



# Pinpointing Poverty in Europe

*New Evidence for Policy Making*

KENNETH SIMLER



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# Abbreviations

ARoP	at risk of poverty
EB	empirical best
EC	European Commission
ELL	Elbers-Lanjouw-Lanjouw
EU	European Union
EU-SILC	EU-Statistics on Income and Living Conditions
LAU	local administrative unit
NSI	National Statistical Institute
NUTS	Nomenclature of Territorial Units for Statistics
TIPSE	Territorial Dimension of Poverty and Social Exclusion in Europe



# Pinpointing Poverty in Europe

## Introduction

More than 122 million people, almost 25 percent of European Union (EU) citizens, are at risk of poverty or social exclusion. The funding and targeting of basic services and of programs to reduce poverty and social exclusion depend on the availability of detailed knowledge of the disparities in socio-economic well-being across and within EU member states. However, the poor are spread about unevenly in the EU across municipalities, districts, and regions in ways that are not entirely known.

Because the World Bank and the EU have the common objective of building competitive and sustainable economies and reducing poverty and social exclusion and because of the World Bank's extensive experience, the EC and the Bank entered into an agreement to assist EU member states in undertaking expert analysis of census and survey data to create accurate, detailed geographical presentations of poverty. This note highlights the context and main findings of the ongoing European Commission (EC)–World Bank project, Poverty Mapping in the European Union, including the EU goals of reducing poverty and social exclusion and the difficulties of precisely identifying the poor in the EU.

- *Outputs:* The main project output has been monetary poverty maps on selected countries that acceded to the EU in or after 2004. In the first phase of the project, small area poverty maps were produced on Estonia, Hungary, Latvia, Poland, Romania, the Slovak Republic, and Slovenia. The maps portray sub-national geographical areas, such as municipalities, counties, and districts, and highlight the small areas most likely to exhibit the highest risk of poverty in each of these EU member states. This note describes the technical aspects of this effort and offers brief case studies of the development of the poverty maps in these seven EU member states.
- *Insights:* The new maps demonstrate clearly that the risk of poverty is heterogeneous across small geographical areas. Moreover, there may be large numbers of poor people concentrated in small discrete areas within larger regions that show low overall poverty rates. For example, urban areas may have large numbers of poor, but low poverty rates, while rural areas may have few poor, but high poverty rates. Or a region with moderate rates of poverty may be composed of smaller districts that have a mix of very high and very low poverty rates. Thus, less detailed poverty maps may give evidence that is misleading and even contradicts the evidence revealed by more finely grained poverty maps.
- *Impact:* The new maps complement other information on the correlates of poverty that enhances regional policy and program design. They have effectively guided decision making and policy making at the sub-national and national levels in EU member states and assisted the EC in allocating national and regional development and financing program funds efficiently

to areas with the greatest need. As the national partners of the project, government authorities, mainly experts at national statistical institutes and ministries, have benefited from substantial knowledge and skill spillovers about poverty mapping through the project. The spillovers have gained prominence through academic research by catalyzing greater communication and collaboration. The Bank, meanwhile, has developed new expertise on poverty mapping in more highly developed countries. Nordregio, a consortium of Nordic research centers, has been using the methodology to create maps elsewhere in the EU under the EU's Territorial Dimension of Poverty and Social Exclusion (TiPSE) project. The EU has also begun conducting mapping exercises on other issues, including social exclusion.

- *Knowledge and innovation:* This note describes other applications of the maps in various countries, including countries outside the EU with which the World Bank has worked on similar initiatives. The project has advanced thinking about the methods and uses of poverty mapping, helped improve the mapping tools, and generated capacity building. Thus, a validation study carried out in Denmark and Slovenia through the project to test various alternative poverty mapping methods has fine-tuned understanding of these methods. Likewise, based on the experience gained through the project, the World Bank has upgraded its PovMap interactive poverty mapping software.

This note illustrates fresh goals in the ongoing project, initiatives envisioned on the horizon, and expectations of new outcomes and impacts. This includes new estimates of poverty in small sub-national geographical areas in Bulgaria, Croatia, the Czech Republic, and Lithuania; fresh maps on Hungary and Latvia based on more recent data; and exploration of refinements to the risk of poverty methodology that take into account sub-national variations in the cost of living across these areas. The note also offers examples of how poverty mapping has been used to inform policy, selected from among the dozens of non-EU countries in which poverty mapping has been carried out with the assistance of the World Bank.

## The Project

As long as poverty and social exclusion exist, social progress may only advance haltingly because certain population groups are unable to participate fully in economic and social development. Thus, poverty and social exclusion are barriers to the achievement of overall territorial cohesion within countries and across regions. One of the five headline targets of Europe 2020—the strategy for the economic advancement of the EU in 2010–20—is therefore to reduce the number of people at risk of poverty or social exclusion by 20 million by the year 2020.<sup>1</sup>

The recent economic slowdown and the decline in the pace of the reduction of poverty and inequality are posing additional obstacles to rapid progress toward the realization of the targets. According to data of Eurostat, the EU statistics agency, more than 122 million people in the EU—almost 25 percent of EU

citizens—are at risk of poverty or social exclusion.<sup>2</sup> Moreover, poverty and social exclusion are distributed unevenly across municipalities, districts, and regions. Indeed, it is spread about in ways that were clear to no one until quite recently.

In the 2014–20 multiannual financial framework, the EU has budgeted €1 trillion to boost growth and job creation, which are instrumental for reducing poverty and social exclusion. Success depends on developing the correct policies and programs and targeting them effectively. It also depends on the availability of detailed knowledge of the disparities across and within member states, but especially in those member states with high levels of poverty and social exclusion.

Identifying the poor accurately helps in delivering antipoverty relief and basic services and guiding programs aimed at eliminating poverty and sharing prosperity more equitably. To help EU member states take advantage of the EU funds available for efforts to reduce poverty and social inclusion most efficiently, the EC decided to develop small area poverty maps on each of the EU member states so that the countries could address problems in their neediest regions.

It was known that poverty maps allow a focus in greater detail on the spatial distribution of poverty at the local level. However, the sub-national data available to the EC has typically had only limited value for this purpose. Moreover, the EC lacked the in-house expertise and specialized resources to produce useful maps of poverty at a scale meaningful for more effective targeting. It therefore approached the World Bank because of the Bank's extensive experience in poverty mapping and because the Bank and the EU have the common objective of building competitive and sustainable economies and reducing poverty and social exclusion. Originally, the EC requested the World Bank to help create maps of poverty in all EU member states, but, for practical and institutional reasons, the task was narrowed to drawing up maps on the more recent EU members emerging among the former transition countries of Central and Eastern Europe (see box 1).

The EC Directorate-General for Employment, Social Affairs, and Inclusion and the EC Directorate-General for Regional and Urban Policy entered into a formal agreement with the World Bank in 2011. The main output the EC requested from

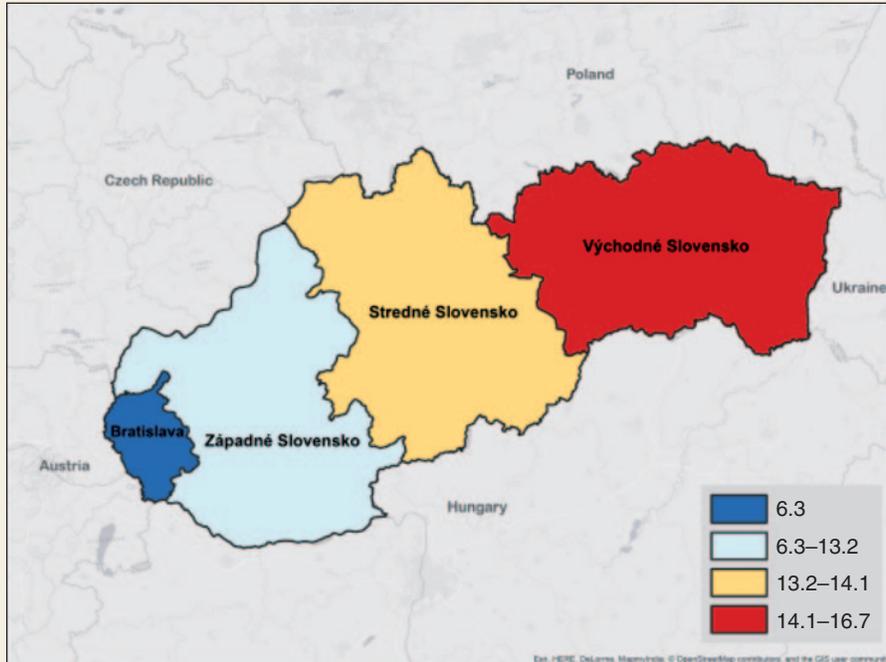
### **BOX 1** Looking behind the Averages: The Power of Poverty Mapping

These maps of the risk of poverty rates in the Slovak Republic illustrate the information gains provided by small area estimation. The top panel shows the sub-national risk of poverty rates at the level of the four oblasts. Oblasts in the Slovak Republic correspond to the “NUTS 2” territorial division in the EU, and is the sub-national level for application of regional policies, including financial support from the EU.<sup>3</sup> The oblast map shows a clear east-west gradient in poverty rates, with the poorest oblast in the east near the border with Ukraine and the least poor in the west, home of the national capital Bratislava and the borders with Austria and the Czech Republic. This east-west pattern of poverty risk appears in most central and eastern European countries.

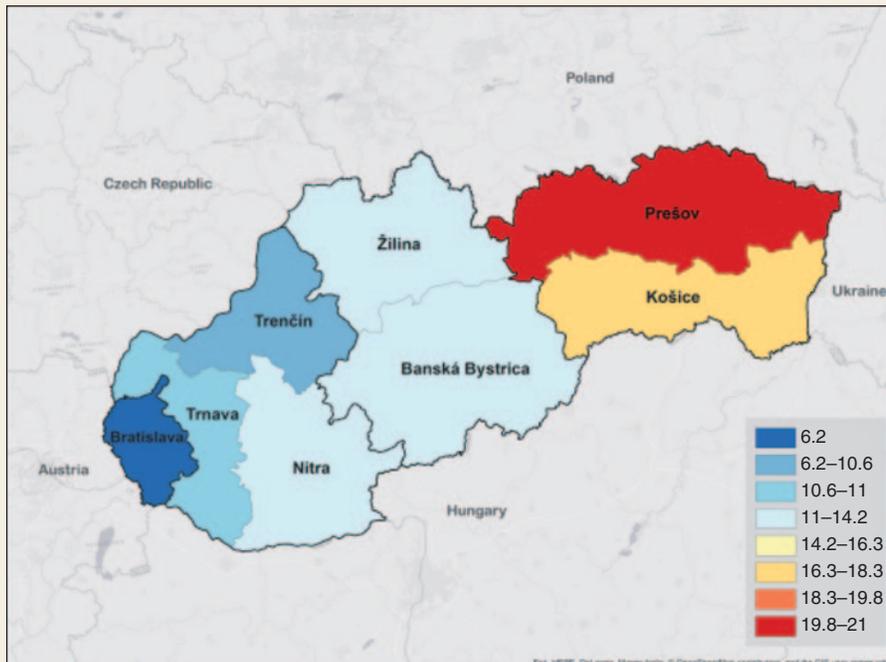
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## BOX 1 Looking behind the Averages: The Power of Poverty Mapping (continued)

Oblasts (NUTS 2)



Regions (NUTS 3)

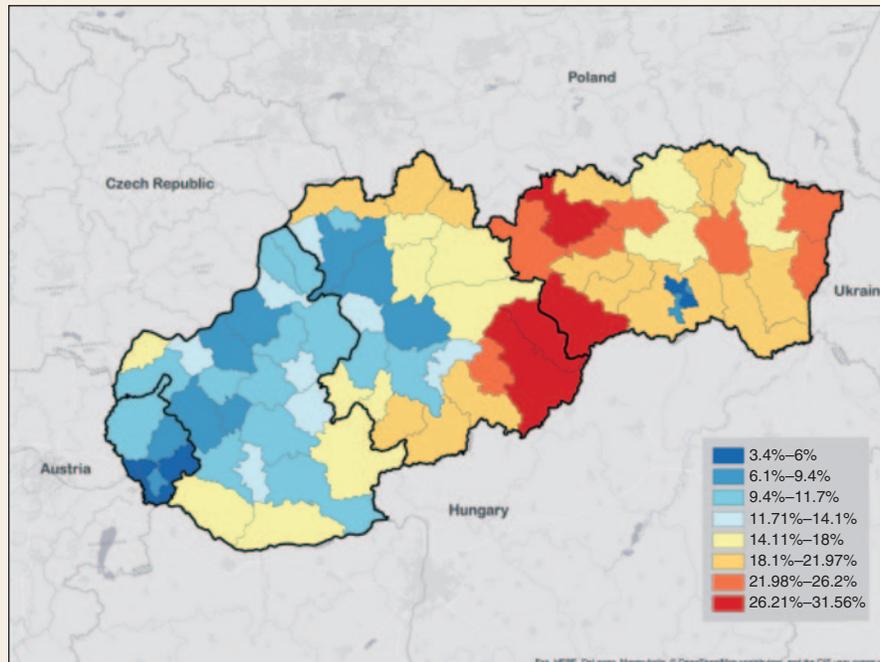


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## BOX 1 Looking behind the Averages: The Power of Poverty Mapping (continued)

As one disaggregates to the eight regions of the Slovak Republic (NUTS 3) in the middle panel, regional differences within the oblasts are revealed. The east-west pattern is still maintained, but differences in poverty rates within oblasts appear, especially in the eastern part of the country.

Districts (LAU 1)



Source: Estimates using data from the 2011 EU-SILC and the 2011 Population and Housing Census collected by the Statistical Office of the Slovak Republic. Boundary map courtesy of Geodesy, Cartography and Cadastre Authority of the Slovak Republic.

Drilling down deeper to the 79 districts of the Slovak Republic (LAU 1, bottom panel) reveals considerable heterogeneity in risk of poverty rates that was obscured when looking at the more aggregate regions. The more granular information on poverty opens up possibilities for more accurately targeted interventions and more cost-effective policies to reduce poverty.

the Bank was technical assistance in the construction of monetary poverty maps on countries that had acceded to the EU in or after 2004. The maps were to portray sub-national geographical areas, such as municipalities, counties, and districts, and highlight the small areas most likely to exhibit the highest risk of poverty in each member state and, thereby, provide a comprehensive picture of poverty in this part of Europe (World Bank 2014a). The objective was to help guide decision making and policy making at the sub-national and national levels in EU member states and assist the EC to allocate European Structural and Investment Funds efficiently to programs serving the areas with the greatest need. In cooperation with the EC, especially the Directorate-General for Regional and Urban Policy,

a consortium of Nordic research centers (Nordregio) was to perform similar work in the rest of the EU, using the same small area methodology as the World Bank in some countries and using tax registry data in others. Government authorities in the individual European countries, mainly national statistical institutes (NSIs), but also ministries, are the national partners of the project.

Despite common EU goals (such as income convergence across and within member states) and technical standards (such as the standards associated with EU household surveys), the engagement with each EU member state has been unique. Working arrangements, analytical approaches, and skill transfers have been tailored to the context of each country, taking into account the considerable variation in staff expertise, the time available to work on the project, data readiness, and procedures for accessing sensitive and confidential data. The customized approach to each country also extended to the dissemination of the results through official publications and web sites and also outreach to local media outlets.

## What Is Poverty Measurement in the EU?

Low income is not a failsafe indicator of poverty experienced across geographical areas because, similar to the rates of poverty and social exclusion, which vary widely across EU member states, there is also considerable variability in living standards across countries and across regions within countries. Relative poverty is therefore more generally used in the European context and is normally specified as income below a minimum acceptable level. The at-risk-of-poverty (ARoP) rate is the key indicator of such relative income poverty in relation to the Europe 2020 targets. It is the population share of people whose yearly disposable income is below the ARoP threshold, which is 60 percent of the national median yearly disposable income of household members after social transfers.<sup>4</sup> This means that each of the countries calibrates their own ARoP rates according to the national median income. Mapping these rates illustrates patterns of within-country relative poverty more effectively.

In previous years, the EC had to rely on less detailed data and maps for program planning and the allocation of EU funds. The ARoP rate for large aggregated areas likewise fails to capture the interaction in finer detail such as within cities, between small urban and rural areas, or in dispersed regions. To understand the role of poverty in wider processes of territorial cohesion, it is important to establish patterns and explore processes at an even finer geographical scale. More precise information about this within-country distribution of poverty was therefore sought through the new mapping methods that have figured in the EC–World Bank poverty mapping project.

