Country experience: United Kingdom: experience with modelling outward FATS

17.42.   Since reference year 2009, the United Kingdom has been obligated to provide Eurostat data on the majority shareholdings outside the European Union held by United Kingdom UCIs. That regulation requires the United Kingdom to produce outward FATS on an annual basis, reporting on the economic activity, turnover, number of persons employed and country of residence of subsidiaries in which a United Kingdom UCI is a majority shareholder. In order to compile those statistics, the United Kingdom adopted a model-based approach using data from survey returns in conjunction with auxiliary information from the EuroGroups Register (EGR) and the national business register.

17.43.   The United Kingdom outward FATS survey collects data from 200 enterprise groups whose UCI is resident in the United Kingdom. Data items include employment, turnover and the number of foreign affiliates. Those variables are consolidated by country and industry for each parent company. By matching the returned information with the corresponding company data held on the EGR and national business register, a model is developed. That model is then applied to the remainder of the unsampled population.

17.44.   The process involves estimating affiliate employment (logistic regression and multilevel model) and calibration:

(a) **Logistic regression** An initial logistic regression is used owing to the prevalence of zero returns that affect the fit of the model. Sample returns are recoded to a binary variable to indicate if the employment is zero or non-zero. That model then calculates the probability that the survey response is non-zero;

(b) **Multilevel model** Once a model is developed to estimate if a record is non-zero, a multilevel model is used to estimate a value for the employment of an affiliate. The explanatory variables that are used in the model have a hierarchical relationship and the model attempts to account for that. For both models, the coefficients are estimated using the sample returns and are then used to predict the estimates when applied to the unsampled population;

(c) **Calibration** The final stage involves calibrating estimates to the employment of global groups outside the United Kingdom. Information on global employment is available from the EGR, while information on the groups' United Kingdom employment is available from the national business register. Model estimates are then calibrated to the calculated employment outside the United Kingdom.

17.45.   The estimates produced for United Kingdom outward FATS are currently branded as experimental statistics by the Office for National Statistics, as they are new official statistics undergoing evaluation.

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