smaller share is allocated to the three social services while a larger share is allocated to Housing and Utilities and other non-social services, in particular Economic Affairs.

Figure 75 – Functional composition of city expenditures by sub-type, 2013

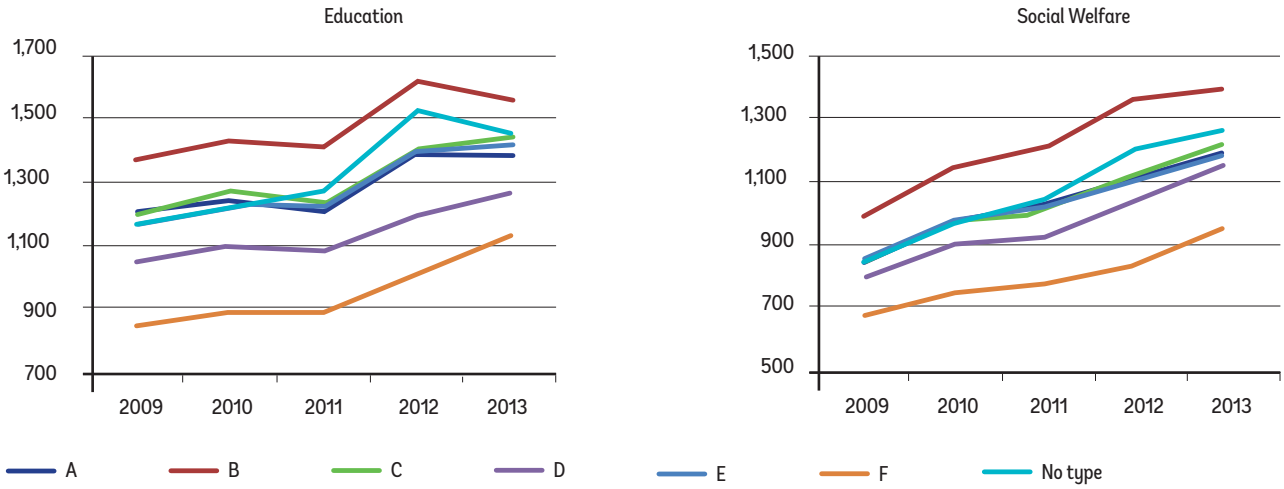


Note:
A: Growing light intensity in expanding periphery;
B: Declining in all aspects;
C: Dimming periphery;
D: Growing light intensity in shrinking footprint;
E: Declining economic activities in the core, growing area with stronger peripheries;
F: Thriving core, shrinking footprint.

However, there are wide disparities across city sub-types in per capita levels of expenditures on each function. The highest per capita expenditures are observed in sub-types B (Declining in all aspects) and E (Growing light intensity in expanding periphery). These high per capita expenditures in sub-types B and E are driven by the three social services, in particular social protection. The lowest per capita expenditures are observed in sub-types D (growing light intensity in shrinking footprint) and F (Thriving core, shrinking footprint). As indicated above, the greatest amount of inter-governmental grants were allocated to sub-types B and E, while the least amount was allocated to sub-types D and F. Thus, the disparities among city categories appear, if not directly caused, then accommodated with the allocation of inter-governmental grants. One possible explanation is the use of the public sector as an employer of last resort in declining cities. At the same time, it appears that a shrinking footprint in the presence of some economic growth is associated with smaller amounts of per capita expenditures and grants.

At least for the intermediate-tier cities, there is a divergence in per capita expenditures on social sectors among night light categories of cities until 2012 (Figure 76). However, the overall reduction of sub-national expenditures in 2013 had a greater impact on the expenditures of sub-type B cities and cities without any type. These are the cities showing highest per capita expenditures in 2009-2012. At the same time sub-types D and F, having the lowest per capita expenditures, actually saw an increase in expenditures on education and social welfare in 2013. Thus, 2013 might represent the first year of rationalizing under-utilized social infrastructure in small cities.

Figure 76: Per capita expenditures on social sectors by night light category in sub-oblast cities, in UAH, 2013

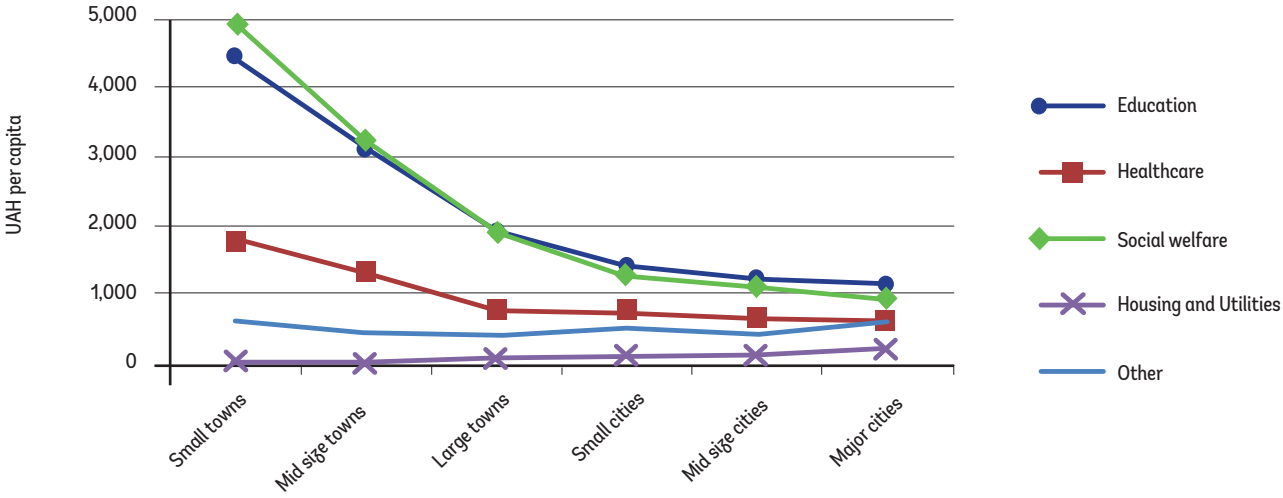


Furthermore, there are 47 outlier cities (or 10 percent of all cities) with levels of per capita current expenditures more than four times the median level. These outliers represent 468,000 people (1.7%) out of the 27.5 million total city population of the country, but account for 10% of the total expenditures of cities.

These extremely high levels of per capita expenditures in outlier cities appear to be primarily driven by the small scale of service provision since their average population is six times smaller than the average city.[108] All but three outliers fall into the categories of small and mid-size towns. In fact, in all types of cities we observe an inverse relationship between population size and per capita expenditure in all sectors except Housing and Utilities and other non-social sectors (Figure 77). In social sectors, larger cities can enjoy lower unit costs as their large population size allows them to take advantage of economies of scale. These economies of scale are particularly visible in the Education and Social Welfare sectors. But large cities also need to spend more on urban infrastructure to deal with urban congestion. For larger cities, higher per capita expenditures on non-social sectors might reflect either higher costs for the same level of services or more extensive and/or better quality of services. Indeed, larger municipalities are able to provide a larger scope of services (and often better quality of services) than very small municipalities; thus, their per capita expenditures capture both lower costs and better services.

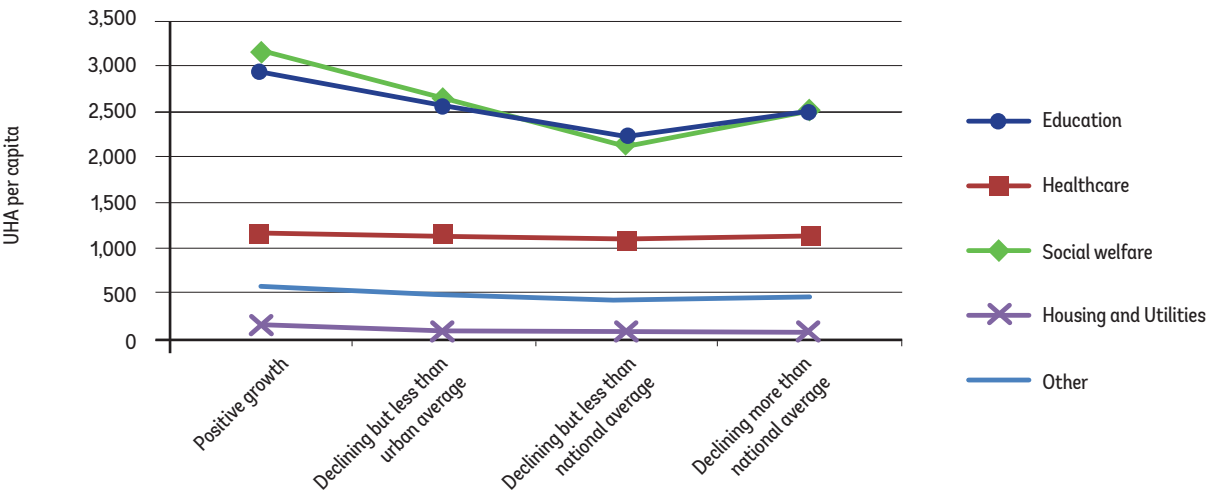
[108] Empirical studies from other countries suggest that economies of scale in the delivery of municipal services are mostly exhausted at an average size of 10,000 inhabitants, even though there are some special services, such as urban transportation and solid waste utilization, where economies of scale improve up to the size of 100,000 inhabitants (Lago-Peña and Martinez-Vazquez, 2013)

Figure 77 – Average per capita expenditures by function and city population size, 2013



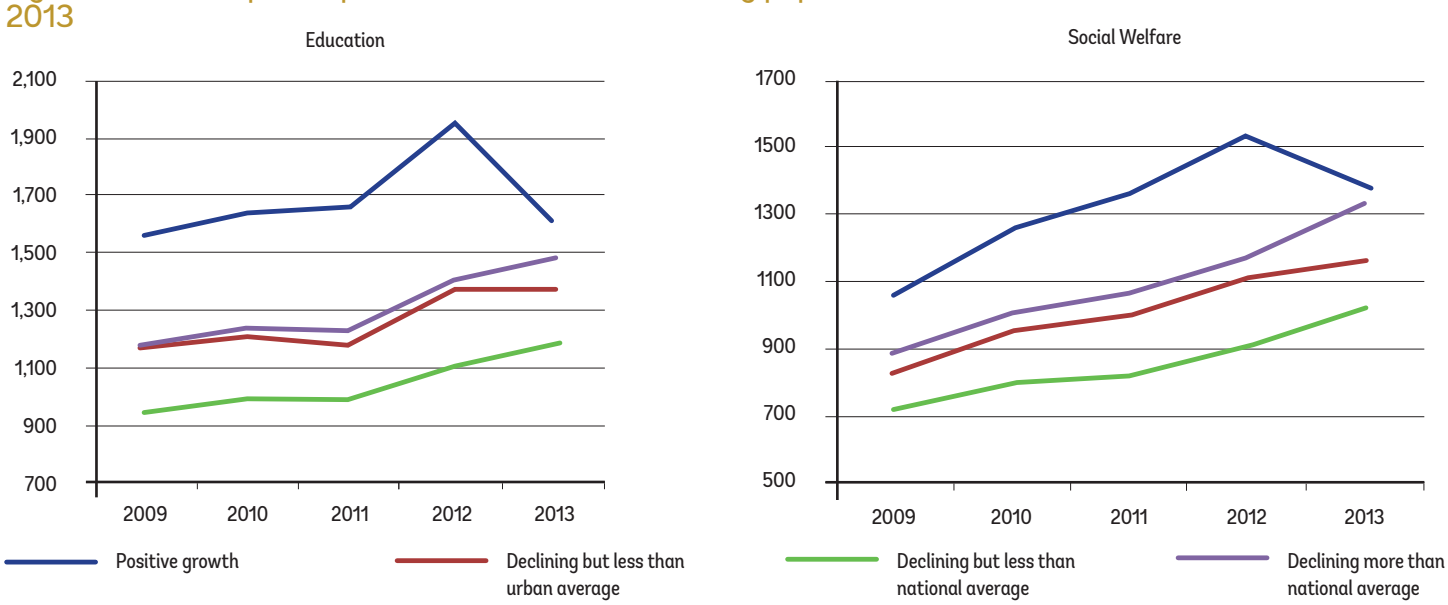
Possibly due to their small size, the outlier cities disproportionally fall into the Appear and Missed types. As a result, half of the outliers are unclassified in the night light topology. Of those that are classified, over two-thirds are sub-type B (Declining in all aspects), which is greater than the proportion for all cities. Earlier we saw that cities in sub-type B and those without any type receive the highest per capita amount of inter-governmental grants.

Figure 78 –Per capita expenditures by function and population trend, 2013



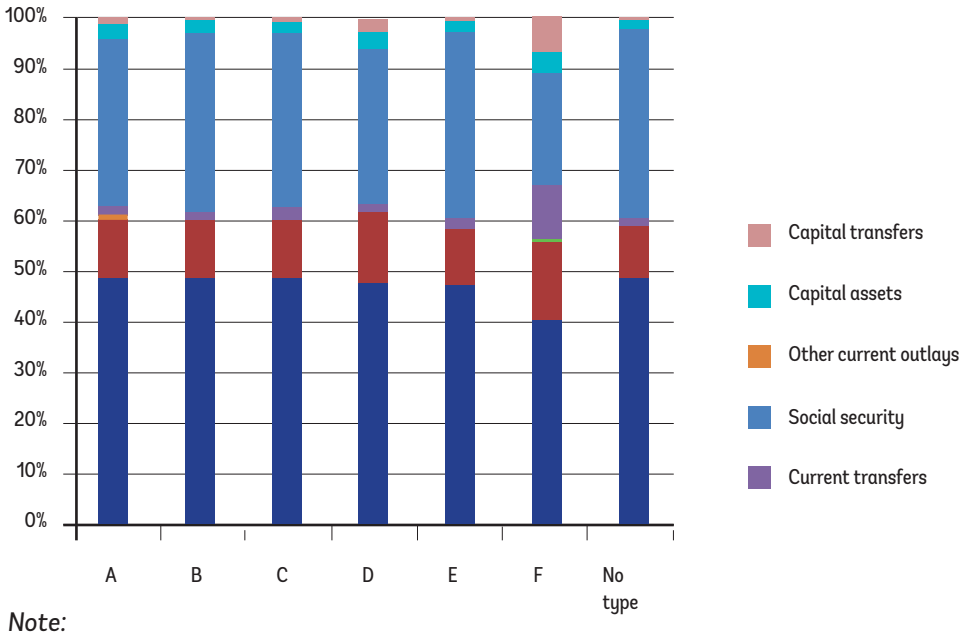
Furthermore, the sub-optimal scale of service provision in the 47 outlier cities does not seem to have been caused by population decline. In fact, only one-third of outliers have population declining more than the urban average and a quarter of them actually experienced population growth. There appears to be a clear U-shape relationship between population decline and per capita expenditures in all sectors except Housing and Utilities (Figure 78). Higher rates of population decline are associated with lower per capita expenditures in those sectors – except for cities declining more than the national average, where per capita expenditures are almost as high as in growing cities. This might be due to an interplay between availability of resources and economies of scale. Cities with population decline less than the national average might exhibit lower per capita expenditures dues to lower resource availability. However, with higher rates of population decline, the lack of economies of scale outweighs low resource availability, which cities offset by obtaining larger inter-governmental transfers. This U-shape relationship persisted throughout 2009-2013 (Figure 79).

Figure 79 – Per capita expenditures on social sectors by population decline in sub-oblast cities, in UAH, 2013



In terms of the economic composition of city expenditures, again there are no major differences among nightlight types. The exception is a higher share of expenditures on current transfers and capital expenditures in sub-type F (see Figure 80). One has to note the small share of city budgets allocated to capital expenditures, ranging from just 2.6 percent of total expenditures in sub-type C cities to 10.9 percent in sub-type F cities. At the same time, the combined share of payroll and social security expenses exceeds three quarters in all city types except sub-type F.

Figure 80 – Economic composition of city expenditures by city typology, 2013



Note:

A: Growing light intensity in expanding periphery;

B: Declining in all aspects;

C: Dimming periphery;

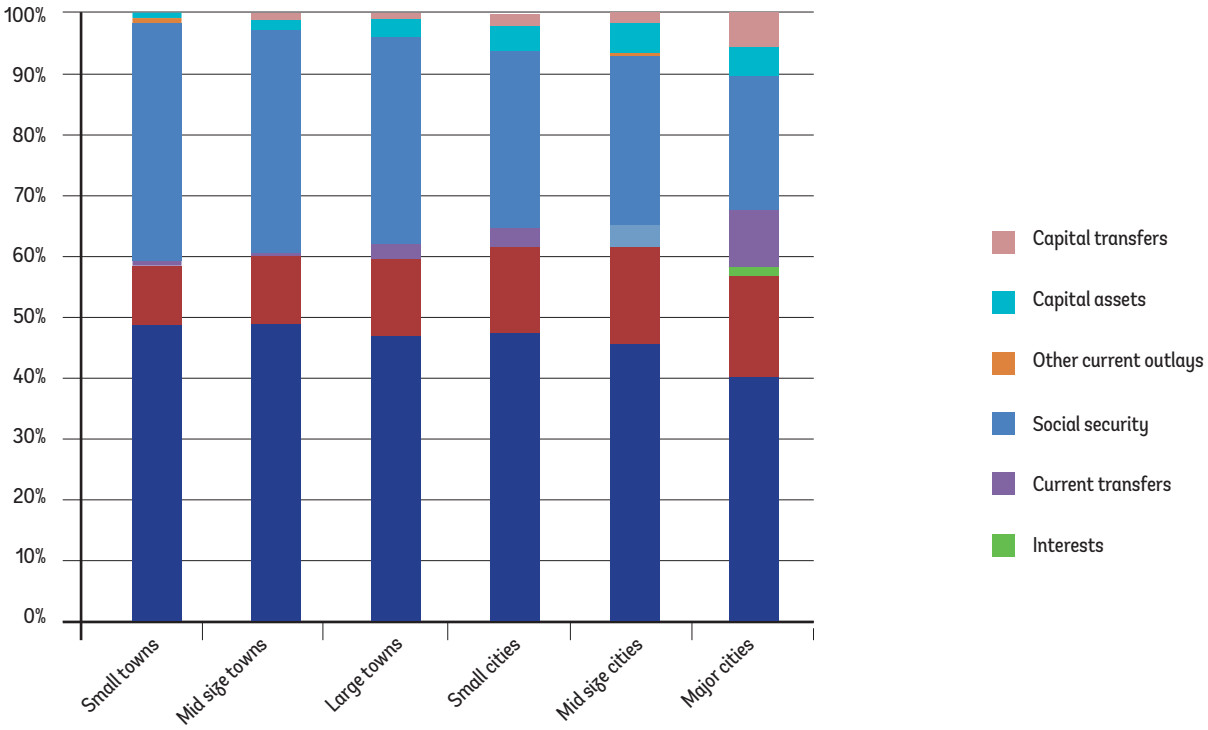
D: Growing light intensity in shrinking footprint;

E: Declining economic activities in the core, growing area with stronger peripheries;

F: Thriving core, shrinking footprint.

There is a clear relationship between the economic composition of city expenditures and a city's population size (Figure 81). Larger cities allocated a smaller share of their expenditures to social security and labor, while allocating a larger share to goods and services and capital investments (as well as larger current transfers, mostly likely related to municipal enterprises). The higher payroll share in small towns might reflect fixed costs of labor-intensive social services like education. However, lower expenditures on supplies and capital inputs are likely to lower productivity of these same staff.

Figure 81 – Economic composition of city expenditures by city population size, 2013



Indeed, the economies of scale are primarily driven by outlays on payroll and social security (Figure 82). Not only that these two economic categories represent the bulk of city expenditures, in per capita terms they are significantly higher proportion of expenditures by smaller cities.

There appears to be a clear U-shape relationship between population decline and per capita expenditures on Labor and Social security (Figure 83). Higher population decline is associated with lower per capita expenditures – except for cities declining more than the national average, where per capita expenditures are almost as high as in growing cities. As conjectured earlier, this might be due to an interplay between resource availability and economies of scale. While growing cities might have resources for a larger and better-paid labor force, the fixed cost of staff might make per capita outlays increase substantially when the denominator (population) drops significantly.

Figure 82 – Economies of scale by economic item, 2013

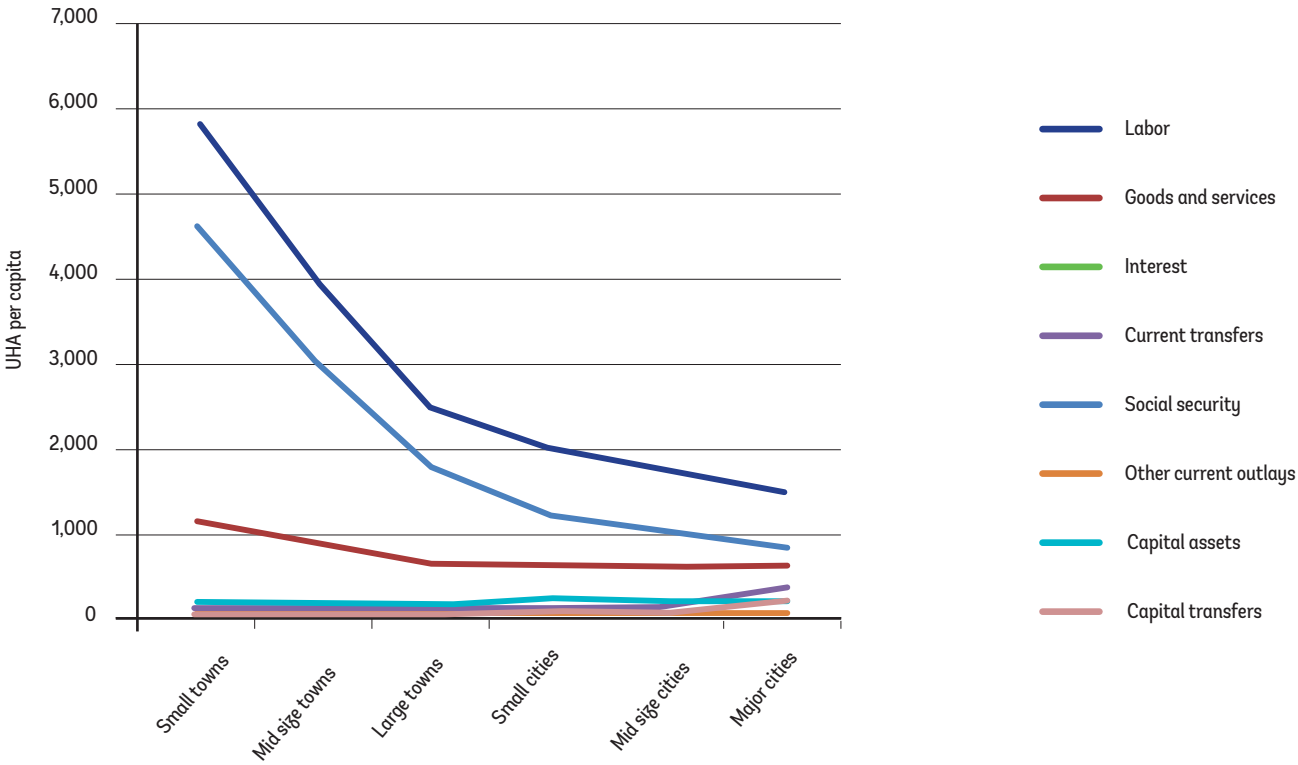
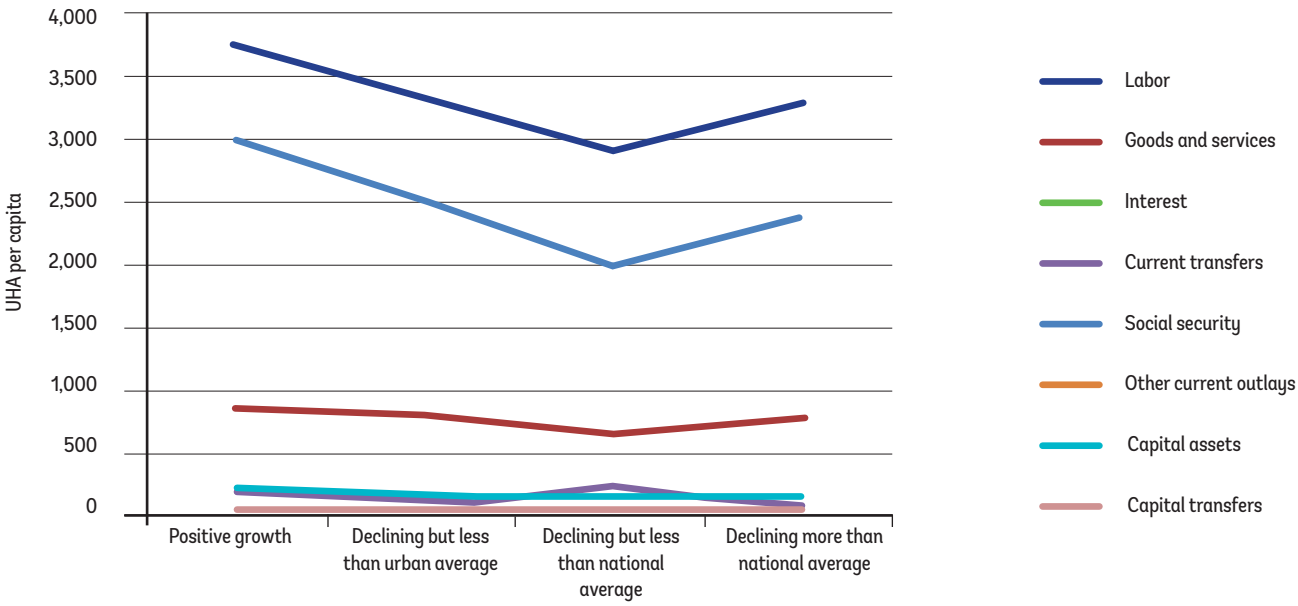
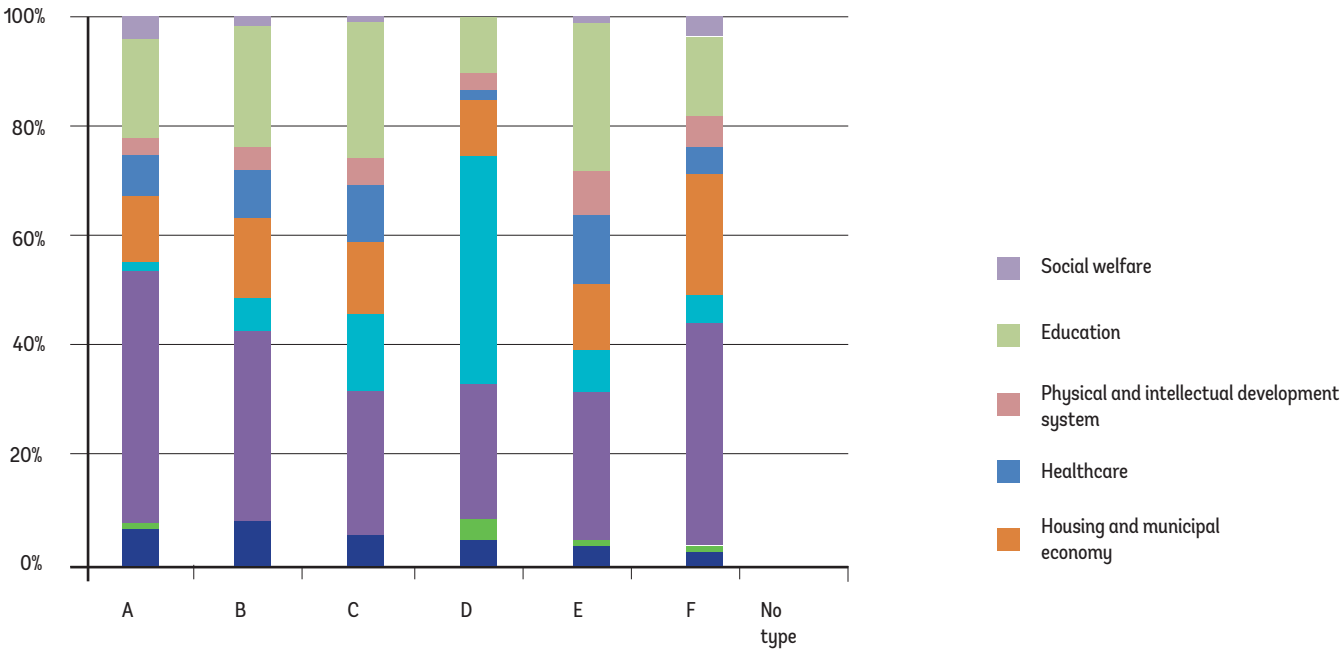


Figure 83 – Economic composition of city expenditures by population trend, 2013



In 2013, Ukraine's sub-national capital investment was quite low at 0.95 percent of GDP. However, this reflected an overall low level of public investments in the country; the sub-national share of total public sector investment (48%) is roughly proportional to the sub-national share in the overall sub-national expenditures (44%). However, sub-national governments typically have a larger share of capital expenditures than recurrent expenditures because municipal services tend to be more capital-intensive than national functions, which are dominated by social services and income redistribution programs[109]. In Ukraine, on average, capital expenditures accounted for about three percent of total city expenditures in 2013. Cities comprised 63% of sub-national capital expenditures, a proportion only slightly higher than their share of the total national population.

