ESPON

TiPSE

The Territorial Dimension of Poverty and Social Exclusion in Europe

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Interim Report

ANNEX 5

Using register data to create At Risk of Poverty Maps for the Nordic Countries

Rasmus Ole Rasmussen, Petri Kahila,
Christian Dymén and Mitchell Reardon
Nordregio

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1 Introduction

The role of this annex is to analyse and test different methodological aspects of At Risk of Poverty Rate calculation. As discussed in the main report there is an important divide within Europe in relation to accessibility of data between countries with register based data and countries with survey based data. While the register based data enables aggregation of information at any administrative level and usually on an annual basis, the census based data may be generated irregularly and at larger administrative levels.

In order to overcome these discrepancies PovMap has been designed by the World Bank as a form of spatial microsimulation, designed specifically to generate estimates of the At Risk of Poverty Rate (RoP) indicator for small areas, where “real data” is only available at the national level, or rather for a few large regions. This procedure has been developed and tested (mainly in developing countries) by the Word Bank. It is distinguished from earlier methods of estimation by its use of individual household data, rather than data averaged over areas or regions. This is believed to deliver a substantial increase in accuracy.

As a tool to overcome severe data limitations in developing countries it has only to a limited extend been used in developed countries, and it of course raises a number of methodological questions.

2 Mapping At Risk of Poverty

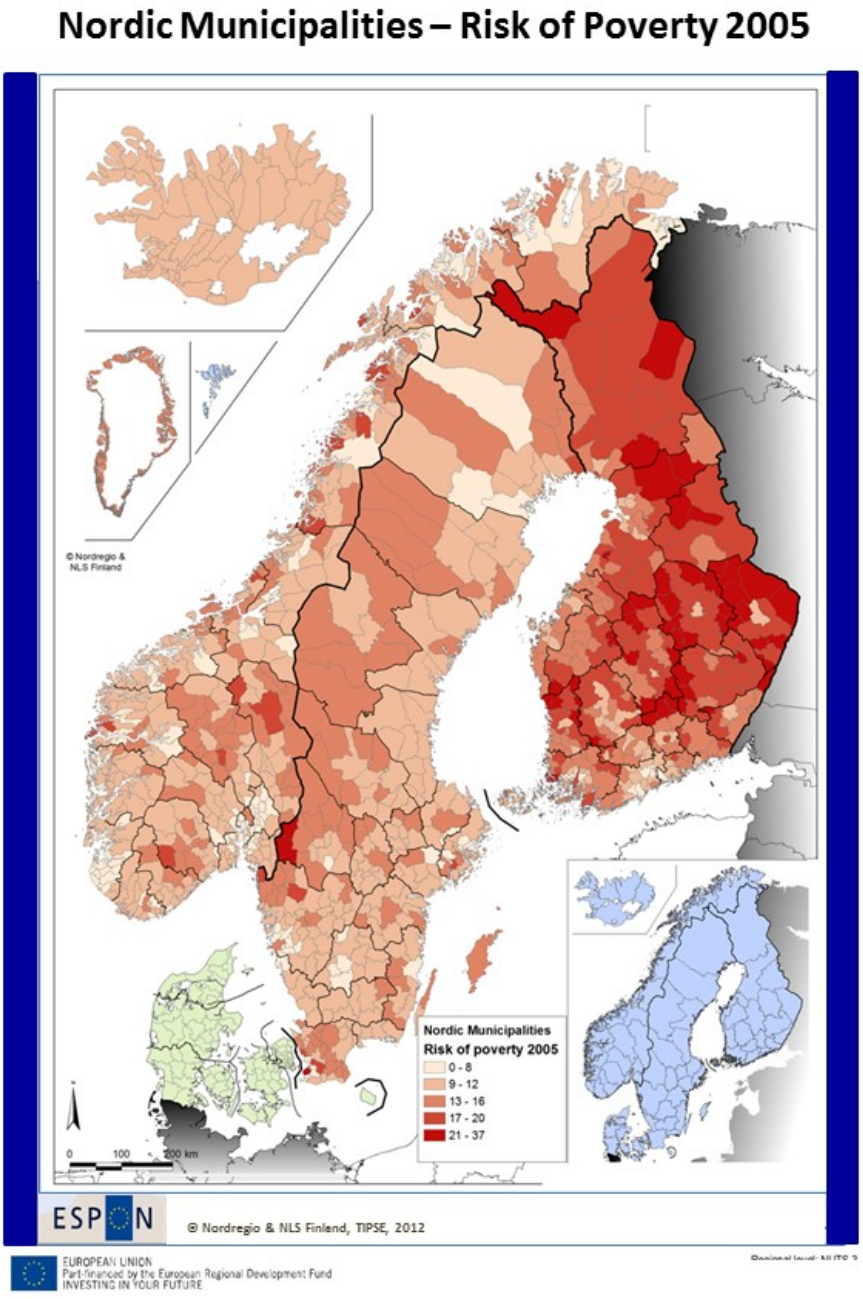
The first series of maps illustrate both qualities in having access to individual maps as the opportunities in identifying changes between different years and relate the changes to marked overall changes. In this case data for 2005 has been available for Sweden, Norway, Iceland, Greenland and Finland and available for Sweden, Norway, Finland, Iceland, Denmark, Greenland and Faroe Islands for 2010. It has enabled the calculation of level of change between 2005 and 2010 for Sweden, Norway and Finland based on the definition of RoP determined as the EU standard, i.e. household incomes below 60%. In Denmark the OECD standard of household incomes below 50% has been available for both years. It would result in misleading results in case the OECD standard was mixed with the EU standard on the yearly overviews, but it has been assumed that any changes in the two standard methods would result in more or less similar change characteristics, so in the change maps the results for Denmark has been included.