## Constructing the Poverty Maps

The maps are constructed using a variation of the small area estimation methodology that was developed to allow accurate estimates of monetary poverty and inequality at lower levels of disaggregation (see Elbers, Lanjouw, and Lanjouw 2002, 2003). At least two datasets are required to implement the method. One is a detailed household survey that includes a welfare measure, typically income or

consumption per capita or per adult equivalent. The other data source is a national census or, alternatively, a large national survey that includes a significant share of the country's population. The method typically consists of three steps.

The first step involves the close scrutiny of a population census and a household living standards survey or a household expenditure survey to identify a set of candidate socioeconomic variables (such as educational attainment, housing characteristics, or access to basic services) that are available in both the census and the survey. The analysts examine the data sources to ensure that the variables are comparable, that is, that they are worded in a similar way, including in the response options.

In the second step, the household survey data and the variables that have been identified in step 1 are used to develop a regression model of disposable household income as a function of individual, household, and community characteristics.<sup>5</sup> The standard EU measure of disposable household income is used, which includes income after tax payments and the receipt of social transfers. The disposable income is equalized by adjusting it according to the size and age composition of households.<sup>6</sup> The independent or explanatory variables commonly include the demographical, educational, and employment characteristics of households, as well as community characteristics such as population density and physical access to infrastructure.

In the third step, the set of estimated parameters obtained from the regression models is applied to the set of matching variables in the population census data to yield the predicted income of each household in the census. Once such information is available, summary measures of poverty and inequality are estimated for sets of census households across any geographical unit with a sufficient number of households to obtain reliable estimates, such as provinces, counties, districts, subdistricts, or municipalities. Statistical tests are then performed to assess the reliability and precision—the standard errors and confidence intervals—of the various measures that have been produced.

After the exercise has been completed for all sub-national units or groups of units, the resulting estimates of poverty and inequality and the related standard errors at a variety of levels of geographical disaggregation are projected onto geographical maps using geographic information system mapping techniques to facilitate the presentation and visual analysis of patterns.

## **The Results: The First EC–World Bank Poverty Maps**

One of the initial steps in the project, from February through November 2012, was a methodological validation study proposed by the EC to test slightly different approaches to small area poverty estimation and identify a preferred method for estimating the EU poverty maps (box 2). The validation study was guided by a steering committee, which was composed of leading experts in small area estimation at European universities and NSIs and senior staff at Eurostat, the EC Directorate-General of Employment, Social Affairs, and Inclusion, and the EC Directorate-General of Regional and Urban Policy.

## **BOX 2 Validation Study of Small Area Poverty Estimation Methods**

The study used validation methods to compare slightly different approaches to the estimation of poverty in small areas. The principal comparison was between the Elbers-Lanjouw-Lanjouw (ELL) method that had been the main approach used by the World Bank and its partners for the past 15 years or so and an extension of the ELL method proposed in the statistical literature as an enhancement and widely known as the empirical best (EB) method (Elbers, Lanjouw, and Lanjouw 2002, 2003; Molina and Rao 2010). The advantage of the EB appeared of marginal consequence in low-income countries such as those in which the Bank had been applying the methodology for years already and where sample surveys typically cover only a small share of the areas in which poverty is being estimated, but it seemed potentially significant in the context of the survey sampling schemes in European countries.

The validation study was carried out in Denmark and Slovenia because, in addition to the EU Statistics on Income and Living Conditions database (EU-SILC) and population census data, complete sets of household income data were available through the tax registries in these countries and could be linked to survey and census data on individuals and households. The methodologies were validated by using them to estimate the poverty rates in small areas as if only the EU-SILC and census data were available and then comparing the resulting rates with the poverty rates calculated from the income tax data, which served as the benchmark reference. By testing selected variations of the ELL and EB on areas in which income data were available for the entire population, it was possible to determine which approaches came closer to the poverty rates as measured directly by the income registry data.

Aided by the guidance of experts on the steering committee, the study was able to quantify the impact of adding the EB to the ELL framework. The systematic testing also furthered the understanding of other elements of poverty mapping.

The validation study found that the six estimation methods that had been tested correctly identified 80–90 percent of the municipalities ranked among the poorest based on the income tax registry data. (Municipalities are the first and second local administrative units [LAUs]—LAU 1 and LAU 2—in Denmark and Slovenia, respectively.) This thus served to support a critical self-examination of the poverty mapping methods used within the World Bank and their applicability in a European setting.

The steering committee was chaired by the directors of these Directorates-General. The exercise thus benefited not only from the knowledge of technical experts, but also from users of this type of information in the EC.

Informed by the results of the validation study, production of the actual small area poverty maps was carried out in EU member states during 2012–2014. Constructing the maps required access to data not available to the World Bank through Eurostat. This typically involved conducting analyses on-site at NSIs in individual EU member states, with the widely varying involvement of NSI analysts. This also meant that the preferred approach of relying on survey and census microdata, that is, data at the household and individual levels, was sometimes not possible. In such cases it became necessary to resort to using

aggregate, or area-level, data to estimate poverty rates in small areas. After the initial results had been obtained, the draft poverty maps were shared with local experts as an informal validation and to open discussions about the likely underlying causes of the observed spatial patterns in poverty and about potential policy remedies. The analysis was then revisited and refined, taking into consideration the comments of the local experts.

During the first project phase, small area poverty maps were produced for seven EU member states: Estonia, Hungary, Latvia, Poland, the Slovak Republic, and Slovenia, which joined the EU in 2004, and Romania, which joined in 2007.<sup>7</sup> Table 1 summarizes the level of spatial disaggregation achieved in each of the poverty maps, using both the Nomenclature of Territorial Units for Statistics (NUTS)–LAU classification system and the common English names for the respective regions in each country. The table also indicates the main data sources and whether the maps are based on microdata or aggregate data.<sup>8</sup>

It was widely assumed that the spatial variation in poverty was considerable within the highly aggregated NUTS 2 regions that are used for EU regional policies and programs. However, concrete and sufficiently precise information about the nature of these regional disparities was lacking.

The new higher-resolution poverty maps based on the small area poverty mapping methodology provide more finely grained information on sub-national variations in poverty than was previously available (also see appendix A). The greater geographical disaggregation of the new maps permits more precise identification of the parts of these larger regions that exhibit particularly high rates of poverty and require greater attention in development assistance and poverty reduction programs, whether through EU funds or other resources. Combined with data on population size, they also provide information on where most of the poor are located. The maps likewise complement other information on the correlates of poverty that enhances regional policy and

**TABLE 1 Level of Aggregation and Data Sources for Poverty Maps, Phase 1, 2012–14**

Country	Level of poverty map	Data sources and comments
Estonia	Municipalities, with some grouping of small municipalities; total of 132 areas, corresponding approximately to LAU 2	Microdata from 2012 EU-SILC and 2011 population census
Hungary	General electoral districts; total of 174 areas, corresponding approximately to LAU 1	Microdata from 2005 EU-SILC and 2005 microcensus
Latvia	Statistical regions; total of 6 areas, corresponding to NUTS 3	Aggregate area-level data from 2012 EU-SILC and 2011 population census
Poland	Statistical subregions; total of 66 areas, corresponding to NUTS 3	Aggregate area-level data from 2011 EU-SILC and 2011 population census
Romania	Counties and Bucharest; total of 42 areas, corresponding to NUTS 3	Microdata from 2011 EU-SILC and 2011 population census
Slovak Republic	Districts; total of 79 areas, corresponding to LAU 1	Aggregate area-level data from 2011 EU-SILC and 2011 population census
Slovenia	Municipalities, with some grouping of small municipalities; total of 195 areas corresponding approximately to LAU 2	Microdata from 2010 EU-SILC and 2011 population census

Source: World Bank 2014a.

program design. The contrast between maps resulting from lower and higher resolution in poverty data is evident in the EU poverty maps produced under this project.

### Highlight: Producing and Using Poverty Maps in Estonia

The poverty mapping exercise in Estonia is an outstanding example of how the poverty mapping methodology—combined with exceptional institutional cooperation and commitment by national officials—made it possible to produce extremely detailed poverty estimates. To help achieve the EU’s Europe 2020 target to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020, the government of Estonia has set a national goal of reducing the ARoP rate from 17.5 percent in 2010 to 15.0 percent by 2020, which is equivalent to an absolute reduction in the number of the poor and socially excluded of 36,248 people (Estonia, Government Office 2014).<sup>2</sup> To inform the steps needed to reach this goal, Statistics Estonia, with the assistance of the World Bank, decided to construct detailed poverty maps of the country.

With a population of around 1.3 million, Estonia is a small country, and the EU NUTS 2 classification covers the entire national territory (as is also the case in Cyprus, Latvia, Lithuania, Luxembourg, and Malta). Clearly, this is inadequate for identifying sub-national variations in poverty. Tallinn, the capital, enjoys high average living standards, but isolated islands and the northeast are relatively much poorer.

Estonia is divided as follows: five groups of counties (NUTS 3), 15 counties (LAU 1), 226 local government units (LAU 2), and circa 5,000 settlement units. The EU-SILC survey in Estonia is based on a sufficiently large sample to produce reasonably precise direct estimates of the risk of poverty within the counties (LAU 1), but not within the local government units (LAU 2). Some of the local government units have such small populations—fewer than 500 households, for example—that precise poverty estimates are not possible even if one uses the poverty mapping methodology based on combining survey and census data. Precise poverty estimates are crucial for ranking the poverty rates of local government units reliably, an important step in the practical targeting of antipoverty initiatives.

After consultations and some experimentation with preliminary findings, representatives of Statistics Estonia and the World Bank agreed on a system for grouping sparsely populated local government units with other local government units to produce trustworthy poverty estimates. The criteria for the grouping were based on the following principles: (1) each area should have at least 1,000 households, (2) local government units that belong to the same group should be located within the same county so that the estimates would remain additive, (3) local government units that belong to the same area have similar socioeconomic characteristics, and (4) the local government units should have common borders. The municipality of Tallinn is sufficiently large—a population of over 400,000—that it was possible to disaggregate it on the basis of the municipality’s eight

urban administrative districts. In addition to these eight districts of Tallinn, the division resulted in 124 groups, each consisting of 1–6 local government units.

The project made use of the data from the Estonian Social Survey of 2012 (Estonia's implementation of the EU-SILC), in which income variables refer to 2011, and data from the housing, household, and personal questionnaires of the Population and Housing Census as of December 31, 2011. Estonian privacy laws allow no access to census microdata by outside analysts before the publication of official reports. This could have blocked or delayed the efforts to produce the poverty maps. However, Statistics Estonia was so committed to completing the maps that it adjusted its existing work program and assigned two of its experts to work on the project. In addition to contributing their technical proficiency and local knowledge, the Statistics Estonia experts had sole responsibility for handling the census microdata, thereby ensuring compliance with the privacy laws.

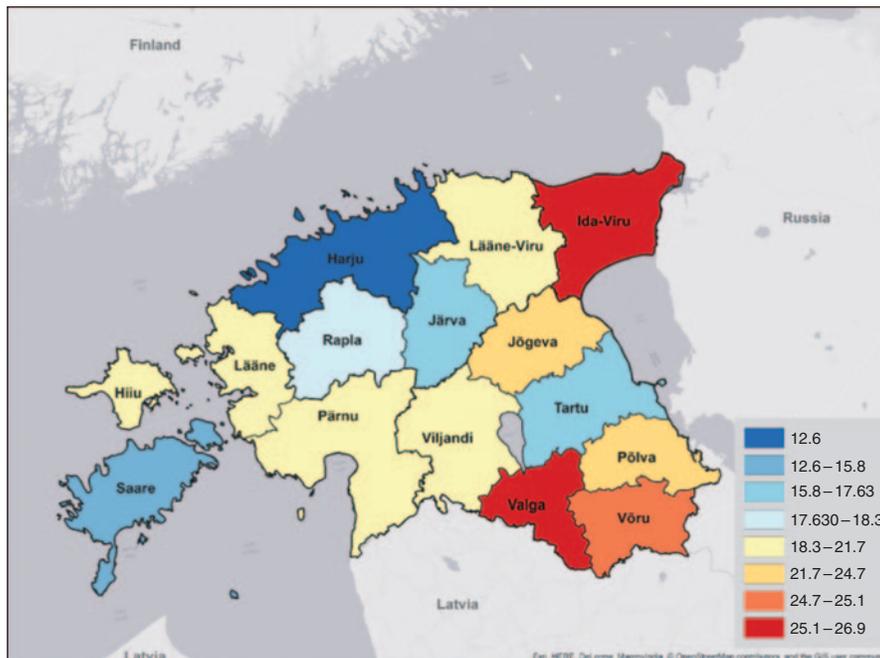
The poverty maps confirm existing knowledge about poverty in Estonia, but also reveal new insights. Thus, for example, panel a, map 1 shows graphically that direct estimates from the Estonian Social Survey suggest there is some poverty heterogeneity across counties, but the estimates for groups of local government units illustrated in panel b, map 1 reveal considerably more variation in poverty incidence within counties. Previous surveys indicated that counties in the northeast and southeast had the highest rates of poverty, but the more disaggregated estimates reveal contrasts between the lower poverty estimates in large cities and surrounding areas relative to other parts of the counties. There are also local government units with high poverty incidence in counties that otherwise have low to moderate overall poverty rates.

The new poverty maps demonstrate that poverty rates in the poorest areas and poverty rates in the least poor areas differ by a factor of almost seven, ranging from 6 percent to 40 percent. The EU poverty rate for the NUTS 2 area, that is, the entire country, was 17.6 percent. As Estonia is a single NUTS 2 region, finer geographic disaggregation is required to show sub-national variations in poverty. Estonia's EU-SILC is representative at the LAU 1 level (15 counties). The small area estimation methodology allows further disaggregation to the LAU 2 level (local government units), revealing smaller pockets of poverty that require more well-targeted policy attention.

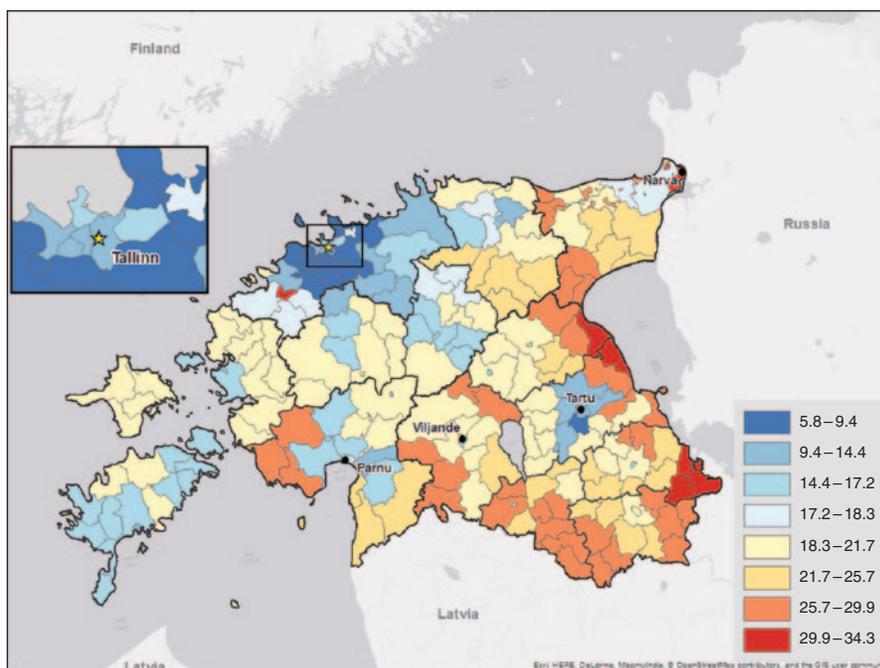
Targeting poor areas alone can have limitations, however. Policy makers have an interest both in areas where poverty is high and in areas that have the highest number of poor people. These two are not always the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of large populations. This contrast is readily seen in the large concentration of poor people in the cities of Tallinn and Tartu and the surrounding areas (map 2). Even though the ARoP rates are low, these cities are home to a large share of Estonia's poor. On the other hand, Ida-Viru county in the northeast has both high poverty rates and a large number of poor people. This is most pronounced in the former military-industrial city of Narva, Estonia's third largest city, which has

## MAP 1 At-Risk-of-Poverty Rates, Estonia

### a. Countries (LAU 1)

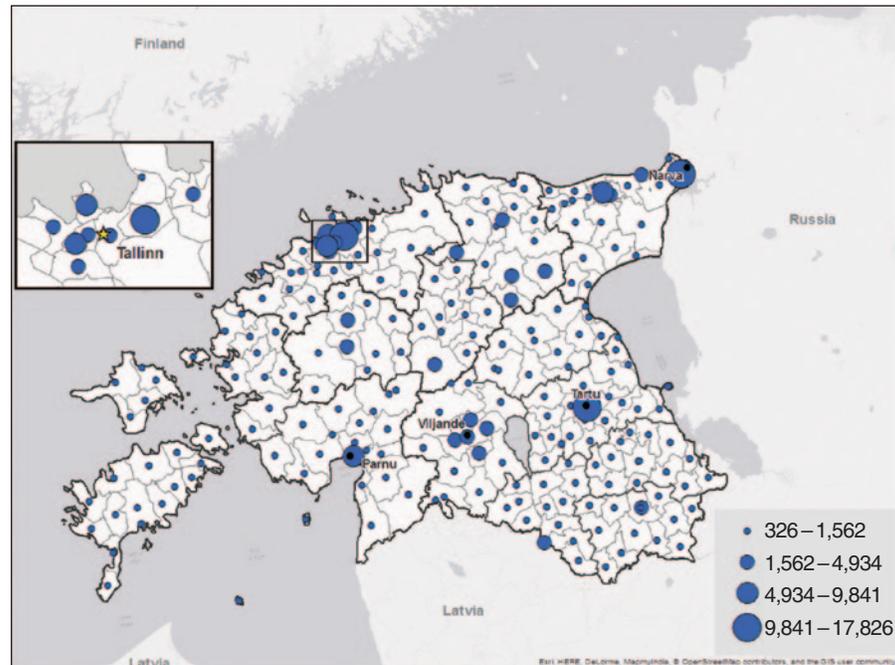


### b. Groups of local government units (LAU 2)



Source: Estimates using data from the 2012 Estonian Social Survey and the 2011 Population and Housing Census collected by Statistics Estonia.

