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7ᵗʰ Workshop on Labour Force Survey Methodology

Calculating the eligibility rate of sampling units with unknown eligibility
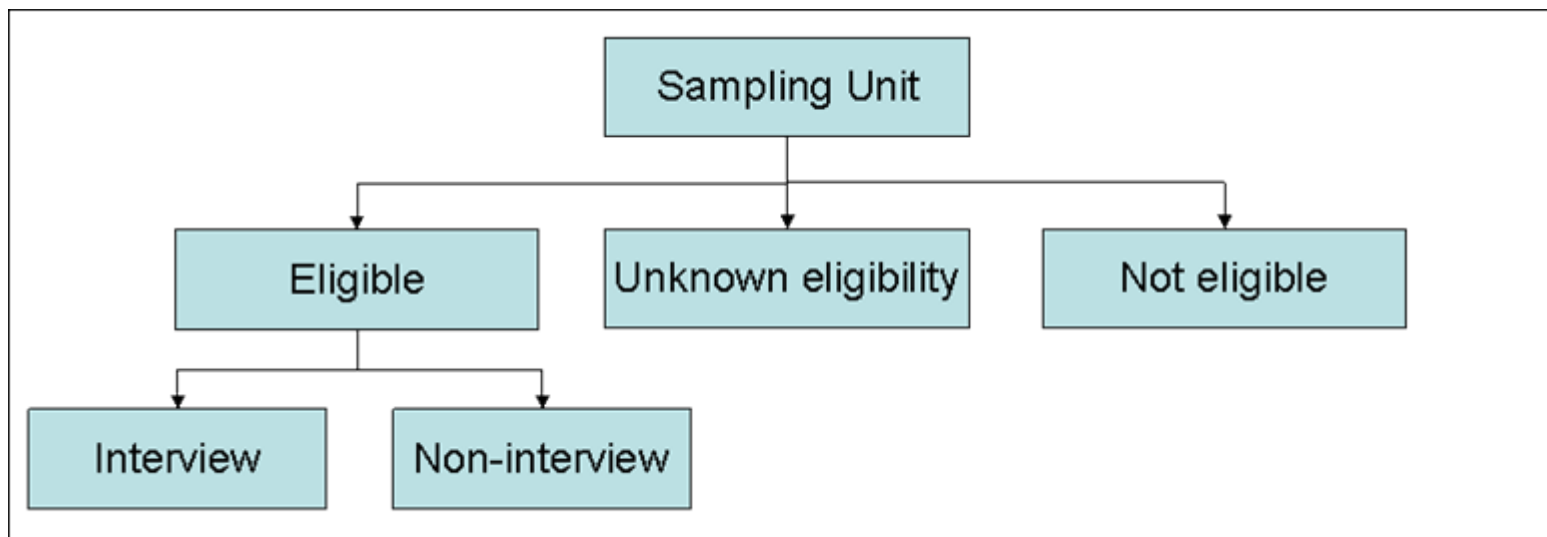
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Classification of units according to eligibility

A core issue is the **definition of "eligible unit"** as it affects the calculation of response rate