2.1 Status of Risk of Poverty in the Nordic countries 2005 and 2010

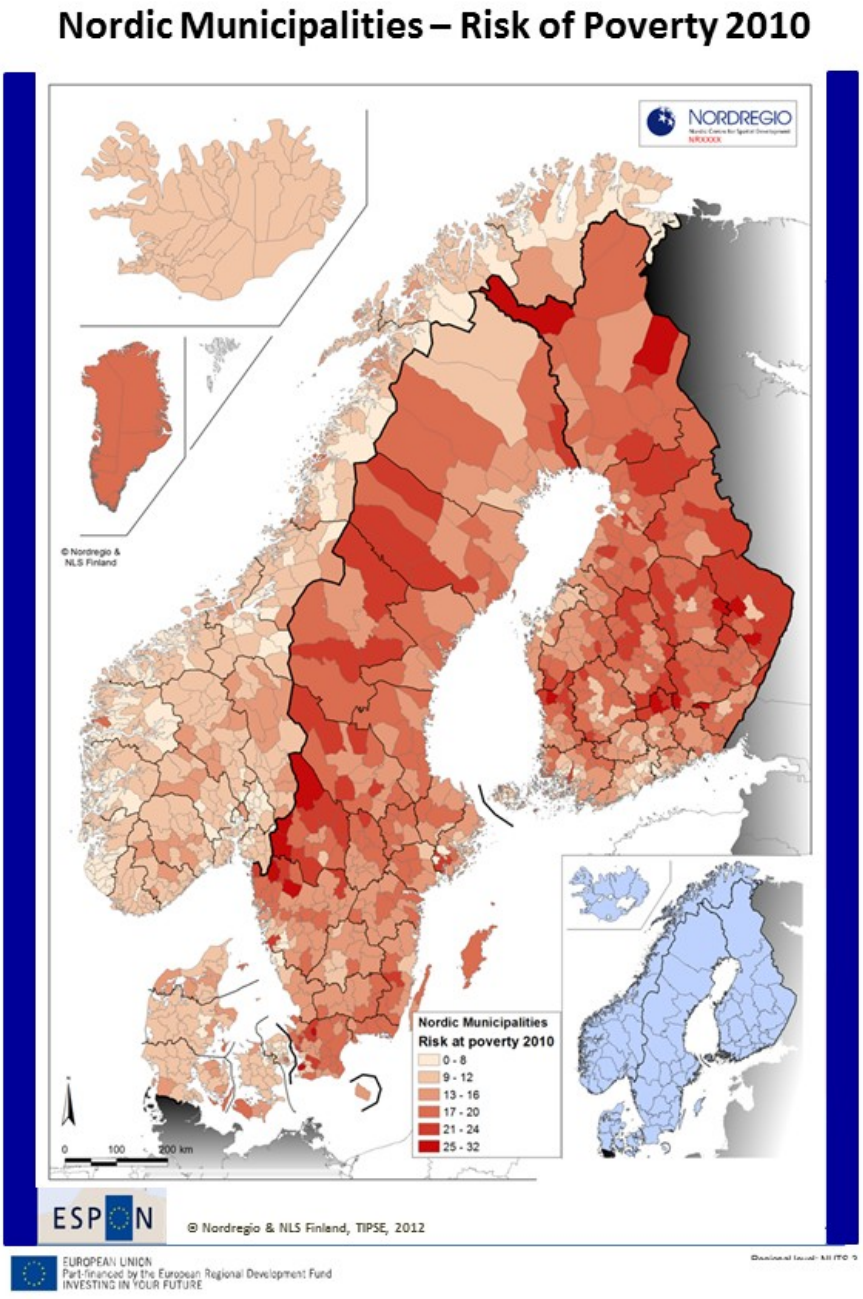
The color ramp on map 1 and map 2 shows in red colour intensity the Risk of Poverty in 2005 and 2010 respectively. Low percentage of household at risk of poverty (below 8%) is shown with low intensity colour while high intensity show municipalities with high risk of poverty (above 21%) according to the EU definition of poverty, i.e. household incomes below 60% of the median household income. The span of values from below 8% and up till 37% show marked differences which may be considered conflicting with the Nordic welfare model. At the same time the maps reflects regional patterns known from some of the general economic maps from the Nordic countries, so while the levels may be unexpected the patterns are not.