## MAP 2 Population Living below the Poverty Threshold, Estonia



Source: Estimates using data from the 2012 Estonian Social Survey and the 2011 Population and Housing Census collected by Statistics Estonia.

among the highest poverty rates, despite an urbanized and well-educated population. This is an outcome of the disappearance of the manufacturing base in these places.

### Six Other Poverty Mapping Exercises

The World Bank and NSIs carried out initial poverty mapping exercises in six other countries besides Estonia. Summaries of these experiences are provided below. More detail is supplied in appendix B.

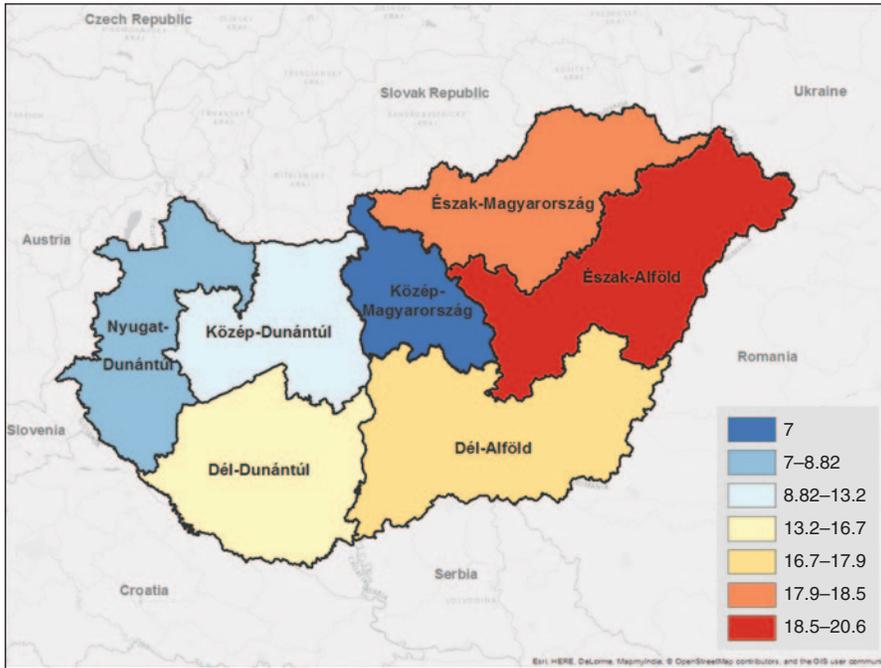
#### *Hungary*

In 2013, 3.3 million people, or 33.5 percent of the population, were at risk of poverty or social exclusion in Hungary.<sup>10</sup> To help achieve the Europe 2020 target to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020, the government of Hungary has set a national goal of reducing the number of the poor or socially excluded by 450,000 people (Hungary, Ministry for National Economy 2015). To inform the steps needed to reach this goal, the Hungarian Central Statistical Office, with the assistance of the World Bank, constructed detailed poverty maps of the country (map 3).<sup>11</sup>

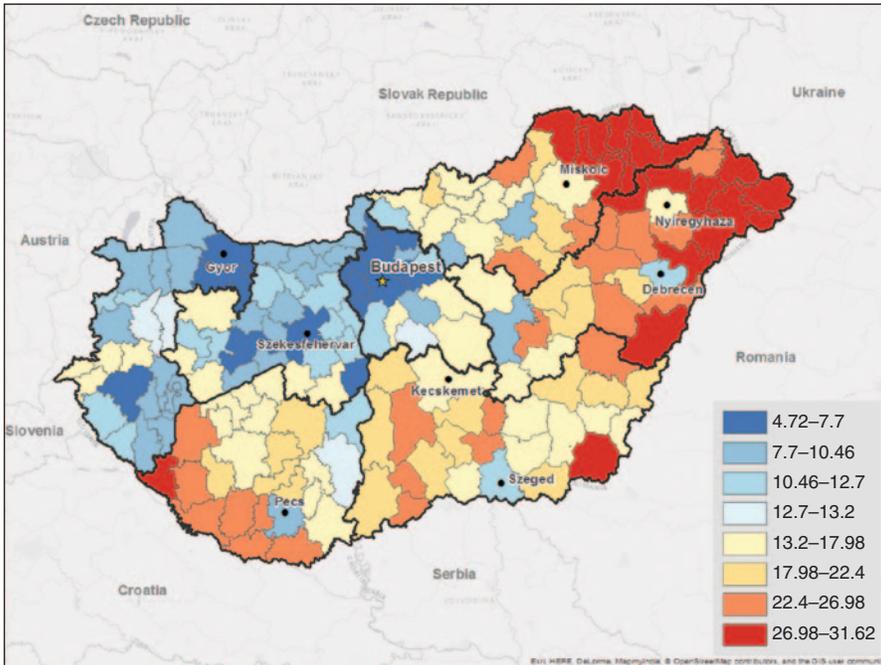
The poverty maps corroborate existing knowledge about poverty, but also reveal much more. For example, previous surveys showed that the highest rates of poverty occur in the northeast (map 3, panel a). The statistical

### MAP 3 At-Risk-of-Poverty Rates, Hungary

a. Seven planning and statistical regions (NUTS 2)



b. Subregions (LAU 1)



Source: Estimates using data from the 2005 EU-SILC and 2005 Microcensus collected by the Hungarian Central Statistical Office.

subregion (LAU 1) poverty map shows that many of the subregions in the northeast face an elevated risk of poverty, although Eger, Miskolc, and Nyíregyháza stand out as areas with only moderate poverty incidence (map 3, panel b). In contrast, Southern Transdanubia is heterogeneous, comprising low poverty incidence in subregions such as Pécs and relatively high poverty incidence in nearby Siklós, Sellye, Szigetvár, or Szentlőrinc. More generally, there is a much higher degree of heterogeneity in poverty incidence in the statistical subregions relative to the estimates available directly from the EU-SILC survey for the statistical regions.

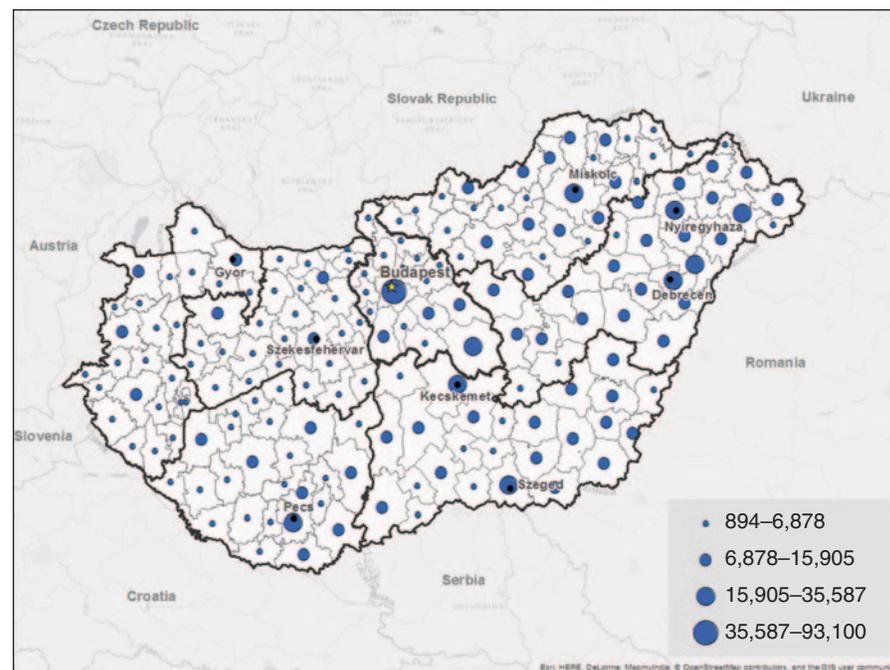
The density of the population below the poverty threshold is, on average, also higher in districts with higher poverty incidence (map 4). Nonetheless, the rankings of subregions by poverty incidence and by poverty density are quite divergent; districts such as Budapest, Pécs, Győr, and Székesfehérvári have a low poverty incidence, but, given their large populations, they account for a large share of the total population below the AROp threshold.

### Latvia

To help reach the EU's Europe 2020 target, the government of Latvia has set a national goal of reducing by 121,000 the number of people at risk of poverty or living in households with low work intensity (Latvia, Ministry of Economics 2015).<sup>12</sup>

The EC has relied on the NUTS 2 territorial classification to determine eligibility for aid from European Structural and Investment Funds and for

**MAP 4** Population Living below the Poverty Threshold, Hungary



Source: Estimates using data from the 2005 EU-SILC and 2005 Microcensus collected by the Hungarian Central Statistical Office.

program planning. In smaller countries such as Latvia, the NUTS 2 classification corresponds to the entire national territory, that is, with no sub-national divisions (map 5, panel a). The EU-SILC in Latvia is representative at the statistical region level (NUTS 3), and the Central Bureau of Statistics reports ARoP estimates at that level.

Using small area estimation techniques, it was possible to improve the precision of these poverty estimates for the six regions of Latvia. According to these estimates, there is quite a bit of heterogeneity across regions (map 5, panel b). Pierīga and Rīga in north central Latvia are the only regions where the incidence of poverty is below the national average.<sup>13</sup> Estimates of poverty in other regions range from 21 percent to as high as 28 percent in Latgale in southeastern Latvia. Rīga Region has the lowest estimated risk of poverty, 12.9 percent, which is less than one-half the risk in the poorest region, Latgale (28.0 percent). However, because Rīga Region is much more populous, each of the two regions has approximately 85,000 people living at risk of poverty. While the remaining four regions have a somewhat heterogeneous poverty incidence, they all have a similar number of poor people, in the range of 50,000–60,000.

## ***Poland***

About 10 million people, or 26.7 percent of the population, were at risk of poverty or social exclusion in Poland in 2012.<sup>14</sup> The government has set a national goal of reducing the number of the poor and socially excluded by 1.5 million people (Poland, Ministry of Economy 2015). To further the steps needed to achieve this goal, the Central Statistical Office of Poland and the Statistical Office of Poznań, with the assistance of the World Bank, constructed detailed poverty maps of the country (map 6).

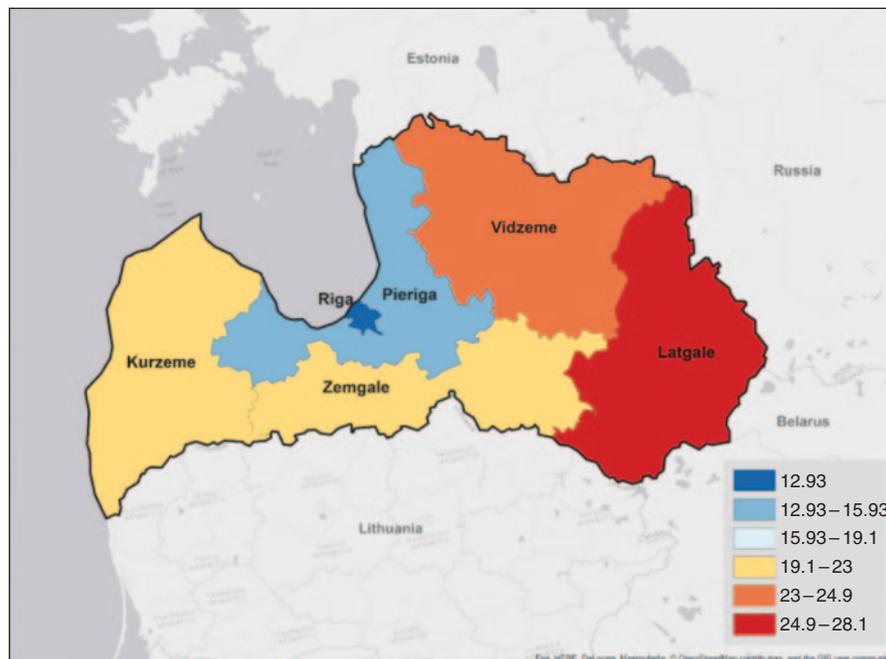
Previous surveys have shown higher poverty rates in the southeastern voivodships (in particular Lubelskie and Świętokrzyskie) and Lubuskie in the west (map 6, panel a). The more detailed poverty map shows that most of the statistical subregions with the highest ARoP rates are in the east and southeast of the country (map 6, panel b). However, the subregional map also reveals visible differences in poverty incidence between the low poverty cities (Kraków, Poznań, Warsaw, and Wrocław) and surrounding lower population-density areas with higher poverty incidence. The subregional map also highlights heterogeneity in poverty estimates within voivodships; the voivodship of Pomorskie includes Trójmiejski, with an estimated poverty incidence of 7 percent, alongside Słupski and Starogardzki, both with poverty rates in excess of 20 percent. There is an overall positive and relatively strong relationship across subregions between poverty incidence and the total number of individuals living below the poverty threshold. The highest absolute numbers of the poor are located in the east and southeast. At the same time, Warsaw stands out because it has the lowest estimated poverty incidence among statistical subregions, but, on account of its size, it ranks 27th among 66 subregions in the absolute number of individuals living below the poverty threshold. This is not observed in other large cities

## MAP 5 At-Risk-of-Poverty Rates, Latvia

### a. NUTS 2 classification



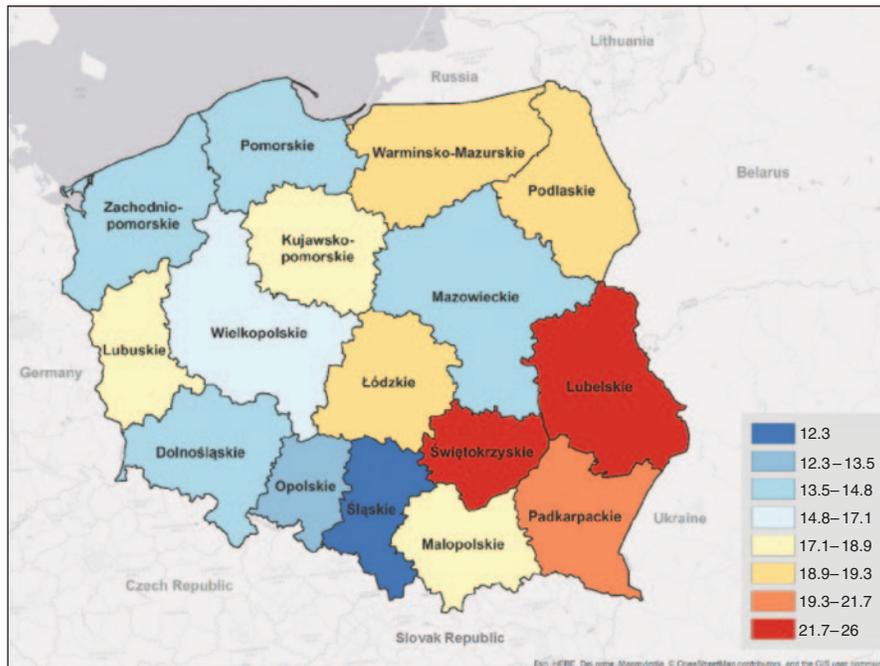
### b. Statistical subregions (NUTS 3)



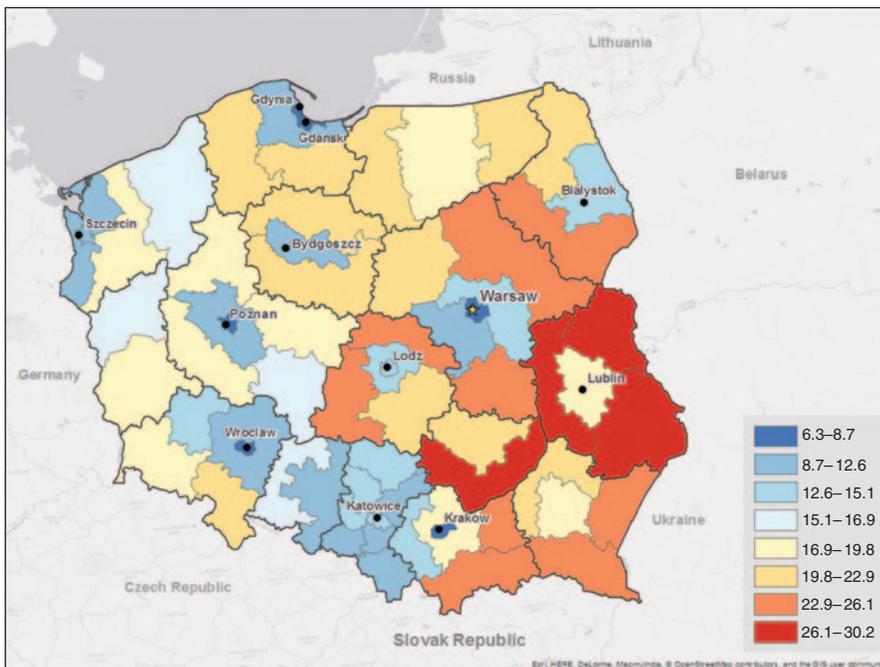
Source: Estimates using data from the 2012 EU-SILC and 2011 Population and Housing Census collected by the Latvia Central Statistical Bureau.