Figure 84 – Composition of capital expenditures by function and city typology, 2013



Note:
A: Growing light intensity in expanding periphery;
B: Declining in all aspects;
C: Dimming periphery;
D: Growing light intensity in shrinking footprint;
E: Growing light intensity in expanding periphery;
F: Thriving core, shrinking footprint.

More than half of capital spending by cities is outside the three social sectors (Figure 84). In all types of cities except sub-type D (Growing light intensity in shrinking footprint), the largest share of capital expenditures goes to Economic Affairs. Capital expenditures account for less than 15 percent of city expenditures in all sectors except Economic Affairs, Environmental Protection, and Housing and Utilities, where the share of capital expenditures is 76%, 68%, and 25% of total city expenditures, respectively.

[109] Martinez-Vazquez, Jorge, and Andrey Timofeev. 2012. "Propensity to Invest and the Additionality of Capital Transfers: A Country Panel Perspective" International Studies Program Working Paper 12-16. International Studies Program, Andrew Young School of Policy Studies, Georgia State University.

In the Education and Health care sectors, per capita capital expenditures decrease with the size of a city, while in Housing and Utilities and other non-social sectors they increase (Figure 85). This is consistent with the patterns found for total per capita expenditures in those sectors.

Per capita capital investments are lower in cities with population declining more than the national average (Figure 86). This is mostly driven by city investments in non-social sectors other than Housing and Utilities, in particular Economic Affairs and Public Administration.

Figure 85 – Per capita capital expenditures by function and population size, 2013

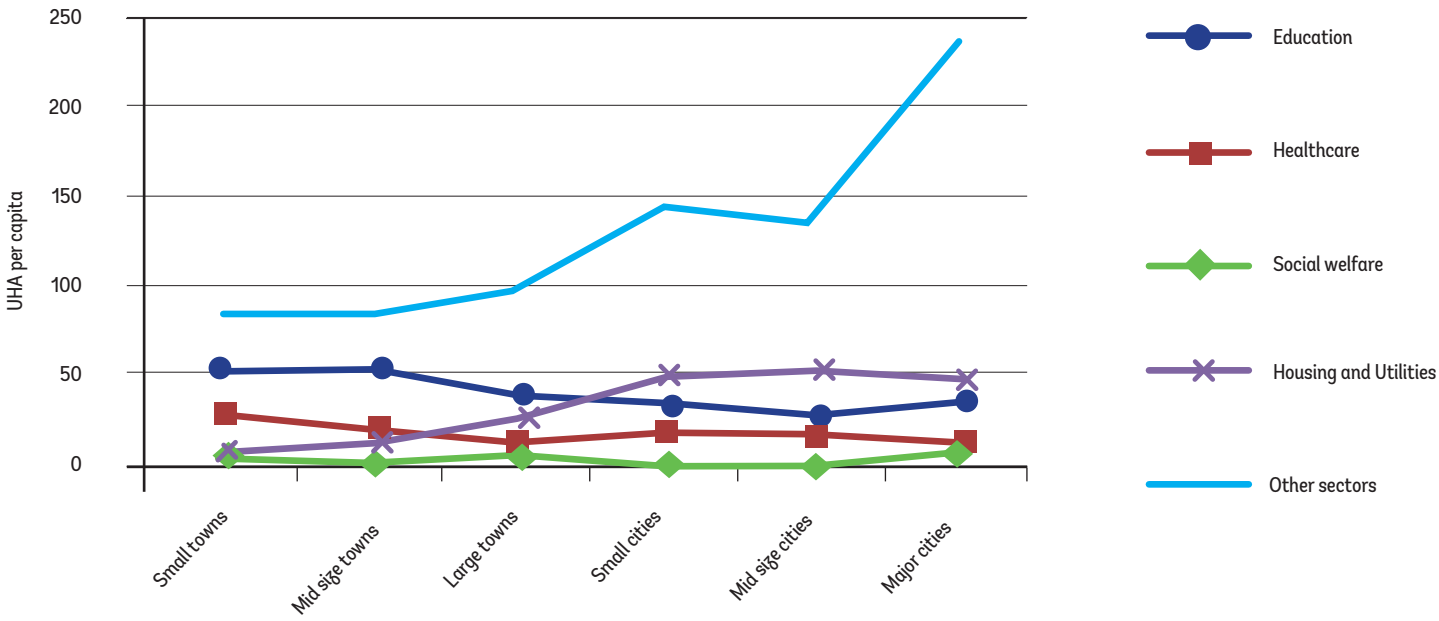
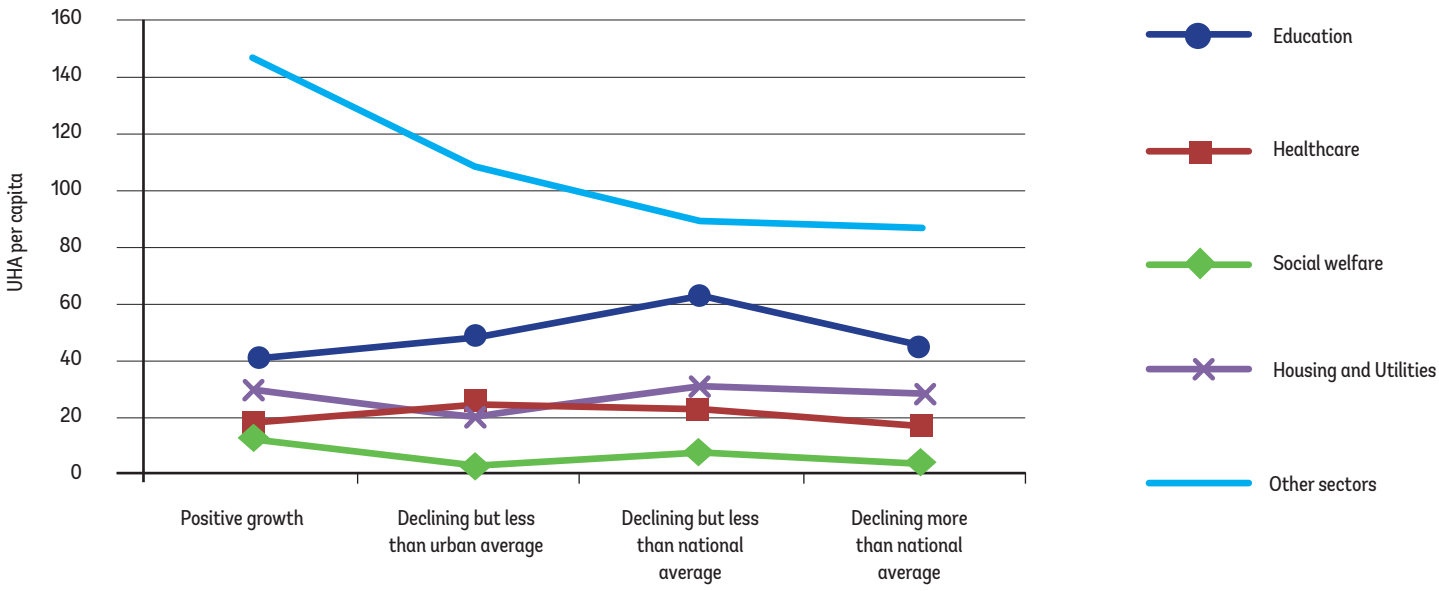


Figure 86 – Per capita capital expenditures by function and population trend, 2013



IV. Cities and the Fiscal System

This study examined public finances of all cities at all three tiers of sub-national government. Some of the patterns found in this chapter reflect the fact that different tiers of sub-national government had – and in the case of Kyiv still have – different assignments of revenue sources and functional responsibilities. Thus, larger cities tend to depend less on explicit grants, while relying more on non-tax revenues and locally-retained shares of national taxes. However, this pattern is not driven by demographic trends, but by the fact that larger cities tend to be at higher tiers in the administrative hierarchy of sub-national government. Thus, until 2015, a larger share of national tax revenue (e.g., PIT) was allocated to the budgets of higher-tier cities than to the budgets of bottom-tier cities.

While at 60,000 residents the average size of a Ukrainian city makes it possible for an average city to provide major social services, including education and health care, almost a quarter of the country's cities have fewer than 10,000 residents. While this might be too small to achieve the minimum efficient scale of provision, this challenge is somewhat mitigated by the fact that most major social services are delegated to the oblast and sub-oblast tiers, leaving sub-district cities responsible only for pre-school education and cultural/recreational centers. Nevertheless, there is an inverse relationship between population size and per capita expenditures, particularly concerning the Education and Social Welfare sectors.

In 10 percent of Ukraine's cities, per capita expenditures are more than four times higher than the median level. Although just 1.7% of the population of all cities, these outlier cities account for 10% of expenditures of all cities. The extremely high levels of per capita expenditures appear to be primarily driven by the small scale of service provision since the population of these cities is six times smaller than in an average city. Across all cities there are increasing economies of scale in all social sectors except hard municipal services such as Economic Affairs and Housing and Utilities. These economies of scale are particularly pronounced in the Education and Social Welfare sectors and primarily related to payroll costs and welfare benefits. As a result, larger cities allocate a smaller share of their expenditures to Social Security while a greater share is allocated to Goods and Services and Capital Investments. The share of city expenditures allocated to capital investments ranges from 1.6% in small towns to 9.4% in major cities. Per capita investments are lower in cities where population is declining more than the urban average.

While cities are housing the bulk of national population and driving the economic growth, until 2015 their fiscal fortunes had been determined by the overall system of inter-governmental relations in the country. This was particular true for sub-district cities – which relied on intermediation by district authorities in their financial affairs – as over 80 percent of city revenues were not locally-derived but came from retained shares of national taxes and other transfers. Despite attempts to introduce formal criteria for the allocation of inter-governmental financial resources, government transfers were not based on an objective demand for services but largely financed the existing network of service facilities and staffing. Such financial disincentives, combined with legal constraints on local government discretion in downsizing the network of facilities and their staff, impeded fiscal adjustments necessitated by demographic and economic changes. Not surprisingly, differences in expenditure patterns among different categories of cities had strong associations with the incidence of grants but little relationship to the amount of locally-derived revenues. By disregarding expenditure needs altogether, the new general-purpose grants can remove financial disincentives that optimize networks and staff in hard municipal services. However, by earmarking new subventions separately for Education and Healthcare, the new system can further entrench under-utilized social infrastructure unless the subvention formulas focus on service needs as opposed to capacity of existing facilities.

The only area where there is a clear relationship between city finances and a city's economic base is in the use of own tax instruments, which produced more revenues in cities thriving in all respects (sub-type A). Similarly, cities with higher population decline appear to raise less own-source revenues per capita. However, because these own sources of revenue

account for a tiny fraction of city revenues, they make virtually no difference in their financial condition. However, when the right incentives are embedded in the system of inter-governmental fiscal relations, even existing local tax instruments can be utilized more fully by city governments to generate more significant revenue. While for reasons of efficiency structures should be taxed less than land, the currently negligible levels of collection from this local property tax (less than 0.01% of GDP) can be significantly increased.

Until 2015, business taxes had been the most utilized out of all tax handles available to city governments in Ukraine. By far the largest per capita yield is observed for the Single Tax, which is paid by small businesses in lieu of the income tax and other national taxes. While taxation of businesses might be more expedient from both political and administrative perspectives, it is not as conducive to accountability and fiscal responsibility as taxing residents. Also, revenues from taxation of business are likely to be more volatile and thus can exacerbate the impact of urban decline. Revenues from property taxes, even when based on market values, are known to be less elastic.

As with the reliance on business taxes, derivation-based sharing of revenues from national taxes, such as PIT, can amplify the revenue impact of urban decline. Derivation-based sharing makes local government revenues more volatile than formula-based sharing of revenue from national taxes. Pooling the sub-national share of revenues from national taxes in a redistribution fund and then allocating to each locality on a formula basis would reduce the volatility of revenue streams for cities by offsetting cyclical fluctuations in tax payments from various businesses located in individual localities.

Furthermore, derivation-based revenue sharing makes it difficult to account for revenue capacity in the allocation of equalization grants. This is because there are no statistical indicators available that objectively capture differences in taxable bases at the bottom-tier level. By using lagged collections as a proxy for revenue capacity, equalization grants discourage mobilization of own revenues. By contrast, revenue sharing entirely based on a per capita formula, combined with adjustments for objective differences in expenditure needs, would provide each city with a predictable budget envelope and allow them to keep any gains achieved by rationalizing their expenditures. Formula-based revenue sharing combined with a hard-budget constraint can provide the right incentives for self-sufficiency.

While being more stable and predictable, formula-based sharing of PIT is not a substitute for a genuine source of own revenues. While derivation-based sharing has some of the same features of local taxes, only the latter can provide local revenue autonomy because – unlike revenue sharing – surtaxes allow local governments a certain measure of discretion over the tax rate, and thus the ability to control their revenue on the margin. Thus, while sharing of PIT can contribute to the financing of local governments, it does not contribute to achievement of a level of revenue autonomy by local governments and to their subsequent increased accountability and fiscal responsibility. High dependence on inter-governmental revenues raises the question of whether cities control their revenues or whether the revenues control the cities' policies.

Increased revenue autonomy can lead to greater accountability and creates the basis for local creditworthiness. First, endowing local governments with a degree of revenue-raising authority allows them to increase or decrease those expenditures over which they have responsibilities based on the needs of their constituency[110]. Second, local taxpayers will have a strong interest in ensuring that local officials use local budget resources wisely. Dependence of local governments on the revenue decisions of the central government (including decisions concerning sharing revenue from national taxes and most other forms of transfers) undermines the accountability of local officials to their constituency.

[110] Thus revenue autonomy does not require that local governments control (i.e., determine bases and rates) for all their revenue sources. It would suffice if they could increase or decrease rates for a few taxes that comprise a meaningful share of their revenues with the rest coming from the predictable and stable sharing of national tax revenues. However, there would be little revenue autonomy if any additional revenue from higher local taxes were almost entirely offset with a reduction in grants.

Broadening revenue-raising powers of city governments can be achieved through a combination of reforms related to tax administration and enforcement and tax assignment policy changes. Given that the most expensive local functions (Education, Health care, and Social Protection) are to be financed with earmarked grants starting from 2015, the remaining (own) local functions can to a large extent be covered by fully utilizing the 'tax handles' that have traditionally been given to local authorities throughout the world (user fees, property taxes, and betterment levies) as well some additional taxes, including vehicle and transportation taxes and a PIT surtax (or piggyback). While Ukraine's cities have always received a share of revenue from some of these taxes levied by the national government (land tax and vehicle tax), until 2015 they were passive recipients of these monies and thus could not affect this revenue on the margin.

The recent introduction of earmarked financing of social services, including Education and Health, should allow cities to focus on their core functions, such as urban infrastructure. However, local governments can also play an important role in the process of rationalization of the school network. Besides realizing the economies of scale in managing the network of schools – for example, by sharing specialized staff or custodial services among schools – local governments could also realize economies of scope in using the same facility for several functions such as education and culture. In these matters of coordination and rationalization, local governments have an information advantage over the central government. In addition, local governments can be instrumental in securing community consent for network rationalization by facilitating bargaining among affected parties (i.e., among winners and losers). For example, it is much harder to justify the closure of a school to the local community when the savings cannot be shifted to other services, which may be more critical for the community.

In the short term, the focus of reforms should be on increasing the yield of user fees and property taxes, and perhaps introducing several new local taxes. Establishing minimum rates for these taxes (as exists for the Single Tax) could be an effective way to make cities assume to a minimal extent their responsibility to collect own revenues. In the medium term, the reassignment of those other taxes from national to sub-national levels will bring very desirable improvements to city finances, including increased horizontal accountability of local officials to their residents and greater fiscal responsibility in expenditure and debt management at the sub-national level.

CHAPTER 3
Urban Planning and the Spatial Development

Key Highlights and Implications for Further Policy and Analytical Work

Urban planning in Ukraine bears the legacy of a centralized planning system. It is not sufficiently flexible to respond to market conditions and be an effective tool in developing the urban space. Centralized development of master and zoning plans is inefficient, costly and distant from realities on the ground. It is also not sufficiently transparent or welcoming to public input and debate. In addition, the planning framework is not equipped to adequately support strategies that reflect the reality of population loss and economic decline. Existing urban plans are aligned with national growth policies, and so propose expansions of housing and economic activity across all cities.

Recent steps orchestrated in the Government's Action Plan on Decentralization towards a planning reform, if implemented in full, have the potential to place planning at the local level, which will permit cities to determine their own priorities along their economic and social needs. It will promote a more transparent system resulting in plans more closely attuned to the actual conditions of growing and shrinking cities. Such changes will require increased funding and intense capacity building at the local level.

Going forward, urban planning and spatial development should take note of the continuous demographic changes and shifts in the country. Current mobility remains low and the high homeownership rate has prevented the widespread housing abandonment that characterizes typical shrinking cities in Europe and United States. Once mobility increases and people start migrating to opportunity, declining cities are likely to decline even faster, while the growing centers and agglomerations may experience peri-urban growth and sprawled development. In both cases, authorities will need to reassess how infrastructure is planned and maintained to ensure that shrinking cities continue to provide acceptable levels of service to their population at a reasonable cost, while growing urban centers are supported to further foster growth.

I. Regulatory and Institutional Framework

National Laws and the Reform Process

Urban planning in Ukraine has evolved since independence, but still bears the legacy of a centralized planning system inherited from the Soviet era, a time when urban development was under state control. The planning system has adopted international standards such as streamlining building permit procedures; encouraging public participation; and increasing access to planning information. However, the principal challenge remains: to bring legislation and practice in line with contemporary standards that allow increased flexibility for local level planners to manage development. As a result, local governments in Ukraine are yet to capitalize fully on typical urban planning strategies - attracting investment, revitalizing the housing market, modifying infrastructure, revitalizing city centers aimed at stemming decline, and focusing on reducing the urban footprint[111].

Over the past 20 years, urban planning reform in Ukraine shifted between centralized and decentralized planning models - and back - which caused disruption in local government's allocation of land and issuance of permits and stifled potential market demand for urban land. Three national-level laws were passed in this period to govern urban legal, regulatory, and institutional processes. Requirements for stakeholder participation and procedural transparency were modernized through two key national-level urban planning laws. The Law of Urban Development (1992) was Ukraine's first post-independence law that maintained the centralized Soviet system and gave primary planning, monitoring and execution powers to the State Architectural and Construction Inspection Agency (SACI). Under this law, regional and district councils had secondary planning authority, while local government's function was to simply monitor implementation of government programs. The law did, however, give local governments the power to approve planning documentation on territory located in their jurisdiction. The subsequent Reform Law of Urban Planning (2011) simplified planning procedures. However, while local government obtained the power to plan and influence land use, spatial development, and zoning ordinances, they did still not have the power to prepare Master Plans themselves. Instead, these continued to be prepared by a central planning agency. Furthermore, although the 2011 law mandated cities to have master plans and new zoning plans within months of the law's approval, no funding was made available to cities to make these provisions a reality (See Annex VIII for more detail). In the absence of a mandated plan, many local governments temporarily stopped re-allocating land plots and issuing local permits in the absence of transitional arrangements; this stifled market-led spatial and economic development. At the same time, another 2011 law – Law on Regulation of City Construction Activities and State Construction and Architecture Control – streamlined the planning development process by reducing the time allowed for government to process and approve permits and certificates from 415 days to 60 days.

A series of so called centralization laws[112] approved between 2012 and 2014 further shifted urban planning powers from regional and local governments back to the executive branch of the central government (See Annex VIII). The overall effect of these laws with respect to urban planning was the re-centralization of previously local functions to the national level, including zoning ordinances, building contracts, permits, and communal housing. In doing so, the 2012 laws placed tremendous administrative burden on the Ministry of Regional Development, Construction, Housing and Communal Services (MinRegion) without providing commensurate increases in human or financial resources, thereby limiting implementation of the law's new provisions. The Law increased the authority of the central government in urban planning, further diminishing the power of regional and local governments.

[111] Empirical studies from other countries suggest that economies of scale in the delivery of municipal services are mostly exhausted at an average size of 10,000 inhabitants, even though there are some special services, such as urban transportation and solid waste utilization, where economies of scale improve up to the size of 100,000 inhabitants (Lago-Peña and Martinez-Vazquez, 2013).

[112] In 2012, a series of so-called 'centralization laws' enacted by the national government mandated changes to a variety of laws including those concerning urban planning.

However, recent government initiatives, within the context of overall decentralization reforms in Ukraine, support the delegation of urban planning functions to the local level. The Government's Action Plan on Decentralization, published in December 2014, and the 2015 amendments to the Law on Regulation of City Construction Activities and State Construction and Architecture Control, if implemented in full, would permit cities to determine their own planning priorities according to their economic and social needs. The reforms would also permit private development actors to have full access to planning, zoning, and building information in order to facilitate a well-functioning land market. These recent developments would bring current urban planning practices in line with contemporary international standards that allow increased flexibility of local level planners in managing development.

Partly due to the fact that it is mostly centralized, Ukraine's planning framework does not adequately support strategies that address the reality of population loss and economic decline. The one exception is the Law on Master Scheme of Territorial Planning of Ukraine (2002), which requires cities and other settlements to develop general city plans and detailed territorial plans based on demographic forecasts. This should ideally capture cities that are potentially shrinking or declining in population. However, there is little evidence that this law has been effective in guiding planning for such declines. In general, existing urban plans are aligned with national growth policies that propose expansions of housing and economic activity across all types of cities. While these policies are suited for cities that are growing, they do not correspond with the realities of declining cities. These urban plans do not propose alternative uses for underused industrial districts, brownfields, or abandoned buildings; such plans lock land from use and represent a lost economic opportunity. Elsewhere, increased flexibility in urban planning has allowed declining cities such as Dresden in Germany to undertake alternative development paths and adapt to demographic changes.[113]

Enforcing new regulations that have decentralized functions to the local level requires systemic changes including increased funding and capacity building. Today, planning regulations required by law often remain unimplemented due to insufficient funding or capacity. Many city-level General Plans[114] (hereafter referred to as "Master Plans"), as well as local zoning information, are outdated. Other planning elements, such as the requirement for citizen participation, are ignored or subverted. Decentralizing urban planning places more responsibilities on local bodies; however, it can only be an effective local development tool if local governments are enabled with the right set of capacities and financing.