As most detail is available on map 2 a few comments should be given. First that peripheral regions, often identified as sparsely populated areas, tend to be more exposed to RoP. Second that larger urban centres, especially capital regions, tend to show urban cores with relatively high levels of RoP, surrounded by a suburban fringe of low levels of RoP.

What is most obvious by comparing the two maps is that while Finland in 2005 show a situation where the RoP is substantially higher compared to the other Nordic countries, both Sweden and Finland seems to be at the same high level in 2010. There are many explanations for this, but the process of being hit by the economic crisis may be a relevant issue to bring forward. In the case of Norway the regional policy – Distrikspolitiken (District Policy) – where considerable amounts of money are spend on ensuring comparable living conditions in peripheral regions is an obvious explanation for the stable patterns in RoP throughout the country.



Map 1: Risk of poverty 2005 in the Nordic Municipalities



Map 2: Risk of poverty 2010 in the Nordic Municipalities. Data for Faroe Islands were missing when the map was created.

2.2 Changes in Risk of Poverty in the Nordic countries 2005-2010

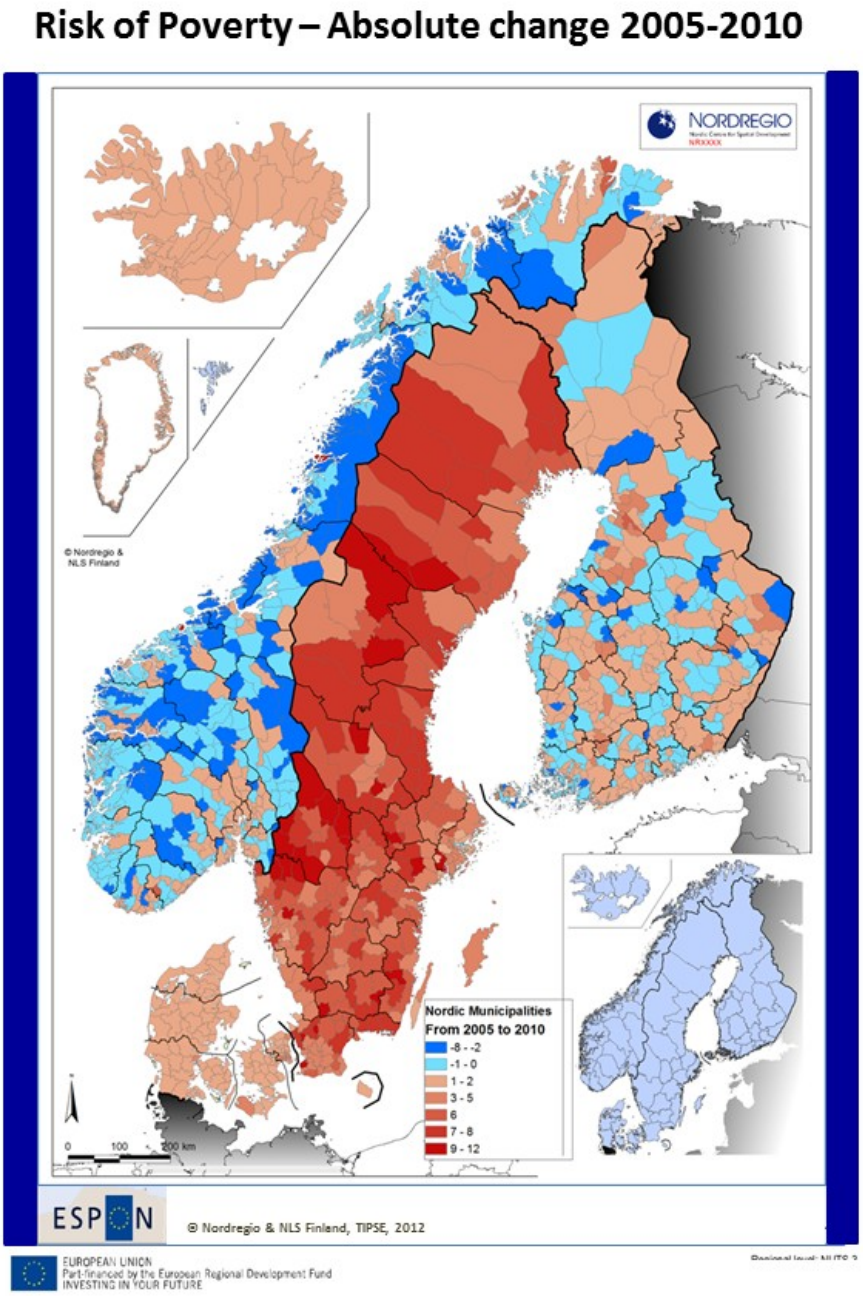
The maps 3 and 4 show two different versions of calculated differences between the RoP for 2005 and 2010.

