

### **Spatial microsimulation of apparent and inactive unemployment in Poland**

Providing reliable, timely and accurate information for the economy and society is one of the most important tasks of national statistics institutions. As the development progresses, the demand for information is growing, in more and more cross-sections of increasingly better quality.

Repeated and ad-hoc sample surveys provide rich and multidimensional information, but the limitations resulting from the relatively small sample size cause that the precision of estimators decreases with increasing the number of published cross-sections. Thus information about so-called small domains (detailed cross-sections) are not published due to unacceptably large random error.

Administrative registers or census data are characterized by full or almost full coverage, but their substantive content is usually smaller than in the case of sample surveys. On their basis, detailed tables are published, with a relatively small number of dimensions, however.

The integration of information from many sources may lead to the improvement of the quality and precision of estimates made on the basis of surveys [Rahman et al., 2010]. Modern methods of statistical data integration, small area statistics and spatial microsimulation significantly contribute to the reduction of random and non-random errors without increasing the sample size or carrying out new surveys [Tanton 2014, Rahman, 2009].

The present study is an attempt to fill a gap concerning research on the scale of the phenomenon of apparent and inactive unemployment, which involves people registering as unemployed with district labour offices (DLO) in spite of not meeting the criteria of the official definition of an unemployed person. Under current regulations, a person can register as unemployed if he or she (1) is not engaged in paid employment, (2) is looking for a job, and (3) is ready to start work. However, not all persons registered as unemployed meet the above criteria. Some of them are not interested in finding a job and only register to take advantage of the unemployment benefit or health insurance. In the study, authors distinguishes two groups of persons that do not meet the definition of an unemployed person: apparently unemployed persons and inactive unemployed persons. The former category includes people registered as unemployed but engaged in paid employment. People classified as inactive unemployed are registered as unemployed and are economically passive, i.e. neither willing nor ready to start work, nor looking for a job.

The main goal of the study is to estimate the level of apparent and inactive unemployment in Poland. The quantities to be estimated are the number of apparently and inactive unemployed and the corresponding percentages of the total number of persons registered in DLOs. The estimation is to be performed by NUTS-3 spatial aggregation level.

The level of apparent and inactive unemployment was estimated using unit-level data from the LFS. Owing to the small number of respondents characterized by studied phenomenon, precision of direct estimation of apparent and inactive unemployment by NUTS-3 is low. To increase estimation precision, the author used an approach based on spatial microsimulation methodology.

A spatial microsimulation is a method of generation of synthetic data sets, where integration of aggregated census data (or other source with full coverage) with micro datasets from sample survey is performed [Tanton, Edwards ed., 2013]. The result is a synthetic dataset where joint and marginal distributions for specific variables is preserved. Increasing the number of records by synthetic ones enables a more detailed analysis for small domains [Rahman, Harding, 2017]. The paper presents the methods and the algorithm of data generation based on aggregated Census tables and LFS microdata along with the assessment of results quality and is aimed at verifying two research hypotheses: (a)

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apparent and inactive unemployment is characterized by considerable spatial variation, (b) methods based on spatial microsimulation allow to estimate the level of apparent and inactive unemployment.

So far, studies of apparent and inactive unemployment have only provided: annual estimates of the phenomenon at the national level (Czapiński and Panek, 2014), quarterly estimates for domains defined by gender, age, educational level and place of residence (urban / rural) (Wilak 2018) and quarterly estimates for NUTS-2 (Wilak 2018). This study is an attempt to provide more detailed estimates of apparent and inactive unemployment by selecting more detailed administrative division.

**Key words:** data integration, small area estimation, spatial microsimulation, synthetic data generation, labour force, LFS, unemployment, apparent unemployment, inactive unemployment

**Selected literature:**

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