Urban Planning Institutional Framework

The urban planning policy framework in Ukraine is fragmented between the nation's legislative and executive bodies and other public stakeholders. Various committees, ministries, agencies, and associations are responsible for elements of urban planning policies that span physical, economic, and cultural development (See Table 15 and Annex VIII). On the legislative end, two Verkhovna Rada (Parliament) Committees develop laws independent of other government institutions. In addition, several central government ministries – the Ministry of Economic Development and Trade, the Ministry of Culture, and MinRegion – make planning decisions within their respective areas of responsibility, i.e., economic development, culture, and construction. Among them, MinRegion makes the majority of planning decisions. It is responsible for the development and implementation of national policy on urban planning, architecture, housing construction, and formulation of regional development policy. MinRegion also monitors the implementation of urban planning legislation and initiatives. Other public players include the state scientific and research institutes, the most important among which is the Ukrainian State Scientific Research Institute for Urban Planning (Dipromisto). Dipromisto develops the national and regional General Plans and the city-level Master Plans as discussed in the next Section.

[113] Dresden experienced a cycle of initial decline and regeneration between 1990 – 2002. In this period, the city went through three different phases of planning policy – Phase I Ignoring Shrinkage/Going for Growth (1990-1995); Phase II Urban Restructuring (1996-2001); and Phase III Re-urbanization (2002-onwards).

[114] For ease of reference, this chapter will refer to the city level General Plans as Master Plans to avoid confusing them with the national and regional level General Plans.

The division of planning functions between government bodies creates structural challenges, ambiguity, and duplication of efforts to formulating and implementing planning policy in Ukraine (Table 15). For instance, MinRegion authored the Reform Urban Planning Law of 2011. Then in 2012, the Verkhovna Rada passed the centralization laws limiting city governments' planning powers and contradicting the Reform Urban Planning Law of 2011. Another consequence of the current institutional set up is that it perpetuates potential conflicts of interest between agencies. For example, Dipromisto defines the parameters of city-level Master Plans, but it is also the primary generator of such plans.

Table 15 - Urban planning and spatial development institutions

Executive	Legislative Brunch	Local legislative Regional and Municipal Authorities	Other Public Players
Ministry of Regional Development, Housing Construction, and Communal Services. Agencies under its authority: 1) State Architectural and Construction Inspection (SACI) 2) State Service of Geodesy, Cartography and Cadastre (merged in 2015 with State Agency of Land Resources and Cartography Agency) 3) State Agency of E-government Ministry of Ecology and Natural Resources of Ukraine Ministry of Economic Development and Trade Ministry of Culture	Verkhovna Rada Committees: 1) Committee for Construction, Urban Planning, and Communal Housing 2) Committee for State Construction, Regional Policy, and Local Self-Government	Oblast and raion state administrations, including regional representative offices of national agencies and ministries Oblast and raion councils City councils and their executive committees	Three state research and scientific institutes: 1) Scientific Research Institute Dipromisto 2) Scientific Research Institute of City Construction 3) State Company "Ukrainian State Scientific Research and Planning Institute of Civil Construction" Communal enterprise "Institute of Master Plan of Kyiv" Association of Ukrainian Cities Association of Small Cities of Ukraine Eastern Ukrainian Centre of Community Initiatives

Another consequence of the current institutional set-up is that local governments are developing informal Strategic Plans, which are not connected to the Master Plans, in an effort to wrest some control over their development. Strategic plans, discussed in the next section, are developed by local government often with support from donor organizations, whereas Master Plans are developed by Dipromisto and approved by the MinRegion. Ukraine's centralized planning system requires Master Plans for every settlement, but accords settlements little latitude in determining the content of those Plans. Consequently, local governments have often chosen to generate strategic plans that take into account local views but that have no formal relationship to the Master or General plans.

The overarching consequence of the current system is that it has rendered urban planning inflexible. Ukraine's planning system is centralized and often cannot take into account local conditions. The central government generally lacks the flexibility or mechanisms to consider special conditions or local contexts, presenting particular challenges for smaller cities that may need sensitive, small-scale planning policies to suit their particular conditions.

II. Spatial Planning

Ukraine sets a demanding standard by requiring spatial planning at all levels, from the scale of the entire nation to the level of individual buildings, contrary to international best practice[115] and with implications at the local level where contexts and needs differ from city to city. There are three levels of spatial plans in the country, all of which are referred to as "General Plans" and are further classified by the administrative territory they cover – national, regional, and local/city-level. Under the current fiscally-strained condition of the country, planning standards are difficult for officials to meet. Local General Plans (aka Master Plans) are time-consuming and expensive to produce and to update. National planning institutes such as Dipromisto lack the staff to create and update local Master Plans, and cities do not have enough resources to commission them. As a result, many Master Plans are old or outdated. In cases where sufficient resources exist, as in Kiev, political disputes sometimes derail the effectiveness of the Master Plans and this in turn puts lower-level planning decisions (e.g., zoning ordinances) on hold as they do not conform to the city's Master Plan. Further, zoning standards are predicated on city growth, but most Ukrainian cities are no longer growing. Even when Master Plans are produced and updated, the task of creating and altering lower-level zoning and building codes is too costly for fiscally-strained city-level planning departments to meet. A final challenge is that if zoning and building plans (i.e., architectural designs) exist, they are most often not made public, so it is impossible for interested private-sector actors (e.g., developers) to access them.

General Plans

Ukraine has a national hierarchy of plans. At the national level, Dipromisto is responsible for developing the "General Scheme for Planning of Territory," or the General Plan of Ukraine, which essentially is a land-use planning and strategic planning document for the nation (See Box 9). All subsequent spatial plans/general plans for regions, municipalities and settlements are to conform to the General Plan for Ukraine, making the system inflexible and many times non-responsive to local situations. Below the General Plan of Ukraine, Dipromisto[116] also creates Regional General Plans for cross-border zones, oblasts, and districts. As with cross-border zones themselves, the plans may spill over the administrative boundaries of a specific district.

[115] This national plan, or General Plan of Ukraine, is another legacy of Soviet-era planning where Territorial Spatial Plans were prepared for the nation. Best practice suggests development of regional plans, city master plans, and local zoning plans and architectural plans /design of buildings.

[116] Dipromisto's role in preparing General Schemes for 27 territories in Ukraine was adopted into law on February 7, 2002. Ordinance: No. 3059-III.

BOX 9: TYPES OF URBAN/SPATIAL PLANS IN UKRAINE

***General Scheme of Territorial Development of Ukraine or General Plan of Ukraine*:** The purpose of the General Plan of Ukraine is to establish a spatial land use plan for the territory of Ukraine; create and maintain elements of the plan that ensure Ukrainian citizens have access to adequate housing, environmental protection, healthcare, and protected historical and cultural monuments; and determine national priorities for housing, industry, engineering, transportation, and social infrastructure. The General Plan includes data about the following national elements: Geo-strategic and geo-economic data; land, water, forest, recreational, and medicinal natural resources; the demographic, scientific, manufacturing, historical, cultural, and tourist potential of international and state significance; networks of settlements; social, engineering, and transport infrastructure; investment policy; and the environmental situation.

***General Plans at the regional level (aka Regional Plans)*:** General Plans are created at the regional level for cross-border zones and oblasts. These regional plans guide land and industrial uses, conservation areas, and regional infrastructure relative to the resources and needs of each district/oblast. Plans for oblasts focus on land-use proposals, housing settlements, and evaluations of the area's urban development potential.

***Local General Plan (aka Master Plan)*:** Local General Plans are city-level plans commonly known as Master Plans in many countries. The Local General Plan represents the overall development vision and spatial growth of a city, providing an essential legal basis for land-use regulation such as zoning and sub-division control, and including plans for schools, housing, green spaces and other civic infrastructure based on population forecasts. Per international norms, a modern master plan should present a unified and compelling vision for a community, derived from the aspirations of its citizens, and establish the specific actions necessary to fulfill that vision.

***Zoning Plans*:** Areas of land within a city or municipal limit are divided by appropriate authorities into zones within which various uses are permitted. Thus, zoning is a technique of land-use planning used by local government urban planners in most developed countries. Zoning ordinances define land uses in a community, whether commercial, residential, industrial, or recreational, and they benefit the community by establishing design standards for that land use.

***Detailed Plan of Territory*:** According to Reform Law of Urban Planning (2011), there is a 5th tier of spatial planning. Cities with populations exceeding 50,000 should also develop a "Detailed Plan of Territory" for individual micro-districts and estates of the city where new construction activities are planned. These plans should be discussed with the local community, approved by the local council, and made accessible to the public.

Ukrainian planning legislation requires that all cities of over 50,000 inhabitants produce Local General Plans also known as Master Plans.[117] Master Plans are produced by government-run Planning Institutes, the principal one being 'Dipromisto.'[118] Dipromisto generates Master Plans for most oblast capitals, except for select cities, like Kyiv, that develop their own. Kyiv has its own planning institute, the "Institute of General Plan of Kyiv." Master Plans developed in Ukraine for cities, towns, and villages require detailed zoning plans for housing, schools, green space, and other civic infrastructure. They are produced on an ongoing basis at the request of cities and are theoretically formulated according to a city's future development trends.

[117] Law on Regulation of City Construction Activity #3038-17, 17.02.2011

[118] The other two planning institutes are the Scientific Research Institute of City Construction and the Ukrainian State Scientific Research and Planning Institute of Civil Construction.

Resource constraints and the monopoly of Master Plan preparation at the central level has resulted in many cities not having completed or updated their Master Plans, limiting local governments' ability to manage their land and property resources efficiently. A review by MinRegion in May 2013 showed that only 62% of all oblast capital cities, 42% of cities of raion significance (or provincial centers), 21% of urban settlements, and 14% of villages had Master Plans[119]. In addition, only 33 zoning plans were developed across all of Ukraine and 624 detailed plans of territories. Dipromisto and two other planning institutes which are developing spatial plans for cities and territories are understaffed, overworked, and often find difficulty keeping up with demand to complete local plans by the stated deadlines. Also, Dipromisto's charges tend to be cost-prohibitive for smaller cities with limited budgets. Further, since in practice, plans produced by Dipromisto are typically the ones recognized as official, Dipromisto is the preferred agency for cities (See Figure 88); consequently, it has a backlog of Master Plan development, leaving cities with outdated local plans. International practice holds that while there may be one regulatory agency at the national, regional, or local level to approve urban plans, the production of plans itself is open for outsourcing.

However, legislation that requires plan production through state planning institutes has been recently revised to permit plan production by private enterprises licensed by the state; however, this legislation has yet to come into effect.[120] These recent changes effectively eliminate the monopoly of state research institutes in architecture and planning control and open the possibility for inclusion of the private sector. When implemented, these changes should bring much more flexibility and local control to urban planning, which could then be used more effectively as a development tool by local governments. Competition from the private sector should also 'incentivize' all plan makers, including planning institutes, to update their planning procedures.

The great discrepancy between planning laws and actual planning practice in Ukraine reduces public trust in the planning system. The planning laws in Ukraine dictate the development and publication of planning, zoning, and building documents; require public participation in development procedures; and outline clearly understandable steps for obtaining building permissions. In practice, these policies are not always followed. Master Plans are often non-public documents and often not implemented. Zoning ordinances are irregular and do not conform to Master Plans. Procedures for obtaining development and building permissions remain overly complicated; this allows for an increased role for intermediaries that are hired by private developers to facilitate the process, increasing the probability of corruption.

Master Plans are made public only partially, encouraging land development speculation rather than guided private sector investments, contrary to the objectives of the Master Plans themselves. While Ukrainian cities are required by law to have Master Plans, and public input and hearings on planning decisions, including the production of drafts, is also required in practice, the Master Plans themselves are not always public documents in practice. In Kyiv, for example, the official Master Plan "GenPlan 2020," is not fully available online. However, Kyiv's Genplan 2025, which is still under preparation, is available online in accordance with recent government efforts to increase public access to information. Although explicitly required to be public by a 2011 law[121], Master Plans are yet to be fully public documents in some cities. This partial secrecy at the local level stands in strict contrast to strategic plans, discussed later, which, by their very nature are stakeholder-driven and fully public documents that are also generally available online. However, this local-level secrecy may be changing; in response to laws passed in 2011 with regard to improving public information, MinRegion – as the responsible agency for planning – is gradually introducing e-governance to improve transparency and public access to information. A review carried out by MinRegion found that cities are slowly starting to publish their plans online; in 2013, 73 cities published their master plans online, while in 2014 this number grew to 169 (representing 40% of the total number of Master Plans developed). MinRegion's aim is to have all updated Master Plans for all types of settlements online by the end of 2015.

[119] http://www.minregion.gov.ua/attachments/content-attachments/1067/2330.05.13.pdf

[120] Law No. 1546 was approved on 9 April 2015 and signed by the President in June 2015.

[121] Article 14 of 2011 Law No. 3038-17

Figure 87– Hierarchy of spatial plans produced by Dipromisto (2013)

Further decentralization of the planning system would give planners additional powers to formulate Master Plans and zoning plan recommendations responsive to city and stakeholder views at the local level. Decentralization of planning powers that allowed city-level planners to amend local Master Plans would enable city planners to add zoning incentives consistent with the public interest to make a property more attractive for a developer. This would promote a well-functioning and transparent urban planning system as a strong tool used by local governments to take stock of a city's growth patterns and economic needs and plan towards a shared economic and spatial development vision. This could result in plans more closely attuned to the actual conditions of shrinking cities and that more closely reflected the desires of city-level stakeholders.

Strategic Plans

Strategic Plans emerged in Ukraine as an independent process in line with international standards, and, although not replacing Master Plans, they have filled a gap in cities lacking updated Master Plans. Strategic Plans focus mainly on socio-economic development, seeking to enhance city competitiveness and seeking to improve access to and quality of local infrastructure and services. These plans essentially help guide city leadership in implementing socio-economic policies. The Strategic Plans are locally-produced documents, existing in parallel to Master Plans that focus on social and economic strategies to connect physical and spatial planning. They are often funded by and produced with assistance of external donors. Many cities in the world produce Strategic Plans in addition to Master Plans. Kyiv, for example, developed its City Development Strategy (CDS) for 2025 with the support of Cities Alliance and other partners such as the Fund of Effective Governance (see Box 10). The development of Strategic Plans such as CDSs permits municipalities to agree on a vision for future development in a consultative manner with key stakeholders and the general population. The development vision is derived by analyzing a city's economic strengths, weaknesses, opportunities, and threats based on a detailed diagnostic of its local economic potential, existing infrastructure, and other local and regional advantages compared to neighboring cities and states. To achieve the development vision, cities agree on strategic action plans and investments that can guide capital investment plans of the local government or attract donor and private investment in the future.

Strategic Plans are viewed as useful exercises for strategizing on socio-economic issues; however, they are not effective tools to ensure implementation unless accompanied by funding. It should be noted that these plans should not be used as a replacement for land use and zoning plans and cannot be used, for example, to determine changes in land use for individual buildings or plots in 'brownfield' areas that may be suitable for redevelopment. Strategic Plans are often perceived by city stakeholders as having more relevance for the city than formally produced and approved Master Plans simply by the fact of the Strategic Plan being locally prepared by relevant stakeholders. The introduction of Strategic Plans into the urban planning process of Ukrainian cities is a welcome development; the Strategic Plans could inform updates to Master Plans by helping incorporate the latest economic and social projections for a particular city and ensuring that public interests are at the forefront of the planning process. In contrast, Master Plans are periodically-produced documents with a long-term horizon of 15-30 years. The shorter planning time horizon of 5-10 years in Strategic Plans make these plans easier and possibly cheaper to produce. They can, among other benefits, inform regular updates and amendments to the Master Plans and other spatial planning documents.

Zoning Plans

The 2012 centralization laws mandated centralized development of local zoning plans; this is likely to prove inefficient and costly since it is distant from realities on the ground and it is also contrary to best practice. Local planners know their city's needs better and are in a better position to determine the spatial growth pattern and constraints. It is for this reason that zoning plans globally are generally prepared by city-level planning organizations. Central government-generated zoning plans encourage building developments that do not conform to existing and/or projected development scenarios. Developers are technically required to consult with the city authorities, incorporate the Master Plan, and to hold a public hearing before moving forward. In fact, approvals are provided based on by the zoning plans produced at the central level, which may not reflect the views of city officials and residents. The issue is further complicated by weak oversight and enforcement in investigating unauthorized building construction across the country. The planning laws should place the development of zoning plans, zoning ordinances, and building permitting functions at the city level as per global best practice. Such reforms should be accompanied by appropriate capacity-building and training at the city level; local governments currently lack expertise in zoning issues and this perpetuates dependence on central agencies located in Kyiv. In addition, zoning plans should be regularly updated, legally enforced, and publicly available online. The current

status of zoning plans as de facto non-public documents is a holdover from the state-driven economy and hampers the normal functioning of land development based on market demands.

BOX 10: KYIV 2025 CITY DEVELOPMENT STRATEGY (SUPPORTED BY A CITIES ALLIANCE GRANT AND OTHER PARTNERS)

Development Vision:

By 2025, Kyiv will become an innovation center for the Eastern European region with a strong competitive position and clear development priorities. This city has maintained and is developing its unique identity and its historical legacy. It constantly improves the standards of living for its residents and its own attractiveness for business. Its development will be implemented in close cooperation with businessmen and investors amid constant improvement of the system of governance and preservation of the city's greenery. On an international scale, Kyiv will be described as (1) Europe's greenest capital city; (2) the recognized meeting site of the West and the East; and (3) an environmentally-friendly city about which its residents pride themselves.

***Strategic Development Objectives*:**

• A two-fold increase in Kyiv's economic welfare indicators (gross regional product per capita) by 2025

• A considerable improvement in the major comfort-of-living indicators (a 1.8 percent increase in the comfort-of-living index).

What will the city of the future look like?		
Dynamic. encouraging innovations	Unique, preserving and developing its identity	Livable, improving its standards of living
Open for business	Clear, having a transparent system of governance	Green and well-balanced
Kyiv on an international scale		
Europe's greenest capital city	The recognized meeting site of the West and the East	The city which its residents pride themselves on

There is a lack of agreement between actual spatial trends and spatial trends projected in planning documents. A closer review of planned projects and actual land use changes for two cities made by the authors of this Chapter – Kyiv, a city that is growing, and Kherson, a city in decline – found irregularities in zoning and building planning procedures resulting in developments that contravene zoning laws. Development that was not projected in the planning documents was built and development that had been projected was not. Despite a detailed legal framework for applying for building permissions, violations of spatial guidelines were noted, particularly in Kyiv[122]. Permissions that had been granted for buildings surpassed zoning limitations sometimes to the detriment of adjacent historic buildings.

Zoning standards to accommodate shrinking cities have not been developed for Ukrainian cities although they are available and in use internationally. In the United States, for example, declining cities such as Youngstown, Ohio have revised their zoning ordinances in order to convert industrial and commercial districts to park land, recreational, and natural green areas. The re-zoning was first proposed in the Youngstown 2010 Plan.

[122] Author's observations based on a team field research visit to Kyiv in 2014.

Engaging Citizen Participation

Although citizen participation is a required element in Ukraine's development permitting, such participation is often limited. In practice, however, the process of involving citizen participation and consultations in planning is often not followed. Public hearings are required according to Article 13 of Ukraine's Self-governance Law, but the procedure for conducting public hearings[123] has yet to be fully implemented and local government agencies need to amend their city charters accordingly. As a result, the process is haphazard and subject to the will of political officials; consequently, proper public outreach is not ensured, a consistent schedule of public hearings is often not met (they are held as seldom as once a year), and citizens' suggestions during public meetings are sometimes subject to approval by national or local authorities.

An increasing number of cities have started to publicize their city plans, but the public availability of detailed zoning and building plans remains limited. This makes irregularities in the planning process more likely, since there is no way to confirm what officials have determined regarding land use or building status for a specific parcel of land. As the vast majority of cities do not possess GIS-based electronic systems, the lack of digital land and building information also inhibits an effective planning process.

Violations of planning regulations in Ukrainian cities reflect the lack of knowledge and enforcement of public participation rights. The government established "State Councils for the Development of Civil Society," but social accountability remains weak. There is no formal channel of communication or consultation with national government agencies on urban planning. Ukrainian residents are largely unaware of their public participation rights or are passive about attending public hearings. This is slowly starting to change, especially in Kyiv, which has had nearly 20 "bottom up" initiatives related to urban development policies. One of these initiatives includes opening the Kyiv General Plan, currently unavailable to the public, to input by the public. Civil society organizations are critical participants in nurturing, advocating, and facilitating public participation as provided for in the planning regulations. Further investment in information and advocacy campaigns is required in order to enhance the "demand" side of public participation and to achieve transparency of the information produced by government agencies. See Box 11 about the case of Detroit's master plan.

BOX 11: DETROIT (USA) MASTER PLAN

Detroit was once the fourth-largest city in the United States, but by the 1990s, it had lost over 800,000 people from its 1960 peak. The city had hollowed-out industries, diminishing population, significant poverty, and high levels of abandoned housing. Detroit began only around 2008 to attempt to confront most of these challenges on a city-wide scale.

Between 2010 and 2012, a new master plan, known as *Detroit Future City*, was prepared for Detroit. This was the city's first master plan since the 1960s and one of the first master plans in the United States that openly acknowledged shrinkage as a central element of future city planning and policy. The plan's development was funded by the Kresge Foundation, a Michigan philanthropy, and it was authored by a variety of national planning, engineering, and urban design consultants. The plan was issued in 2012 following a long public outreach and consultation process involving more than 3000 public meetings to gather feedback and ideas for the future of the city[124]. *Detroit Future City*'s overall vision accepted Detroit's loss of population, abandonment of housing and departure of industry, and the city's smaller and different future economic structure. Upon its launch, Detroit's plan was widely publicized and acclaimed throughout the United States[125].

[123] Decree of the Cabinet of Ministers on Ensuring Public Participation in Formulation and Implementation of State Policy #996, 3 November 2010.

[124] See *Detroit Future City* website at www.detroitfuturecity.com.

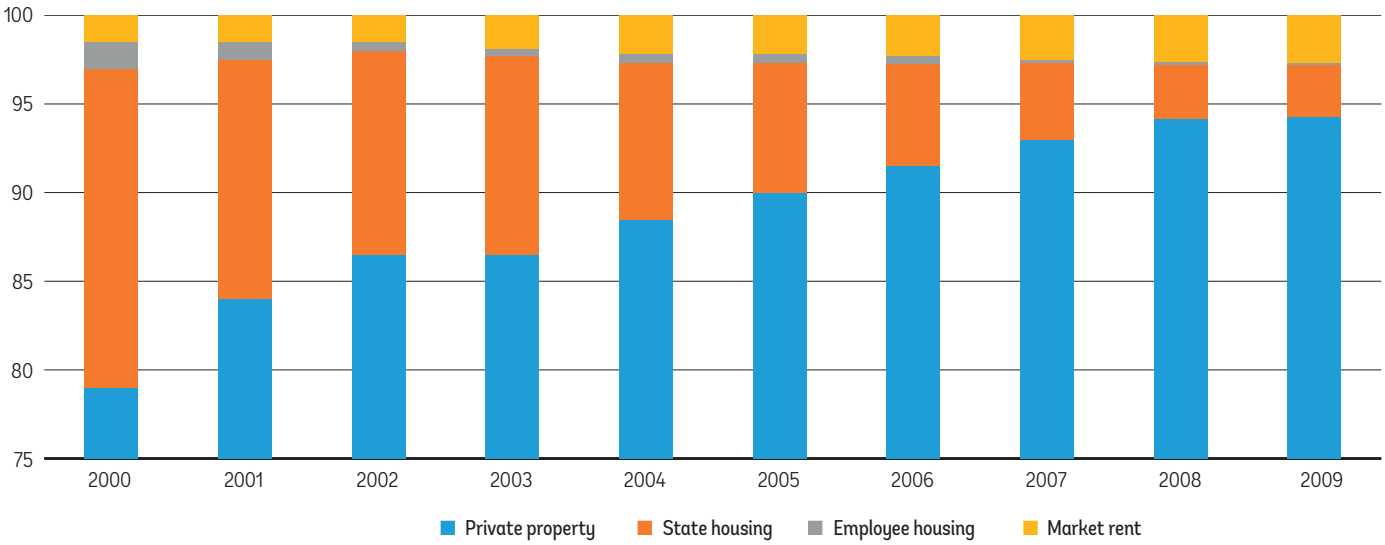
[125] "Detroit Future City" 2012 Detroit City Strategic Framework Plan.

III. Housing Market

Consequences of Demographic Changes On Housing

Ukraine's housing market is characterized by very high homeownership rates, few rental options, and very minimal mortgage holding. Privatization following independence from the Soviet Union in 1991 generated a homeownership rate of over 94 percent by 2010 (See Figure 88 and Figure 89). At the same time, the supply of new rental properties – a valid affordable housing option for the young and for urban migrants – has been very limited. In addition, very few households are able to obtain mortgages, so must finance a housing acquisition through other means (i.e., savings, family loans – see Figure 90). In fact, most households with average income in Ukraine cannot afford to buy a dwelling. The price to income ratio[126] stands at 16.8 in Ukraine, which is more than three times higher than Germany (See Figure 91). As a consequence of these conditions there is a substantial 'grey market' of undocumented rental arrangements featuring insecure landlord/tenancy rights as well as tax evasion.

