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Summary:

New criteria for measuring settlement patterns in the Norwegian general purpose grants scheme

The Norwegian general purpose grants scheme

The aim of the Norwegian general purpose grants scheme is to even out disparities in public expenses between municipalities because of differences in geographical and demographic conditions. The purpose of the system is to form the basis of a minimum level of public services for people in all parts of Norway. Thereby it is an important element of the Norwegian regional policy.

In the scheme different indicators are applied in order to express the relative differences in the municipal costs due among other factors to dispersed population. Costs connected to the primary school and home services for the elderly people, are supposed to be affected by the settlement patterns.

Until 1992 the share of rural inhabitants was used as an indicator of the settlement patterns. In 1992 a new indicator, called “estimated travel time”, was implemented. This is a measure of the average travel time for all persons living in the municipality to the centre of the municipality (i e the town hall). The first criteria is effective for distinguishing between cities and rural municipalities, but is not sufficient when it comes to describing differences between rural municipalities. On the other hand the "travel time” criteria, which gives a more differentiated measure of the rural municipalities, do have the disadvantage of giving the big cities too high score (due to the fact that the distance to town hall is often relatively long).

A governmental committee (Rattsøutvalget) made a proposal in 1996 to develop better measures for the settlement patterns. The purpose of this project has been to develop such new criteria for the description of settlement patterns.

Requirements

A new settlement indicator should be based on measured distances to more than one destination, thus taking into account both the effect of distances and the effect of densely built up areas (which may give the possibility of economies of scale despite distance to city centre). The indicator should be based on three main components:

1. appropriate zones,
2. a method for measuring distances within the zones,
3. a geographical point (within each zone) defining the centre of the zone.

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The zones must contain an appropriate number of residents necessary for the provision of a basic unit of the different municipal services. If extra units or extra transport is necessary due to dispersed settlement patterns, the result may be higher costs per user.

Geographical references and the measurement of distances

Norway is divided into approximately 13 600 census tracts which are used as geographical units in this project. We have used a database with information about the population in each census tract, coordinates etc.

The distance measures are based on a model estimating distances between census tracts. The main data source has been the Statistics Norway's register containing data on road and ferry distances between pairs of neighbouring census tracts. The calculations are based on approximately 42 000 road links and 600 ferry connections.

Zones

The ideal size of a zone could be when the amount of inhabitants is suitable for the economies of scale. Thus the zones must contain a number of people appropriate to basic units of municipal services. Three types of zones are tested in the project:

2000-zones. The zones contain at least 2 000 inhabitants each, which according to a normal distribution of age, will give the basis of a school with one class with 25 pupils at each level.

400-zones. Because of variations in the settlement patterns among different age groups, we have also tested zones containing at least 400 inhabitants between 0 and 15 years of age. On the average this is according to the definition of the 2000-zones.

5000-zones. We do not have detailed information about the number of clients in the home services which is necessary for economies of scale. In spite of this uncertainty we have chosen to test zones containing at least 5 000 inhabitants in addition to the 2000-zones.

The zones are based on Statistics Norway's division of the municipalities into subdistricts. These subdistricts are made by merging census tracts so as to form natural divisions according to the local physical geography, the number of inhabitants, and the local transportation system. Normally subdistricts shall contain 1 000 – 3 000 inhabitants in rural areas whereas the number in urban areas should be between 3 000 – 5 000 inhabitants. In the largest cities Oslo, Bergen and Trondheim, we have used the municipalities own local administrative units.

According to the general rules concerning the number of inhabitants within the zones, some of the subdistricts are to small. In these situations the subdistricts are combined with their nearest neighbour in order to create zones.

Although some difficulties arise due to the fact that the subdistricts were defined some 20 years ago, the main conclusion is that in most cases the defined zones give an appropriate division of the municipalities according to the targets set in the project.

Settlement pattern indicators

To develop settlement pattern indicators we need to define a point within each of the zones representing the destination when measuring distances. Two alternative +centres were tested; the most populated census tract within the zone and the census tract with the highest concentration of commercial activities (measured as floor space). The first one was chosen because data was more easily accessible. In most cases it was also the most representative one both concerning population, schools and commercial activities.

The following criteria of measuring settlement patterns are tested (see also a working paper from Statistics Norway, Langørgen 1998a):

A. Average distance in kilometres for all persons living in the municipality to the centre within the 2000-zone where each one is living.

B. Average travel time in minutes to the centre within 400-zones.

C. Average distance in kilometres to the centre within 2000-zones for distances longer than a given limit.

D. Average distance in kilometres to the centre within 2000-zones with weighted distances.

E. Average distance in kilometres for inhabitants 0 – 15 years old to the centre within 400-zones.

F. Average distance in kilometres to the centre within 5000-zones.

G. Average distance in kilometres from each census tract to the nearest neighbouring census tract within 2000-zones.

H. Density – average decares of settled area per settled person within 2000-zones.

Based on a correlation test, it is recommended to use as indicators of settlement pattern, the indicator A, as a measure of average distance to zone centres, and the indicators G and H, as measures of local dispersion.

It is shown in the project that it is a connection between, on the one hand, the class structures in school and the extent of bus transport of pupils and the three indicators, on the other hand.

For many municipalities the indicator A has lower values for 1995 than for 1980. This is explained by concentration of the settlement patterns in these areas through the latest 15 years. It is expected that this trend will continue in the next years.

Changes in the local administrative division seem to have no influence on the indicators. This conclusion is based on testing the effect of merging municipalities in some areas of Norway where this is discussed.

By using the recommended indicators the municipalities constitute a different ranking than under the present criteria. The largest cities and some rural municipalities will have to be ranked considerable lower than now.