The first map (map 3) show the absolute changes in percent of the households being at Risk of Poverty with blue colours (and negative numbers) showing the level of decrease in risk of poverty while red colours (and positive numbers) show the level of increase. As mentioned earlier the calculation of data for Denmark has been based on the <50% data and therefore resulting in lower values The regional variations in absolute values therefore does appear within low levels of increase.

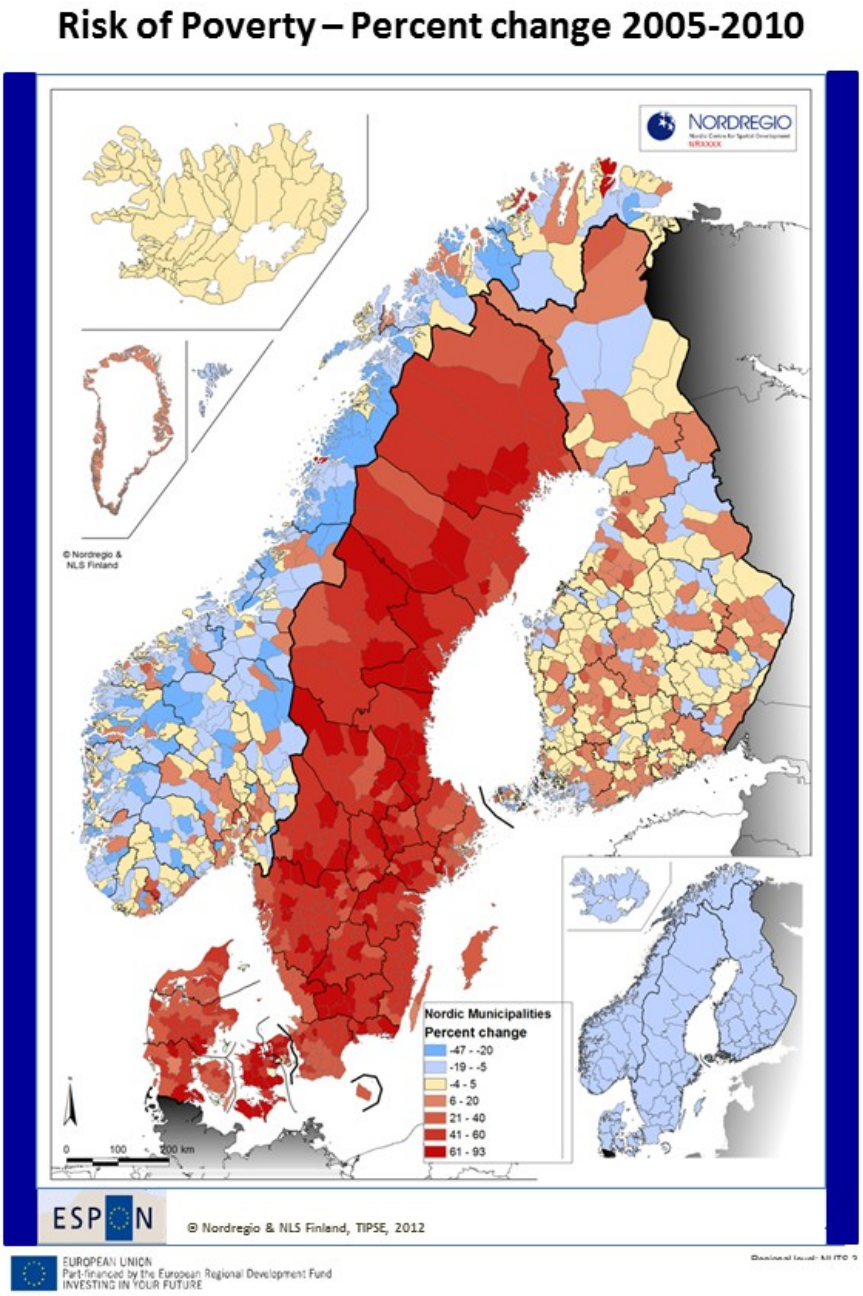
As already indicated by the presentation of the general maps of RoP Sweden has been exposed to remarkable high increases, basically representing all levels from 1 up till 12 percent. Only central Stockholm has shown an improved situation with a decline in RoP just below 1 percent. In both Norway and Finland changes of similar magnitudes have happened, from improvements up till 8 percent and increased RoP levels with up till 5 and 6 percent. Interesting is it that the highest level of increase are found in two municipalities in Norway situated on islands at the west coast. In spite of the district policy mentioned above the policy has obviously not been able to cover all situations.

The next map (map 4) show the percent changes in percent of the households being at risk of poverty. Also here blue colors show the % decrease in risk of poverty, yellow show where no or limited change has taken place, while red colours show the % increase in risk of poverty. In this version the Faroe Islands are missing due to data not accessible when the map was created while data for Denmark are calculated based on <50% of median values and for the period 2003-2010.