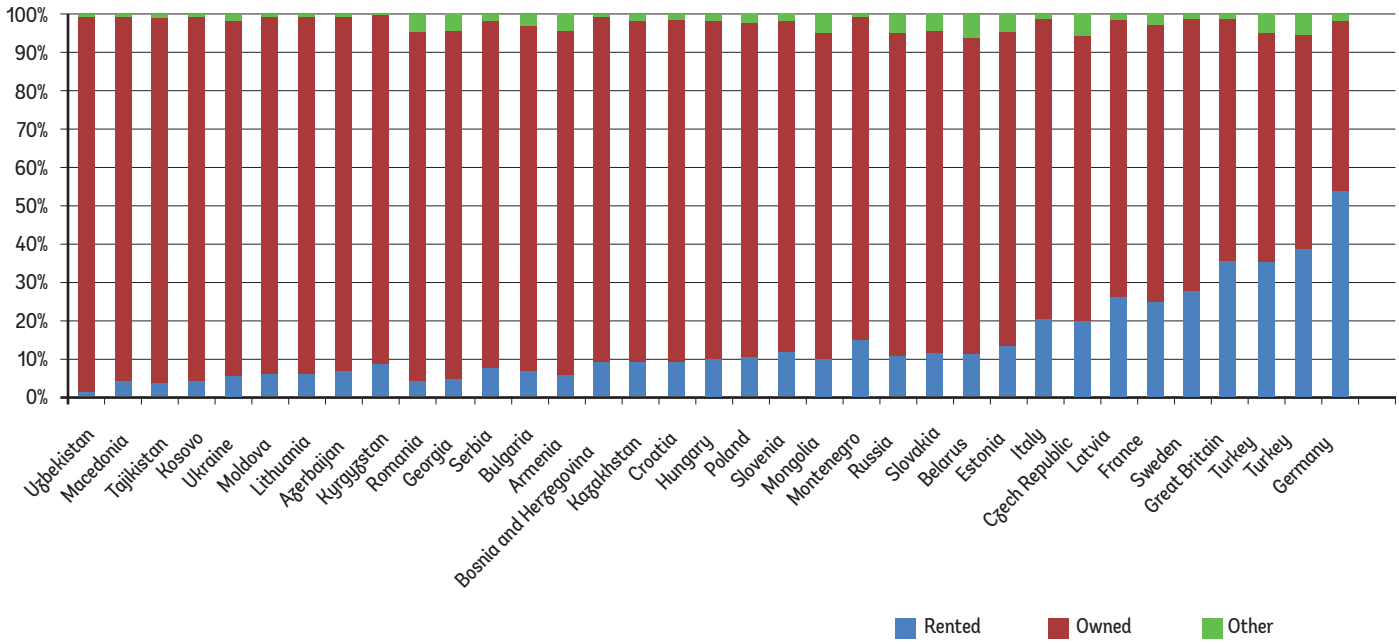
Figure 88– Dwelling stock by tenure status 2000-2009



Source: State Statistics Service of Ukraine

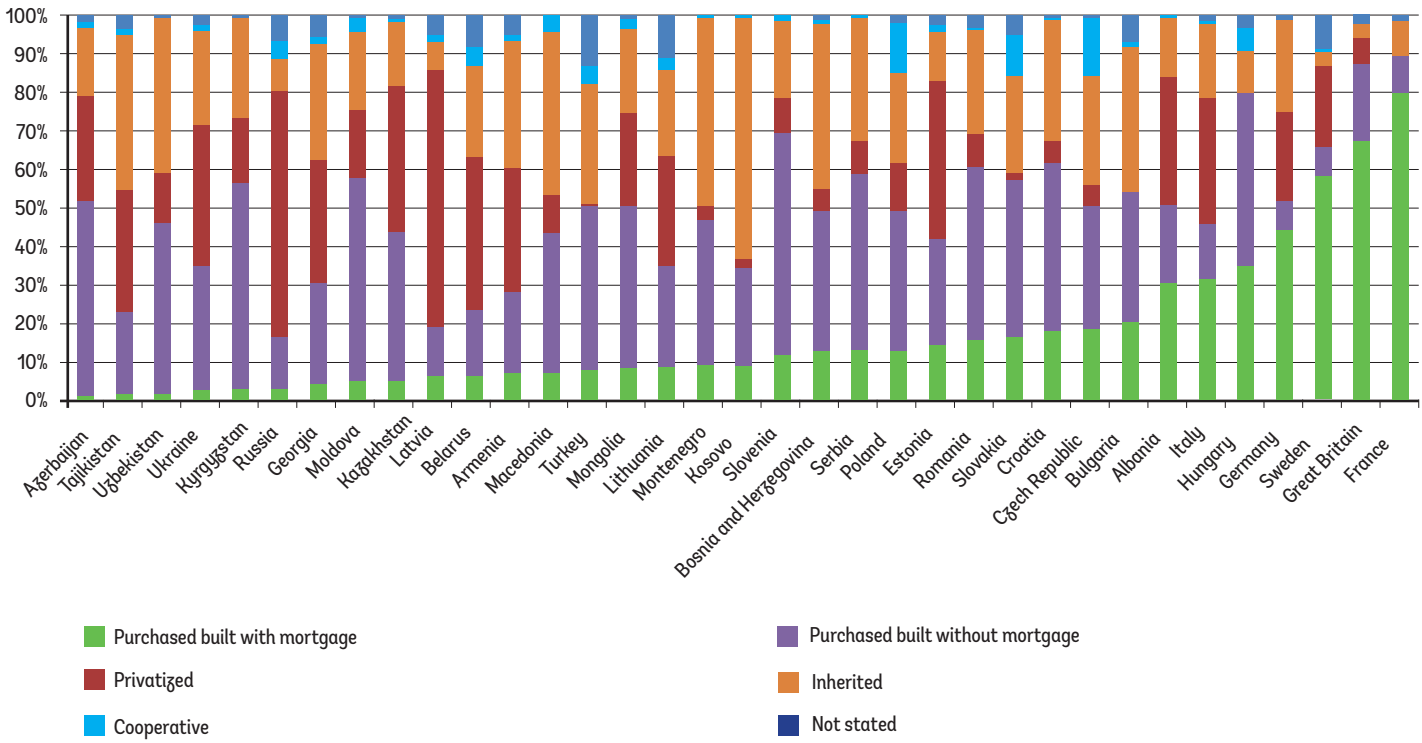
[126] House price to income ratio is the ratio of median house prices to median annual disposable salary (after tax), expressed as years of income. Median house price and median salary are taken as average for the set of cities inside the country. For example, Ukraine is assessed on the basis of 16 cities, including all major oblast centers. Observations for Russia include 24 cities across the country, Poland 22 cities, and the USA around 240. In the case of Ukraine, a person with average income would have to save for 17 years in order to buy a house.

Figure 89 – Dwelling stock by country



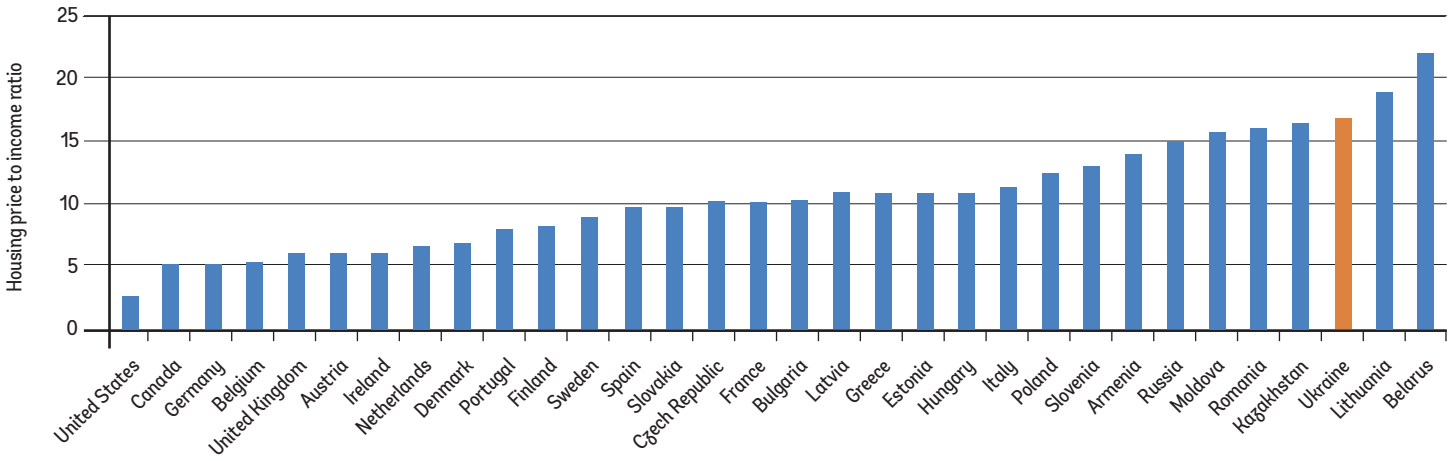
Source: Estimates from Living in Transition survey, European Bank for Reconstruction and Development and World Bank, 2010

Figure 90 – Level of mortgage penetration



Source: Estimations From Living in Transition Survey, 2010

Figure 91 – House price to income ratio



Source: Numbeo, 2011

Housing construction in Ukraine reflects the country's demographic transition and regional urbanization trends – discussed in Chapter 1 of this report. There are relatively high levels of new housing construction in Western Ukraine, which had Ukraine's lowest urbanization levels at independence in 1991. In 2010, the Western region's leader by numbers of commissioned apartments was Ivano-Frankivsk Oblast, with 5,540 apartments, which could be a reflection of the very high Night Lights growth observed in this oblast. According to a recent housing market and mobility study carried out by the World Bank, in the last five years this Oblast was one of the top-5 oblasts in terms of the number of apartments put into operation per 1000 residents. Other oblasts of Western Ukraine also showed higher than average levels of housing construction per 1000 residents[127]. Growth in the tourism sector and investments in recent years by Ukrainians working abroad spurred the housing construction activity. On the contrary, very low levels of housing construction were observed in the oblasts of Eastern Ukraine. In 2010 the number of new apartments built and occupied per 1000 residents was less than 0.63 (in Dnipropetrovsk Oblast. Although construction rates in bigger cities such as Donetsk, Kharkiv, and Dnipropetrovsk exceeded this average in 2010, they were lower than average in the West and, with the recent conflict are expected to drop drastically. Even during the construction boom of 2006-2008, the number of newly built apartments in these oblasts rarely was higher than 1 apartment per 1000 residents[128]. The region's sharp population decline and its existing high urbanization rates are likely the main causes of the low construction levels observed. As discussed in detail in Section 2 of Chapter 1, most cities and towns in the Eastern Region have been declining in population over the past two decades – a key factor for the substantial drop in housing demand.

[127] Lviv – 1.77; Chernivtsi – 2.27; Ternopil – 2.23. The same goes for neighboring Khmelnitsky Oblast – 2.47. Bureau of Economic and Social Technologies, Housing Market and Labor Mobility, September 2011 (Research Report Prepared Under Contract for the World Bank).

[128] Bureau of Economic and Social Technologies, Housing Market and Labor Mobility, September 2011 (Research Report Prepared Under Contract for the World Bank).

The very high homeownership rate in Ukraine, among other factors, has prevented the widespread housing abandonment that characterizes typical shrinking cities in Europe and United States. As discussed in Chapter 1, people in Ukraine are not migrating internally at expected rates; this is due to a combination of factors: very high ownership rates; limited access to finance, which makes it difficult to finance moving costs; and an underdeveloped housing market. In addition, in places where economic opportunities have declined, households find it difficult to find suitors to buy their dwellings and are hesitant to leave; this is particularly true for older residents who are generally less eager to move and more dependent on pensions. As a result, people in Ukraine have a high tendency to stay behind in shrinking cities, despite declining economic opportunities. Under improved housing market conditions, households (labor) mobility would be expected to increase, leading to higher housing abandonment in economically declining cities. This dynamic has been observed in shrinking cities in other countries (e.g., Cleveland, Detroit, Leipzig).

The quality and quantity of the multi-family housing stock is declining due to deferred maintenance and the cost of service provision.[129] City housing agencies provide collective services (water, heat, and electricity) to the substantial stock of existing housing constructed prior to 1991[130]. This housing stock consists of 19.3 million apartments, equivalent to 422 apartments per 1,000 residents. Here Ukraine lags just behind the EU-27 average (446 apartments) and is ahead of such countries as Poland (349), Slovakia (370), Romania (391), and Slovenia (410). As a result of de-population, the housing stock per 1,000 residents is likely to rise above the EU average (as discussed in the 'built-up area' analysis presented in Section 4 of Chapter 1). However, the quality of housing stock is much lower than the European norm. Three-quarters of all homes were built between 1945 and 1990 (See Table 15), and many of these have been poorly maintained. Necessary repairs on facilities such as roofs and elevators are often delayed or not undertaken; as a result most homeowners possess low-value properties in poor condition. Upkeep that will improve housing values and quality is often difficult due to the weak regulatory and enforcement environment relative to that ensured by the home-owners associations that are typical for multi-family residential buildings in Europe or the US.

Table 15 – Age distribution of housing stock

	Year	<1919	1919-1945	1946-1970	1971-1980	1981-1990	1991-2000	>2000
Ukraine	2010	4.7	11.8	49.2	16.2	10.7	4.4	3
Estonia	2009	9.4	14.2	30	21.5	19.6	2	3.3
Latvia	2008	13.8	13.1	22.1	19.4	20.2	7	4.4
Austria	2009	15.2	8.2	28	15.2	11.5	13.6	8.3
Netherlands	2009	6.9	13.9	27	17	15.4	12	7.9
Sweden	2008	12.1	14.7	37	16.8	9.4	5.5	4.6
Portugal	2008	7.4	10	21.9	16.1	18.8	17.7	8.1

Source: Housing statistics in the EU (2010); state statistics service of Ukraine; calculations[131]

[129] Ibid.

[130] Ibid, p. 12

[131] Ibid.

Inefficient or non-functioning land registration and title systems in Ukraine hamper development of affordable housing. Land costs represent a substantial part of overall construction costs and thus affect the availability of affordable housing. The transaction cost to acquire land through purchase or by having land allocated for housing by local government is non-transparent and costly. According to the World Bank's latest Doing Business report (2015), obtaining construction permits requires eight separate procedures, takes 64 days, and costs 10.2 percent of the warehouse value (one of the highest values in the region). Completing a property transfer requires seven separate procedures, takes 27 days, and costs 2 percent of the property value (one of the highest values in the region). Globally, Ukraine ranks 70th of the 189 economies assessed on the ease of dealing with construction permits and 59th on the ease of registering property[132]. Out of all 25 million plots of land in the country, only about 12 million plots are in the cadaster. However, the cadaster does not contain information about plots that were registered before the Land Code came into effect in January 2002. Registration of titles for land parcels and buildings is done by two separate agencies. Registration of property rights for apartments, houses and other buildings is done by offices of the Bureau of Technical Inventory that are attached to local administrations. The register is kept by the Ministry of Justice. Registration of land parcel titles is done by local offices of the State Service of Geodesy, Cartography, and Cadastre (in 2015, this was merged into the State Agency of Land Resources and Cartography Agency). As a result, it may happen that a land plot is registered to more than one person, increasing the risk of legal disputes. Access to municipal land for construction purposes is possible in two ways – land auctions and non-competitively. Both come with their own specific challenges and costs, and an assessment of risks and profitability of investment is complicated. Consequently, investors are left uncertain about various characteristics of a land parcel such as transport access, engineering services and infrastructure, environmental conditions, and restrictions on land use.

Incomplete urban planning documentation for most Ukrainian cities results in local government being unclear about the direction of development and the activities allowed on each land parcel.[133] The absence of Master Plans and detailed zoning plans in some cities tends to make urban development more chaotic, increasing the risk of congestion in growing cities and the risk of vacancy and unsold housing stock in shrinking cities. New construction often takes place at the expense of preservation of open spaces and parks within cities since the extension of boundaries for growing cities involves a complicated planning process leading to disputes with cities and the raions. Brownfields re-development is also problematic as it involves a lengthy and costly process of change in the type of land-use as well as necessary decontamination measures.

[132] World Bank, Doing Business 2015: Going Beyond Efficiency; Economy Profile 2015: Ukraine (Washington, DC: World Bank, 2014), available at http://www.doingbusiness.org/data/exploreeconomies/~/media/giawb/doing%20business/documents/profiles/country/UKR.pdf?ver=2

[133] Housing Market and Labor Mobility

IV. Planning as an Instrument for Managing City Growth And City Decline

Planning for Dynamic Growth

Cities that are experiencing growth in Ukraine are in theory allowed to extend their boundaries according to the mandate of a Master Plan rather than based on market demands; however, in practice the process is complicated and local authorities avoid shifting city boundaries, which has the stimulates uncontrolled urban sprawl. In theory, expanding city boundaries provides access to greenfield land that can be converted into high-density sub-markets under a state-driven planning structure that guides the type, location, and size of development. In reality, city municipal boundaries are fixed, but urban sprawl occurs nonetheless, extending development beyond the border of the city and making centralized planning efforts difficult. For instance, Kyiv's boundaries were expanded in 1961 and again in 2001, yet they do not reflect the full extent of the city. City boundaries are a political designation, but growth is more efficiently accommodated when boundaries are based on transportation, employment, and housing needs. These challenges are present in many countries, especially former Soviet bloc countries. Some countries address the issue by creating functional or administrative agglomerations comprised of a city and its surrounding areas where urban sprawl is the densest. This notion of city-regions is growing in popularity among planners in Europe, but the approach has not reached Ukraine yet.

Zoning is also not flexible or transparent so it is difficult to plan for growth beyond the boundaries of the Master Plan area, particularly in expanding sub-markets. Planning for growing sub-markets requires zoning that permits construction based on both current and future projections of demand. In practice, this "upper limit" of construction is often left flexible in zoning, so that cities can amend or permit variances to zoning that allow additional construction. In New York City, for instance, a shortage of land for additional construction of office space in mid-town Manhattan led the city to propose development and additional density there called the "Vanderbilt Corridor." In the Ukrainian context, there are several growth corridors, but zoning is inflexible without clear reference to demand.

Without strategic investment in infrastructure or services, growing cities accommodate new development in either existing areas or expand to the urban fringe. High land values in desirable areas of the existing city footprint drive up costs and often encourage over-development to recoup costs. On the other hand, lower land values on the periphery are driven up by the cost of extending services and infrastructure, resulting in sprawl. Further complicating development in Ukraine, many of the desirable sub-markets are historic areas with tight development controls including height restrictions.

Growing cities, particularly Kyiv, should establish Master Plans that project a growing future city, but that also protects valued cultural and historic resources such as parkland, green-belts, and historic areas. The land-use pattern of these cities, particularly in their 20th century housing and commercial districts, is characterized by low density and can easily accommodate new development without the need to re-develop parkland or historic areas. The recent development pattern of Kyiv, for example, to favor skyscrapers, ignores the central city's historic importance. An expanding economy also places pressure on existing housing by driving prices up, thus increasing the risk of displacement for low-income homeowners or renters, particularly in high-value, center-city areas. Local governments need to ensure housing strategies are in place at the local level to encourage private sector involvement in providing affordable housing. At the national level, planning reforms need to be put in place to promote the supply of affordable rental housing in the market. An expanding economy also places pressure on the transport system due to increases in jobs and in new commuters. The planning system must accommodate this increased pressure by constructing new transit lines and roadways.

Planning for Shrinking Cities

Many cities in Ukraine have demonstrated declines in many demographic areas yet are operating with Master Plans based on growth trends (See Box 12 for an example). Declining local economies have led to reduced demand for space and the abandonment of industrial, retail, and office parcels. Often, these abandoned parcels are extremely large, causing a large decline in the intensity of economic activity in the city. Gradually, over time, the footprint of the city begins to shrink or remains stable, creating a vicious cycle of population loss and declines in the quality of life. Unfortunately, a declining economy does not reduce the amount of infrastructure required for servicing remaining housing, manufacturing, office, and retail activities in the city.

Ukraine's planning legislation and strategic framework are based on expectations of growth rather than shrinking and redistribution. In a handful of growing cities, the processes of sub-division, zoning variances, and development permissions will continue to be needed. However, in most Ukrainian cities there are very few new residential structures and there is little demand for new industrial or commercial space. Indeed, in many cases, much of the existing commercial and residential space in the city lies vacant[134]. Ukraine's planning laws mandate a system that is fundamentally miss-aligned with the actual needs of the nation's cities, which remain unable to shape their own planning priorities as well as those of private development actors. Citizens are inhibited from accessing or understanding important planning, zoning, and building information. Meanwhile, further reforms of the 2011 legislation have been slow to be implemented.

Given these challenges, General Plans and Master Plans could incorporate new tools for managing decline and redistribution at both the national and city levels. These might include demolition of surplus industrial and dilapidated residential buildings, brownfield redevelopment, allotment of unused or unneeded land to stakeholders, zoning changes to enhance economic development of underused properties, and new spatial strategies that reflect the reduced need for housing and commerce in shrinking cities. Planning legislation should allow for differentiations in planning methodology to account for the mix of local growth and decline. For instance, in the United States, declining cities such as Youngstown, Ohio have revised zoning ordinances in order to convert underused industrial and commercial districts to park land, recreation areas, and natural spaces. This re-zoning was first proposed in the Youngstown 2010 Plan published in 2004[135]. Such zoning changes, if they were implemented, would most likely concern the reuse of abandoned industrial areas, rather than housing due to the relative stability of Ukraine's housing market.

BOX 12: DISCONNECT BETWEEN REALITY AND PLAN

The Master Plan for Kherson projects recreational areas along the Dnipro waterfront. According to some Kherson planners interviewed for this study, the plan is "not realistic; it does not depict the city's actual condition." Overall, Kherson planners regarded both the city's development condition, and the city's planning condition, as "frozen". Development was very limited due to the city's economic decline and Ukraine's overall political problems. At the same time, it was difficult to adjust planning norms such as the General Plan or zoning plans to reflect these conditions because of the centralized nature of Ukraine planning.

[134] Author's interview of officials of the City Administration of Kherson, 17 December 2014.

[135] See http://www.cityofyoungstownoh.com/about_youngstown/youngstown_2010/plan/plan.aspx

Shrinking cities in Ukraine face numerous spatial planning challenges, such as:

- Urban decline places pressure on the planning system to project new activities for abandoned or underused areas. This requires entrepreneurial action on the part of planning departments to project and attract new economic activities.
- Abandonment requires the re-tooling of Master Plans to accommodate changed or declining activities.
- Urban decline may also require projecting a shrunken or changed urban footprint. This is an activity that is unfamiliar to most urban planners and is not part of conventional urban planning practice.
- Maintenance of existing infrastructure is expensive and difficult. Projecting reductions of infrastructure proportionate to the reduction of both residents and economic activities may be a necessity, placing additional demands on the urban planning system.

Approaches to address shrinking cities differ internationally. While some cities plan to stem decline through incentives and investments, others focus on reducing urban footprints and increasing existing efficiencies. Urban planning plays an important and facilitative role for both approaches towards stabilization or growth. While the World Development Report (WDR) of 2009 takes a particular development view towards cities that have no hope for resurrecting economic activity, there is evidence that Local Economic Development efforts – where a city's economic strengths, weaknesses, opportunities, and threats are first evaluated and then used as a basis to re-invent a city's economic potential and development path – have led to the successful comeback of some cities (Dresden being a good example). New master plans geared for shrinking cities can project alternative land uses for underused industrial or commercial areas, including recreational or natural spaces. Community participation can help identify "bottom-up" opinions or interest in uses for underutilized spaces, and these opinions can be incorporated into General Plans. Zoning can be revised to permit a wider range of uses or to remove restrictions on properties that prevent their being re-purposed for alternative land uses.

Ukrainian policy makers may need to look internationally to find suitable planning models to develop policies for the country's shrinking cities. Germany provides an interesting model for future planning in Ukraine (See Box 13). Like Ukraine, Germany has a tradition of state involvement in urban planning, but it has a much stronger economy and a tradition of government transparency and citizen participation in planning decisions. Ukraine lacks these three latter factors. The USA model of urban planning, however, is not necessarily appropriate either. The US has extremely decentralized planning and a tradition of citizen participation in governance – both of which Ukraine lacks. Ukrainian cities also have large-scale problems like deindustrialization that are better solved by state policies at the national and regional level than they are by policies at the local level as in the United States. Ultimately, Ukraine will not be able to "copy" any country's planning system wholesale; reform of planning will have to accommodate those qualities of Ukrainian governance that stem from the country's history, while also accommodating concepts of governmental transparency and citizen participation that are less familiar to public officials and citizens of Ukraine.

BOX 13: NATIONAL LEVEL SPATIAL POLICY: STADTUMBAU OST AND WEST (GERMANY)

German reunification in 1990 catalyzed a substantial series of capital projects to reunify and rebuild the country. To date, the population of the area of the former East Germany has decreased by 12 percent, with nine percent of that decrease occurring during or after reunification in the 1990s.[136]

A national policy strategy came in 2001 in the form of Stadtumbau Ost (Urban Renewal/Restructuring East), a 2.5 billion euro initiative in six former East German states. In effect from 2002 to 2009 (and subsequently extended by the Länder for a second period to 2016), the initiative had a two-fold mission: 1) stabilizing the housing market by tearing down abandoned or underutilized buildings, and 2) upgrading inner-city districts, modernizing living conditions, and improving social infrastructure[137]. The overall goal of Stadtumbau Ost was to remove 350,000 unoccupied houses in order to stabilize the real estate market as well as attract private investment through redevelopment based on new housing construction (220,000 homes were demolished by 2007)[138]. The global economic crisis of 2008 caused more shrinkage, so Stadtumbau Ost proposed the demolition of nearly 350,000 more homes by 2016, the majority of which (217,000) were demolished after the formal conclusion of the program in 2009[139]. The Bund and Länder also spent 320 million euros to upgrade districts in urban centers through the adaptation of urban infrastructure, modernization or demolition of vacant commercial buildings, maintenance of historic buildings, and overall efforts to modernize living conditions.

In 2004 the Bund launched Stadtumbau West in areas of the former West Germany as a companion to Stadtumbau Ost. Between 2004 and 2008, the Bund, Länder, and city/local municipalities each invested one-third of a total of 738 million euros[140] spread across 300 cities[141]. For both Stadtumbau Ost and West, cities and regions were required to generate spatial plans in order to project visions for the future of the areas benefiting from the program. Many of these urban plans were recognized as innovative and attained worldwide visibility as a result of the involvement of leading architects and urban planners in their formulation[142].

[136] Pallagst, Karina, Thorsten Wiechmann and Cristina Martinez-Fernandez, eds., Shrinking Cities: International Perspectives and Policy Implications (New York, NY: Routledge, 2014); Werz 2001, Abwanderung.