## MAP 6 At-Risk-of-Poverty Rates, Poland

### a. Voivodships (NUTS 2)



### b. Statistical subregions (NUTS 3)



Source: Estimates using data from the 2011 EU-SILC and the 2011 Census of Population and Housing collected by the Central Statistical Office of Poland.

such as Krakow, Poznań, or Wroclaw, where poverty incidence and the absolute number of poor both appear to be low.

### ***Romania***

The government has set a national goal of reducing the number of poor and socially excluded by 580,000 people (Romania, Ministry of Economy, Trade, and Tourism 2015).<sup>15</sup> To achieve the progress needed to realize this goal, the National Institute of Statistics, with the assistance of the World Bank, constructed detailed poverty maps of the country.

Previous surveys have shown the highest rates of poverty in the Northeast Region (map 7, panel a). The county-level poverty map (map 7, panel b) shows that all the counties in that region, with the exception of Bacău, have elevated ARoP rates. In contrast, the South Region is heterogeneous, comprising counties with high poverty rates, such as Călărași and Teleorman, and counties with relatively low poverty rates, such as Prahova. Similarly, Cluj County has the second lowest poverty rate in Romania (after Bucharest), but its neighboring counties in the Northwest Region (Bistrița-Năsăud, Maramureș, Sălaj, and Satu Mare) have higher than average poverty rates. Despite its lower poverty rate, Cluj has more people at risk of poverty than Sălaj, and Bucharest has more people at risk of poverty than six other counties. The maps suggest a complementary approach to the allocation of resources for poverty reduction: Bucharest and other urban areas might be given greater attention because many of the poor live in relatively rich counties. The maps clearly illustrate that the Northeast, especially Botoșani, Iași, and Suceava, have high poverty rates and large numbers of poor people and should be given high priority by either criterion.

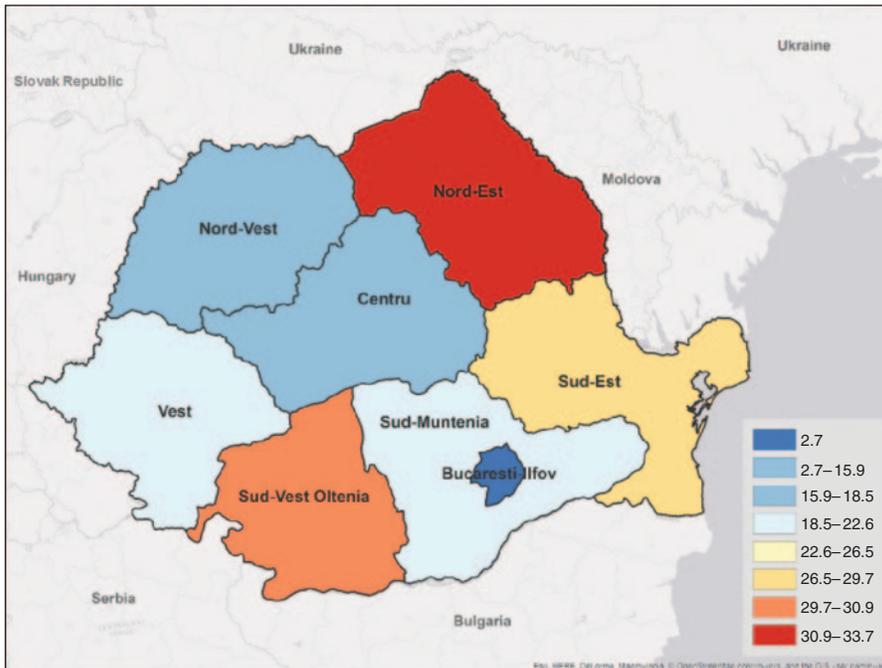
### ***The Slovak Republic***

In 2012, 1.1 million people, or 20.5 percent of the population, were at risk of poverty or social exclusion in the Slovak Republic.<sup>16</sup> The government has set a national goal of reducing the number of the poor and socially excluded by 170,000 people (the Slovak Republic, Ministry of Finance 2015). As a step toward this goal, the Statistical Office of the Slovak Republic, with the assistance of the World Bank, constructed detailed poverty maps of the country.

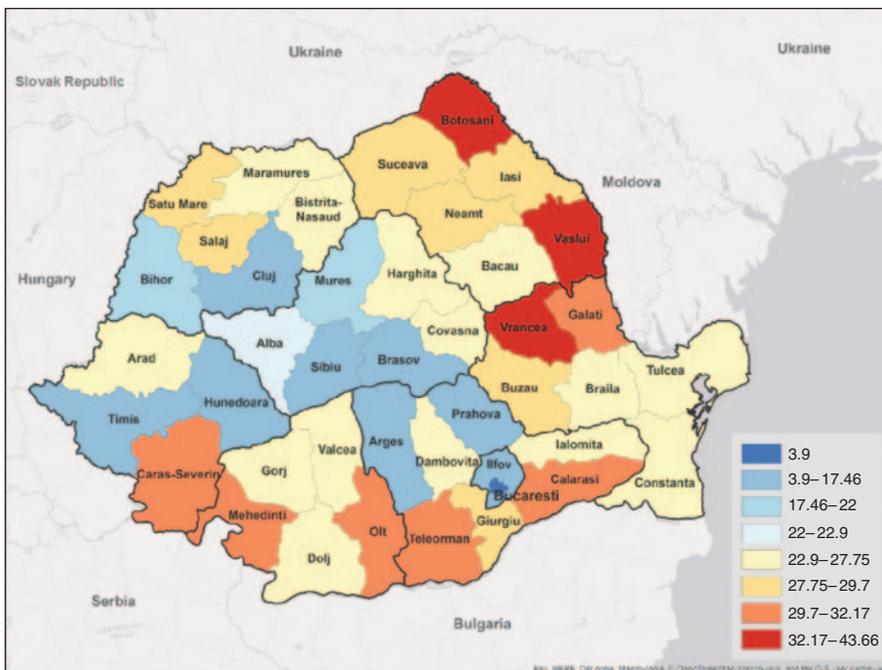
Previous surveys have shown the highest poverty rates in the eastern oblasts (map 8, panel a). Yet the district map (map 8, panel b) reveals considerably more heterogeneity in the incidence of poverty. In the east of the country, the highest poverty incidence appears to be concentrated primarily among the districts along the border with the center (Kežmarok, Poprad, and Rožňava) and in the districts along the border with Ukraine (Snina and Sobrance), while the incidence of poverty is relatively low in Košice. At the same time, districts such as Poltár, Revúca, and Rimavská Sobota in the center also show high incidence, although incidence is moderate in the center overall. In 23 of 79 districts, the district poverty estimates are statistically different from the estimates for the oblasts in which the districts are located. Even though the poverty headcount is generally correlated with the absolute size of the poor population, this is not always the case. Districts such as Nitra, Trenčín, Trnava,

## MAP 7 At-Risk-of-Poverty Rates, Romania

### a. Development Regions (NUTS 2)



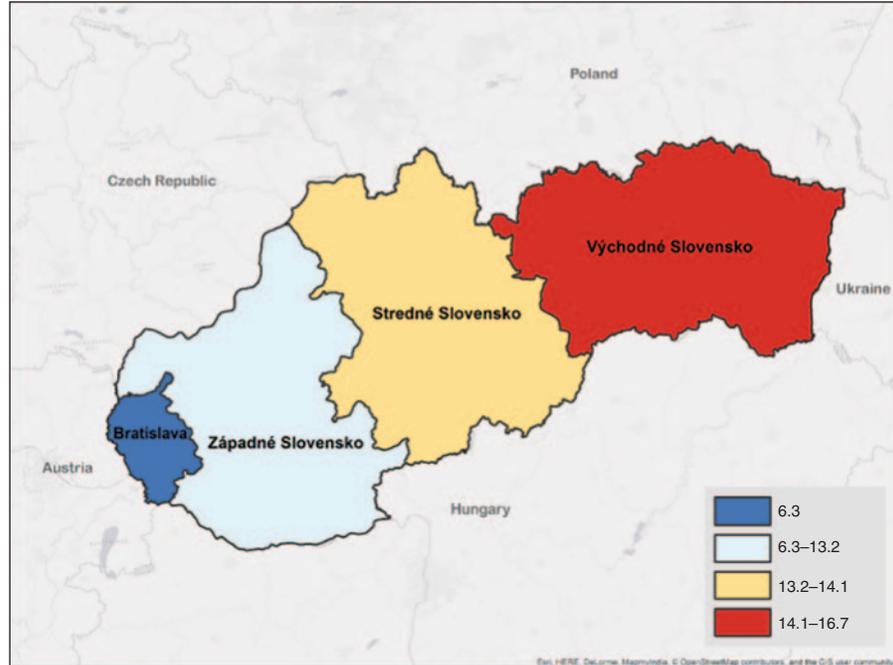
### b. Countries (NUTS 3)



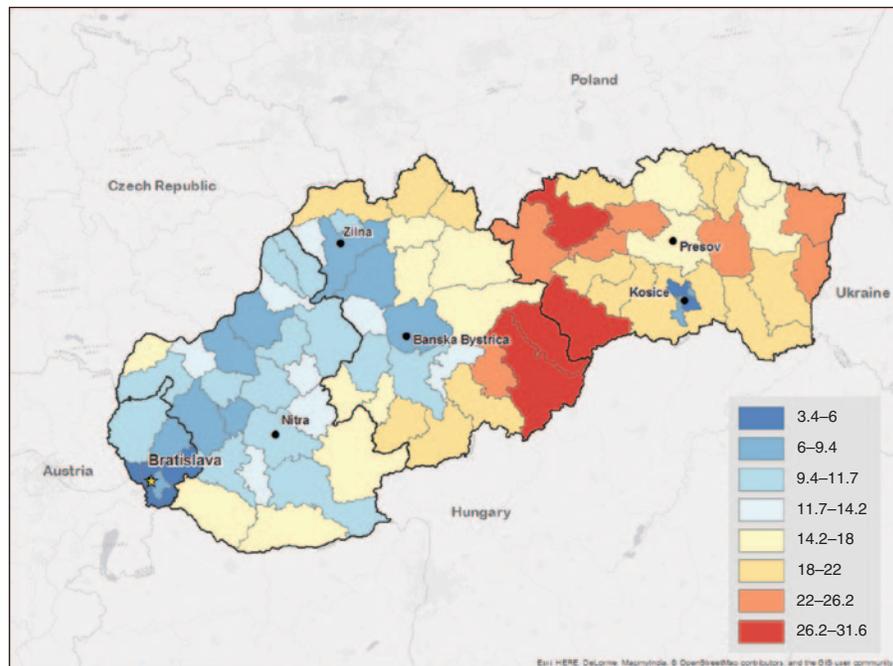
Source: Estimates using data from the 2011 EU-SILC and 2011 Population and Housing Census collected by the Romania National Institute of Statistics.

## MAP 8 At-Risk-of-Poverty Rates, the Slovak Republic

### a. Oblasts (NUTS 2)



### b. Districts (LAU 1)



**Source:** Estimates using data from the 2011 EU-SILC and the 2011 Population and Housing Census collected by the Statistical Office of the Slovak Republic. Boundary map courtesy of Geodesy, Cartography and Cadastre Authority of the Slovak Republic.

and Žilina have low poverty rates, but rank relatively high among districts in the absolute size of the poor population. Meanwhile, districts such as Krupina, Poltár, Sobrance, and Stropkov have higher poverty headcounts, but represent only a small share of the total population living below the ARoP threshold.

### **Slovenia**

In 2012, 392,000 people, or 19.6 percent of the population, were at risk of poverty or social exclusion in Slovenia.<sup>17</sup> The government has set a national goal of reducing the number of poor and socially excluded by 40,000 people (Slovenia, Ministry of Finance 2014). To achieve progress toward this goal, the Statistical Office of the Republic of Slovenia, with the assistance of the World Bank, constructed detailed poverty maps of the country.

Previous surveys have shown higher poverty rates, albeit only marginally, in the east and southeast (map 9, panel a). Most of the municipalities with the highest ARoP rates are in the east. However, some municipalities in western Slovenia (Kobarid and Tolmin in Goriška) have a high incidence of poverty (map 9, panel b). There is considerable heterogeneity in incidence across the east. For instance, in the Savinja region, incidence ranges from 12 percent in the municipalities of Celje, Valenje, and Vojnik to about 25 percent in Luče, Rogatec, and Solčava. Similarly, the Drava region combines municipalities at low incidence, such as Lenart and Starše, and municipalities at high incidence, such as Cerkevjak and Juršinci. There is an overall negative relationship between municipal poverty incidence and the total number of individuals living below the poverty threshold. Thus, municipalities such as Luče, Rogatec, and Solcava account for few poor individuals, despite relatively high poverty rates. Meanwhile, municipalities such as Koper, Kranj, and Ljubljana show low incidence, but rank high in the absolute number of the poor on account of their relatively large populations.

### Dissemination and Outreach Activities

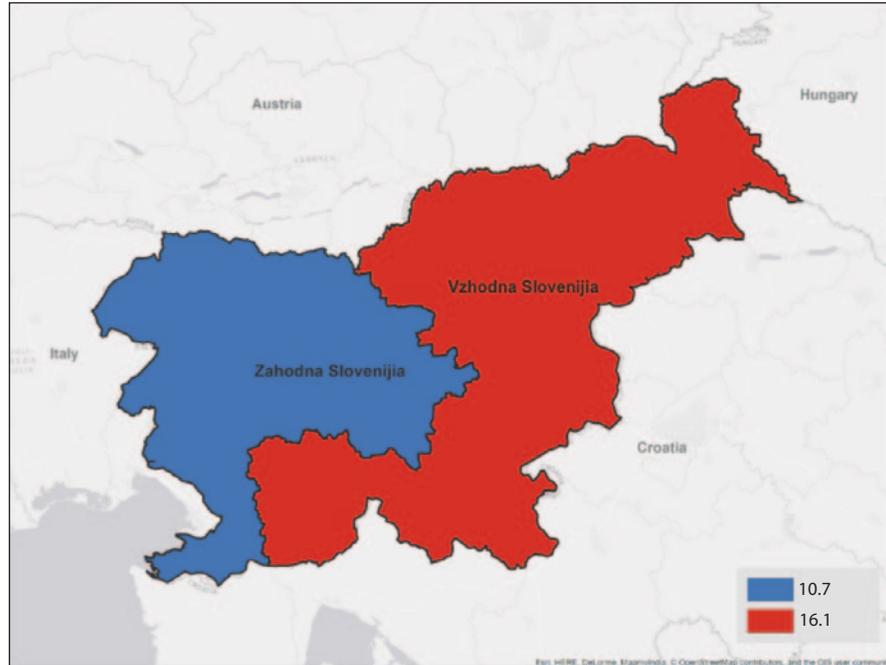
The guidance provided by the World Bank has generated substantial knowledge exchange and skill spillovers to the project steering committee and the NSI counterparts. The spillovers have likewise gained prominence through academic research by catalyzing greater communication and collaboration.