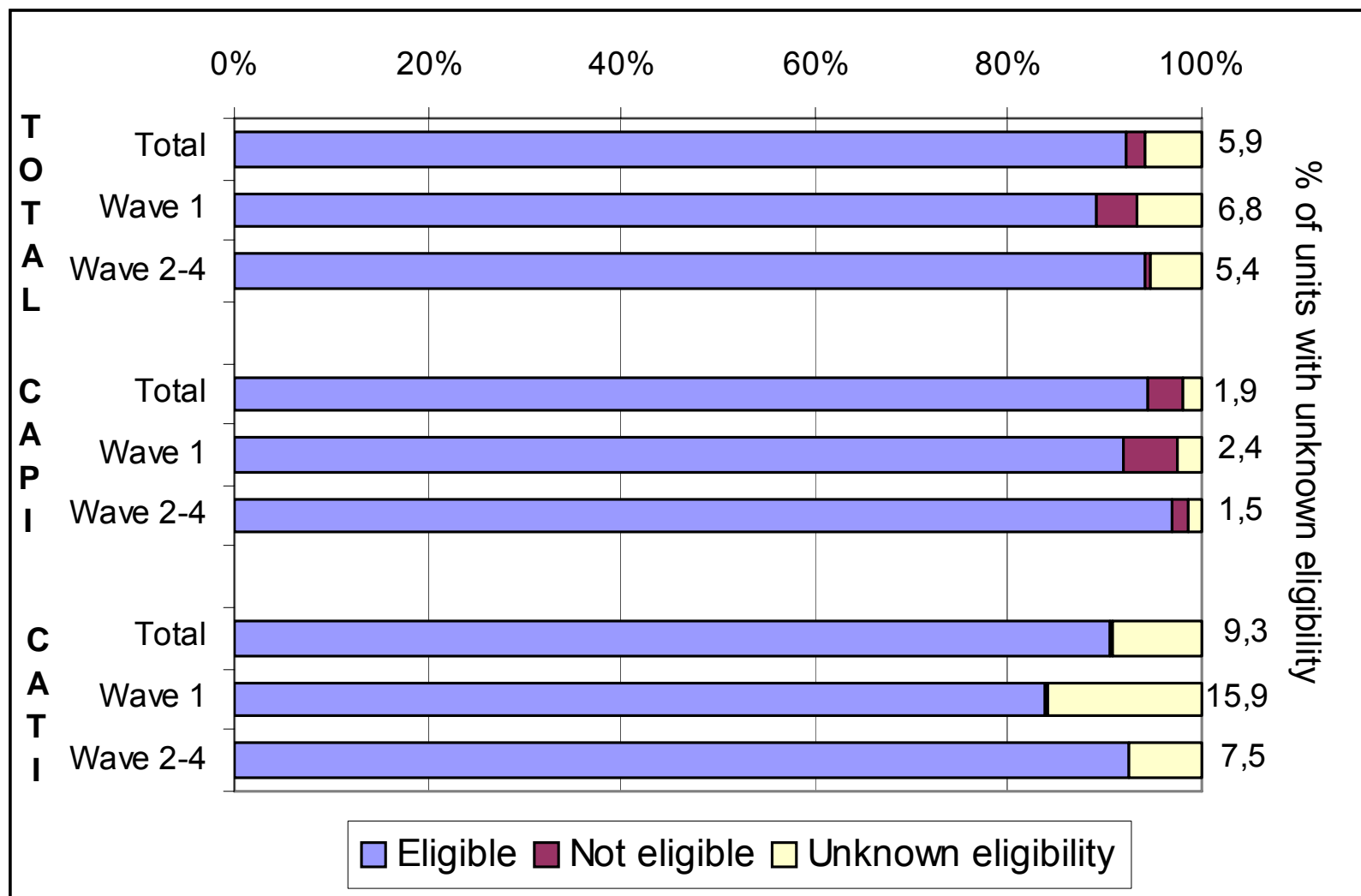# Definition of "eligible unit" in the IT LFS

A **unit is eligible**:

- if the name corresponds to the selected household and

- if it is a private household having usual residence in the municipality

The **eligibility is unknown** when it is not possible to collect sufficient information for a proper classification, e.g.

➢ no contact made during fieldwork period
➢ no one at home and no other information available (CAPI)
➢ unreachable due to wrong telephone number (CATI)

Units according to eligibility (shares)
IT LFS, by survey mode and wave - 1st quarter 2011

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Response rate

- one of the most important **quality indicators** for the social sample surveys

- used between surveys, years and countries **to compare survey quality**

$$RR = \frac{EI}{EI + EN + \boxed{\alpha} \cdot UN} \times 100$$

where:

EI   Number of eligible interviews

EN   Number of eligible non-interviews

UN   Number of units with unknown eligibility

α   Estimated proportion of units of unknown eligibility that are actually eligible

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Estimating Eligibility Rates: a review

- ✓ The Minimum and Maximum Allocation method (MMA)

- ✓ The Proportional Allocation method (CASRO)

- ✓ The American Association for Public Opinion Research (AAPOR) approach

- ✓ The Survival Analysis method (SAM)

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The Minimum and Maximum Allocation method (MMA)

- Defines the lower and upper boundaries of the response rate: all units with unknown status are actually eligible (upper) or non-eligible (lower)

- So it is possible to define a range of response rates by setting:

$$\alpha_{MMA_{upper}} = 0 \qquad\qquad \alpha_{MMA_{lower}} = 1$$

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The Proportional Allocation method (CASRO)

- Proportion of eligible units amongst those whose eligibility is unknown = Proportion of eligible units amongst the eligibility known sample units

- CASRO formula for α is:

$$\alpha_{CASRO} = \frac{EI + EN}{EI + EN + NE}$$

where:

EI   Number of eligible interviews

EN   Number of eligible non-interviews

NE   Number of not eligible units

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The American Association for Public Opinion Research (AAPOR) approach

- Estimation of the eligibility rate left to discretion of researchers

  - on the basis of the best available scientific information

  - the basis of the estimate must be explicitly stated and explained

  - if no information available, all units of unknown eligibility should be considered as eligible

- AAPOR formula for α is:

$$\alpha_{AAPOR} = 1$$

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The Survival Analysis method (SAM)

- Estimates the eligibility rate by modeling the "time to resolution (death)" of each sampling units using survival analysis. It uses the additional information on the number of attempts until resolution (eligible or ineligible).