[137] Shrinking Cities (2014); Urban Regeneration.

[138] Ibid; Glock, Birgit, and Hartmut Häussermann, "New trends in urban development and public policy in eastern Germany: dealing with the vacant housing problem at the local level," International Journal of Urban and Regional Research, Volume 28, Issue 4, pp. 919–929, December 2004.

[139] Goethe Institut 2009, Making Shrinking Cities.

[140] An additional 76 million euros was allocated to the initiative in 2009.

[141] Ibid.

[142] International Building Exhibition Urban Redevelopment Saxony-Anhalt 2010: Less Is Future (Jovis: 2010).

CHAPTER 4
Impact of the Current Conflict on the Urban System

The UUR was initiated prior to the ongoing conflict in Ukraine. Even though events related to the conflict are not reflected in the analysis undertaken for the UUR – due to the limitation of data sets from 1998 to 2013, the unavailability of recent and reliable data from the conflict areas, and the continuously evolving and changing characteristics of the crisis – the conflict is expected to impact the urban system in the country. To that end, the following discussion, drawing on the recent Eastern Ukraine Recovery and Peacebuilding Assessment, concerns recent events in Ukraine.

The Current Conflict

Ukraine's ongoing conflict has had a huge impact on human welfare and social and economic conditions in the East. The current conflict commenced with a political crisis that started in late 2013, followed by the referenda in Crimea in March 2014[144], and an intensifying conflict in Eastern Ukraine focused on the areas of Donetsk and Luhansk. In late 2014, the European Union, the United Nations, and the World Bank, under the leadership and participation of the Government of Ukraine, commenced the Eastern Ukraine Recovery and Peacebuilding Assessment (RPA). It was finalized in March 2015 and informs this present section.

The conflict has resulted in a significant number of displaced people. The RPA found that, as of February 2015, there have been 7,000 deaths, some 18,000 wounded, and over 1.6 million people displaced both internally and outside of Ukraine. Around 1 million persons are registered as internally displaced and another 640,000 have taken refuge in other countries, many in the Russian Federation. Out of the 5.2 million people that resided in conflict-affected regions prior to the conflict, at least 3.9 million have been directly affected by the conflict. Initially, the majority of the displaced were women and children. As the conflict deepened, the demographic profile of internally displaced people (IDPs) broadened to also include older and disabled residents. Figure 93 shows displacement as of February 2015.

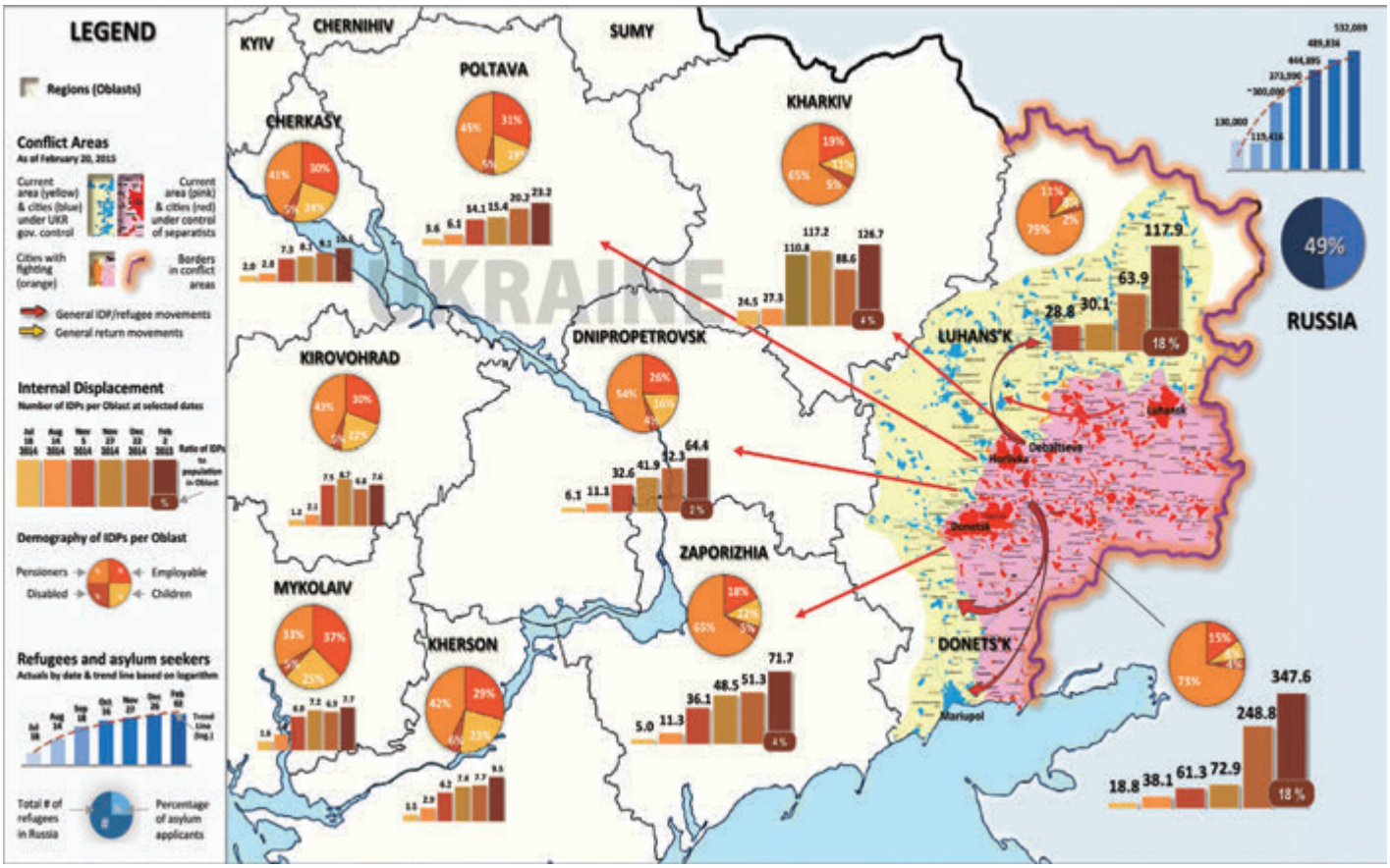
The displacement intensified as a result of a Government of Ukraine resolution to halt services in areas not controlled by the government. Government decree 875/2014 issued in mid-November 2014 closed all Government offices in areas outside the Government's control, halting funding of pensions, social benefits, and other services while also withdrawing support to schools and hospitals. Offices of Ukraine's Central Bank also closed, limiting access to cash and banking services. Pension and social payments are now only available to persons with registered residences in Government-controlled territory. This withdrawal of financial services and resources to Government-supported institutions deepened vulnerability and prompted outflows of some of the Donbas region's most vulnerable residents. There are indications, for example, of extraordinary numbers of pensioners leaving areas outside of Government control in December 2014-January 2015 and registering as IDPs in Government-controlled areas.

The majority of the displaced population seems to be concentrated in the areas close to the line of conflict. Over 96% of IDPs originated from the oblasts of Luhansk and Donetsk. Of these, 75% sought refuge in host communities within the five eastern oblasts. 49% of IDPs stayed within Luhansk and Donetsk, swelling the population of conflict-affected host communities nearest to the fighting. This is reported to be a typical movement pattern for IDPs, reflecting a desire to achieve greater physical safety, while remaining within a reasonable distance of home, relatives, property, and former livelihoods. The result is a concentration of the displaced into host areas that are poorly prepared to receive them; some cities host IDP populations that exceed by several times their original populations (See Figure 92).

[143] This section is based on and summarizes findings of the Eastern Ukraine Recovery and Peacebuilding Assessment (RPA). See World Bank, RPA: Analysis of Crisis Impacts and Needs in Eastern Ukraine: Synthesis Report (World Bank Group), March 2015, available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/05/14/090224b082e84fea/1_0/Rendered/PDF/Synthesis0report.pdf

[144] In March 2014, the Autonomous Republic of Crimea and the city of Sevastopol held referenda to join the Russian Federation, which were widely criticized and declared as having no validity in the UN General Assembly resolution 63/262

Figure 92 – Conflict and displacement in Eastern Ukraine (as of February 2015)



Source: Eastern Ukraine Recovery and Peacebuilding Assessment (RPA) February 2015

The displaced bear the intense human and personal cost of the conflict; however, IDPs also create a significant strain on local communities, services, and financing. Among other effects are a downward pressure on wages, and an upward pressure on food prices. The RPA found that health facilities and classrooms are oversubscribed in many areas and community services such as elderly care, child care, recreation services, and sanitation services have been affected as resource-poor authorities redirect their budgets to the immediate needs of IDPs. This fuels social fragmentation in host areas, further complicating the effects of the conflict.

The majority of the displaced in Ukraine have moved at least twice in the course of their displacement, while one-third of IDPs have moved three or more times. While repeat movements are typically driven by a search for secure, adequate, and reasonably priced accommodation, they should be understood as disruptive episodes in the lives of the displaced as they search for improved circumstances. IDP movements are driven by a variety of factors, such as the depletion of personal capital; limited access to services and assistance in new and unfamiliar areas; disinclination of landlords to rent to IDPs; loss of the ability of host families and family members to provide support; and the search for employment opportunities. However, many of the displaced have worked in the industrialized Eastern regions and have labor skills that are in less demand in the Central and Eastern regions. Repeated dislocations due to renewed physical safety concerns are also common as many of the displaced, seeking to remain near home areas, have had to flee repeatedly due to heavy fighting nearby.

The effect of the conflict on the local regional economy and the economy of Ukraine at large is significant. As the Donbas region historically contributed approximately 16% to the GDP and 25% to Ukrainian exports, the conflict in the East has had significant economic implications for the whole country. Trade disputes with Russia have further damaged the Ukrainian economy. Ukraine's real GDP is expected to decrease by 8% in 2014 and is forecast to contract by a further 7.5% in 2015,[145] while the exchange rate has heavily depreciated since early 2014. Over the same period registered unemployment has increased from 7.7% to 9.3% while employment opportunities are estimated to have decreased by 2 million. This is due to the fact that nearly 80% of the formal economy in Donetsk and Luhansk regions is not operational, resulting in decline of industrial production in the regions of 60% and 85%, respectively. However, the economic spillover of the conflict extends to the entire country.

The Urban System Following the Conflict

At the time of this report, the conflict continues to evolve; its long-term impact on both population movement and the economy at large remains to be seen. The joint assessment sees the situation in the East as likely to remain volatile and fluid for some time. To date, the RPA[146] assesses total damages to infrastructure and social services estimated at around USD 463 million. Damages to the transport and energy sectors constitute the bulk of the impact. Further, there are losses that have been incurred in various sub-sectors, but not fully quantified yet relating to diminished output capacity, increased production costs, the inability to efficiently transmit and deliver services as a result of infrastructure damage, and reduced ability of consumers to pay for services already received. Total recovery needs for infrastructure and social services are estimated by the RPA at around USD 1.3 billion. Needs are greatest in the transport, social welfare, and health sectors at USD 558m, USD 329m, and USD 184m, respectively. Needs estimates are built upon the damages reported to infrastructure and the reconstruction of impacted infrastructure to improved standards; the restoration of service delivery to individuals residing in Donetsk and Luhansk and replacement of facilities; and the provision of social services to individuals displaced as a result of the conflict (IDPs).

To contain the developmental impacts of displacement and leverage the skills and presence of the displaced for more positive outcomes for all, the RPA recognizes four key challenges: (i) delivery of services such as security, education, health, and social payments along with basic infrastructure in equal measure to the displaced and host populations, (ii) the displaced (re)gaining control of land and property, (iii) reestablishing livelihoods and social bonds that are disrupted by forced displacement and conflict and (iv) accountable and responsive governance and rule of law at the local level.
These are the barriers to durable solutions for Ukraine's internally displaced – and they are, at the same time, critical development challenges for the entire population of Ukraine. This approach is premised on the continuation of the IDP crisis for the foreseeable future and the associated strains that such population movements place on state finances, service delivery mechanisms, governance, and social cohesion.

Once conditions allow, the restoration of infrastructure and services in conflict-affected areas should reflect the new realities of geographic distribution of people and production. Even prior to the conflict, the area had largely obsolete and inefficient heavy industries, many of which were in decline. The area was a recipient of targeted central fiscal transfers (subsidies) and there was accumulation of wage arrears. Post-conflict rebuilding of assets should be guided by the expected numbers of returnees and should focus on restoring institutions, rule of law, and social cohesion as well as basic services for the population. This will ensure that people who choose to return and remain will have their basic needs met, and not be pushed out by the lack of schools, health services, and public security. Connectivity to the rest of the country

[145] World Bank estimations

[146] Recovery and peace building assessment : analysis of crisis impacts and needs in Eastern Ukraine (Vol. 2): Full component reports (World Bank Group), March 2015, available at http://documents.worldbank.org/curated/en/2015/05/24487461/recovery-peace-buiding-assessment-analysis-crisis-impacts-needs-eastern-ukraine-vol-2-full-component-reports

will be especially important to ensure re-integration of the conflict-affected areas.

The UUR suggests that even in areas not affected by the conflict, *push* factors rather than *pull* factors seemed to underpin internal migration. The conflict has further reinforced the push factors. The interplay of push and pull factors in Ukraine needs to be further analyzed. A first step in this direction would be to carry out a new census since the last census was taken in 2001. A set of public policies aimed to ease mobility (such as further developing the housing and rental markets) would benefit economic integration. One consequence of improved mobility could be that shrinking cities will shrink even faster, but the desired objective would be a set of conditions where people are pulled to cities with emerging economic opportunities. This will then permit the urban system to achieve its full potential as Ukraine's engine of growth.

While some of the UUR's findings related to individual cities may change as a result of population movements wrought by the ongoing conflict, its findings on trends, challenges, and opportunities for the urban system in Ukraine remain. Most cities, in the short- and medium-term, will probably continue to loose population. However, several cities in Ukraine – in particular those close to the largest urban centers – are growing, albeit slowly, and will continue to attract people in search for opportunities. This presents a dual challenge: city administrators, including planners, need to manage for urban expansion in the country's population growth centers while local governments of urban centers affected by population decline need to adapt their city strategies to reflect new demographic and economic realities associated with shrinking. Reforms should underpin a realignment of fiscal resources across cities and other local governments, and provide better incentives to local governments for efficient fiscal management and improved urban services.

In declining cities local authorities will need to re-assess how infrastructure is planned and maintained, and the way services are financed and delivered. Neighborhoods may need to be consolidated as cities lose density. Public service plans, designed for a larger population, may have to be re-considered to address lower demand. Many cities around the globe have successfully transitioned through periods of demographic decline and the main lesson is that, while challenging, opportunities exist for declining cities. If managed well, cities can "shrink better," i.e., consolidate their urban footprint, emerge greener through the conversion of brownfields to green public spaces, and so on. In addition, an aging urban population has consequences for the demand for and the type of housing (e.g., long-term care facilities), the demand for public transportation (as elderly tend to commute less), and other basic services. Further, the combination of an overall aging urban population and declining fertility rates will also likely shift demand from education to health services. Urban areas will therefore need to adapt their social and physical infrastructure to better serve the changing needs and demands of their population.

Simultaneously, growing urban centers need to be supported by a set of public policies that further foster economic growth. The majority of population growth observed in Ukraine is concentrated on the outskirts of main urban centers, such as Kyiv and Lviv, which are core elements of larger urban agglomerations. As discussed in Chapter 1, one of the key findings of the UUR is that agglomerations are particularly important engines of economic growth in the country. However, growth centers, as observed in many countries, can experience setbacks associated with congestion costs; traffic congestion, a shortage of infrastructure, and environmental pollution can increase as cities become larger and denser if growth is not properly managed. Making agglomeration economies work in Ukrainian growth centers will require a set of instruments that span institutional, administrative, and sometimes geographic boundaries. Infrastructure will need to be adapted to ensure that newcomers are well-absorbed and integrated into the city. This is particularly challenging in the case of public transport, particularly where the functional urban footprint expands beyond administrative boundaries – as is the case in most major urban centers in Ukraine. The introduction of metropolitan governance mechanisms might be needed to effect coordination in urban areas that have expanded into multiple administrative units. In addition, Ukraine's growing cities need to better manage their peri-urban growth to avoid sprawled development and facilitate in-fill development options (e.g., brownfield re-development), while ensuring that sufficient green and public space is available. Finally, despite growth in their populations, Ukrainian growth centers will also experience aging of their populations, which will require local governments to reshape their services in order to meet the changing needs of their population.

ANNEXES

Annex I

Special Economic Zones

Special Economic Zones (SEZ) were established in Ukraine in order to overcome the crisis that the country faced during the post-soviet era in the 1990s. The deep crisis of the coal industry, the country's hyperinflation in the 1994 and complications faced during the privatization of public enterprises led to a situation in which a great level of investment was needed to re-boost economic activity. Two types of SEZ were approved in 1998: (i) Free Economic Zones (FEZ), defined as SEZ in which companies are taxed very lightly or not at all, and (ii) Territories of priority development (TPD) which are SEZ designated in distressed regions.

The benefits of the SEZ included the exemption from VAT taxes, subsidies and financial grants for companies installed. A total of 12 FEZ and 9 TPD were established between 1998 and 2005, when the government eliminated them. During their existence, SEZ attracted numerous investments, mostly from Ukrainian residents and offshore jurisdictions. Tax incentives created opportunities for corruption and rent seeking activities, opening the way for oligarchs to establish and own much of the economic activity in these priority regions and cities. The revenue costs and budget were seldom transparent, and they proved not to be a good system for promoting foreign investment in new local enterprises. Moreover, these zones often distorted local and regional competition and led to mechanical relocation of production facilities to designated areas rather than creation of new companies. Additionally, Ukraine was in the process of entering the WTO, and it failed at being compelling in this process in at least three aspects: first, import duties were not collected when goods manufactured in free economic zones were sold outside of them, but inside the Ukrainian territory; second, preference to investment projects that promised to procure Ukrainian-made goods contradicted the WTO Agreement on Trade Related Investment Measures (TRIMS); third, direct tax incentives could be interpreted as discriminatory protection against imports, and deterrence for foreign investment. This led to the cancellation of the SEZ in 2005. Ukraine joined the WTO shortly after. The total investment attracted during the existence of these incentives was 1.5 billion US$ from Ukraine residents and 600 million US$ from foreigner investors. Currently, there is debate about the negative consequences of SEZ discontinuing, especially the impact on the investors in those zones, and their potential reopening with stricter conditions.

Figure 1 – Special economic zones Ukraine (1998-2005)

Sources:
Violeta Skrypnykova, Channels of Corruption in Establishment of Special Economic Zones in Ukraine
Ondrej Klipa | Ph.D. Candidate, Charles University, the Czech Republic| Issue 2, 2005, Problem Of The Special Economic Zones Within The Ukrainian Economy And Politics
Mark Davis, The World Bank, The debate on Elimination of Free Enterprise Zones in Ukraine, *December 12, 2005*

Annex II

Location Quotient

Region	Sector	lq2010	lq2000
Western region	Agriculture, hunting and forestry. Fishing	1.33	1.21
	Industry	0.77	0.81
	Construction	1.12	1.01
	Trade; repair of motor vehicles, household goods and personal use. Hotels and restaurants	0.92	0.91
	Transport, storage and communication	0.84	0.85
	Finance	0.72	0.85
	Real Estate	0.64	0.64
	Public Administration	0.96	0.89
	Education	1.15	1.13
	Health care	1.06	1.03
	Other community and personal services; activities in the field of culture and sports	1.17	1.20
Eastern region	Finance	0.79	0.81
	Other community and personal services; activities in the field of culture and sports	0.90	0.95
	Public Administration	0.78	0.86
	Construction	1.05	1.00
	Real Estate	0.97	1.02
	Health care	0.91	0.90
	Transport, storage and communication	1.03	1.03
	Education	0.85	0.85
	Agriculture, hunting and forestry. Fishing	0.65	0.60
	Industry	1.43	1.40
	Trade; repair of motor vehicles, household goods and personal use. Hotels and restaurants	1.08	1.15

Region	Sector	lq2010	lq2000
Central region	Finance	1.44	1.24
	Other community and personal services; activities in the field of culture and sports	0.94	0.95
	Construction	0.98	1.00
	Health care	1.02	1.02
	Transport, storage and communication	1.02	0.98
	Real Estate	1.29	1.19
	Public Administration	1.24	1.14
	Education	1.03	1.06
	Industry	0.86	0.86
	Agriculture, hunting and forestry. Fishing	0.97	1.08
	Trade; repair of motor vehicles, household goods and personal use. Hotels and restaurants	0.95	0.95
Southern region	Finance	0.91	1.01
	Other community and personal services; activities in the field of culture and sports	1.01	0.93
	Construction	0.89	0.99
	Real Estate	1.00	1.06
	Public Administration	0.94	1.05
	Health care	1.00	1.04
	Transport, storage and communication	1.09	1.11
	Education	0.96	0.96
	Agriculture, hunting and forestry. Fishing	0.94	0.98
	Industry	1.01	0.98
	Trade; repair of motor vehicles, household goods and personal use. Hotels and restaurants	1.06	1.00

Annex III

Methodological Annex Using NL Data as a Proxy for Economic Activity

Night-time lights and economic activity. In a series of articles, Henderson, Soreygard and Weil[147] have developed a methodology based on the finding that there is a strong empirical connection between economic activity and the intensity level of night lights observed by satellites. This can be an important complement to official GDP data particularly when countries have poor national income accounts. In some cases it can even be used as a replacement or proxy for GDP data. For example, data on NLs is often readily available at arbitrary granularity levels, while GDP official data is rarely collected at a level of disaggregation finer than the first subnational division. In this case, night light information can help draw conclusions about the behavior of economic activity at these smaller geographical levels such as metropolitan areas or municipalities. NLs also allow for the estimation of economic activity at supranational levels. Several applications of NLs have been produce, including those found in the World Bank 2014 SAR Urbanization Flagship report.

Having an interest in regional dynamics in this review, NLs are a particularly useful tool. As a reassurance that Ukraine follows the same patterns shown in the literature for other countries and regions, this appendix provides regression analyses of the statistical link between night lights and GDP for Ukraine at the Oblast level in absolute, growth, and per capita levels. A significant positive relationship is ofund between nightlights and economic activity variables using panel data from the 24 Oblasts in Ukraine, the Autonomous Republic of Crimea, Kiev City and Sebastopol for the years 2004-2008 (2000-2008 when using gross value added instead of gross regional product as a robustness test). Oblast level consumer price indices were used to express economic activity variables in real terms (in 2002 Hryvnias).

Correlation between night lights intensity and levels of real Gross Value Added (GVA). Regression Table 1 shows a positive statistically significant relationship with (GVA), with a robust estimated elasticity of GDP with respect to lights of around 0.8. The R-squared numbers support the validity of the relationship. The model specification in column (2) introduces electricity production, which has a positive significant effect in economic activity. The significance of night lights remains, but is reduced by the inclusion of electricity, which suggests that electricity production is an important part of the transmission mechanism which links lights to economic activity, but is not the only one[148]. Finally, the results in column (3) include year dummies. The effect of night lights remains significant, supporting that our results are not driven by time trends. As a robustness test, results calculated using Gross Value Added (GVA) are included in table 2. As expected, results are reproduced with slight differences in magnitude. Both tables use robust standard errors to take into account for possible correlation between observations in the same Oblast.

[147] Henderson et al. (2009) develop a theoretical model that suggests an optimal way to combine night lights data and available GDP. This is based on the idea that both pieces of information can present measurement error, but that there is no reason for us to think that these errors will be correlated with each other. Henderson et al. (2011) apply this to a sample of 170 countries, while Henderson et al., (2012) further develops the intuition by providing additional examples of how night lights readings react to documented economic and social phenomena, and estimate a model that focuses on night lights density.

[148] Other studies like the 2014 SAR Urbanization Flagship report and Henderson et al., (2012) show electricity consumption has a much higher correlation. Electricity consumption data available at the disaggregation level required for a similar analysis is not available for Ukraine.

The estimating equations are:

$$\ln(Y_{it}) = \beta_0 + \beta_1 \ln(NL_{it}) + \mathcal{E}_{it}$$

where i is an index for Oblasts, t is an index for time, ε is the estimation error. β1 is the parameter of interest. Because our regression is run in logarithms, its estimated value is an estimation of the elasticity. Y is a measurement of economic performance for Oblast I at time t. In our different regressions specifications gross regional product (GRP), GRP per capita, and gross value added (GVA) are used as dependent variable Y[149].

Table 1 – Correlations with Log of real GVA

	(1)	(2)	(3)
Log (Night lights)	0.823***	0.694***	0.851***
	(0.0496)	(0.0806)	(0.0753)
2005			-0.0920
			(0.149)
2006			0.153
			(0.149)
2007			0.230
			(0.149)
2008			0.219
			(0.149)
Log(Electricity Output)		0.0800***	
		(0.0277)	
Constant	-0.278	0.591	-0.691
	(0.586)	(0.771)	(0.866)
Observations	135	135	135
R-squared	0.473	0.507	0.501

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

[149] In some specifications, which are shown in the results tables, electricity consumption is added to the estimation equation as a control.

Correlation between the growth of night-time light intensity, and GVA growth. Additionally, a regression specification is estimated that uses the growth of the logarithms across time instead of the levels. The regression in those cases is:

$$\Delta \ln(Y_{it}) = \beta_0 + \beta_1 \Delta \ln(NL_{it}) + \mathcal{E}_{it}$$

The results in columns (1) and (2) in Table 2 show that there is not a statistically significant positive relationship between the growth in the intensity of a country's night-time lights and its growth of real GRP. Growth is calculated for 4 years periods. The same results are obtained when year by year growth rates are used.