After the production of the first draft of the poverty maps in a country, the Bank has shared the initial findings in seminars among local experts and government authorities. This has served as an informal validation of the maps, and also as a catalyst for dialogue on the causes for the observed patterns of poverty.

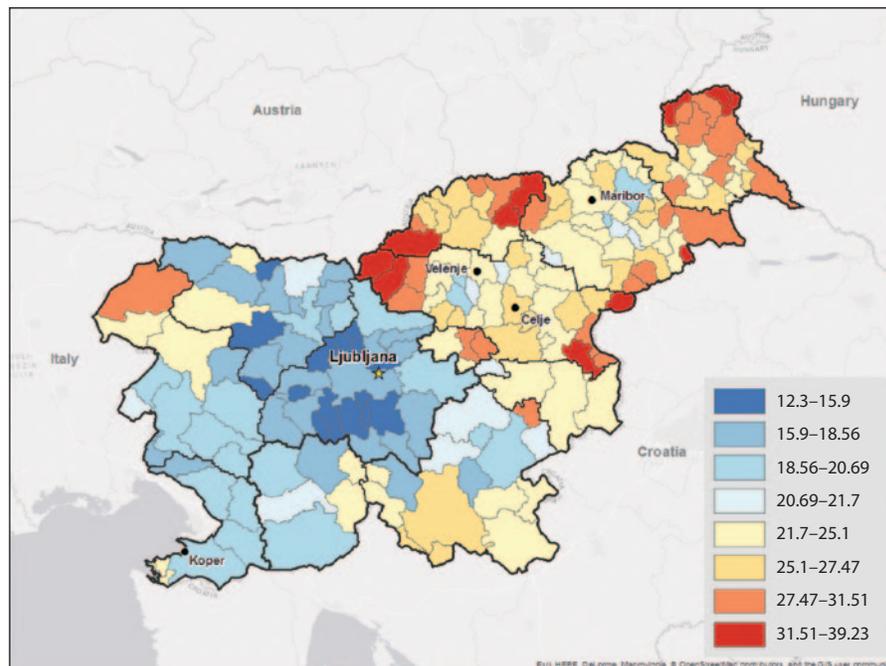
After finalizing the poverty maps the World Bank team prepared short technical reports on the results, often co-authored with NSI counterparts. These have been specifically requested by Eurostat as a deliverable to support the evaluation and documentation of the technical soundness of the analytical work. The technical reports<sup>18</sup> each describe (1) the spatial divisions in the country and the target level of the poverty map, (2) the modeling approach, (3) the specific data sources, and (4) the results of the small area estimations, including regression results, point estimates and confidence intervals or

## MAP 9 At-Risk-of-Poverty Rates, Slovenia

### a. Macroregions (NUTS 2)



### b. Municipalities (LAU 2)



Source: Estimates using data from the 2010 EU-SILC and 2011 Census of Population, Households, and Dwellings collected by the Statistical Office of the Republic of Slovenia.

standard errors for poverty rates, and regression diagnostics. The reports demonstrate the knowledge gains possible from the small area estimation approach. They also demonstrate the results achievable in less than ideal circumstances, such as if census microdata are not available. In Estonia and Poland the reports were released as official publications of the respective national statistical institutes.

To complement the technical reports, two-page summaries of the poverty map results were prepared for each country. These poverty mapping briefs, which are included in the appendix, provide information about the motivations for producing the poverty maps, summarize some of the main results, and outline how the poverty maps may help in the design of policies and programs.

## Using the Fresh Information

### How Similar Information Has Been Used: The Experience of Non-EU Countries

Understanding which areas have higher poverty rates can potentially allow the more accurate and efficient targeting of resources for development and poverty reduction. Indeed, poverty maps are to be used to help guide the allocation of EU funds.

The maps may also force more thinking in sub-national and national decision making and policy making on how best to balance the targeting of poor areas and poor people to combat poverty and social exclusion, and how to improve standards of living. For this purpose, it is important to understand why these areas are relatively poorer and address the associated issues. The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, and an insufficiently skilled work force.

Led by cutting-edge research and widespread empirical application of the poverty mapping methodology, more than 60 countries have, since the late 1990s, gained experience in the small area estimation of poverty illustrated by poverty maps. This experience illustrates innovative ways to use the information provided by the maps. For example, poverty maps were combined with maps of market accessibility in Bangladesh to provide an ex ante estimation of the poverty reducing impact of building a new bridge across the Padma River to link the isolated southwest of the country with the more prosperous northern and eastern regions. In Vietnam, policy makers used the detailed poverty map to assess the targeting accuracy of Program 135, which aims to reduce poverty in ethnic minority areas. The assessment helped identify errors of inclusion and exclusion in program coverage, leading to a refinement in targeting criteria (Swinkels and Turk 2007). In Mexico, the government used poverty map results to guide the allocation of funds under the Habitat Program, which makes a series of integrated poverty reducing interventions in urban areas with the highest concentrations of poor people (Lopez-Calva et al. 2007). Box 3 highlights the ways that poverty maps were used to inform development policies in Albania and Morocco.

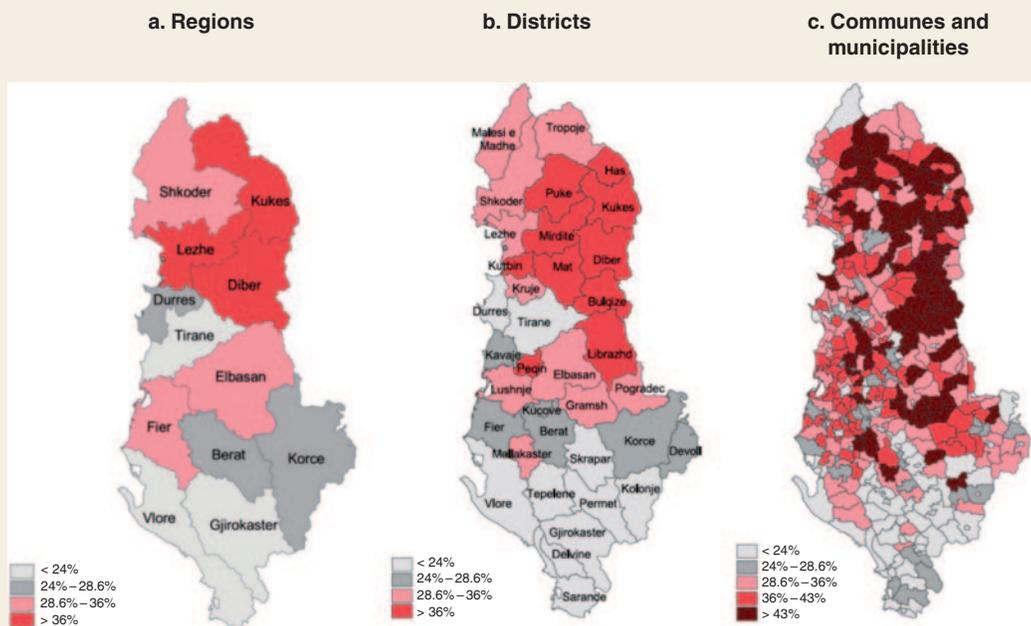
### BOX 3 Two Examples of Non-EU Poverty Maps: Albania and Morocco

#### Albania

By late 2000, Albania had no reliable, nationally representative survey to assess the living conditions of the population adequately. In 2001, however, the Institute of Statistics, with donor support, carried out the country's first census since the end of the communist era. The following year, the institute implemented a nationally representative multitopic household survey. During the same year, the World Bank began to prepare a poverty assessment, and the government completed the preparation of a Poverty Reduction Strategy Paper. The convergence of these events and the related data provided the ideal opportunity to construct small area estimates of poverty and inequality, as well as poverty maps. The maps clearly show how an analysis of poverty might improve because of the detail at a more finely disaggregated level (map B3.1).

The aim of the creation of the poverty maps was to estimate poverty and inequality for each of the regions, districts, and municipalities or communes, and for each submunicipality of Tirana. This was because the poor are concentrated in rural and mountainous areas, but also in regions that are more well off, because the government was seeking to decentralize the delivery of services to local governments, which might develop independent strategies and interventions, and because the targeting of government antipoverty programs needed to be improved. All these aims show useful possible applications of the maps.

**MAP B3.1 Poverty Maps, Poverty Headcount Ratio, Albania**



Source: Instat 2004.

*box continues next page*

### **BOX 3 Two Examples of Non-EU Poverty Maps: Albania and Morocco** (continued)

Following the mapping exercise, individuals involved in the preparation of the maps and potential users of the maps were interviewed. The interviews revealed that there were three ways in which the poverty maps were being applied: (a) as a benchmark against existing resource allocation criteria, for example, whether social-assistance block grants allocated according to previously established criteria correlate with current poverty rates; (b) as a tool in targeting public spending; and (c) for the provision of data to monitor the progress toward achieving the Millennium Development Goals. Several nongovernmental organizations have also relied on the poverty maps in supplying advisory services to local governments and donor agencies and in designing joint intervention strategies. The poverty maps have likewise been used to improve the prioritization of investments in secondary roads.

#### **Morocco**

The Moroccan government requested the support of the World Bank in 2002 to learn how to use poverty mapping techniques and produce a detailed, disaggregated map of poverty throughout the country. At the time, the Bank was scheduled to undertake a poverty report on the country. This enabled the emergence of an active dialogue on how to improve targeting in social spending. Thus, there was already substantial interest in the issues. The task team made a significant effort to situate the report with appropriate counterparts, such as pivotal people at ministries. When the first poverty map and other analyses were completed, key policy makers had already been sensitized to the significance of poverty maps.

The need for finer geographical targeting of the poor was intensified because of two factors. First, because of the threat of terrorism, renewed attention was being focused on the vulnerability of the urban poor and the phenomenon of rural-urban migration. More information was needed on pockets of poverty and vulnerability. Second, because of a growing budget deficit, there was strong pressure to make public expenditures more effective. The desire to minimize benefit leakage to the nonpoor had gained strength.

The poverty mapping program proceeded for almost a year on technical and policy levels. The technical focus permitted a transfer of the capacity to construct poverty maps to local experts, and the policy focus stimulated interest in the potential utility of the maps for policy purposes; if the maps were to have an impact on policy, they had to appeal to decision makers who would be able to apply them to realize the country's policy goals.

The Bank's poverty report was published two months after the government's poverty map report (Planning Commission 2004; World Bank 2004). Both publications provided analysis of the spatial aspects of poverty and inequality, but also other issues. Eventually, the government constructed a second, updated poverty map.

*box continues next page*

### **BOX 3 Two Examples of Non-EU Poverty Maps: Albania and Morocco** (continued)

That poverty varied greatly not only among provinces, but also within provinces was an eye opener for policy makers and led to a reappraisal of targeting strategies. Whereas the major poor-area development project, the Barnamaj al Aoulaouiyat al Ijtimaiya (Social Priorities Program), had relied on province-level targeting, the new information on poor communes provided the government with fresh insights into the possible design of a more finely targeted program, the National Initiative for Human Development. (Litvack 2007, 216)

The National Initiative for Human Development was launched in May 2005. The government announced that \$1 billion would be allocated to the program, half of which would go to efforts to target extra resources to the poorest 360 rural communes and poorest 250 urban neighborhoods. The maps were to be used for targeting purposes.

The maps also began to play an interesting role in promoting local governance. Several governors had been surprised by some of the poverty map data and had undertaken site visits to confirm the data. The poverty maps thus contributed to a much broader agenda of transparency and good governance.

Sources: Carletto, Dabalen, and Moubayed (2007); Litvack (2007).

## Other Impacts and Uses

### *EU Cohesion Policy*

Cohesion policy in the EU is oriented towards reducing territorial disparities in economic and social conditions. It is financed through the European Structural and Investment Funds—especially the Regional Development Fund, the Cohesion Fund, and the Social Fund—with a budget of more than €350 billion for 2014–20. The bulk of cohesion policy funding is concentrated on less developed European countries and regions to help them catch up. Cohesion policy supports job creation, business competitiveness, economic growth, and sustainable development, seeks to improve the quality of life among citizens, and helps combat poverty in all EU cities and regions. To enhance the application of the funding, the EC has used poverty maps during negotiations with the EU member states to ensure that the strategies selected target poverty reduction, especially in areas with high poverty rates. Reducing poverty involves unique approaches in remote rural areas and in deprived inner-city neighborhoods. The poverty maps, in combination with other sources of information, have thus also been used in the design of a mix of investments to confront the underlying causes of poverty specific to each area.

The EC has encouraged member states to allocate more funding per person from the European Social Fund to areas with high poverty rates as identified in the poverty maps. In the new 2014–20 programming period, each member state must dedicate at least 20 percent of the European Social Fund (that is, €16 billion in a total budget of €80 billion) to promote social inclusion and combat poverty. This guarantees a concentration on a few key priorities, each with a critical mass of funding that can have a substantial impact.

### ***Mapping Social Exclusion***

While poverty and social exclusion are closely related, they are distinct in a number of ways (Copus 2014). Poverty is commonly defined relative to a minimum income. Social exclusion refers not only to income or physical well-being, but also to inclusion within various aspects of society, such as the labor market, administrative systems, communities, institutions, and democratic processes. The difficulty of capturing patterns of exclusion is heightened because social exclusion is intrinsically a set of processes rather than static characteristics. Much like the measurement of human development through the human development index or shared prosperity through the shared prosperity convergence index, social exclusion is measured indirectly by examining proxy indicators. Mapping social exclusion therefore involves separately gauging indirectly the risk of experiencing exclusion in its various dimensions, such as the labor market, education, health care, and so on, and then considering ways to synthesize the results.

The EU's Territorial Dimension of Poverty and Social Exclusion in Europe (TIPSE) project seeks to describe and understand regional patterns of poverty and social exclusion and considers how these may be monitored more effectively, including for the identification of general implications for policy design and implementation (Copus 2014). A review of the literature led the TIPSE project team to conclude that social inclusion may be represented as comprising four broad domains, each of which may be disaggregated into individual component dimensions. These domains, each followed, in parentheses, by the component dimensions are (1) earning a living (income, employment), (2) access to services (health care, education, housing, transport and communications), (3) social environment (age, ethnic composition, migrants, crime and safety), and (4) political participation (citizenship).

Taking a page from the World Bank's approach, the researchers turned to the population census as a principal source of data on the domains at the NUTS 3 level. A substantial dataset of NUTS 3 proxy indicators, which are, in principle, harmonized and broadly comparable between 2001 and 2011, was eventually assembled.

### ***Representative Case Studies***

The TIPSE project selected ten case study areas to represent various European macroregions, territorial and socioeconomic typologies, and welfare regimes. The case studies, which include focus on five different thematic challenges: ethnicity-related social exclusion; age-related exclusion, both youth and elderly, and access to services of general interest in sparsely populated areas; urban education, with a focus on educational success, school performance, and segregation patterns; patterns and processes of ethnic and social segregation in metropolitan regions; and unemployment.

An overarching conclusion of the research is that a much stronger regional evidence base is required to enable EU and national policies to address effectively the challenges of poverty and social exclusion as hindrances to

territorial cohesion and balanced territorial development. Policy must become more well informed especially in three areas: geography, trends through time, and less tangible aspects beyond labor market issues. The mapping of poverty and social exclusion is expected to play a crucial role.

## The Next Steps

The World Bank and the European Commission have agreed to carry out a second phase of the EU poverty mapping project (phase 2, 2015–16). The World Bank is continuing to supply technical assistance to the EC and EU member states for the development of small area poverty maps of member states that acceded to the EU in or after 2004 (excluding Cyprus and Malta). New estimates of poverty in small sub-national geographical areas are also to be provided, and refinements to the risk of poverty methodology that take into account sub-national variations in the cost of living across these areas and countries are to be investigated.

### New Maps Where They Did Not Exist

Based on 2011 population censuses, new maps were to be produced on Bulgaria, the Czech Republic, and Lithuania. This was not possible in the first phase of the project because of delays in census data processing by NSIs and ongoing negotiations about the data confidentiality agreements required by the NSIs. The EC is financing a follow-on activity, in which one of the top agenda items is completion of these poverty maps. The World Bank will work with the NSI in Bulgaria to complete poverty maps at the municipality level (LAU 1).