This map seems to be the best indicator of what has taken place during the time period 2005-2010 (and for Denmark 2003-2010). While Finland was already hit by the economic crisis in 2005 both Sweden and Denmark experienced general increases in RoP of magnitudes between 6% and 93%. The only exceptions from this pattern of increase are municipalities in the urban fringe areas with more wealthy inhabitants where neither increases nor decreases in RoP have taken place.



Map 3: Absolute changes in percent of the households being at risk of poverty in the Nordic countries between 2005 and 2010



Map 4: Percent changes in percent of the households being at risk of poverty in the Nordic countries between 2005 and 2010

3 Registration of change paths in Risk of Poverty

An important question of working with RoP at a relatively detailed administrative level is to what extend the patterns are reflecting general national tendencies in performance, and to what extend the patterns are showing specific regional situations. With data at the municipal level for Norway, Sweden, Denmark and Finland a simple tabulation plus regression and correlation analysis has been conducted.

3.1 Sweden

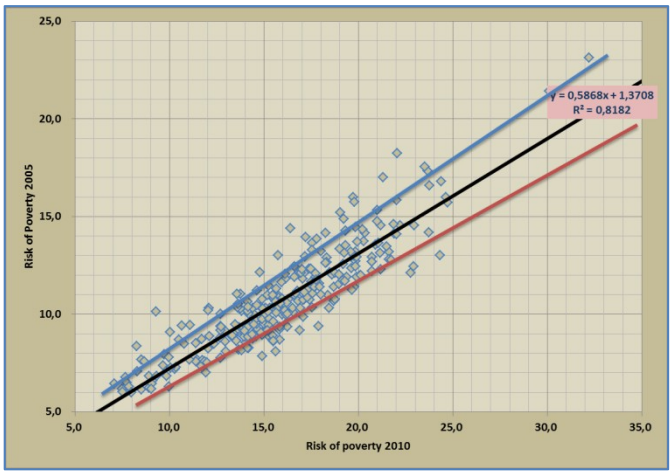


Figure 1: Changes in the Risk of Poverty in households in Sweden from 2005 to 2010

Risk of poverty in 2010 is shown along the x-axis while the risk of poverty in 2005 is shown along the y-axis. The numbers show the percent of household at risk of poverty according to the EU definition of poverty, i.e. household incomes lower than 60% of the median income. Each dot represents a municipality, and the black line show the linear regression line in the data, in this situation defined as:

$$Y=0,5868x + 1,3708$$

The R2 show a very high correlation of 0,905 between the two datasets, indicating that municipalities with low risk of poverty continue to have this status, while municipalities with high risk continue to maintain that. And the slope of the regression line show the overall situation of an increase in poverty which is also shown in the formula where x-values below 1 show general increased in risk of poverty, while x-values above 1 show general decreases in risk of poverty. In this situation a value of 0,5868 show a very high increase of risk of poverty.

Along the trendline are shown 20% increase (the red line) and 20% decrease (the blue line) in risk of poverty compared to the average increase indicated by the slope

between the two years. Municipalities situated outside this line can be considered outliers deviating from the general pattern of development defined by for instance national policies. In the case of Sweden there are not many municipalities situated in this area, and they are only deviating minor from the general trend. So all in all a conclusion would be that it is more the general national performance than the regional strategies that defines the changes in RoP.

3.2 Denmark

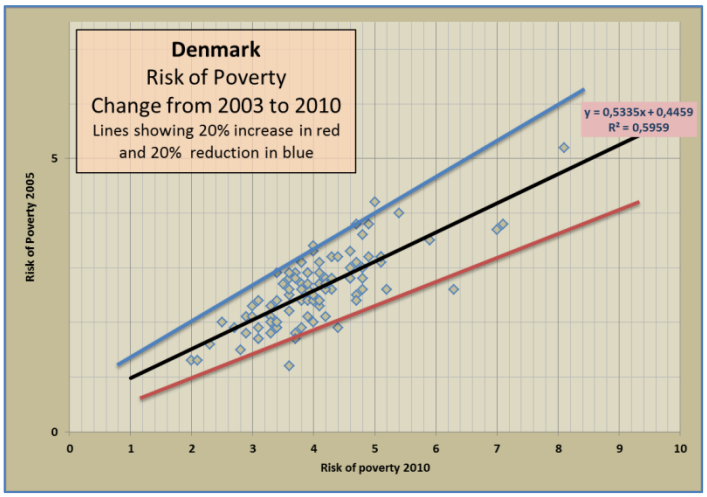


Figure 2: Changes in the Risk of Poverty in households in Denmark from 2003 to 2010

Similar to the previous graph risk of poverty in 2010 are shown along the x-axis while the risk of poverty in 2005 are shown along the y-axis. Due to data availability the numbers show the percent of household at risk of poverty according to the OECD definition of poverty, i.e. household incomes lower than 50% of the median income. Each dot represents a municipality, and the black line show the regression line in the data, in this situation defined as:

$$Y=0,5335x + 0,5959$$

The R2 show a high correlation of 0,772 between the two datasets, indicating that municipalities with low risk of poverty continue to have this status, while municipalities with high risk continue to maintain that. And the slope of the regression line show the overall situation of an increase in poverty which is also shown in the formula where x-values below 1 show general increased in risk of poverty, while x-values above 1 show general decreases in risk of poverty. In this situation a value of 0,5335 show a very high in increase of risk of poverty.