- Being resolved as eligible or ineligible is comparable to two different "causes of deaths".

$$\hat{R}_\infty = \frac{\hat{S}_{eligible}(0)}{\hat{S}_{eligible}(0) + \hat{S}_{ineligible}(0)}$$

$$\alpha_{SAM} = \frac{(\hat{R}_\infty \times n_{tot}) - n_{eligible}}{n_{unknown}}$$

where:

$\hat{S}_{eligible}(0)$ survival function for resolving as eligible

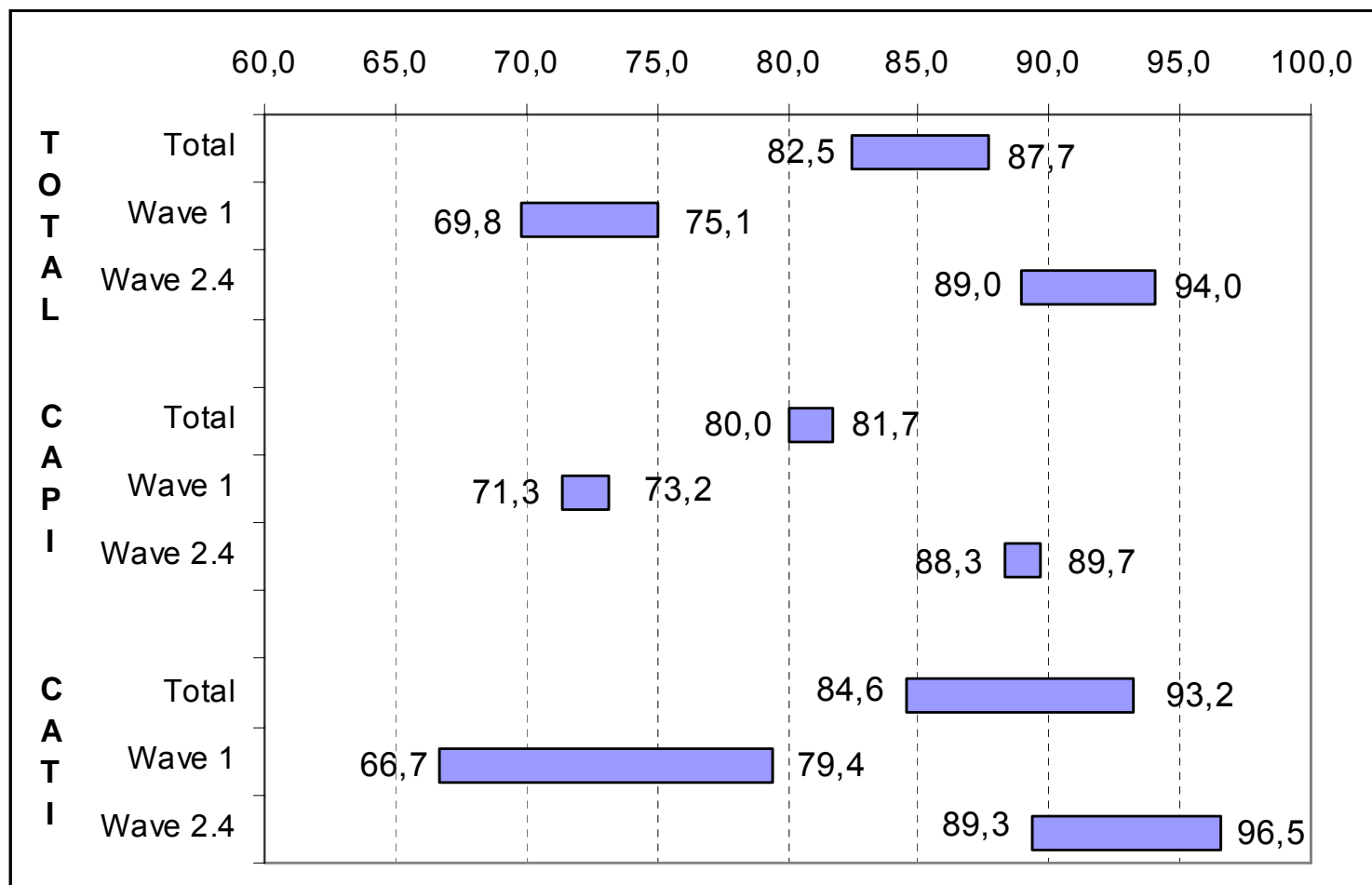$\hat{S}_{ineligible}(0)$ survival function for resolving as not eligible

where:

