

The usage of R programme for official statistics

Background

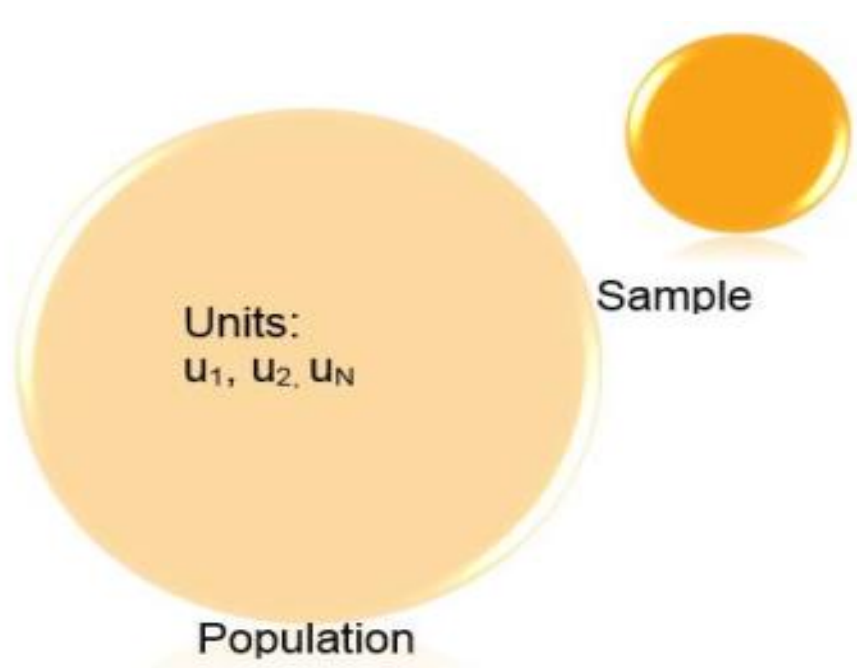
The Kosovo Agency of Statistics (KAS) has adopted the R programming language for various aspects of survey work, including sample design, calculation of sampling errors, and calibration of weights. R's packages provide tools for these tasks, particularly for selecting samples and calibrating weights using auxiliary information. This calibration process improves estimate accuracy by reducing sampling variance and addressing non-sampling errors like nonresponse bias. KAS has applied R to EU SILC surveys for the first time, streamlining weight calculation and enhancing data accuracy. This successful implementation has led to the extension of R usage to other household surveys across different stages of the survey process.

The methodology of Statistics on Income and Living Conditions (EU-SILC)

Sample

In statistics, a data sample is a subset of data collected from a larger population using a defined procedure. Sample points, units, or observations represent individual elements within the sample.

Figure 1: Sample selection



Weights in SILC

The sample design is used for calculation the weights for SILC data.

The weights based on the construction and design are:

1. Design weight (for households and for a selected respondents)
2. Cross-sectional weight
3. Base weight
4. Longitudinal weight

Age and sex are the natural ancillary variables used in a human population survey

```
rfile21$ageSex <-
as.factor(
with(rfile21,
1*(age<10 & A21==1) +
2*(age>9 & age<20 & A21==1) +
```

Calculation of calibrated weights from survey design object and population totals

```
designCal <- calibrate(design, ~ageSex, popTotals,
aggregate.stage = 1, bounds=c(0.1,3))
rfile21$rb050 <- weights(designCal)
```