Along the regression line are shown 20% increase (the red line) and 20% decrease (the blue line) in risk of poverty compared to the average increase indicated by the

slope between the two years. As emphasized before, municipalities situated outside this line can be considered outliers deviating from the general pattern of development defined by for instance national policies. In the case of Denmark there are only very few municipalities situated in this area, and they are only deviating minor from the general trend. So all in all a conclusion would be that it clearly the general national performance than the regional strategies that defines the changes in RoP.

3.3 Norway

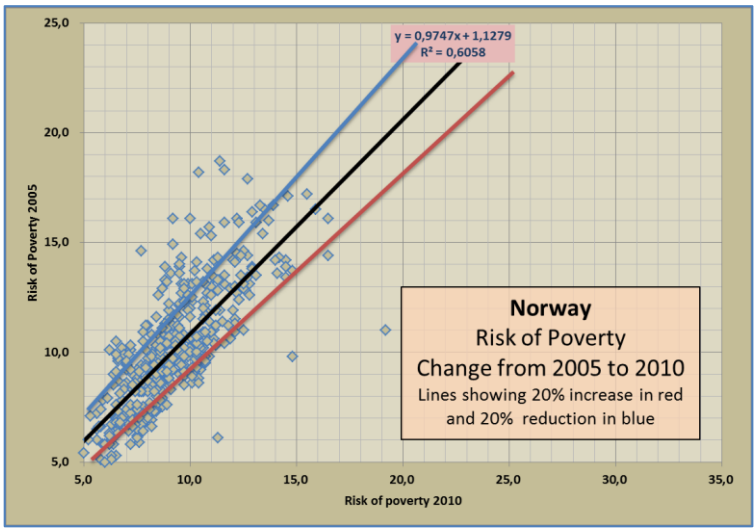


Figure 3: Changes in the Risk of Poverty in households in Norway from 2005 to 2010

Risk of poverty in 2010 are shown along the x-axis while the risk of poverty in 2005 are shown along the y-axis. The numbers show the percent of household at risk of poverty according to the EU definition of poverty, i.e. household incomes lower than 60% of the median income. Each dot represents a municipality, and the black line show the regression line in the data, in this situation defined as:

$$Y=0,9747x + 1,1279$$

The R2 show a high correlation of 0,778 between the two datasets, indicating that municipalities with low risk of poverty continue to have this status, while municipalities with high risk continue to maintain that. And the slope of the regression line show the overall situation of an increase in poverty which is also shown in the formula where x-values below 1 show general increased in risk of poverty, while x-values above 1 show general decreases in risk of poverty. In this situation a value of 0,9747 show a very low increase of risk of poverty – actually as close to a balanced situation as possible.

Along the regression line are shown 20% increase (the red line) and 20% decrease (the blue line) in risk of poverty compared to the average increase indicated by the slope between the two years. As emphasized before, municipalities situated outside this line can be considered outliers deviating from the general pattern of development defined by for instance national policies. In the case of Norway there are marked differences to the other countries. There are many outliers, and especially on the positive side showing improved conditions by lower levels of RoP in 2010 compared to 205. So a conclusion in the case of Norway would be the regional policy or "Distriktspolitiken" which has been mentioned before, seems to have high impact on the RoP pattern on that it clearly the general national performance than the regional strategies that defines the changes in RoP.

3.4 Finland

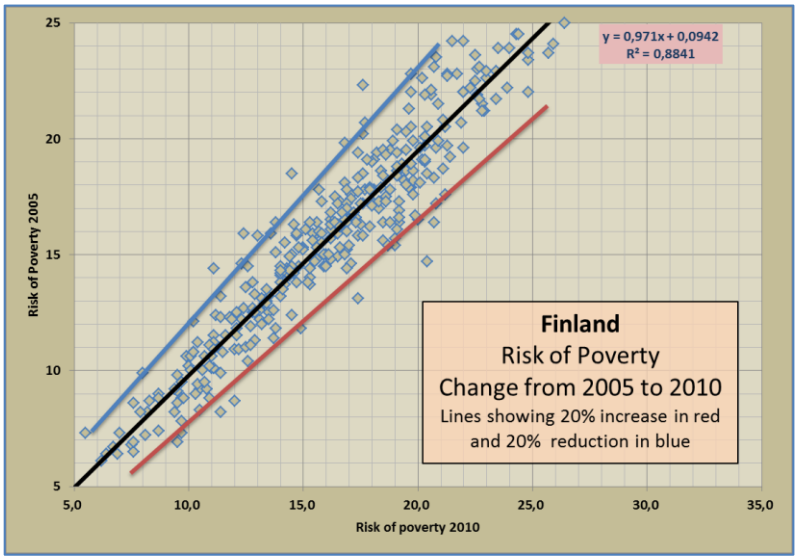


Figure 4: Changes in the Risk of Poverty in households in Finland from 2005 to 2010