n_{tot} total sample size

$n_{eligible}$ number of eligible units

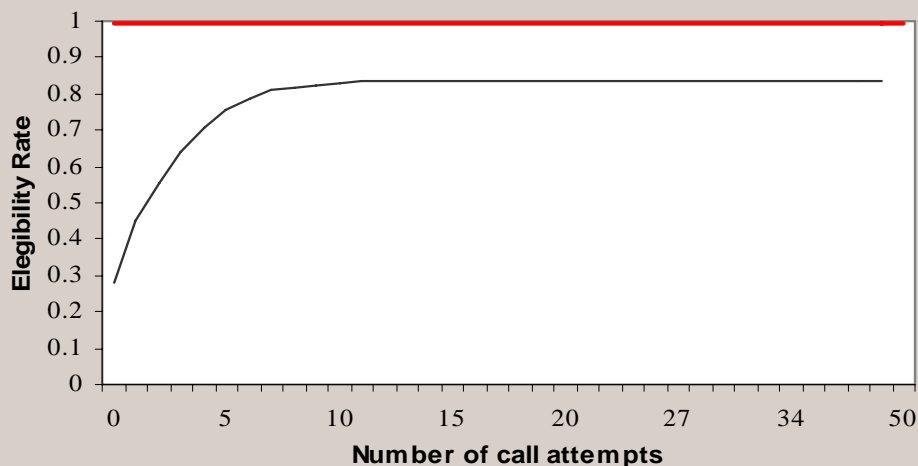$n_{unknown}$ number of units with unknown eligibility

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Ranges of the response rates according to MMA method in the IT LFS by survey mode and wave - 1st quarter 2011

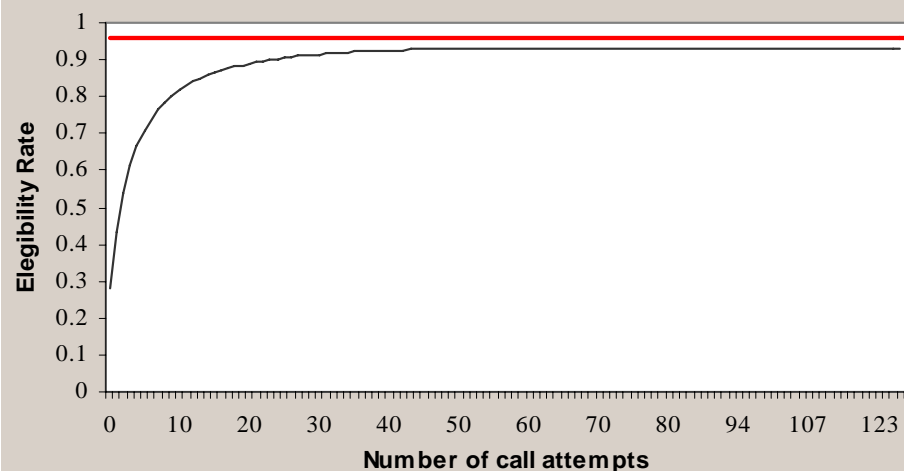**Eligibility rate for CATI mode of the IT-LFS according to SAM method by wave and number of call attempts – 1st quarter 2011**

The main result is that, insisting endlessly to contact the units, at the end they are almost all eligible

Estimated eligibility rates and response rates according to different methods in the IT CATI LFS – 1st quarter 2011

	Eligibility rate (α)					Response rate (RR)				
	MMA lower	MMA upper	CASRO	AAPOR	SAM	MMA lower	MMA upper	CASRO	AAPOR	SAM
Total	1	0	0.9990	1	0.9990	84.558	93.210	84.566	84.558	84.566
Wave 1	1	0	0.9959	1	0.9967	66.728	79.439	66.771	66.728	66.763
Waves 2-4	1	0	0.9997	1	0.9996	89.313	96.545	89.315	89.313	89.316

There is no practical difference between the different methods

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✓ **MMA method**

advantage: comparability of the results
drawback: communication issues and the range of response rate could be great

✓ **CASRO method**

advantage: easy to apply and it does not inflate the response rate
drawback: the assumption that the units with uncertain eligibility have the attributes as the units with known eligibility may be too strong

✓ **AAPOR approach**

advantage: easy to apply
drawback: it inflates the response rate and the assumption of considering all uncertain units as eligible may be strong

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✓ **SAM method**

advantage: it estimates accurately the eligibility rate if we have large sample of units that are contacted more times

drawback: its application to this problem is relatively new and it is a very complicated estimation method for the current practice

Under these conditions the CASRO method produces more similar results to the SAM method for the IT LFS

Moreover it seems the most appropriate one to estimate the eligibility rate in case there is evidence that α is less than 1

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Thank you for your attention