The additional EC funds will also be used to produce small area maps for Croatia, which was not included in the original EC-World Bank agreement because it was not a member of the EU at the time. Croatia's Ministry of Regional Development and European Union Funds is especially interested in using the poverty maps, along with other regional data, to assess the effectiveness of government spending on social programs and infrastructure investments.

### Better Maps Where They Already Exist

Work with the Hungary Central Statistical Office to update the poverty maps of the country using the 2011 population and housing census and the 2012 EU-SILC survey is ongoing. Achieving further disaggregation of the existing poverty maps in selected countries, particularly Latvia, is planned.

### Related Areas of Investigation

Since the onset of the global financial crisis in 2008, public debt has increased dramatically; income has declined among many people across the EU; employment rates have fallen in most countries; and the unemployment rate is higher than it has been for over 20 years, while poverty and social

exclusion have become more widespread. At the same time, disparities in employment and unemployment rates and in gross domestic product per capita have widened across regions in many countries, while, in others, the rates have stopped narrowing. This means that the EU's Europe 2020 employment and poverty targets are now significantly more distant than they were when they were first established, and it will require a substantial effort in the coming years to achieve them in a context of significant budgetary constraints (EC 2014).

A greater risk of poverty and social exclusion is another legacy of the economic crisis. There are now around 9 million more people at risk of poverty or social exclusion in the EU relative to the situation before the crisis. A key issue is the variation within countries. The risk of poverty tends to be much lower in cities than in rural areas in less developed EU member states, while, in cities in the more developed member states, the reverse is the case. Accordingly, in the latter, to meet the national Europe 2020 poverty targets requires a major reduction in the number of people at risk of poverty or social exclusion in urban centers, while, in the former, the main challenge is to reduce the numbers at risk in rural areas (EC 2014). The new European Commission that took office in November 2014, led by EC President Jean-Claude Juncker, places new emphasis on investments to revitalize economic growth in Europe. The detailed geographic estimates of poverty from the poverty maps may help assess the distributional impacts of such investments, especially investments in physical infrastructure.

The current EU approach to measuring the ARoP indicator implicitly assumes uniform costs of living within each EU member state. Thus, a single ARoP threshold is set for each member state corresponding to 60 percent of the national median income (see above). To the extent that a given income level supports a higher standard of living in a low-cost area, or a lower standard of living in a high-cost area, this assumption represents an inconsistency in the measurement of the risk of poverty. In line with the phase 2 agreement between the EC and the World Bank, the World Bank will draw on its global experience and on existing European data to explore effective and practical ways to enhance the methodology for gauging the risk of poverty so as to take into account sub-national variations in the cost of living, including those that have worsened in the last few years, and incorporate these variations into the ARoP measure and produce consistent indicators.

## Final Remarks

The EC and the World Bank concur that the direct interaction through the project has been beneficial to both institutions and, through them, the countries involved in the project, especially because of the provision of analytical, advisory, and knowledge services and technical assistance and the poverty mapping outputs.

The maps, meanwhile, are already supplying useful estimates of poverty in a readily understandable and practical manner on small sub-national geographical areas such as districts or municipalities. They are helping guide allocations of European funds, antipoverty program targeting, and decision making and policy making at sub-national and the national levels in EU member states.

The project is ongoing and continues to enable the EC and the World Bank to collaborate and exchange experiences and expertise on themes of mutual interest supported by the pillars of the Europe 2020 strategy within the framework of smart, sustainable, and inclusive economic and social growth. These pillars broadly parallel the strategy pillars established in the Europe and Central Asia Region of the World Bank.

The EC has been a discerning consumer of the output of poverty mapping, while remaining cognizant of the constraints imposed by institutional barriers. The exchange of ideas and information has been extremely constructive, and it is expected to become deeper as the new poverty maps are applied in EC operations and in World Bank initiatives.

The EC–World Bank project has helped change the way the World Bank and other analysts approach poverty mapping, and it has come to embody new challenges and opportunities to improve efforts to reduce poverty and social exclusion in Europe and elsewhere throughout the world.

## Notes

1. The five EU-wide targets are (a) to raise the employment rate of the population aged 20–64 from the current 69 percent to at least 75 percent; (b) to invest 3 percent of gross domestic product in research and development by improving the conditions for such investment by the private sector and to develop a new indicator to track innovation; (c) to reduce greenhouse gas emissions by at least 20 percent relative to 1990 levels or, if conditions are promising, by 30 percent, to increase the share of renewable energy in final energy consumption to 20 percent, and to achieve a 20 percent increase in energy efficiency; (d) to reduce the share of early school leavers to 10 percent from the current 15 percent and to increase the share of the population aged 30–34 who have completed tertiary education from 31 percent to at least 40 percent; and (e) to reduce the number of Europeans living at risk of poverty or social exclusion by 20 million people by 2020 (EC 2010).
2. Income and Living Conditions, Main Tables (database), Eurostat, Luxembourg, <http://ec.europa.eu/eurostat/web/income-and-living-conditions/data/main-tables> (Accessed April 3, 2016). Also see World Bank (2014a).
3. NUTS is a geocode classification standard for referencing subdivisions of countries for statistical purposes. In the EU, it is a hierarchical system for the division of economic territory for the development of regional statistics and regional socioeconomic analyses and the framing of EU regional policies. NUTS 1 represents major socioeconomic regions, typically large national regions or groups of regions, each with a population from 3 million to 7 million people. NUTS 2 corresponds to basic national regions for the application of regional policies and is usually composed of individual regions with populations from 800,000 to 3 million. NUTS 3 is usually counties or districts, each with a population from approximately 150,000 to 800,000. In Poland, for instance, NUTS 1 is the country's six

regions; NUTS 2 is the 16 voivodeships; and NUTS 3 is the 66 statistical subregions. To date, the NUTS 2 classification has been used to determine the eligibility for aid through European Structural and Investment Funds. Below the NUTS 3 classification, areas are defined according to local administrative units (LAUs). Most EU member states have two LAUs. (LAU 1 and LAU 2), but some have only one. See “Common Classification of Territorial Units for Statistical Purposes,” EUR Lex (database), Publications Office of the European Union, Luxembourg, [http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1428951729674&uri=URI\\_SERV:g24218](http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1428951729674&uri=URI_SERV:g24218).

4. In the reckoning of these rates, yearly disposable income is equalized across households. This means that household income data are subjected to calculations so as to render them comparable across households of different sizes and compositions.
5. In statistics, regression analysis is a process for estimating the relationships among variables. It includes various techniques to model (analyze) several variables, whereby the focus is on the relationship between a single dependent variable and one or several independent variables. A dependent variable is a variable of which the value depends on the value of another variable (the independent variable). For instance, a household's income (the dependent variable) might depend on the number of household members who are employed, the sectors in which they are employed, and their occupational skill levels (the independent variables).
6. A modified Organisation of Economic Co-operation and Development scale is used to calculate equalized income. The scale assigns a weight of 1.0 to the first adult household member aged 14 years or older, 0.5 to other household members aged 14 or older, and 0.3 to household members younger than 14 years.
7. Maps were also to have been produced on Bulgaria, the Czech Republic, and Lithuania, but this has not been possible because of delays in census data processing by NSIs and institutional impediments. Croatia, which joined the EU in 2013, will be included in the second round of poverty map construction, which began in 2015. See the text, following, for more details.
8. In survey and census data, microdata represent information at the level of individual respondents or households, such as individual educational attainment or the number of household members. Aggregate or area-level data are summary statistics for a given geographical area, such as the proportion of area residents who have completed secondary school or the average household size in the area.
9. The text here is based on Statistics Estonia and World Bank (2014a) and World Bank (2013).
10. The text here is based on the Poverty Mapping Brief on Hungary (HCSO and World Bank 2014).
11. The maps for Hungary are based on the 2005 EU-SILC and a 2005 microcensus. New maps using the latest complete census (2011) and the 2011 EU-SILC are being produced in 2016 under phase 2 of the EC-WB project.
12. The text here is based on the Poverty Mapping Brief on Latvia (CSB and World Bank 2014).
13. The initial mapping exercise did not have access to census microdata on Latvia. The processing of the microdata has now been completed, and the construction of new poverty maps, including data on 119 cities and municipalities, is planned for 2016.
14. The text here is based on the Poverty Mapping Brief on Poland (CSO and World Bank 2014).
15. The text here is based on the Poverty Mapping Brief on Romania (NIS and World Bank 2014).

16. The text here is based on the Poverty Mapping Brief on the Slovak Republic (Statistical Office of the Slovak Republic and World Bank 2014).
17. The text here is based on the Poverty Mapping Brief on Slovenia (Statistical Office of the Republic of Slovenia and World Bank 2014).
18. The technical reports are Statistical Office in Poznań, Central Statistical Office and the World Bank (2014), Statistics Estonia and World Bank (2014b), World Bank (2013a), World Bank (2013b), World Bank (2013c), World Bank (2014b), and World Bank (2014c). Full citations are listed in the references.



## Appendix A

# PovMap and the Validation Study

### Building Poverty Maps: The World Bank PovMap Software

Several methodologies are available to produce finely disaggregated poverty maps. The small area estimation methodology developed at the World Bank provides several benefits relative to alternative poverty maps based on composite thematic indicators using administrative data, such as maps based on a basic needs index. First, maps based on composite indicators are rather arbitrary in both the choice of variables and the weights assigned to the variables, yielding ad hoc, easily disputable outputs. Also, drawing a connection between these composite indicators and income poverty is not straightforward and often prone to criticism. In contrast, the approach employed by the World Bank in the EU and in other poverty mapping efforts is based on official poverty lines using a clear and transparent methodology, which may produce easily interpretable results, and the statistical precision of which may be properly gauged.

Despite this and many other advantages, however, small area estimation has some drawbacks, too. The first concern is related to the significant data requirements; indeed, small area estimation poverty maps rely on large and sequenced survey data collection and censuses. Thus, given the low frequency of census undertakings, small area estimation maps would typically be updated only every decade or so, although there are methods for updating maps on the basis of new household surveys or other population surveys. In addition, the analytical skills and human resources needed for the production of small area estimation maps are substantial and often beyond the available skill level in many countries. This also makes the full transfer of ownership and acceptance by local policy makers more difficult to accomplish in a short time. Finally, there is a limit to the level of disaggregation that may be achieved with small area estimation given the increasing level of imprecision as one moves to successively smaller population sub-groups.

In 2004, the World Bank research department developed special-purpose software, PovMap, for the estimation of poverty in small areas. The main advantage of PovMap relative to standard statistical software is the speed and efficiency it allows in performing hundreds of simulations on large census datasets containing millions of observations. The software is also effective in handling the complex error structures used in small area estimation. PovMap's graphical user interface simplifies operations, while retaining, in the background, the required rigor and complexity of the computations.

From the outset, the EC–World Bank project has supported the enhancement of the PovMap software. In response to the methodological findings

from poverty mapping in the EU, several new features were added to the latest release of the software, PovMap 2.5.<sup>1</sup> This new version offers increased flexibility so users can choose between conventional ELL methods or EB enhanced methods. Initially, this was an outcome of addressing the methodological questions raised during the EC–World Bank project validation study (see the main text and below). However, computational methods have also been refined, and new approaches and solutions have been generated and integrated throughout the project so that new features have been regularly added to the software package. Although some of the most recent innovations are experimental, they have improved the flexibility of the software and produced useful regression diagnostic output. The software is being used by analysts within and outside the World Bank.

## The EC–World Bank Mapping Methodology Validation Study

Elbers and van der Weide (2014) suggest that the choice between EB and ELL is largely determined by two key factors: (1) how much information one stands to ignore or lose, which depends on how many of the small areas have been sampled in the income survey and the size of the area error relative to the total error; and (2) the degree of nonnormality in the data. In regard to the first decisive factor, two key observations emerged from the poverty mapping exercises. The first observation recognizes that the number of small areas covered by the EU-SILC—the instrument used by EU member states to collect household data on income—tends to be substantial. It is typical for the EU-SILC to cover 50–100 percent of the small areas for which poverty is to be estimated, compared with a norm of 5–25 percent in low-income countries. However, the size of the location effect is relatively small in the EU member states. Thus, for example, the correlation of household incomes within a small area is less likely to affect the estimates on EU member states. This suggests that the gains from the use of the EB are modest for most areas, although there may still be a handful of areas where the EB could realize a substantial improvement.

This brings us to the second decisive factor for choosing a small area estimation method: the degree of nonnormality in the data, that is, the issue of data redundancy. If this is notable, then ELL would be the preferred method. However, the amount of empirical evidence collected on the question of normality is rather limited. Monte Carlo simulations carried out through the project show that ignoring the nonnormality of errors can lead to biased estimates of poverty and inequality as high as 2–3 percent on a poverty rate of 20–30 percent (Elbers and Van der Weide 2014).

Under each of the ELL and EB umbrellas are a host of other assumptions and choices that are also testable, such as how to model the random error associated with location or how to handle heteroskedastic errors in modeling household income.

Likewise, the study provided other insights that helped improve the understanding of small area poverty estimation. In particular, it generated knowledge about appropriate choices in the incorporation of survey sampling weights in regressions, ways to account for heteroskedasticity in household income models, and whether the distribution of model parameters should be estimated parametrically or through bootstrap methods. Overall, the study also spurred new research in small area poverty estimation, including more intensive dialogue among various practitioners. The research-focused aspects of the project were presented at numerous academic conferences and results seminars in new EU member states and at the EC.

Finally, through the methodological validation, it became apparent that current approaches to small area estimation face difficulties in producing estimates of poverty accurately in the tails of the distribution, that is, those areas with especially high or low poverty rates. This will be an important avenue of further research to continue improving the way that poverty mapping is practiced by the World Bank and others.

## Note

1. PovMap is freely available from the World Bank website, at <http://iresearch.worldbank.org>.



## Appendix B

# Poverty Mapping Briefs

The following are the complete versions of the Poverty Mapping Briefs for the seven countries completed during the first phase of the EC-World Bank project, Poverty Mapping in the European Union, which are summarized in the main text.

# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in Estonia

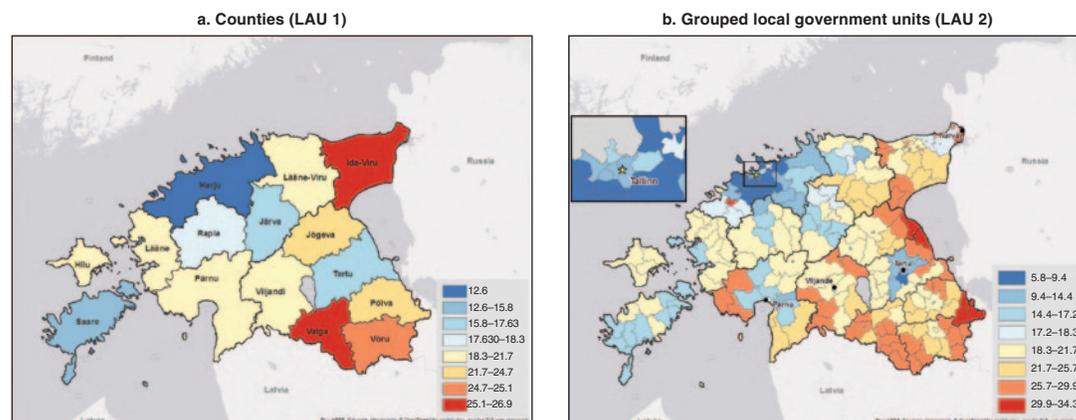
Rates of poverty and social exclusion vary widely across European Union (EU) member states and there is also a high degree of variability in living standards within member states. In its 2014–2020 multiannual financial framework the EU has budgeted one trillion euros to support growth and jobs and to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To this end, the Government of Estonia has set a national goal of reducing the risk of monetary poverty rate from 17.5 percent in 2010 to 15.0 percent by 2020.<sup>1</sup>

Success depends on developing the right policies and programs and targeting them effectively; however, the European Commission has previously had to rely on sub-national data at a relatively high level of aggregation for program planning and the allocation of EU funds. The European Commission and the World Bank, in cooperation with individual EU

member states, have developed a set of high resolution poverty maps. The greater geographic disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention for poverty reduction programs.

The poverty maps for Estonia confirm existing knowledge about poverty in Estonia, but also reveal new insights.<sup>2</sup> For example, previous surveys have shown counties in the North-Eastern and South-Eastern regions to have the highest rates of poverty (map 1, left panel), but the more disaggregated estimates reveal contrasts between lower poverty estimates in large cities and surrounding areas vis-à-vis other parts of the counties (map 1, panel a). Such is the case in the county of Jõgeva, which has a high poverty rate overall, but has a lower poverty incidence in the western regions. There are also local

**Map 1 At-Risk-of-Poverty Rates, Estonia**



**Source:** Estimates using data from the 2012 Estonian Social Survey and the 2011 Population and Housing Census collected by Statistics Estonia.