As previously risk of poverty in 2010 are shown along the x-axis while the risk of poverty in 2005 are shown along the y-axis. The numbers show the percent of household at risk of poverty according to the EU definition of poverty, i.e. household incomes lower than 60% of the median income. Each dot represents a municipality, and the black line show the regression line in the data, in this situation defined as:

$$Y=0,971x + 0,0942$$

The R2 show a very high correlation of 0,940 between the two datasets, indicating that municipalities with low risk of poverty continue to have this status, while municipalities with high risk continue to maintain that. And the slope of the regression line show the overall situation of an increase in poverty which is also shown in the formula where x-values below 1 show general increased in risk of poverty, while x-

values above 1 show general decreases in risk of poverty. In this situation a value of 0,971 show a very low increase of risk of poverty – actually almost like Norway close to a balanced situation as possible.

Along the regression line are shown 20% increase (the red line) and 20% decrease (the blue line) in risk of poverty compared to the average increase indicated by the slope between the two years. As emphasized before, municipalities situated outside this line can be considered outliers deviating from the general pattern of development defined by for instance national policies. While the case of Norway showed almost similar regression line as Finland but a large number of outliers there are basically very few outliers in Finland which show the general national performance much more than specific regional strategies defines the changes in RoP.

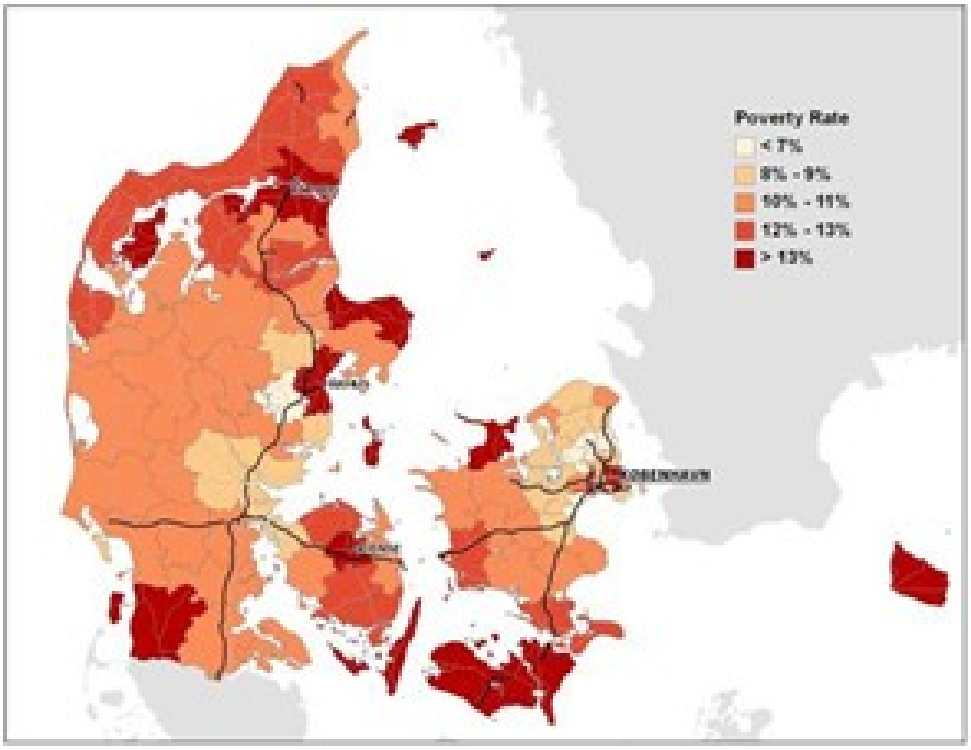
4 Registration of change paths in Risk of Poverty

The PovMap software has already been mentioned as an important tool for ensuring comparable data between register-based and non-register based countries, and it is therefore important to be aware of any limitations to the output generated from both types of data.

As already described in the main report there are many challenges in relation to use the PovMap software in the European context. And one of the issues that will be pursued further in the future is the comparing the outcome of the software generated output with register based data wherever possible. Luckily one such comparison has already been done through a partnership between the World Bank team and the Economics Department of the University of Copenhagen. The core research team for the Denmark study is Peter Lanjouw, Ken Simler, Thomas Pave Sohnesen, Roy van der Weide, Qinghua Zhao (World Bank), Azhar Hussein and Finn Tarp (University of Copenhagen), and the following short presentation is based on their Interim report for European Commission Scientific Steering Committee on June 2012.