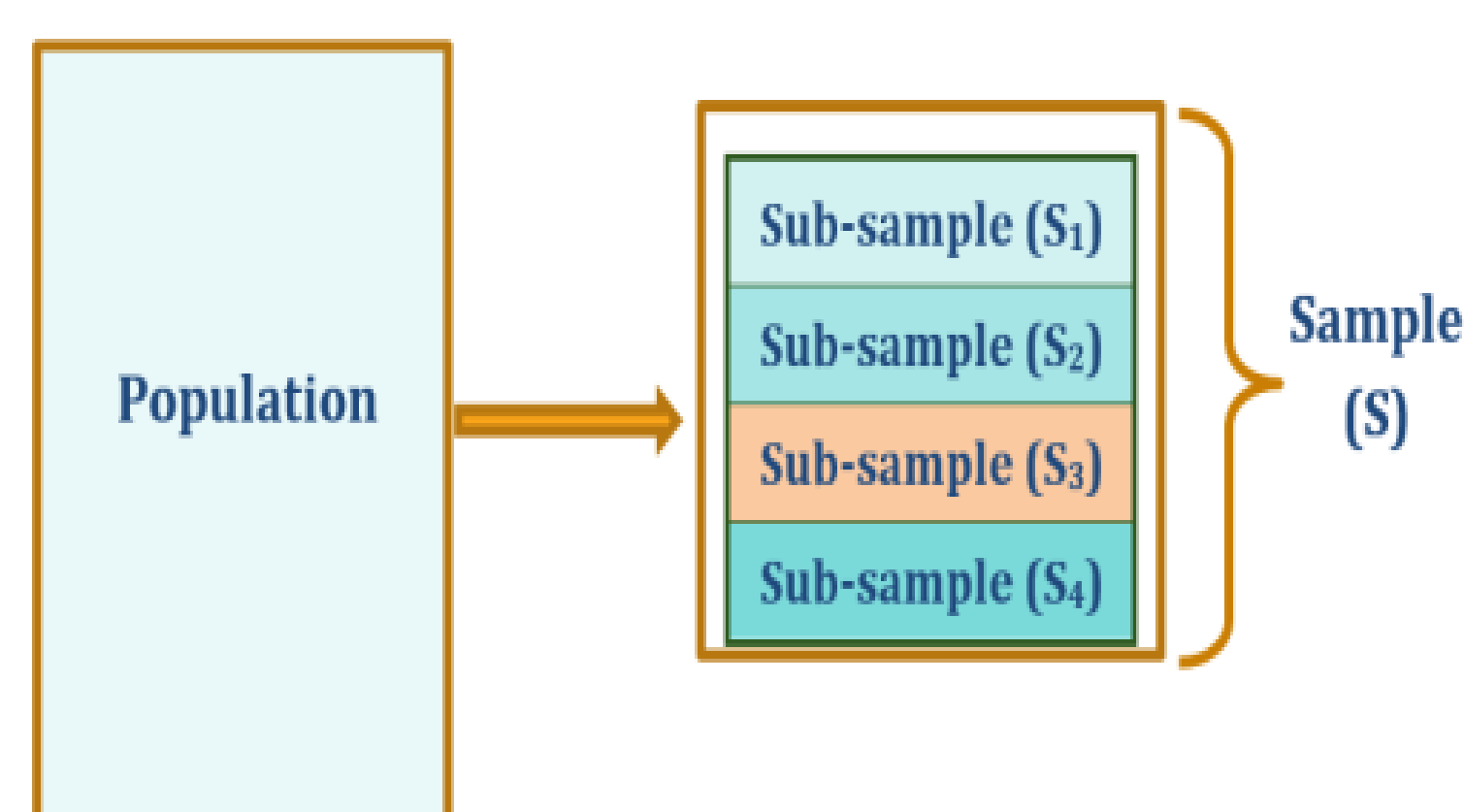
Sample Design of SILC Kosovo

The sample design is two stage:

- On the first stage EA were selected
- Second stage the household was selected within EA.

Rotational (integrated) design refers to sample selection based on four subsamples or replications that are all similar in size and design and representative of the whole population.

Figure 2: Rotational design



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Figure 3: Illustration of a sample rotational design

Time/ Rotation	Year 1	Year 2	Year 3	Year 4	Year 5
1	S ₁	S₁ dropped			
2	S ₂	S ₂	S₂ dropped		
3	S ₃	S ₃	S ₃	S₃ dropped	
4	S ₄	S ₄	S ₄	S ₄	S₄ dropped
1		new S ₁	S ₁	S ₁	S ₁
2			new S ₂	S ₂	S ₂
3				new S ₃	S ₃
4					new S ₄

Data collection

PAPI-Intervista me Letër



CAPI - Intervista me Tablet



- The CAPI method has increased the quality of data
- Immediate error reduction and control
- Monitoring of Interviews with GPS
- Safety and reliability (after each interview)

Conclusions

In recent years, the Kosovo Agency of Statistics (KAS) has focused on enhancing the quality of its statistical production processes. This involves aligning methodologies and practices with EU standards and continuously adopting best practices. Standardizing data collection methods across sectors has ensured consistency and reliability, leading to more accurate and comparable statistics. KAS has partnered with the World Bank to conduct surveys using tablets and Survey Solutions software, enabling web-based data collection from enterprises. This approach enhances confidentiality, reduces form-filling burdens, and boosts statistical process efficiency. Centralizing business data collection through a common website could further leverage internet usage. These initiatives have increased cost-effectiveness and resulted in higher-quality statistics. Additionally, investing in staff training on new technologies and various software packages has improved efficiency and timeliness in data production and dissemination.

Reference

- <https://circabc.europa.eu/sd/a/f8853fb3-58b3-43ce-b4c6-a81fe68f2e50/Methodological%20guidelines%202021%20operation%20v4%2009.12.2020.pdf>
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