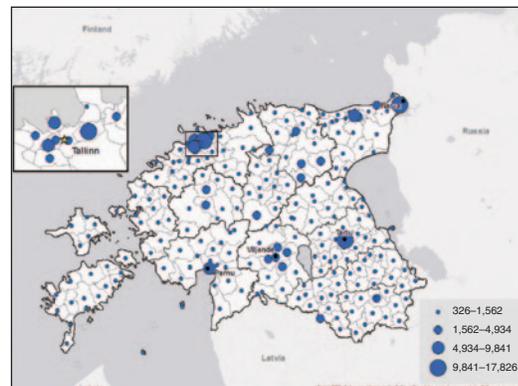
**Note:** The risk of poverty rates are defined using the EU standard of 60 percent of median national equivalized income after social transfers.

government units with high poverty incidence in counties that otherwise have low-to-moderate overall poverty rates. For example, the county of Tartu has a moderate poverty rate at the LAU1 level,<sup>3</sup> but more disaggregated estimates suggest a sharp divide between the low poverty incidence in the city of Tartu and its surroundings, and the higher poverty incidence in the eastern municipalities. Knowing which areas have higher poverty rates can help in more efficiently targeting resources for development and poverty reduction.

Targeting poor areas alone can have its limitations. Policy makers have an interest both in areas where poverty is high and also in areas that have the highest number of poor people. These two are not the same: areas that are very poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of large populations. This contrast is readily seen in the large concentration of poor people in Tallinn and Tartu cities and their surrounding areas (map 2). Even though risk of poverty rates are low, these cities are home to a large share of Estonia's poor population. On the other hand, Ida-Viru county in the northeast has both high poverty rates and a large number of poor people. This is most pronounced in the former military-industrial city of Narva, Estonia's third-largest city, which has a large ethnic Russian majority.

Poverty maps do not provide all the answers—they must be combined with other information, including local expertise, to inform decision-making. After identifying the areas or populations in greatest need it is necessary to understand why these places are poor. The reasons are likely to vary from place to place, and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled work force, or other reasons. Poverty maps provide finer grained information on sub-national variation in

**Map 2 Population Living below the Poverty Threshold, Estonia**



**Source:** Estimates using data from the 2012 Estonian Social Survey and the 2011 Population and Housing Census collected by Statistics Estonia.

poverty than was previously available and may help improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the right combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and exclusion.

### Notes

1. Estonia, Government Office. 2014. National Reform Programme "Estonia 2020." May 8. Tallinn, Estonia: Government Office, Stenbock House.
2. These maps combine microdata from the 2011 population census and the 2012 EU-SILC survey.
3. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.

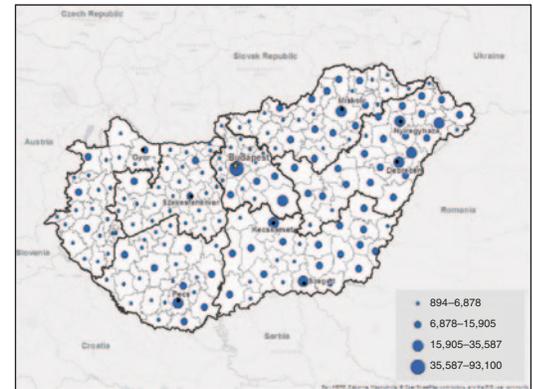


poverty incidence in nearby Siklós, Sellye, Szigetvár, or Szentlőrinc. More generally, there is a much higher degree of heterogeneity in poverty incidence at the statistical subregion level vis-à-vis the estimates available directly from the EU-SILC survey for the seven planning and statistical regions. Knowing which subregions have higher poverty rates can help in more efficiently targeting resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two are not the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. In Hungary, the density of the population below the poverty threshold is, on average, also higher in subregions with higher poverty incidence (map 2). Nonetheless, the rankings of subregions by poverty incidence and by poverty density are quite divergent; sub-regions such as Budapest, Pécs, Győr, and Székesfehérvári have a low poverty incidence, but, given their large populations, they account for a large share of the total population below the risk of poverty threshold.

Poverty maps do not provide all the answers. They must be combined with other information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need, one must understand why these places are poor. The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas

**Map 2 Population Living below the Poverty Threshold, Hungary**



Source: Estimates using data from the 2005 EU-SILC and 2005 Microcensus collected by the Hungarian Central Statistical Office.

and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

### Notes

1. Hungary, Ministry for National Economy, 2015. "National Reform Programme 2015 of Hungary." Ministry for National Economy, Budapest.
2. At the time of preparing these poverty maps of Hungary, the 2011 Population Census data were still being processed. Therefore these maps are based on the 2005 EU-SILC and the 2005 Microcensus carried out by the Hungarian Central Statistical Office, which covered two percent of the population. The poverty maps will be updated under Phase 2 of the EC-World Bank project, using the 2011 Population Census and 2011 EU-SILC.
3. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.

# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in Latvia

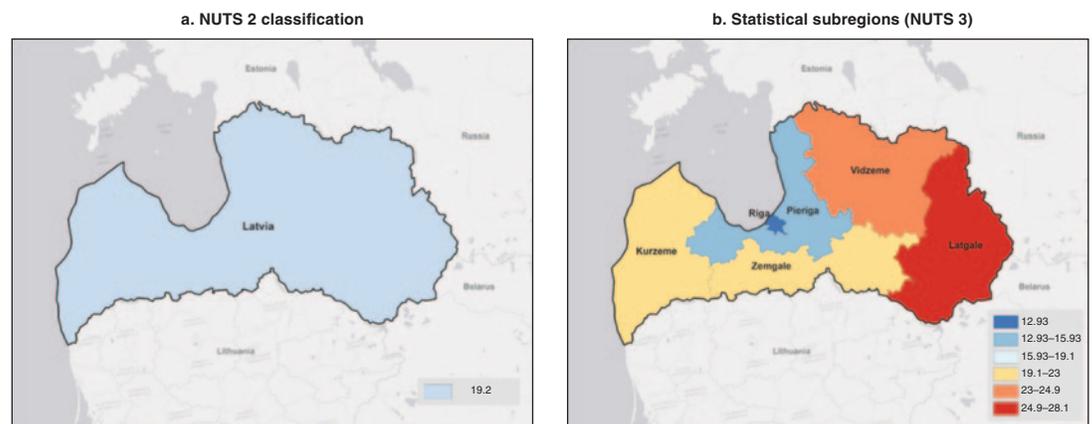
Rates of poverty and social exclusion vary widely across European Union (EU) member states, and there is also a high degree of variability in living standards within member states. In its 2014–20 multiannual financial framework, the EU budgeted €1 trillion to support growth and jobs, which will contribute to the goal of reducing the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To contribute to this goal, the Government of Latvia has set a national goal of reducing by 121,000 the number of people at risk of poverty or living in households with low work intensity.<sup>1</sup>

Success depends on developing the appropriate policies and programs and targeting them effectively. However, the EC has previously had to rely on sub-national data at a relatively high level of aggregation for program planning and the allocation of EU funds. The EC and the World Bank, in cooperation with

individual EU member states, have developed a set of high-resolution poverty maps.<sup>2</sup> The greater geographical disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention in poverty reduction programs.

The poverty maps for Latvia confirm existing knowledge about poverty in Latvia, but also reveal new insights. The EC has relied on the NUTS 2 territorial classification<sup>3</sup> to determine eligibility for aid from European Structural and Investment Funds and for program planning. In smaller countries such as Latvia, the NUTS 2 classification corresponds to the entire national territory, that is, with no sub-national divisions (map 1, panel a). The EU-SILC in Latvia is representative at the statistical region level (NUTS 3), and the Central Bureau of Statistics reports risk of poverty estimates at that level. Using small area estimation techniques, it

**Map 1 At-Risk-of-Poverty Rates, Latvia**



**Source:** Estimates using data from the 2012 EU-SILC and 2011 Population and Housing Census collected by the Latvia Central Statistical Bureau.

**Note:** The risk of poverty rates are defined using the EU standard of 60 percent of median national equivalized income after social transfers.

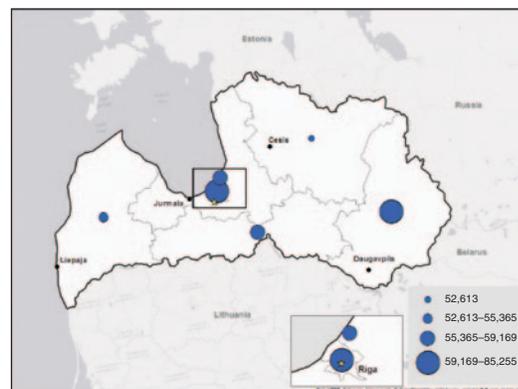
was possible to improve the precision of these poverty estimates for the six regions of Latvia. According to these estimates, there is quite a bit of heterogeneity across regions (map 1, panel b). Riga and Pieriga in northern central Latvia are the only regions where the incidence of poverty is below the national average. Estimates of poverty in other regions range from 21 percent to as high as 28 percent in Latgale in southeastern Latvia. Knowing which regions have higher poverty rates can help more efficiently target resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two are not the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. For example, Riga Region has the lowest estimated risk of poverty, 12.9 percent, which is less than one-half the risk in the poorest region, Latgale (28.0 percent). However, because Riga Region is much more populous, each of the two regions has approximately 85,000 people living at risk of poverty. While the remaining four regions have somewhat heterogeneous poverty incidence, they all have a similar number of poor people, in the range of 50,000–60,000 (map 2).

While poverty estimation at the regional level adds a significant nuance to national estimates, more revealing spatial heterogeneity is possible if census microdata are employed. The initial poverty maps in Latvia were limited to the six statistical regions because census microdata were not available at that time. The processing of the microdata has now been completed, and it is planned to revisit the poverty mapping exercise using census and EU-SILC microdata. By using microdata, one will be able to estimate the risk of poverty for much smaller geographical units and provide much higher-resolution poverty estimates than are possible directly from the EU-SILC. It is expected that reasonably precise poverty estimates can be obtained for Latvia's 119 municipalities and cities.

Poverty maps do not provide all the answers. They must be combined with other information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need,

**Map 2 Population Living below the Poverty Threshold, Latvia**



Source: Estimates using data from the 2012 EU-SILC and 2011 Population and Housing Census collected by the Latvia Central Statistical Bureau.

one must understand why these places are poor. The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

## Notes

1. Latvia, Ministry of Economics. 2015. "National Reform Programme of Latvia for the Implementation of the 'Europe 2020' Strategy: Progress Report." April, Ministry of Economics, Riga, Latvia.
2. These maps combine aggregate data from the 2011 population census and the 2012 EU-SILC survey.
3. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.



# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in Poland

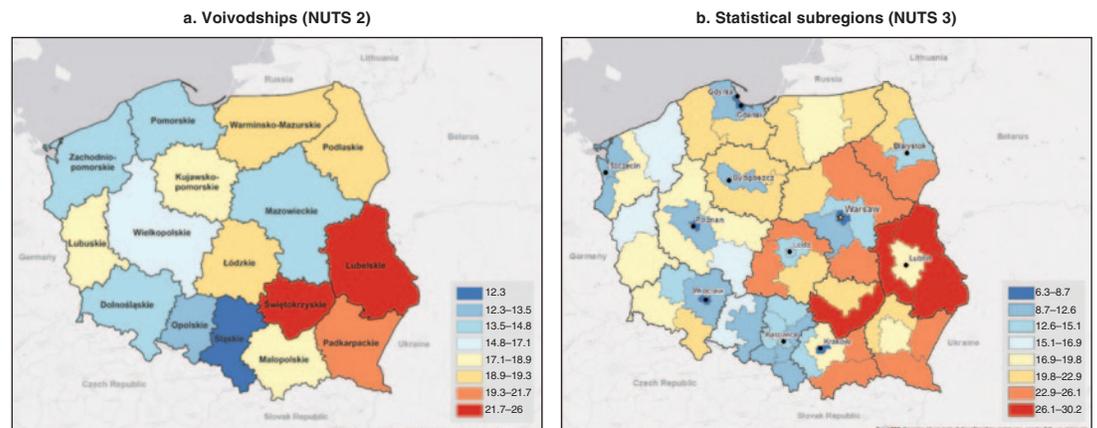
Rates of poverty and social exclusion vary widely across European Union (EU) member states, and there is also a high degree of variability in living standards within member states.<sup>1</sup> In its 2014–20 multiannual financial framework, the EU budgeted €1 trillion to support growth and jobs and to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To this end, the Government of Poland has set a national goal of reducing the number of the poor and socially excluded by 1.5 million people.<sup>2</sup>

Success depends on developing the appropriate policies and programs and targeting them effectively. However, the EC has previously had to rely on sub-national data at a relatively high level of aggregation for

program planning and the allocation of EU funds. The EC and the World Bank, in cooperation with individual EU member states, have developed a set of high-resolution poverty maps.<sup>3</sup> The greater geographical disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention in poverty reduction programs.

The poverty maps confirm existing knowledge about poverty in Poland, but also reveal new insights. For example, previous surveys have shown the southeastern voivodships (in particular Lubelskie and Swietokrzyskie) as well as Lubuskie in the west to have higher poverty rates (map 1, panel a). The more detailed poverty map shows that most of the statistical subregions with the highest risk of

**Map 1 At-Risk-of-Poverty Rates, Poland**



**Source:** Estimates using data from the 2011 EU-SILC and the 2011 Census of Population and Housing collected by the Central Statistical Office of Poland.

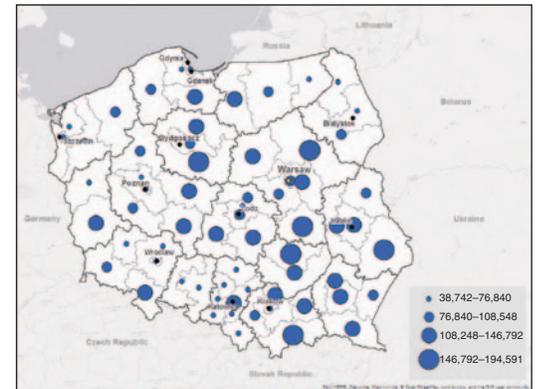
**Note:** The risk of poverty rates are defined using the EU standard of 60 percent of median national equivalized income after social transfers. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.

poverty rates are in the east and southeast of the country (map 1, panel b). However, the subregional map also reveals visible differences in poverty incidence between the low poverty cities (Krakow, Wroclaw, Poznań, Warsaw) and lower population-density surrounding areas with higher poverty incidence. The subregional map likewise highlights heterogeneity in poverty estimates within voivodships; the voivodship of Pomorskie includes Trojmiejski, with an estimated poverty incidence of 7 percent, alongside Starogardzki and Slupski, both with poverty rates in excess of 20 percent. Knowing which subregions have higher poverty rates can help more efficiently target resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two are not the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. In Poland, there is an overall positive and relatively strong relationship at the subregional level between the poverty incidence rate and the total number of individuals living below the poverty threshold. The highest absolute numbers of the poor are located in the east and southeast of Poland (map 2). At the same time, Warsaw stands out as having the lowest estimated poverty incidence among statistical subregions, but, on account of its size, it ranks 27th out of 66 subregions in terms of the absolute number of individuals below the poverty threshold. This is not observed in other cities such as Poznań, Wroclaw, or Krakow, where both poverty incidence and the absolute number of poor people appear to be low.

Poverty maps do not provide all the answers. They must be combined with other information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need, one must understand why these places are poor. The reasons are likely to vary from

## Map 2 Population Living below the Poverty Threshold, Poland



Source: Estimates using data from the 2011 EU-SILC and the 2011 Census of Population and Housing collected by the Central Statistical Office of Poland.

place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

### Notes

1. The results presented here are from the study "Poverty maps at the Subregional Level in Poland Based on Indirect Estimation." They are not official statistical data and are entirely the result of an experimental work. The estimates have been elaborated by the Central Statistical Office of Poland in the framework of its collaboration with the World Bank set out in the letter of intent dated 26 June 2013.
2. Poland, Ministry of Economy. 2015. "National Reform Programme Europe 2020: Update 2015/2016." April 28, Ministry of Economy, Warsaw.
3. These maps combine aggregate data from the 2011 population census and the 2011 EU-SILC survey.



# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in Romania

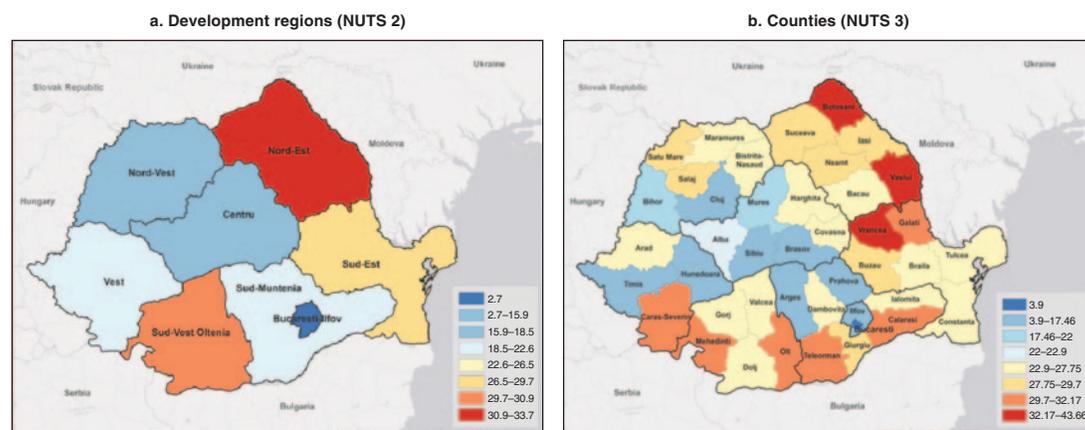
Rates of poverty and social exclusion vary widely across European Union (EU) member states, and there is also a high degree of variability in living standards within member states. In its 2014–20 multiannual financial framework, the EU budgeted €1 trillion to support growth and jobs and to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To help reach this EU-wide target, the Government of Romania has set a national goal of reducing the number of the poor and socially excluded by 580,000 people.<sup>1</sup>

Success depends on developing the appropriate policies and programs and targeting them effectively. However, the EC has previously had to rely on sub-national data

at a relatively high level of aggregation for program planning and the allocation of EU funds. The EC and the World Bank, in cooperation with individual EU member states, have developed a set of high-resolution poverty maps.<sup>2</sup> The greater geographical disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention in poverty reduction programs.

The poverty maps for Romania confirm existing knowledge about poverty in Romania, but also reveal new insights. For example, previous surveys have shown the Northeast Region to have the highest rates of poverty (map 1, panel a), but the county-level poverty map (map 1, panel b) shows that all counties

**Map 1 At-Risk-of-Poverty Rates, Romania**

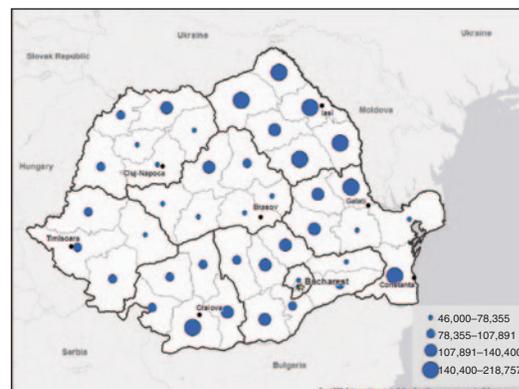


of that region, with the exception of Bacău, have elevated risk of poverty rates. In contrast, the South Region is heterogeneous, comprising counties with high poverty rates, such as Călărași and Teleorman, and counties with relatively low poverty rates, such as Prahova. Similarly, Cluj County has the second-lowest poverty rate in Romania (after Bucharest), but its neighboring counties in the Northwest Region (Bistrița-Năsăud, Maramureș, Sălaj, and Satu Mare) have higher poverty than the Romanian average. Knowing which counties have higher poverty rates can help more efficiently target resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two are not the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. For example, despite its lower poverty rate, Cluj County has more people at risk of poverty than Sălaj, and Bucharest has more people at risk of poverty than six other counties. Poverty map 2 suggests a complementary approach to allocating resources for poverty reduction, with Bucharest and other urban areas given greater attention as many of the poor live in relatively rich areas. The maps clearly illustrate that the Northeast, especially Botoșani, Iași, and Suceava, have high poverty rates and large numbers of poor people and should be given high priority by either criterion.

Poverty maps do not provide all the answers. They must be combined with other information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need, one must understand why these places are poor.

**Map 2 Population Living below the Poverty Threshold, Romania**



**Source:** Estimates using data from the 2011 EU-SILC and 2011 Population and Housing Census collected by the Romania National Institute of Statistics.

The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

### Notes

1. Romania, Ministry of Economy, Trade, and Tourism. 2015. "National Reform Programme 2015." April, Ministry of Economy, Trade, and Tourism, Bucharest, Romania.
2. These maps combine microdata from the 2011 population census and the 2011 EU-SILC survey.

# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in the Slovak Republic

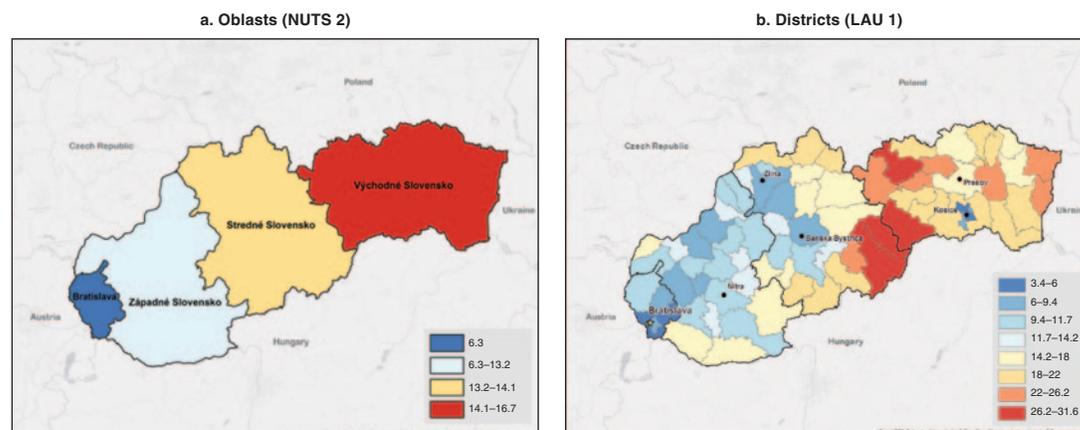
Rates of poverty and social exclusion vary widely across European Union (EU) member states, and there is also a high degree of variability in living standards within member states. In its 2014–20 multiannual financial framework, the EU budgeted €1 trillion to support growth and jobs and to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To help reach this goal, the government of the Slovak Republic has set a national goal of reducing the number of the poor and socially excluded by 170,000 people.<sup>1</sup>

Success depends on developing the appropriate policies and programs and targeting

them effectively. However, the EC has previously had to rely on sub-national data at a relatively high level of aggregation for program planning and the allocation of EU funds. The EC and the World Bank, in cooperation with individual EU member states, have developed a set of high-resolution poverty maps.<sup>2</sup> The greater geographical disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention in poverty reduction programs.

The poverty maps confirm existing knowledge about poverty in the Slovak Republic, but also reveal new insights. Previous surveys

**Map 1 At-Risk-of-Poverty Rates, the Slovak Republic**



**Source:** Estimates using data from the 2011 EU-SILC and the 2011 Population and Housing Census collected by the Statistical Office of the Slovak Republic. Boundary map courtesy of Geodesy, Cartography and Cadastre Authority of the Slovak Republic.

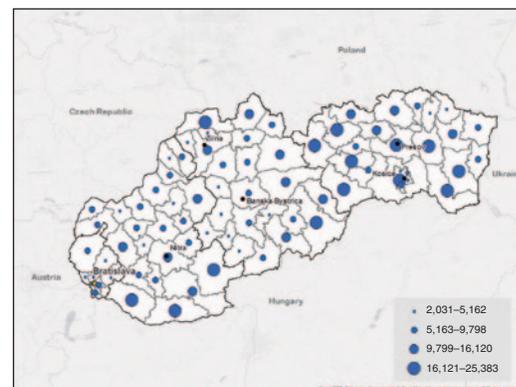
**Note:** The risk of poverty rates are defined using the EU standard of 60 percent of median national equivalized income after social transfers. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.

have shown the eastern oblasts to have the highest rates of poverty (map 1, panel a), and this may also be seen in the district-level poverty map (map 1, panel b). Yet, the district-level map also reveals considerably more heterogeneity in poverty incidence across space vis-à-vis the oblast-level map. In the east, the highest poverty incidence appears to be concentrated primarily along the border with the center (Rožňava, Poprád, Kežmarok) and along the Ukrainian border (Sobrance and Snina), while poverty incidence is relatively low in Košice. At the same time, districts such as Revúca, Rimavská Sobota, and Poltár in the center also have high poverty incidence, even though poverty incidence is moderate in the center overall. In 23 out of 27 districts, the district-level poverty estimate is statistically different from the estimate for the oblast in which the district is located. Knowing which districts have higher poverty rates can help more efficiently target resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two need not be the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. Even though, in the Slovak Republic, the poverty headcount is generally correlated with the absolute size of the poor population, this is not universally the case (map 2). Districts such as Žilina, Nitra, Trnava, and Trenčín have low poverty rates, but rank relatively high among districts in the absolute size of the poor population. Meanwhile, districts such as Poltár, Sobrance, Stropkov, and Krupina have higher poverty headcounts, but represent only a small share of the total population living below the risk of poverty threshold.

Poverty maps do not provide all the answers. They must be combined with other

**Map 2 Population Living below the Poverty Threshold, the Slovak Republic**



Source: Estimates using data from the 2011 EU-SILC and the 2011 Population and Housing Census collected by the Statistical Office of the Slovak Republic. Boundary map courtesy of Geodesy, Cartography and Cadastre Authority of the Slovak Republic.

information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need, one must understand why these places are poor. The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

## Notes

1. Slovak Republic, Ministry of Finance. 2015. "National Reform Programme of the Slovak Republic 2015." April, Ministry of Finance, Bratislava, Slovak Republic.
2. These maps combine aggregate data from the 2011 population census and the 2011 EU-SILC survey.

# Poverty in Europe

March 2016

Poverty and Equity Global Practice

## Pinpointing Poverty in Slovenia

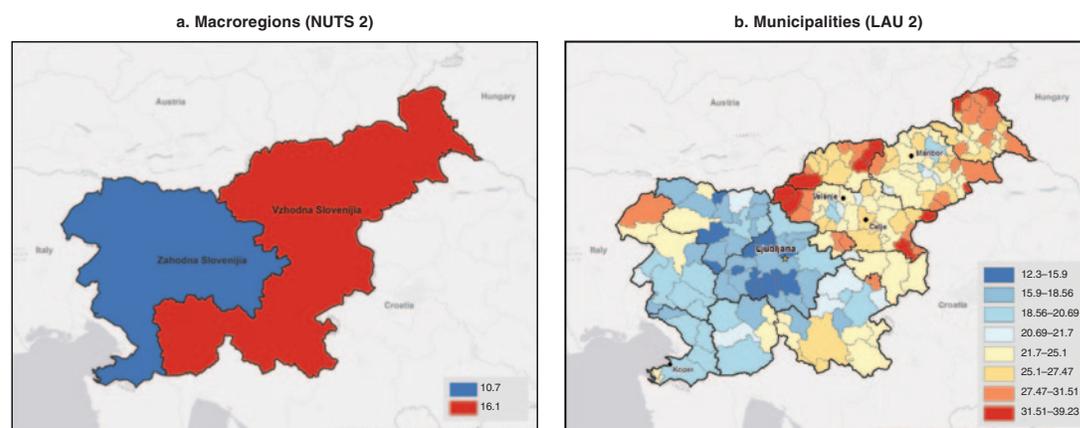
Rates of poverty and social exclusion vary widely across European Union (EU) member states, and there is also a high degree of variability in living standards within member states. In its 2014–20 multiannual financial framework, the EU budgeted €1 trillion to support growth and jobs and to reduce the number of people living at risk of poverty or social exclusion by 20 million by the year 2020. To help reach this EU-wide target, the government of Slovenia has set a national goal of reducing the number of the poor and socially excluded by 40,000 people.<sup>1</sup>

Success depends on developing the appropriate policies and programs and targeting them effectively. However, the EC has previously had to rely on sub-national data at a relatively high level of aggregation for

program planning and the allocation of EU funds. The EC and the World Bank, in cooperation with individual EU member states, have developed a set of high-resolution poverty maps.<sup>2</sup> The greater geographical disaggregation of the new poverty maps reveals which parts of these larger regions have particularly high rates of poverty and require greater attention in poverty reduction programs.

The poverty maps confirm existing knowledge about poverty in Slovenia, but also reveal new insights. For example, previous surveys have shown the eastern and southeastern parts of the country to have higher poverty rates, albeit only marginally (map 1, panel a). The municipality-level poverty map (map 1, panel b) shows that most of the municipalities with the highest risk of

**Map 1 At-Risk-of-Poverty Rates, Slovenia**



**Source:** Estimates using data from the 2010 EU-SILC and 2011 Census of Population, Households, and Dwellings collected by the Statistical Office of the Republic of Slovenia.

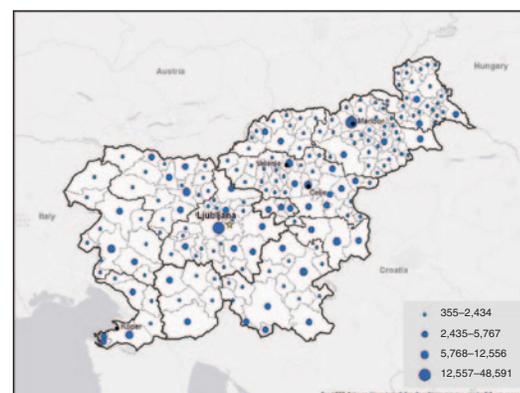
**Note:** The risk of poverty rates are defined using the EU standard of 60 percent of median national equivalized income after social transfers. The NUTS (Nomenclature des Unités Territoriales Statistiques) classification is a hierarchical system of dividing up the economic territory of the European Union for the development of regional statistics, regional socioeconomic analysis, and the framing of EU regional policies. To date the NUTS 2 classification has been used for determining eligibility for aid from European Structural Funds. Below the NUTS 3 classification areas are defined according to Local Administrative Units (LAU). Most EU member states have LAU 1 and LAU 2 divisions, but some only have LAU 2.

poverty rates are in the east of the country. However, also visible are some municipalities with high poverty incidence in western Slovenia (Kobarid and Tolmin in Goriška), and considerable heterogeneity in poverty incidence across eastern Slovenia. For instance, in the Savinja region, poverty incidence ranges from 12 percent in the municipalities of Valenje, Vojnik, and Celje to about 25 percent in Rogatec, Luče, and Solčava. Similarly, the Drava region combines municipalities at low incidence, such as Starše and Lenart, with high-incidence municipalities, such as Cerkevnik and Juršinci. Knowing which sub-regions have higher poverty rates can help more efficiently target resources for development and poverty reduction.

Targeting poor areas alone can have limitations. Policy makers have an interest both in areas where poverty is high and in areas that have the most poor people. These two are not the same: areas that are poor may also be sparsely populated, whereas large cities tend to have low poverty rates, but large numbers of poor people because of the large populations. In Slovenia, there is an overall negative relationship between municipal poverty incidence and the total number of individuals below the poverty threshold (map 1). Thus, municipalities such as Rogatec, Luče, and Solcava account for few poor individuals, despite relatively high poverty rates. Meanwhile, municipalities such as Ljubljana, Kranj, and Koper, having low poverty incidence, rank high in the absolute number of the poor on account of their relatively large populations.

Poverty maps do not provide all the answers. They must be combined with other information, including local expertise, to inform decision making. After identifying the areas or populations in greatest need, one must understand why these places are poor.

**Map 2 Population Living below the Poverty Threshold, Slovenia**



Source: Estimates using data from the 2010 EU-SILC and 2011 Census of Population, Households, and Dwellings collected by the Statistical Office of the Republic of Slovenia.

The reasons are likely to vary from place to place and may include inadequate infrastructure, lack of economic activity, an insufficiently skilled workforce, or other reasons. Poverty maps provide more finely grained information on sub-national variations in poverty than was previously available and can potentially improve resource allocation. The maps also force more thinking on how best to allocate resources aimed at improving standards of living, balancing the targeting of poor areas and poor people. While the appropriate combination of approaches will vary by country, the maps provide important information to help improve policies and programs to combat poverty and social exclusion.

### Notes

1. Slovenia, Ministry of Finance. 2014. "National Reform Programme 2014–2015." April, Ministry of Finance, Ljubljana, Slovenia.
2. These maps combine microdata from the 2011 population census and the 2010 EU-SILC survey.



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