Table 2 – Correlation between growth of Log of real GRP and growth of Log of night lights

	(1)
	0.102
Δ log(Night Lights)	(0.0637)
Δ log(Electric Output)	0.0373
	(0.0546)
Constant	0.888***
	(0.0165)
Observations	54
R-squared	0.066
Number of code	

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Correlation between "URBAN" night lights intensity and levels of real GDP. Gross Value Added (GVA) data is available by sector for the years 2001-2002. The sectors can be divided into those are typically urban and sectors that are typically rural according to the following classification: agriculture, hunting, forestry, fishing, fish farming in the rural production, and industry, construction, trade, repair of motor vehicles, household goods and personal goods, hotels and restaurants, transport and communication, financial activities, real estate, lease, and engineering. Using this division, measurements of aggregate urban and rural GVA can be constructed. It is necessary to separate urban and rural GVA, even if it is done at an Oblast level, because the relationship between each of these two categories and night lights intensity are fundamentally different. In particular, urban production is expected to be more strongly linked to night light intensity. Also, given that the interest here is in using NLs to infer economic activity at the city level, it is more accurate to estimate the relationship between the average urban production in the Oblast (as opposed to total) and the night lights classified as urban. The tables below do just that for both levels and growth rates.

Table 3 - Correlations with Log of real urban GVA and Log of urban night lights

	(1)	(2)	(3)
luntl	0.791***	0.751***	0.790***
	(0.0564)	(0.0685)	(0.0401)
2003.year			0.120
			(0.124)
2004.year			0.240*
			(0.124)
2005.year			0.147
			(0.125)
2006.year			0.235*
			(0.124)
2007.year			0.417***
			(0.124)
2008.year			0.338***
			(0.124)
lelec		0.0296*	
		(0.0165)	
Constant	0.593	0.775	0.391
	(0.547)	(0.593)	(0.412)
Observations	189	189	189
R-squared	0.667	0.670	0.692

A significant positive relationship is obtained as expected. It is in fact quite similar to what was obtained when the aggregate night lights for both urban and rural were used, confirming the robustness of the results. Tables 4 show results for growth rates of the logs. Growth is calculated as the total change between 3 year periods. This reduces the effect of noise. As opposed to the results that use aggregate GVA and lights, here, the growth of urban lights is positively and significantly correlated with the growth of urban GVA.

Table 4 - Correlations with growth of Log of real urban GVA and growth of Log of urban night

	(1)	(2)
Δ (Night Lights)	0.404***	0.390***
	(0.0921)	(0.0955)
Δ(Electric output)		0.0182
		(0.0223)
Constant	0.192***	0.191***
	(0.0117)	(0.0123)
Observations	54	54
R-squared	0.260	0.266

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Heterogeneity in interregional variation between night lights intensity and economic activity. In Bickenbach et al (2013) data on Brazil, India, United States and some countries in Western Europe are used to show that the relationship between economic activity and night lights is not stable when looking at subnational or regional units. As a consequence, conclusions drawn about the differences between cities in different regions based solely on night lights are less reliable than comparisons for a single city across time. In the following table, results are presented for regressions that use interactions with a dummy for regions. The elasticity between economic activity and nigh lights is, by this construction, allowed to be different across regions.

In table 4, Region 1 refers to the Western, region 2 to the Eastern region, region 3 to the Central region, and region 4 to the Southern region (omitted category). The first two columns show a model that uses total (urban and rural) economic activity and night lights. The second column shows that the interaction with regional dummies is significant, which implies a varying elasticity . These regional effects are significant and show that, all else equal, the region where a city is located affects how much light it emits even at similar economic activity levels. This is also true when considering only urban economic activity and lights in columns 3 and 4.

The regional effects are significant for the Western region, i.e. for similar levels of night lights, economic activity is lower in the East (when compared to the missed category (Southern)). The contrast is more important in the regressions that use urban variables, in which both the Western and the Central regions present this trend. This explains statistically why the large growth in lights in these two regions is not necessarily accompanied by a large growth in economic. The economic reason behind this might be more complex, but the differences in the movements from urban to rural as well as the initial conditions (the East being initially much more urban and industrial in nature while Central region being more service oriented) are candidate explanations.

Finally, joint tests that compare the elasticities between regions conclude that they are statistically different.

[150] The elasticity in this case is given by the coefficient on the night lights independent variable plus the coefficient on the interaction between night lights and the corresponding regional dummy.

Table 5 - Correlation between GVA and night lights changes are significantly different between regions

	(1)	(2)	(3)	(4)
VARIABLES	**GVA**	**GVA**	**GVA Urban**	**GVA Urban**
Log(Night Lights)	0.839***	0.728***		
	(0.0496)	(0.0620)		
Western X log(Night Lights)		-0.0283***		
		(0.00632)		
Eastern X log(Night Lights)		0.0133		
		(0.00888)		
Central X log(Night Lights)		-0.00235		
		(0.0110)		
year	0.0754**	0.0705**	0.0573***	
	(0.0336)	(0.0326)	(0.0166)	
Log (Urban Night Lights)			0.786***	0.776***
			(0.0555)	(0.0615)
Western X log (Urban Night Lights)				-0.0325***
				(0.00605)
Eastern X log (Urban Night Lights)				-0.00127
				(0.00796)
Central X log (Urban Night Lights)				-0.0343***
				(0.00818)
Constant	-151.8**	-140.6**	-114.2***	0.958
	(67.54)	(65.57)	(33.22)	(0.623)
Observations	135	135	189	189
R-squared	0.493	0.528	0.687	0.706
Joint Test dummies		0.000		0.000

Robust standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Annex IV

Robustness of City Typologies

The threshold used to define whether an area is part of an urban footprint or is rural has been selected by calibrating the lights data against higher resolution land use cover maps, in particular, the European Space Agency's *GlobCover 2009* map and the *MODIS Collection 5 Land Cover Type*. This calibration process uses images to determine which areas are urban and which are rural and then contrasts it with measurements of emitted light. A model is built with this relationship to determine urban and rural areas in the rest of the country. The errors of this process allow for the calculation of a distribution of thresholds. The median threshold is the one used in the section to determine urban areas. For Ukraine, this threshold was determined to be 20.94 DN. Intensity of night-time light here is measured on a "Digital Number" (DN) scale.

The determination of this threshold is subject to measurement error. This error is transmitted to the determination of the typologies constructed in the section. Depending on how close to the threshold the light emitted by a city is, a city might jump between the different categories (Found, Appeared, Disappeared, Missed) if the threshold is perturbed marginally. Similarly, both area change and intensive growth could pass from negative to positive or vice versa, if numbers are close to the threshold. To test the robustness of these typologies, they can be calculated using not only the original threshold, but also the 5th and 95th percentile. This gives a 90 percent confidence interval that a particular area is urban or rural when determined by NLs thresholds. This error bounds are passed to the typology classification.

When testing the first typology with the 90 percent confidence interval, a total misclassification or classification error of 15 percent is obtained. This means that performing the classification of the first typology the 5th and 95th percentiles and comparing it with the current classification (calculated with the median or 50th percentile), only 15 percent of cities change type. The change comes from cities that were close to the median threshold. For example, one city could have disappeared by presenting emitted lights just below the urban threshold in the second period. Changing this threshold can move it from disappeared to found.

Similarly, when testing the second typology with the 90 percent confidence interval, a total misclassification of 35 percent is obtained. The same logic applies as before. The classification error in this case was expected to be higher because changing the threshold changes the urban footprint, which changes multiple dimensions of the data used to construct the second typology: it changes the total area of the footprint, which determines the area change; it also changes the amount of light emitted in the core, as it changes the measurement of the core, as well as its change overtime. Given that the confidence interval is so wide, this scale of misclassification error is not so large[151].

[151] See Denison D., Holmes C., Mallick B., Smith A., Bayesian Methods for Nonlinear Classification and Regression. (2002) for a discussion on classification error and applications on the social sciences.

Annex V

List of Ukrainian Cities (2013)

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Simferopol	Crimea	1	337285	FOUND	Southern	Mid size cities (100k - 500k)	Declining but less than urban average	A
Vinnytsia	Vinnytsia	1	371698	FOUND	Central	Mid size cities (100k - 500k)	Positive growth	A
Rivne	Rivne	1	250333	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A
Ternopil	Ternopil	1	217118	FOUND	Western	Mid size cities (100k - 500k)	Declining but less than urban average	A
Kamianets-Podilskyi	Khmelnytskyi	1	102743	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A
Sarny	Rivne	1	28625	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Kuznetsovsk	Rivne	1	41432	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Kivertsi	Volhynia	1	14611	FOUND	Western	Mid size towns (10k - 20k)	Declining more than national average	A
Stryi	Lviv	1	60126	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A
Chernihiv	Cernihiv	1	296089	FOUND	Central	Mid size cities (100k - 500k)	Declining but less than urban average	A
Shepetivka	Khmelnytskyi	1	43375	FOUND	Western	Small cities (50k - 100k)	Declining more than national average	A
Kovel	Volhynia	1	68912	FOUND	Western	Small cities (50k - 100k)	Positive growth	A
Hnivan	Vinnytsia	1	12587	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	A
Khust	Zakarpattia	1	28643	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Chernivtsi	Cernivcy	1	258842	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Kerch	Crimea	1	145265	FOUND	Southern	Mid size cities (100k - 500k)	Declining more than national average	A
Kalush	Ivano-Frankivsk	1	67585	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A
Khmel-nytskyi	Khmel-nytskyi	1	264988	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A
Kostopil	Rivne	1	31590	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Bakhmach	Cernihiv	1	18683	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	A
Kharkov	Charkiv	1	1451028	FOUND	Eastern	Major cities (> 500k)	Declining but less than urban average	A
Kamianka-Buzka	Lviv	1	10900	FOUND	Western	Mid size towns (10k - 20k)	Declining more than national average	A
Pyriatyn	Poltava	1	15981	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	A
Vynohradiv	Zakarpa-ttia	1	25565	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Brody	Lviv	1	23784	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Yevpatoria	Crimea	1	106877	FOUND	Southern	Mid size cities (100k - 500k)	Positive growth	A
Sokal	Lviv	1	21386	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Volodymyr-Volynskyi	Volhynia	1	38870	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Feodosiya	Crimea	1	69461	FOUND	Southern	Small cities (50k - 100k)	Declining more than national average	A
Staro-kostiantyniv	Khmel nytskyi	1	34945	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Soledar	Donetsk	1	11708	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	A
Rava-Ruska	Lviv	1	8426	FOUND	Western	Small Town (<10k)	Positive growth	A
Kolomyia	Ivano-Frankivsk	1	61428	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Dunaivtsi	Khmel-nytskyi	1	16219	FOUND	Western	Mid size towns (10k - 20k)	Declining but less than urban average	A
Hlukhiv	Sumy	1	34574	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	A
Novovo-lynsk	Volhynia	1	53199	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A
Nizhyn	Cernihiv	1	73282	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	A
Berehove	Zakar-pattia	1	24458	FOUND	Western	Large towns (20k - 50k)	Declining more than national average	A
Yalta	Crimea	1	78115	FOUND	Southern	Small cities (50k - 100k)	Declining but less than urban average	A
Sevastopol	Sevas-topol	1	342580	FOUND	Southern	Mid size cities (100k - 500k)	Positive growth	A
Zbarazh	Ternopil	1	14004	FOUND	Western	Mid size towns (10k - 20k)	Positive growth	A
Chervo-nohrad	Lviv	1	68000	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A
Horodok_K	Khmel-nytskyi	1	16761	FOUND	Western	Mid size towns (10k - 20k)	Declining but less than urban average	A
Ismail	Odessa	1	73007	FOUND	Southern	Small cities (50k - 100k)	Declining more than national average	A
Kalynivka	Vinnytsia	1	19291	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	A
Mena	Cernihiv	1	12264	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	A
Ivano-Frankivsk	Ivano-Frankivsk	1	226018	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A
Skvyra	Kiev	1	16715	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	A
Lviv	Lviv	1	730272	FOUND	Western	Major cities (> 500k)	Declining but less than urban average	A
Sambir	Lviv	1	34899	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Droho-bych	Lviv	1	77080	FOUND	Western	Small cities (50k - 100k)	Declining but less than urban average	A

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Lutsk	Volhynia	1	214727	FOUND	Western	Mid size cities (100k - 500k)	Positive growth	A
Zhytomyr	Zhytomyr	1	271303	FOUND	Central	Mid size cities (100k - 500k)	Declining but less than urban average	A
Zolochiv	Lviv	1	24074	FOUND	Western	Large towns (20k - 50k)	Positive growth	A
Odessa	Odessa	1	1014852	FOUND	Southern	Major cities (> 500k)	Declining but less than urban average	A
Hadiach	Poltava	1	24196	FOUND	Central	Large towns (20k - 50k)	Positive growth	A
Uman	Cherkasy	1	87111	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	A
Kiev	Kiev	1	2757900	FOUND	Central	Small Town (<10k)	Positive growth	A
Buryn	Sumy	1	9134	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	A
Zoloto-nosha	Cherkasy	1	28371	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	A
Radekhiv	Lviv	1	9600	FOUND	Western	Small Town (<10k)	Positive growth	A
Dubno	Rivne	1	38019	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	A
Kakhovka	Kherson	2	37419	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Bar	Vinnytsia	2	16442	APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	B
Luhansk	Luhansk	2	425848	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Starobilsk	Luhansk	2	18297	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Mykolaivka	Donetsk	2	15684	FOUND	Eastern	Mid size towns (10k - 20k)	Declining but less than urban average	D
Torez	Donetsk	2	57998	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Sniatyn	Ivano-Frankivsk	2	10106	APPEAR	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Balakliia	Charkiv	2	29499	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Popasna	Luhansk	2	21917	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Marhanets	Dnipro-petrovsk	2	48546	FOUND	Southern	Small cities (50k - 100k)	Declining but less than urban average	B
Bolekhiv	Ivano-Frankivsk	2	10768	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Synelny-kove	Dnipro-petrovsk	2	31568	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Khmilnyk	Vinnytsia	2	28209	APPEAR	Central	Large towns (20k - 50k)	Positive growth	B
Chortkiv	Ternopil	2	29640	FOUND	Western	Large towns (20k - 50k)	Positive growth	B
Znamianka	Kirovohrad	2	23983	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	B
Buchach	Ternopil	2	12597	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Krasnohrad	Charkiv	2	21332	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than national average	B
Komsomolsk	Poltava	2	51730	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	B
Sievero-donetsk	Luhansk	2	109466	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Novoia-vorivske	Lviv	2	29580	APPEAR	Western	Large towns (20k - 50k)	Positive growth	B
Novyj Rozdil	Lviv	2	28797	APPEAR	Western	Large towns (20k - 50k)	Positive growth	B
Mohyliv-Podilskyi	Vinnytsia	2	32056	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	B
Volochysk	Khmel-nytskyi	2	19619	APPEAR	Western	Large towns (20k - 50k)	Declining more than national average	B
Pervomaisk	Mykolaiv	2	66671	FOUND	Southern	Small cities (50k - 100k)	Declining but less than urban average	B
Kaniv	Cherkasy	2	25558	APPEAR	Central	Large towns (20k - 50k)	Declining but less than urban average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Trostianets	Sumy	2	21368	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	B
Ordzhonikidze	Dnipropetrovsk	2	41374	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	B
Konotop	Sumy	2	88787	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	B
Zalishchyky	Ternopil	2	9417	APPEAR	Western	Mid size towns (10k - 20k)	Declining more than national average	B
Bakhchi saray	Crimea	2	26482	APPEAR	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Horodok_L	Lviv	2	15959	APPEAR	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B
Lebedyn	Sumy	2	26137	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	D
Novyi Buh	Mykolaiv	2	15531	FOUND	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	B
Yuzhnou krainsk	Mykolaiv	2	40555	FOUND	Southern	Large towns (20k - 50k)	Positive growth	B
Snizhne	Donetsk	2	48485	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Okhtyrka	Sumy	2	49047	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	B
Nemyriv	Vinnytsia	2	11900	APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	B
Nova Kakhovka	Kherson	2	47852	FOUND	Southern	Small cities (50k - 100k)	Declining more than national average	B
Kotovsk	Odessa	2	40692	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Enerhodar	Zaporizhia	2	54708	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Slavutych	Kiev	2	24826	FOUND	Central	Mid size towns (10k - 20k)	Positive growth	B
Zvenyho rodka	Cherkasy	2	17958	APPEAR	Central	Large towns (20k - 50k)	Declining more than national average	B
Druzhkivka	Donetsk	2	59863	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Dnipro dzerzhynsk	Dnipro petrovsk	2	241880	FOUND	Southern	Mid size cities (100k - 500k)	Declining but less than urban average	B
Morshyn	Lviv	2	6037	APPEAR	Western	Small Town (<10k)	Declining more than national average	B
Chasiv Yar	Donetsk	2	13999	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	B
Romny	Sumy	2	42616	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	B
Liuboml	Volhynia	2	10246	APPEAR	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B
Lutuhyne	Luhansk	2	17989	FOUND	Eastern	Mid size towns (10k - 20k)	Declining but less than urban average	B
Kherson	Kherson	2	299052	FOUND	Southern	Mid size cities (100k - 500k)	Declining more than national average	B
Berdiansk	Zaporizhia	2	116034	FOUND	Southern	Mid size cities (100k - 500k)	Declining but less than urban average	B
Hrebinka	Poltava	2	10960	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than national average	D
Poltava	Poltava	2	296852	FOUND	Central	Mid size cities (100k - 500k)	Declining more than national average	D
Burshtyn	Ivano-Frankivsk	2	15340	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Dolyna	Ivano-Frankivsk	2	20622	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	B
Zhydachiv	Lviv	2	11180	APPEAR	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B
Myronivka	Kiev	2	11964	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Nowomos kowsk	Dnipro petrovsk	2	70787	FOUND	Southern	Small cities (50k - 100k)	Declining but less than urban average	B
Kosiv	Ivano-Frankivsk	2	8543	APPEAR	Western	Small Town (<10k)	Positive growth	B
Zmiiv	Charkiv	2	15211	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Mostyska	Lviv	2	9193	APPEAR	Western	Small Town (<10k)	Positive growth	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Amvrosiivka	Donetsk	2	18832	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Horodnia	Cernihiv	2	12558	APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Mykolaiv_M	Mykolaiv	2	496188	FOUND	Southern	Major cities (> 500k)	Declining but less than urban average	B
Krasnyi Lyman	Donetsk	2	22509	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Kostianty nivka	Donetsk	2	77066	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Shchors	Cernihiv	2	11471	APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Oleksandriia	Kirovohrad	2	82819	FOUND	Central	Mid size cities (100k - 500k)	Declining more than national average	B
Khorol	Poltava	2	13593	APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Ternivka	Dnipro petrovsk	2	28920	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Polohy	Zaporizhia	2	19906	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	B
Alushta	Crimea	2	28418	APPEAR	Southern	Large towns (20k - 50k)	Declining more than national average	B
Khodoriv	Lviv	2	9829	APPEAR	Western	Mid size towns (10k - 20k)	Declining more than national average	B
Kryvyj Rih	Dnipro petrovsk	2	656478	FOUND	Southern	Major cities (> 500k)	Declining but less than urban average	B
Koziatyn	Vinnytsia	2	24247	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	B
Pomichna	Kirovohrad	2	9210	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	D
Druzhba	Sumy	2	5031	FOUND	Central	Small Town (<10k)	Declining more than national average	B
Krasnyi Luch	Luhansk	2	82765	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Vovchansk	Charkiv	2	19082	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Reni	Odessa	2	19480	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	D
Mykolaiv_L	Lviv	2	14877	FOUND	Western	Mid size towns (10k - 20k)	Positive growth	B
Dzhankoy	Crimea	2	36086	FOUND	Southern	Small cities (50k - 100k)	Declining more than national average	D
Svaliava	Zakarpattia	2	17027	FOUND	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B
Chervono zavodske	Poltava	2	8612	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	B
Saky	Crimea	2	23655	APPEAR	Southern	Large towns (20k - 50k)	Declining more than national average	B
Kitsman	Cernivcy	2	6762	APPEAR	Western	Small Town (<10k)	Declining more than national average	B
Dokucha ievsk	Donetsk	2	23733	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than urban average	B
Zuhres	Donetsk	2	18553	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Zelenodolsk	Dnipro petrovsk	2	13947	FOUND	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	B
Chop	Zakarpattia	2	8994	FOUND	Western	Small Town (<10k)	Positive growth	B
Pryluky	Cernihiv	2	58475	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	B
Yaremche	Ivano-Frankivsk	2	8124	APPEAR	Western	Small Town (<10k)	Positive growth	B
Berezan	Kiev	2	16543	APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	B
Swerdlovsk	Luhansk	2	65276	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Rozdilna	Odessa	2	17904	FOUND	Southern	Mid size towns (10k - 20k)	Positive growth	B
Kaharlyk	Kiev	2	13758	APPEAR	Central	Mid size towns (10k - 20k)	Positive growth	B
Melitopol	Zaporizhia	2	156984	FOUND	Southern	Mid size cities (100k - 500k)	Declining but less than urban average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Izium	Charkiv	2	51511	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Sudak	Crimea	2	15457	APPEAR	Southern	Mid size towns (10k - 20k)	Positive growth	B
Vilniansk	Zaporizhia	2	15682	FOUND	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	B
Staryi Sambir	Lviv	2	6446	APPEAR	Western	Small Town (<10k)	Positive growth	B
Svitlovodsk	Kirovohrad	2	46613	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	B
Khrysty nivka	Cherkasy	2	10860	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	D
Bilopillia	Sumy	2	16731	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Verkhivtseve	Dnipro petrovsk	2	10033	FOUND	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	B
Krolevets	Sumy	2	23574	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	B
Malyn	Zhytomyr	2	26934	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	B
Vilnohirsk	Dnipro petrovsk	2	23764	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	B
Kirovske	Donetsk	2	28291	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Dniprorudne	Zaporizhia	2	19479	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	D
Debaltseve	Donetsk	2	25774	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Novoselytsia	Cernivcy	2	7774	APPEAR	Western	Small Town (<10k)	Declining more than national average	B
Novodni strovsk	Cernivcy	2	10776	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Zhovkva	Lviv	2	13594	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Piatykhatky	Dnipro petrovsk	2	18944	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Kamin-Kashyrskyi	Volhynia	2	12018	APPEAR	Western	Small Town (<10k)	Positive growth	B
Krasyliv	Khmelnyt skyi	2	19743	APPEAR	Western	Large towns (20k - 50k)	Declining but less than urban average	B
Khotyn	Cernivcy	2	9771	APPEAR	Western	Mid size towns (10k - 20k)	Declining more than national average	B
Kramatorsk	Donetsk	2	164283	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Bobrynets	Kirovohrad	2	10991	APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	B
Lokhvytsia	Poltava	2	11863	APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	B
Horokhiv	Volhynia	2	9093	APPEAR	Western	Small Town (<10k)	Positive growth	B
Kupiansk	Charkiv	2	29487	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Dnepro petrovsk	Dnipro petrovsk	2	997754	FOUND	Southern	Major cities (> 500k)	Declining more than national average	D
Horlivka	Donetsk	2	256714	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	D
Sokyriany	Cernivcy	2	9462	APPEAR	Western	Mid size towns (10k - 20k)	Declining more than national average	B
Smila	Cherkasy	2	68636	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	B
Kurakhove	Donetsk	2	20098	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	D
Berezhany	Ternopil	2	18161	APPEAR	Western	Mid size towns (10k - 20k)	Positive growth	B
Alchevsk	Luhansk	2	111360	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Shpola	Cherkasy	2	17806	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	B
Krasno perekopsk	Crimea	2	29815	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	D
Biliaivka	Odessa	2	12052	APPEAR	Southern	Mid size towns (10k - 20k)	Declining more than national average	B

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Dzerzhynsk	Donetsk	2	35296	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Nikopol	Dnipro petrovsk	2	118720	FOUND	Southern	Mid size cities (100k - 500k)	Declining more than national average	B
Izjaslav	Khmelnyt skyi	2	17172	APPEAR	Western	Mid size towns (10k - 20k)	Declining more than national average	B
Komsomol ske	Donetsk	2	11763	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	B
Antratsyt	Luhansk	2	54640	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Ilovaisk	Donetsk	2	15949	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	B
Korsun-Shevchenkiv-skyi	Cherkasy	2	18655	APPEAR	Central	Large towns (20k - 50k)	Declining but less than urban average	B
Zhmerynka	Vinnytsia	2	35390	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	B
Zhovti Vody	Dnipro-petrovsk	2	47509	FOUND	Southern	Small cities (50k - 100k)	Declining more than national average	B
Artemivsk	Donetsk	2	77620	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Lubny	Poltava	2	47643	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	B
Pochaiv	Ternopil	2	7842	APPEAR	Western	Mid size towns (10k - 20k)	Declining but less than urban average	B
Krasnodon	Luhansk	2	44283	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Olevsk	Zhytomyr	2	10231	APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than national average	B
Stakhanov	Luhansk	2	77593	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	B
Rovenky	Luhansk	2	47852	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	B
Vorozhba	Sumy	3	7444	DIS APPEAR	Central	Small Town (<10k)	Declining more than national average	C

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Bila Tserkva	Kiev	3	210919	FOUND	Central	Mid size cities (100k - 500k)	Positive growth	C
Haisyn	Vinnytsia	3	25855	FOUND	Central	Large towns (20k - 50k)	Positive growth	E
Myrhorod	Poltava	3	41109	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	E
Yavoriv	Lviv	3	12905	FOUND	Western	Mid size towns (10k - 20k)	Declining but less than urban average	E
Siversk	Donetsk	3	12145	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Ladyzhyn	Vinnytsia	3	22961	FOUND	Central	Mid size towns (10k - 20k)	Positive growth	E
Krasno-armiysk	Donetsk	3	64895	FOUND	Eastern	Small cities (50k - 100k)	Declining but less than national average	E
Bobrovytsia	Cernihiv	3	11238	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	C
Kobeliaky	Poltava	3	10181	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	C
Bohodukhiv	Charkiv	3	15797	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	E
Haivoron	Kirovohrad	3	15214	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining but less than urban average	C
Volnovakha	Donetsk	3	23305	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than urban average	E
Apostolove	Dnipro petrovsk	3	14432	DIS APPEAR	Southern	Mid size towns (10k - 20k)	Declining more than national average	C
Kreminna	Luhansk	3	20324	DIS APPEAR	Eastern	Large towns (20k - 50k)	Declining more than national average	C
Verkhniod niprovsk	Dnipro petrovsk	3	16885	DIS APPEAR	Southern	Large towns (20k - 50k)	Declining but less than urban average	C
Kirovohrad	Kirovohrad	3	234322	FOUND	Central	Mid size cities (100k - 500k)	Declining more than national average	C
Selydove	Donetsk	3	24145	DIS APPEAR	Eastern	Large towns (20k - 50k)	Declining more than national average	C
Karlivka	Poltava	3	15202	DIS APPEAR	Central	Large towns (20k - 50k)	Declining more than national average	C