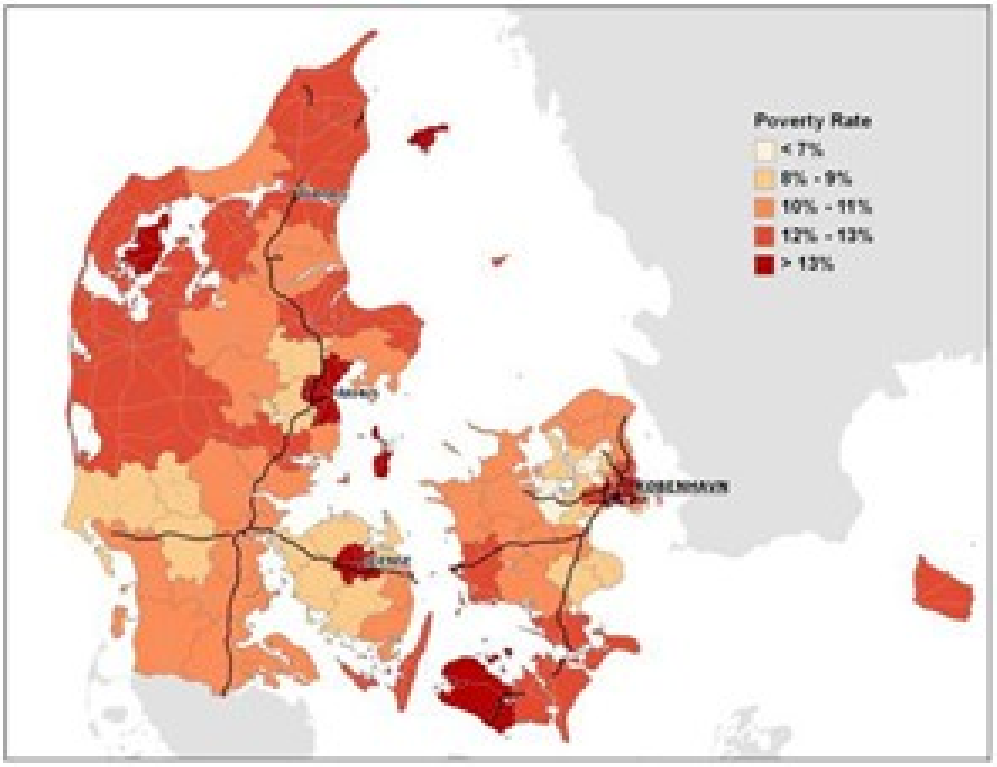
Three steps have been taken and presented in the report.

The first step has been a register based calculation of Risk of Poverty at the Municipal level in Denmark, with the results shown on figure 9 below.



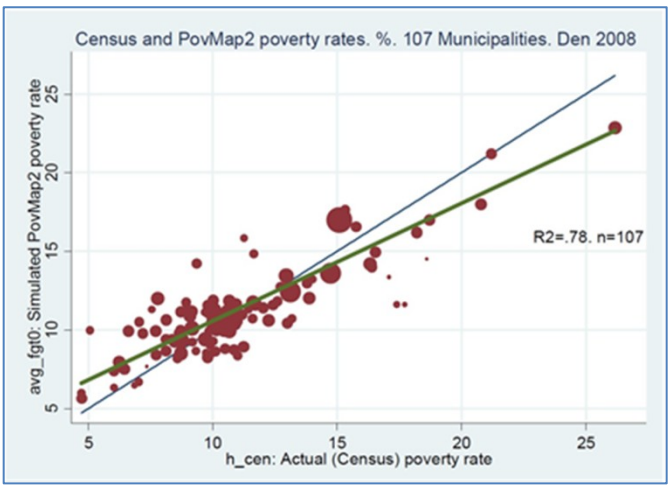
Map 5: Register based Risk of Poverty calculations

A sample from the register data has then been generated in order to simulate a situation similar to what would be expected – and needed – in running the PovMap, and based on these data the PovMap software has been used in generating the output shown on figure 10 below.



Map 6: Estimated Risk of Poverty

As clearly indicated on the two maps there are marked differences between them. While larger regions with equal levels of RoP rates become subdivided, many of the high level regions disappear in the modelled results. As emphasized by the authors Denmark provides an interesting, and in some respects difficult, test case for poverty mapping methods. The high level and diversity in economic transfer results in that net income inequality is low, and spatial variation in poverty also seems low. This has been shown previously with the graph showing the RoP based on the 2003-2010 data.



The authors of the report present this graph showing the municipalities and their population sizes as circle sizes with actual RoP on the x-axis and simulated RoP and PovMap generated values on the Y-axis.

Figure 5: Actual versus simulated RoP for Denmark 2008

One of the most important tasks in this connection will obviously be to test the outcome of modelled versus register based data for other countries where register based data are available. And especially in regions where marked differences in level of poverty seems to show, as it may be easier to find which indicator sets may allow for a more precise identification of the Risk of Poverty by means of the PovMap software.

References

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Qinghua Zhao, Peter Lanjouw (No year): Using PovMap2 - A USER's GUIDE. The World Bank