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Netishyn	Khmelny tskyi	3	36741	FOUND	Western	Large towns (20k - 50k)	Positive growth	C
Pervo maisk L	Luhansk	3	38435	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	E
Kremenchuk	Poltava	3	225892	FOUND	Central	Mid size cities (100k - 500k)	Declining but less than urban average	C
Barvinkove	Charkiv	3	9709	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Cherkasy	Cherkasy	3	285605	FOUND	Central	Mid size cities (100k - 500k)	Declining but less than urban average	E
Novohrad-Volynskyi	Zhytomyr	3	55991	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	E
Korosten	Zhytomyr	3	65503	FOUND	Central	Small cities (50k - 100k)	Declining but less than urban average	E
Sumy	Sumy	3	269177	FOUND	Central	Mid size cities (100k - 500k)	Declining more than national average	C
Shchastia	Luhansk	3	12773	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Berdychiv	Zhytomyr	3	78523	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	C
Mala Vyska	Kirovohrad	3	11141	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	C
Slavuta	Khmelnyt skyi	3	35625	FOUND	Western	Large towns (20k - 50k)	Positive growth	E
Mariupol	Donetsk	3	461810	FOUND	Eastern	Major cities (> 500k)	Declining but less than national average	E
Ovruch	Zhytomyr	3	16614	FOUND	Central	Mid size towns (10k - 20k)	Declining but less than urban average	E
Snihurivka	Mykolaiv	3	13131	DIS APPEAR	Southern	Mid size towns (10k - 20k)	Declining more than national average	C
Bilhorod-Dnistrovskyi	Odessa	3	50246	FOUND	Southern	Small cities (50k - 100k)	Declining but less than urban average	E
Khorostkiv	Ternopil	3	7057	DIS APPEAR	Western	Small Town (<10k)	Declining but less than urban average	C
Orikhiv	Zaporizhia	3	15281	DIS APPEAR	Southern	Large towns (20k - 50k)	Declining more than national average	C

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Andrushivka	Zhytomyr	3	9038	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	C
Novo ukrainka	Kirovohrad	3	17741	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	C
Skadovsk	Kherson	3	18940	FOUND	Southern	Large towns (20k - 50k)	Declining but less than urban average	E
Borshchiv	Ternopil	3	11222	FOUND	Western	Mid size towns (10k - 20k)	Declining but less than urban average	E
Svatove	Luhansk	3	18241	DIS APPEAR	Eastern	Large towns (20k - 50k)	Declining more than national average	C
Uzhhorod	Zakarpattia	3	116349	FOUND	Western	Mid size cities (100k - 500k)	Declining but less than urban average	C
Nadvirna	Ivano-Frankivsk	3	22209	FOUND	Western	Large towns (20k - 50k)	Positive growth	E
Petrovske	Luhansk	3	13260	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Pereiaslav-Khmelnytskyi	Kiev	3	27945	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	E
Pershotravensk	Dnipropetrovsk	3	29019	DIS APPEAR	Southern	Large towns (20k - 50k)	Declining but less than urban average	C
Novhorod-Siverskyi	Cernihiv	3	13791	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	C
Mukachevo	Zakarpattia	3	84992	FOUND	Western	Small cities (50k - 100k)	Positive growth	E
Mospyne	Donetsk	3	10806	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Vosnessensk	Mykolaiv	3	36613	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	C
Zymohiria	Luhansk	3	9949	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Hirske	Luhansk	3	10131	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Talne	Cherkasy	3	14216	FOUND	Central	Mid size towns (10k - 20k)	Declining more than national average	E
Vasylivka	Zaporizhia	3	13996	DIS APPEAR	Southern	Mid size towns (10k - 20k)	Declining more than national average	C

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Tsiurupynsk	Kherson	3	25112	DIS APPEAR	Southern	Large towns (20k - 50k)	Positive growth	C
Svitlodarsk	Donetsk	3	12164	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Fastiv	Kiev	3	48237	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	E
Hirnyk	Donetsk	3	11641	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	C
Yahotyn	Kiev	3	20445	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	C
Armiansk	Crimea	3	22337	FOUND	Southern	Large towns (20k - 50k)	Declining more than national average	E
Chervono partyzansk	Luhansk	3	15659	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	E
Tokmak	Zaporizhia	3	32996	DIS APPEAR	Southern	Large towns (20k - 50k)	Declining more than national average	C
Bashtanka	Mykolaiv	3	12680	DIS APPEAR	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	C
Shostka	Sumy	3	79058	FOUND	Central	Small cities (50k - 100k)	Declining more than national average	E
Liubotyn	Charkiv	3	21909	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	E
Korostyshiv	Zhytomyr	3	25817	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	E
Donetsk	Donetsk	4	953217	FOUND	Eastern	Major cities (> 500k)	Declining but less than national average	.
Zaporizhia	Zaporizhia	4	770672	FOUND	Southern	Major cities (> 500k)	Declining but less than national average	.
Yasynuvata	Donetsk		35836	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than urban average	.
Busk	Lviv		8437	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Artemove	Donetsk		5598	DIS APPEAR	Eastern	Small Town (<10k)	Declining more than national average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Artsyz	Odessa		15178	MISSED	Southern	Large towns (20k - 50k)	Declining more than national average	.
Novohro divka	Donetsk		15398	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Rudky	Lviv		5434	MISSED	Western	Small Town (<10k)	Positive growth	.
Boryspil	Kiev		59545	FOUND	Central	Small cities (50k - 100k)	Positive growth	.
Peremy shliany	Lviv		6874	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Komarno	Lviv		3842	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Dovbysh	Zhytomyr		4498	MISSED	Central	Small Town (<10k)	Declining but less than urban average	.
Marinka	Donetsk		9913	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Vynnyky	Lviv		16278	FOUND	Western	Mid size towns (10k - 20k)	Positive growth	.
Shcholkine	Crimea		11184	MISSED	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	.
Brianka	Luhansk		47512	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Zastavna	Cernivcy		8063	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Oster	Cernihiv		6339	MISSED	Central	Small Town (<10k)	Declining more than national average	.
Ustyluh	Volhynia		2214	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Illichivsk	Odessa		59718	FOUND	Southern	Small cities (50k - 100k)	Positive growth	.
Kamianka	Cherkasy		12652	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Pivdenne	Charkiv		7818	FOUND	Eastern	Small Town (<10k)	Declining more than national average	.
Kremenets	Ternopil		21729	MISSED	Western	Large towns (20k - 50k)	Declining but less than urban average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Baranivka	Zhytomyr		11980	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Bilozerske	Donetsk		16101	MISSED	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Rzhyshchiv	Kiev		7532	MISSED	Central	Small Town (<10k)	Declining more than national average	.
Bilohirsk	Crimea		18220	MISSED	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	.
Bolhrad	Odessa		15631	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Polonne	Khmelnytskyi		21749	MISSED	Western	Large towns (20k - 50k)	Declining but less than national average	.
Huliaipole	Zaporizhia		14358	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Inkerman	Sevastopol		11985	FOUND	Southern	Mid size towns (10k - 20k)	Positive growth	.
Hlyniany	Lviv		3183	MISSED	Western	Small Town (<10k)	Declining but less than national average	.
Zboriv	Ternopil		6923	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Pryvillia	Luhansk		7747	DIS APPEAR	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Kirovsk	Luhansk		28529	DIS APPEAR	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Zorynsk	Luhansk		7331	MISSED	Eastern	Small Town (<10k)	Declining more than national average	.
Obukhiv	Kiev		33102	FOUND	Central	Large towns (20k - 50k)	Positive growth	.
Artemivsk L	Luhansk		7506	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Shumsk	Ternopil		5404	MISSED	Western	Small Town (<10k)	Positive growth	.
Teplodar	Odessa		10204	MISSED	Southern	Small Town (<10k)	Positive growth	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Vasylkiv	Kiev		36672	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	.
Radomyshl	Zhytomyr		14943	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Dubrovytsia	Rivne		9414	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Lanivtsi	Ternopil		8752	MISSED	Western	Small Town (<10k)	Positive growth	.
Pustomyty	Lviv		9111	APPEAR	Western	Small Town (<10k)	Declining more than national average	.
Henichesk	Kherson		20353	MISSED	Southern	Large towns (20k - 50k)	Declining more than national average	.
Lysychansk	Luhansk		104314	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	.
Skalat	Ternopil		4018	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Vashkivtsi	Cernivcy		5406	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Krasno horivka	Donetsk		15937	FOUND	Eastern	Mid size towns (10k - 20k)	Declining but less than urban average	.
Velyki Mosty	Lviv		6121	MISSED	Western	Small Town (<10k)	Positive growth	.
Ochakiv	Mykolaiv		14632	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Lypovets	Vinnytsia		8727	MISSED	Central	Small Town (<10k)	Declining more than national average	.
Rodynske	Donetsk		10698	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Irmino	Luhansk		10044	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Borzna	Cernihiv		10535	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Yunokomu narivsk	Donetsk		14154	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Boiarka	Kiev		35320	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Sukhodilsk	Luhansk		21061	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Sosnivka	Lviv		11517	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Korets	Rivne		7388	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Brovary	Kiev		98250	FOUND	Central	Small cities (50k - 100k)	Positive growth	.
Turka	Lviv		7173	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Khartsyzk	Donetsk		59315	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Sharhorod	Vinnytsia		6975	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Berezivka	Odessa		9760	MISSED	Southern	Mid size towns (10k - 20k)	Positive growth	.
Uzyn	Kiev		12122	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Monasty ryska	Ternopil		6089	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Balta	Odessa		19211	MISSED	Southern	Large towns (20k - 50k)	Declining but less than urban average	.
Storozhy nets	Cernivcy		14473	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Skole	Lviv		6312	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Vyshhorod	Kiev		26536	FOUND	Central	Large towns (20k - 50k)	Positive growth	.
Terebovlia	Ternopil		13783	MISSED	Western	Mid size towns (10k - 20k)	Positive growth	.
Stary Krym	Crimea		9512	MISSED	Southern	Small Town (<10k)	Declining but less than national average	.
Miusynsk	Luhansk		4830	MISSED	Eastern	Small Town (<10k)	Declining more than national average	.
Belz	Lviv		2343	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Ostroh	Rivne		15725	MISSED	Western	Mid size towns (10k - 20k)	Positive growth	.
Tavriysk	Kherson		11001	FOUND	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	.
Ulianovka	Kirovohrad		6109	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Tysmeny tsia	Ivano-Frankivsk		9497	APPEAR	Western	Small Town (<10k)	Declining but less than urban average	.
Bylbasivka	Donetsk		6310	FOUND	Eastern	Small Town (<10k)	Declining more than national average	.
Rakhiv	Zakarpattia		15243	MISSED	Western	Mid size towns (10k - 20k)	Positive growth	.
Zdolbuniv	Rivne		24569	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	.
Pereshche pyne	Dnipro petrovsk		10178	MISSED	Southern	Small Town (<10k)	Positive growth	.
Prymorsk	Zaporizhia		12208	MISSED	Southern	Mid size towns (10k - 20k)	Declining but less than national average	.
Monasty ryshche	Cherkasy		9040	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Vakhrusheve	Luhansk		11878	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Kodyma	Odessa		8865	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Horodysche	Cherkasy		14291	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Kiliya	Odessa		20606	MISSED	Southern	Large towns (20k - 50k)	Declining more than national average	.
Hola Prystan	Kherson		14870	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Zinkiv	Poltava		9953	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than national average	.
Dubliany	Lviv		10240	FOUND	Western	Small Town (<10k)	Positive growth	.
Sudova Vyshnia	Lviv		6461	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Nosivka	Cernihiv		14077	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Putyvl	Sumy		16317	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than national average	.
Novyi Kalyniv	Lviv		4105	MISSED	Western	Small Town (<10k)	Positive growth	.
Irpin	Kiev		42924	FOUND	Central	Large towns (20k - 50k)	Positive growth	.
Rozhyshche	Volhynia		13327	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Dobromyl	Lviv		4457	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Perechyn	Zakarpattia		6716	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Zhashkiv	Cherkasy		14234	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Valky	Charkiv		9410	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Pervomaiskyi	Charkiv		31061	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than urban average	.
Nova Odesa	Mykolaiv		12298	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Novodruzhesk	Luhansk		7749	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Ananiv	Odessa		8614	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Hlobyne	Poltava		10043	DIS APPEAR	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Dolynska	Kirovohrad		19420	FOUND	Central	Mid size towns (10k - 20k)	Positive growth	.
Pohrebyshche	Vinnytsia		9898	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Baturyn	Cernihiv		2716	MISSED	Central	Small Town (<10k)	Declining more than national average	.
Ukrainka	Kiev		15644	FOUND	Central	Mid size towns (10k - 20k)	Positive growth	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Derhachi	Charkiv		18154	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Vyshneve	Kiev		37457	FOUND	Central	Large towns (20k - 50k)	Positive growth	.
Semenivka	Cernihiv		8476	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Bilytske	Donetsk		8691	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Tarashcha	Kiev		11410	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Irshava	Zakarpattia		9221	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Bohuslav	Kiev		16825	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Ichnia	Cernihiv		11587	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Seredyna-Buda	Sumy		7231	MISSED	Central	Small Town (<10k)	Declining but less than urban average	.
Novoazovsk	Donetsk		11760	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Tetiiv	Kiev		13329	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Tatarbunary	Odessa		10992	MISSED	Southern	Mid size towns (10k - 20k)	Positive growth	.
Vyzhnytsia	Cernivcy		4207	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Stebnyk	Lviv		20993	FOUND	Western	Large towns (20k - 50k)	Positive growth	.
Berestechko	Volhynia		1752	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Rubizhne	Luhansk		60374	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Molochansk	Zaporizhia		6980	MISSED	Southern	Small Town (<10k)	Declining more than national average	.
Makiivka	Donetsk		353918	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Beryslav	Kherson		13187	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Pidhorodne	Dnipro petrovsk		19498	FOUND	Southern	Mid size towns (10k - 20k)	Positive growth	.
Yampil	Vinnytsia		11300	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Ukrainsk	Donetsk		11994	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Dymytrov	Donetsk		49646	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Merefa	Charkiv		22280	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Vuhlehirsk	Donetsk		7868	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Perevalsk	Luhansk		25941	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Bucha	Kiev		28483	FOUND	Central	Large towns (20k - 50k)	Declining but less than urban average	.
Shakhtarsk	Donetsk		51007	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Almazna	Luhansk		4325	FOUND	Eastern	Small Town (<10k)	Declining more than national average	.
Pavlohrad	Dnipro petrovsk		110070	FOUND	Southern	Mid size cities (100k - 500k)	Declining more than national average	.
Novomyr horod	Kirovohrad		11569	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Uhniv	Lviv		1007	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Lozova	Charkiv		58307	FOUND	Eastern	Small cities (50k - 100k)	Declining more than national average	.
Sloviansk	Donetsk		117445	FOUND	Eastern	Mid size cities (100k - 500k)	Declining but less than national average	.
Rohatyn	Ivano-Frankivsk		8077	MISSED	Western	Small Town (<10k)	Declining but less than national average	.
Illintsi	Vinnytsia		11366	MISSED	Central	Mid size towns (10k - 20k)	Positive growth	.

City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Vatutine	Cherkasy		17563	FOUND	Central	Large towns (20k - 50k)	Declining more than national average	.
Truskavets	Lviv		29516	FOUND	Western	Large towns (20k - 50k)	Declining but less than urban average	.
Chuhuiv	Charkiv		32279	FOUND	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Awdijivka	Donetsk		35128	FOUND	Eastern	Large towns (20k - 50k)	Declining but less than urban average	.
Boryslav	Lviv		34938	FOUND	Western	Large towns (20k - 50k)	Declining more than national average	.
Zolote	Luhansk		14572	MISSED	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Horodenka	Ivano-Frankivsk		9386	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Tiachiv	Zakarpattia		9162	MISSED	Western	Mid size towns (10k - 20k)	Declining more than national average	.
Halych	Ivano-Frankivsk		6290	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Bershad	Vinnytsia		13160	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Molodo hvardiysk	Luhansk		23332	DIS APPEAR	Eastern	Large towns (20k - 50k)	Declining more than national average	.
Pidhaitsi	Ternopil		2866	MISSED	Western	Small Town (<10k)	Declining more than national average	.
Koriukivka	Cernihiv		13161	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Tlumach	Ivano-Frankivsk		8829	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Zhdanivka	Donetsk		12352	FOUND	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Derazhnia	Khmelnytskyi		10317	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Vuhledar	Donetsk		15357	MISSED	Eastern	Mid size towns (10k - 20k)	Declining more than national average	.
Dobropillia	Donetsk		31196	MISSED	Eastern	Large towns (20k - 50k)	Declining more than national average	.

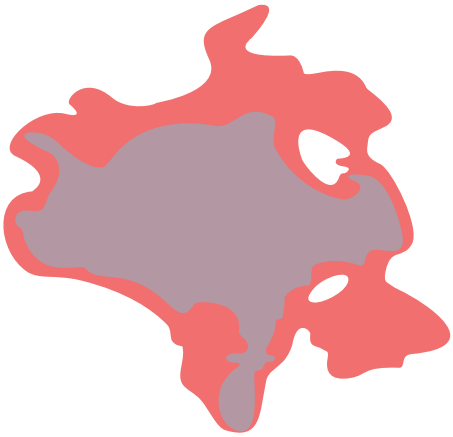
City	Oblast	Typology 2	Population 2013	Typology 1	Region	Size	Population growth	Typology 3
Berezne	Rivne		13444	MISSED	Western	Mid size towns (10k - 20k)	Declining but less than urban average	.
Alupka	Crimea		8520	MISSED	Southern	Mid size towns (10k - 20k)	Declining but less than urban average	.
Hertsa	Cernivcy		2122	MISSED	Western	Small Town (<10k)	Positive growth	.
Bibrka	Lviv		3829	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Kamianka-Dniprovska	Zaporizhia		13495	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Yenakiieve	Donetsk		82629	FOUND	Eastern	Mid size cities (100k - 500k)	Declining more than national average	.
Oleksandrivsk	Luhansk		6635	FOUND	Eastern	Small Town (<10k)	Declining but less than national average	.
Tulchyn	Vinnytsia		15849	MISSED	Central	Mid size towns (10k - 20k)	Declining but less than urban average	.
Radyvyliv	Rivne		10508	MISSED	Western	Mid size towns (10k - 20k)	Positive growth	.
Kopychyntsi	Ternopil		6890	MISSED	Western	Small Town (<10k)	Declining but less than urban average	.
Sviatohirsk	Donetsk		4654	DIS APPEAR	Eastern	Small Town (<10k)	Declining more than national average	.
Chyhyryn	Cherkasy		9371	MISSED	Central	Mid size towns (10k - 20k)	Declining more than national average	.
Vylkove	Odessa		8480	MISSED	Southern	Mid size towns (10k - 20k)	Declining more than national average	.
Khyriv	Lviv		4088	MISSED	Western	Small Town (<10k)	Declining more than national average	.

Annex VI

Extensive Growth

Extensive change refers to the change in brightness in the urban periphery. The periphery is usually defined as the area surrounding the urban core that was not considered as urban by NL standards in the initial period but becomes "urban" in T1. However, the periphery takes another interpretation when urban footprints are shrinking. In this case extensive change is interpreted as the change in NLs in the disappearing footprint. The interpretation in this case, which is the most common case in Ukraine, is not as straightforward as the interpretation of the other indicators used in the section, and hence the analysis of extensive change was moved to this appendix. The following figure and equations explain the way this indicator is calculated.

Figure 1 – Urban footprint, intensive and extensive change using NLs (1996-2010)



CITY FOOTPRINT (1996 - 2010)

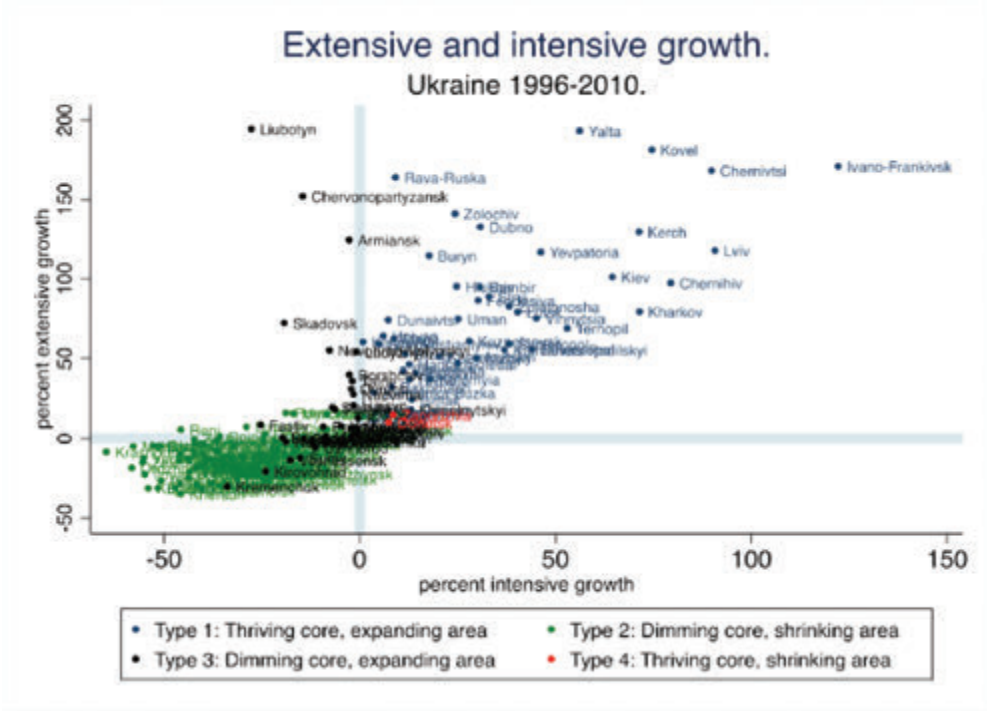
	T0NTL	T1NTL
T0footprint	A	Y
T1footprint	Z	B

The columns represent the summed nighttime lights values for the identified footprint

- Intensive change = Y – A
- Extensive change = (B – Y) – (Z – A)
- Area Change = B – A
- Area Change % = (B – A) / A

The following figure compare intensive versus extensive change over the 1996-2010 period and using the same color coding as the group types mentioned before (Group 1, 2 & 3).

Figure 2 – Intensive vs extensive change (without outliers)



The following table extends the analysis in the text by dividing cities further based on whether they present positive or negative extensive growth.

Table 1 - Description of the different types that uses extensive growth

	Growing urban footprint		**Shrinking urban footprint**	
	- **Extensive growth** Dimming periphery	+ **Extensive growth** Growing light intensity in periphery	- **Extensive growth** Dimming shrinking footprint	+ **Extensive growth** Growing light intensity in shrinking footprint
+ **Intensive growth** Growing light intensity in the urban core	Type 1: Thriving urban core, expanding urban footprint		Thriving urban core, shrinking urban footprint	
	Growing economic activity focused in the core: increased economic activity in the urban center. The new periphery, despite increasing in area, experienced a decline in economic activity as captured by night lights. Examples: no examples in Ukraine found	A. Growing economic activity in the core and periphery: the urban footprint has expanded and economic activity as captured by night lights has increased both in the urban core and the expanding periphery. Examples: Odessa, Lutsk, Kiev, Kharkov, Lviv.	Examples: no examples in Ukraine found	F. Examples: Donetsk,Zaporizhia
- **Intensive growth** Declining light intensity in the urban core	Type 3: Dimming core, expanding area		Type 2: Dimming core, shrinking area	
	C. Declining economic activities in the core and periphery while increasing urban footprints: despite a spreading out of the urban footprint, economic activity is declining in the core and in the new larger periphery. Examples: Mykolaiv, Sumy, Kirovohrad.	E. Declining economic activities in the core, growing area with stronger peripheries: activity has been transferred from the core to the periphery. Examples: Torez, Borshchiv, Ostroh.	B. Declining in all aspects: these cities have decreased their economic activity both in the core in the shrinking footprint. Examples: Dnepropetrovsk, Hirnyk, Kramatorsk.	D. Activity shifted to the periphery: activity in the core has declined but economic growth has occurred in shrinking footprint. Examples: Donetsk, Balta, Vuhledar.

Table 2 – Typology of cities based on NL observations over 1996 & 2010: selected statistics

	Growing area		**Shrinking area**	
	- Extensive growth	**+ Extensive growth**	**- Extensive growth**	**+ Extensive growth**
+ Intensive growth	Type 1: Thriving core, expanding area Mean (Std dev)		Thriving core, shrinking area Mean (Std dev)	
		A		F
Population 2013 (000s)		124.8 (363.2)		861 (129)
Average annual Population growth ('89-'13)		124.8 (363.2)		-0.59% (0.041)
Total NLs value (000s of NLs units) in 2010. [148]		9.40 (32.40)		69.11 (44.80)
Total NLs value (000s of NLs units) per cap (2010).		0.067 (.032)		0.077 (0.048)
NLs growth (% Growth of NLs units) (1996-2010)		587% (22.46)		142.6% (1.23)
- Intensive growth	Type 3: Dimming core, expanding area Mean (Std dev)		Type 2: Dimming core, shrinking area Mean (Std dev)	
	C	E	B	
Population 2013 (000s)	76.3 (88.3)	50.8 (94.4)	79.2 (181.2)	152.3 (399.8)
Average annual Population growth ('89-'13)	-0.57% (.454)	-0.44% (.566	-0.70% (.614)	-0.69% (.256)
Total NLs value (000s of NLs units) in 2010.	6.16 (5.49)	3.23 (7.40)	4.50 (12.95)	10.41 (27.25)
Total NLs value (000s of NLs units) per cap (2010).	0.017 (.012)	0.053 (.030)	0.044 (.03)	0.055 (.065)
NLs growth (% Growth of NLs units) (1996-2010)	-7.7% (.056)	39.4% (.624)	-61.5 % (.24)	-30.4% (.20)

[152] Defined by urban NL measurements per capita.

By adding extensive growth to the previously used intensive growth and area change, the following five city typologies emerge when

(A) **THRIVING AND SPRAWLING[153] CITIES, Growing economic activity in the core and periphery:** the urban footprint has expanded and economic activity as captured by night lights has increased both in the urban core and the expanding periphery. These are mainly large cities (average population is 124.8k) and although – on average – they are still experiencing demographic decline, their decline is the lowest compared to the other types. They present also the highest levels of economic activity per capita suggesting that **these cities are more productive**. In addition, these cities have a higher average total economic growth (587 percent) than the rest suggesting that **these are true growth engines in the country.** However, the growth of the urban footprint accompanied by the observed demographic decline suggests that these cities are sprawling. **Examples of TYPE A are**: Odessa, Lutsk, Kiev, Kharkov and Lviv. Around 24 percent of cities in Ukraine fall under this type.

On the other side of the spectrum cities that are declining economically are found;

(B) **ABSOLUTE DECLINE – COMPACT, These are cities declining in all aspects with a decreasing economic activity in the core and periphery and shrinking footprint:** These cities are smaller than thriving cities - the average population is 79.2k. In addition to experiencing a decline in economic activity, these cities have the fastest declining population – with -0.70 percent annual decline on average and have lowers levels of productivity than thriving cities measured by NL per capita. **Examples of TYPE B are**: Dnepropetrovsk, Hirnyk and Kramatorsk. Around 33 percent of cities in Ukraine fall under this type.

(C) **ABSOLUTE DECLINE AND SPRAWLING, These cities have experienced economic decline in the urban core and periphery despite a growth of the urban footprint**. These cities also present the lowest level of productivity and have fast declining population – with -0.57 percent annual decline on average. The growth of the urban footprint accompanied by the observed demographic decline suggests that these cities are sprawling. **Examples of TYPE C are**: Mykolaiv, Sumy, Kirovohrad. Around 5.47 percent of cities in Ukraine fall under this type.

A third set of cities are those whose urban core has experienced economic decline that was partly compensated through growth in expanding or shrinking areas;

(D) **DECLINING CENTERS but INCREASED ACTIVITY IN SHRINKING AREA, These cities are experiencing a declining in economic activity in the initial urban core and a shrinking urban footprint but increased economic activity in shrinking footprint.** These cities, although rare, have dying centers but economic activity has been catching up in the shrinking footprint. Demographic decline is similar to the one observed in absolute declining cities but productivity – measured as NL per capita – is higher. **Examples of TYPE D are**: Donetsk, Balta, Vuhledar. Around 2.84 cities in Ukraine fall under this type.

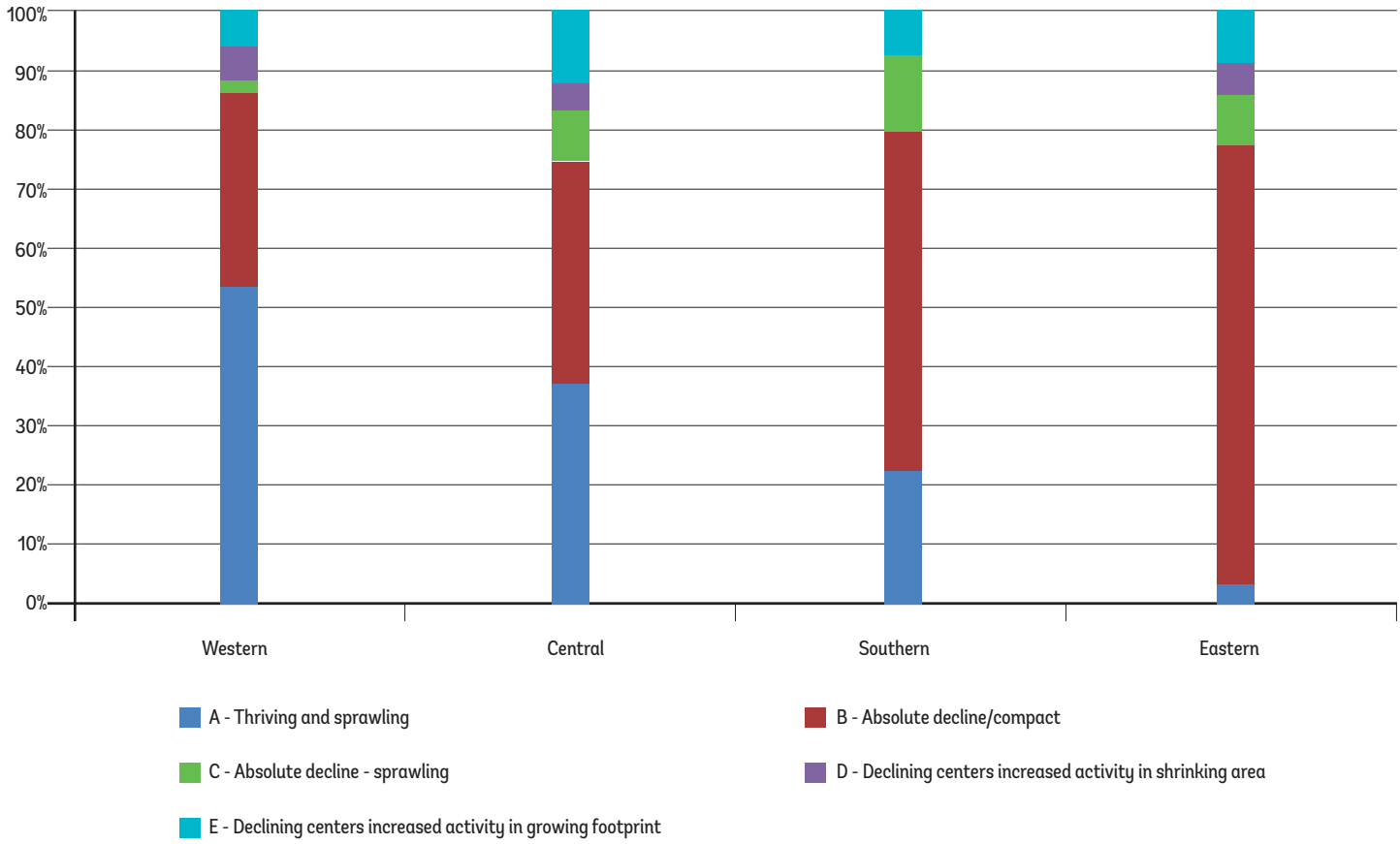
(E) **DECLINING CENTERS but INCREASED ACTIVITY IN GROWING URBAN FOOTPRINT, These cities have experienced economic decline in the urban core but increased economic activity in the growing urban footprint.** These cities, although rare, have dying centers but growing economic activity in the periphery and present overall a positive economic growth – on average. These cities are small – having on average 50.8k population – and have productivity levels similar to those in TYPE D. **Examples of TYPE E are**: Torez, Borshchiv, Ostroh. Around 6.13 percent of cities in Ukraine fall under this type.

[153] Sprawling is a hypothesis based on the growth of the urban footprint and population decline. However the NL footprints do not correspond to the city's boundaries and therefore population data might not correspond to the population living inside the urban footprint defined through NLs.

(F) **GROWING LIGHT INTENSITY IN SHRINKING FOOTPRINT. These cities have experienced economic growth despite dimishing areas, which in both examples found also imply declining population.** The only two cities found in this category are Donetsk and Zaporizhia, which are an agglomeration in the Eastern region and a single city in the Southern respectively.

In the same way **most of the Thriving cities (A – in BLUE) are located in the Western and Central regions** while most of the absolute declining (B and C) settlements are located in the Southern and Eastern Region.

Figure 3 - Distribution of city typologies across economic regions



Annex VII

Assignment of Expenditure Responsibilities in The Budget Code

	Oblast	District	Sub-district	Voluntary
Public administration	Own staff	Own staff	Own staff	Local debt
Defense	none	none	none	mobilization training of local significance
Public order, safety and judicial authority	none	none	none	none
Economic affairs	none	none	none	local-significance roads; transportation and road infrastructure; regulation of passenger fares; land use regulation
Environmental protection activity	none	none	none	environmental protection events of local significance
Housing and municipal economy	none	none	none	local housing and utilities development, populated area improvement
Healthcare	specialized care, sanatoriums medical and sanitary education programs; other activity in the health protection system	Out-patients' clinics, ambulance departments, ambulance and first aid stations; primary care, medical and sanitary education programs	none	none
Physical and intellectual development system	sports schools for children and young people, physical culture and sports-based rehabilitation of the disabled people, culture and sports events, libraries, museums and exhibitions, philharmonic societies, musical ensembles, theatres, culture palaces and houses	sports schools for children and youth of all types, physical culture and sports events and organizations; cultural/ education and theatrical/show programs (theatres, rayon (city), libraries or centralized libraries of the centralized rayon (city) library system, museums, exhibitions, culture palaces and houses, aesthetic education schools for children; zoos	palaces and houses of culture, clubs, entertainment centers, other clubs and libraries	community-owned zoos

	Oblast	District	Sub-district	Voluntary
Education	General secondary education system for individuals with special needs; Vocational training system; Higher education; Postgraduate education system; Out-of-school education system and establishments for non-school activity of children; Other establishments and initiatives in the national education system	Pre-school education system; General secondary education system; continuing education; Out-of-school education system and establishments for non-school activity of children; Other establishments and initiatives in the national education system	Pre-school education system	extracurricular education
Social protection and social security system	fulfillment of allowances and other entitlements for disabled; fulfillment of allowances and other entitlements for orphans	disabled children social rehabilitation centers; disabled people professional rehabilitation centers, shelters for children, the centers of the socio-psychological rehabilitation of children and social dormitories for orphan children and children deprived of parental care; implementation of the state policy in respect of children, young people, women and families assistance to families with children, poor families, people disabled since childhood, disabled children, temporary state assistance to children; additional payments to the population for the coverage of the utilities expenses (housing subsidies for the population), support to the housing construction (rehabilitation) for certain categories of individuals; compensations to individuals rendering social services to senior citizens, the disabled, disabled children, outpatients unable to take care of themselves and requiring outside assistance: benefits for special categories of individuals	none	social protection for poor students of vocational education establishments; social protection establishments for homeless individuals; utility rates subsidized through local council decision; centers of the social adaptation of individuals released from penitentiary institutions; reduced fares granted to certain categories of individuals

Annex VIII

Summary of Urban & Spatial Planning Legislation

Law/Act with access address and date of approval	Core objectives	Elements relevant to urban planning and spatial policy
Fundamental legislation		
Civil Code #435-15, 16.01.2003	Regulates personal property and non-property ownership rights and relationships among different stakeholders on the basis of principles of judicial equality, freedom of action and independence of ownership. It does not cover the aspects of ownership rights emerging as a result of administrative subordination, execution of power and budgetary relationships.	› Stipulates rights of private ownership, including property, and measures to protect these rights. › Provides legal basis for concluding and implementing civil agreements (contracts), their enforcement and procedures for restoring abused rights of ownership.
Land Code #2768-14, 25.10.2001	Regulates issues of land property and relations among various stakeholders in managing, transferring and owning the land resources of Ukraine.	› Stipulates rights and responsibilities of central, regional and local authorities in managing land resources. › In particular determines that the right to change the borders of rayons and cities, as well as change the status of the most valuable land resources belongs to the parliament of Ukraine. › Stipulates separately the rights and responsibilities of each tier of territorial government in land management, appropriation, sale, purchase and rent of state, communal and private land plots. › Stipulates nine different types of land plots depending on the core use, including housing and communal building, as well as the procedures for change of main use.
Law on Local Self-Government 280/97-вр, 21.05.1997	Stipulates the system of self-government in Ukraine, basic principles and guarantees of self-government, its organisation and activities, legal status and responsibilities of local self-government institutions and personalities	› Defines the authorities and responsibilities of self-government bodies, among others, in the sphere of managing communal property, land ownership, land use and management (including the right to setup the level of land use tax), urban planning, construction, housing. › Stipulates what territorial community is in the territorial-administrative arrangement, what are its rights, including land and property ownership, principles of functioning of representative elected bodies and individuals (councils and mayors), executive bodies of the councils. › Defines the rights to unite with other territorial communities, create self-organised bodies by community members, organise public hearings.

Law/Act with access address and date of approval	Core objectives	Elements relevant to urban planning and spatial policy
Law on the Fundamentals of State Regional Policy #156-19, 05.02.2015	Stipulates legal, economic, social, environmental, humanitarian and organisational fundamentals of state regional policy as an integral element of Ukraine's domestic policy.	› Defines the principles of regional development, which among other includes subsidiarity – transfer of responsibilities to the lowest possible territorial level of governance. › Defines the role of local and regional self-government bodies in formulation and implementation of regional policy on their respective territories.
Sector-specific legislation		
Law on Amendments to Certain Laws of Ukraine on Regulation of City Building Activities and State Construction and Architectural Control #1546, approved on 9.04.2015 but is still awaiting President's signature (as of 10 April 2015)	Stipulates framework for decentralising the authorities in the sphere of building, architectural and construction activities, their monitoring, control over compliance.	› Envisages transfer of responsibilities for (1) issuing construction permits and land use permits; (2) architectural and construction control; and (3) approval of complete construction objects from oblast state administrations to executive bodies of city, rayon and village councils where respective land plots and buildings are located (with some exceptions). › Stipulates reduction of the number of days for obtaining necessary technical documentation for construction works. › Removes the limitation to use only specialists of scientific research and engineering institutions accredited by the MinRegion for architecture and construction control.
Law on Master Scheme of Territorial Planning of Ukraine #3059-14, 07.07.2002	Stipulates the terms and conditions of use of the territory of Ukraine, responsible authorities for developing General Scheme, its implementation, monitoring and control. Includes maps and text, which explains current spatial organisation of economic, social and environmental systems and presents priorities for development until 2020.	› Outlines priorities and conceptual decisions about planning and use of territory of Ukraine, including improving the settlement system, development of industrial, social, engineering and transport infrastructure, creation of national environmental network etc. › Defines four types of territories in Ukraine, including urbanisation zones, which require (strict) regulation of construction and zoning.

Law/Act with access address and date of approval	Core objectives	Elements relevant to urban planning and spatial policy
Law on Regulation of City Construction Activity #3038-17, 17.02.2011	Stipulates legal and organisational fundamentals of city construction activities. Ensures that these are congruent with the objectives of sustainable development of territories; with state, communal and private interests.	› Defines terminology of city construction activities, including master plan, detailed plans of territories, zoning, suburban territories etc. Regulates procedures for preparation of project documentation, ensuring continuous oversight and control over construction activities according to technical, architectural and land use standards defined for each individual city by its self-governing bodies. › Stipulates that city planning and construction should be aimed at creating rational system of settlement, balanced use of territory that combines housing and communal buildings, industrial, recreational, cultural, and environmentally important and protected areas. › Divides responsibilities among different tiers and branches of power (see the most recent Law #1546 above). › Requires obligatory publication of all planning documentation, including online (with the exceptions of secret and restricted information). › Requires obligatory preparation of master plans for ALL cities, settlements and villages of Ukraine, which is the condition for taking any decisions in the area of land ownership transfer and management.
Law on Architectural Activity #687-14, 20.05.1999	Stipulates legal and organisational fundamentals of architectural activities and aimed at creating beneficial life environment, achieving aesthetical distinctiveness, economic expediency, reliability of buildings and constructions.	› Defines standards and principles of architectural activities towards all objects, including buildings and constructions of all purposes and ownership types, landscapes, specific areas and territorial-administrative units. › Defines standards and principles for preparing necessary documentations and drawings, maintaining high standards of technical, architectural and engineering expertise, actual construction of the objects, their acceptance, monitoring compliance with technical and other standards, activities of self-regulated professional organisations in the sphere etc.

Law/Act with access address and date of approval	Core objectives	Elements relevant to urban planning and spatial policy
Law on Complex Reconstruction of Outdated Housing Estates (Neighbourhoods) #526-16, 22.12.2006	Stipulates legal, economic, social and organisational aspects of complex reconstruction of outdated housing estates (neighbourhoods) with the substitution of dilapidated residential and non-residential housing stock.	› Determines the notion of dilapidated residential housing – with the amortisation level above 60%. › Determines the procedures for guaranteeing property rights in the process of complex reconstruction of outdated and dilapidated housing stock requiring resettlement of residents to temporary and/or permanent new housing. › Defines responsibilities of central government institutions and local self-governments. The latter, among others, is responsible for preparing complex master plans of reconstruction of estates with outdated housing, conduction competitive tenders for selection of investor and construction company, managing all relations with the residents of estates due for reconstruction, including dispute resolution.
Law on Land Planning #858-15, 22.05.2003	Stipulates legal and organisational fundamentals of land management and regulates relationships among state government institutions, self-government, physical and judicial persons aimed at achieving the standards of sustainable land use.	› Defines priorities for land use and stipulates responsibilities for central government and regional/ local self-governments to adhere to those, especially in terms of prioritisation of protection of agrarian lands, setting and monitoring environmental standards; › Defines responsibilities for actual management of land allocation for all types of owners across all types of settlements, including cities.
Law on State Land Cadastre #3613-17, 07.07.2011	Establishes State Land Cadastre as Ukraine's single GIS system that contains information about all land plots regardless their ownership and type of use.	› Defines the principles and procedures for registering land plots of different types of ownership and land use; as well as requirements for information for each land plot that should be gathered, classified, presented in GIS form and published with open access. › Stipulates free public access to information in Land Cadastre. It includes online access to the entire database, which was launched in 2013 at the address http://map.land.gov.ua/

Law/Act with access address and date of approval	Core objectives	Elements relevant to urban planning and spatial policy
Relevant legislation in adjacent spheres		
Law On Information, #2657-XII, 02.10.1992	Regulates relationships for creating, collecting, obtaining, storing, using, sharing, protecting and securing information; stipulates core principles and mechanisms of state information policy.	› Stipulates universal right on free access to information, its use, sharing, storing, protecting and securing, except when information is classified as confidential, secret or for internal use only; › Defines the obligation for all government agencies to inform public and mass media about its activities and decisions; › Obliges government agencies to create special units responsible for ensuring access to the information.
Law on Public Access to Information #2939-VI, 13.01.2011	Introduces procedures for ensuring the universal right for public access to information produced by authorities at different tiers, as well as by other providers of publicly significant information.	› Stipulates obligations of state authorities to publish information – proactively or reactively; as well as mechanisms, timeframe and costs related to disclosure; › Sets up clear limitations when information cannot be disclosed and procedures for communicating these limitations to the public; › Defines procedure for substantiating the refusal to release information in the public domain (three-stage test).
Presidential Decree on Provision of Public Access to Information by the Executive Power agencies #547, 05.05.2011	Regulates public access to information produced and administered by the executive power authorities	› Stipulates forms and procedures, timeframe for disclosing information in the public domain; › Standards of dealing with information requests and appeals for all executive power agencies.
Decree of the Cabinet of Ministers on Ensuring Public Participation in Formulation and Implementation of State Policy #996, 03.11.2010	Established mechanisms for public participation in developing, implementing and monitoring state policies.	› Sets up typical procedure for establishing and functioning of Public Councils, their responsibilities and rights; › Defines mechanisms for public consultations, survey of public opinions, submitting proposals, recommendations and complaints; › Stipulates mechanisms for organising public hearings.

Annex IX

Summary of Planning Stakeholders

Legislative

Parliament has authority to develop and approve legislation governing all spheres.[154] It has to vote on any decisions with regard to local elections, status and responsibilities of different tiers of public administration and self-government, changes in the borders of administrative units, including cities, budgetary allocation etc. **Two committees of Verkhovna Rada** are responsible for developing and submitting legislation in the sphere of urban planning, spatial development and housing. These are:

1. Committee for Construction, Urban Planning, and Communal Housing
2. Committee for State Construction, Regional Policy, and Local Self-Government

Executive – central level

Ministry of Regional Development, Construction and Housing (MinRegion) is responsible for developing and implementing policies and regulations in the spheres of territorial-administrative organization and self-government, construction, spatial planning, housing and communal services. It is led by the Minister who is at the same time Vice Prime Minister of the Cabinet, with the responsibility of introducing e-government and development of territories of Ukraine affected by the security crisis. MinRegion has a range of state agencies/services under its jurisdiction, among which the most crucial are:

· **State Architectural and Construction Inspection (SACI)** which is responsible for implementing policy of state architectural and construction control and oversight; issues permits for various types of planning and construction works; issues licenses for professional market operators. Has 25 regional offices.

· **State Service of Geodesy, Cartography and Cadastre (created as a result of merger of State Agency of Land Resources and Cartography Agency in 2015)** which is responsible for land management functions, evaluation of value and technical characteristics of land plots, expertise and environmental protection, managing State Land Cadastre and database of valid expert organisations and individuals with technical skills in land survey and management. It has 557 regional departments across all regions of Ukraine. Currently the State Service is in the process of changing all heads of oblast and rayon offices as one of the steps aimed at reducing large-scale corruption.

Ministry of Economic Development and Trade is responsible for state regional policy and overall economic policy, performs monitoring of the development of Ukrainian regions, as well as development of deprived territories (that include monofunctional cities), provides administrative, organizational support and expertise in preparation of socio-economic strategies for oblasts, ARC and cities of state significance. The Ministry is responsible for implementation of the State Strategy for Regional Development 2020 (approved by the Cabinet in August 2014), which recognizes the importance of the network of large cities for enhancing the competitiveness of national economy. It is also responsible, together with MinRegion, for implementation of the Law on Fundamentals of State Regional Policy (February 2015).

Ministry of Culture is responsible, among other things, for developing and implementing policy in the area of protecting national cultural heritage.

It includes Department for Protection of Cultural Architectural Heritage, that is crucial agency for agreeing and issuing

[154] According to Ukrainian legislation, initiators/authors of the law could be both MPs and executive power – Cabinet of Ministers. All draft legislator acts developed by executive agencies, for example MinRegion, have to be approved by the Cabinet of Ministers before submission to the Verkhovna Rada.

permits for construction and development activities in the areas with special cultural and historical status (e.g. UNESCO site, architectural national reserve etc) and in adjacent areas.

Ministry of Ecology and Natural Resources of Ukraine is responsible, among other things, for developing and implementing policy in the area of protecting environment, air, water, land resources including designating the land use and establishing restriction in use of land and other resources.

Ministry of Infrastructure of Ukraine is responsible, among other things, for developing and implementing policy in the area of development and maintenance of infrastructure, use of land and construction of buildings on land that belongs to road and other infrastructural objects.

Legislative and executive power agencies – regional and local level

Oblast and rayon state administrations, including regional representative offices of national agencies and ministries, such as Territorial Architectural and Construction Inspections (property, construction, planning), as well as oblast, city and rayon departments of State Service of Geodesy, Cartography and Cadastre (land allocation, planning and management); oblast departments of economic development. They are responsible for implementing national legislation and regulations at oblast and rayon level, for ensuring oversight and monitoring over execution, providing a range of administrative services in the areas of urban development, architecture, planning, land management etc.

Oblast and rayon councils are self-government bodies elected every 5 years. They are responsible for developing policies at oblast and rayon tiers according to the authorities granted to them by the Constitution and the Law on Local Self-Government, approving budgets, special programs and project of development, managing assets belonging to the oblast and rayon community. They do not have their own executive committees and **delegate ALL executive functions** to state administrations at oblast and rayon levels (see above).

City councils and their executive committees are legislative bodies at city level with their own executive bodies elected every 5 years. City mayors are directly elected local politicians (with 5 years term of service) who are leading executive committees of the councils. These bodies are responsible for developing and implementing local socio-economic and other policies in the boundaries of their respective cities.

Other Organizations

Three state scientific and research institutes in the area of urban planning are responsible for preparing master plans for oblasts, rayons and cities of Ukraine, zoning plans and detailed territory plans; providing expertise for monitoring and oversight of their implementation as stipulated by specific national and local level regulations. These are:
1. Scientific Research Institute Dipromisto
2. Scientific Research Institute of City Construction
3. State Company "Ukrainian State Scientific Research and Planning Institute of Civil Construction"

City of Kyiv has its own communal enterprise **Institute of Master Plan of Kyiv**. It is responsible for development, implementation and monitoring of execution of Kyiv Master Plan, as well as zoning plans and detailed plans of territories, other urban planning documentation, planning of engineering infrastructure.

Association of Ukrainian Cities (AUC) is one of the most influential lobbying platforms in Ukraine that brings together mayors of all major and medium-sized cities of Ukraine. It has special section for small cities and towns. AUC is traditionally one of the strongest protagonists of functional and fiscal decentralization, strengthening the role and capacities of city councils in developing and implementing effective policies.

Association of small cities of Ukraine is another lobbying platform that evolved from original Association of the heads of villages and settlements. It unites mayors of cities of rayon significance with the headquarters in the city of Ukrainka (Kyvska o blast).

Eastern Ukrainian Centre of Community Initiatives is one of very few Ukrainian NGOs, which is specifically dealing with the issues of transparency and public participation in the area of urban planning and spatial development. In particular it is a very active lobbyist of the question of making 100% of master plans open for public.