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GOTHENBURG

Attrition in a four-wave panel survey with Swedish citizens

Differences between a probability- and non-probability recruited sample

ELINA LINDGREN & FELIX CASSEL
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The problem

- Panel surveys suffer from attrition → reduces sample size and can bias estimates

- Random sampling procedures generally fare better in terms of accuracy of estimates than opt-in samples (e.g., McInnis et al., 2018)

- **But…** is the higher accuracy of probability samples maintained in panel surveys (over time)?

- We study 1) the attrition patterns, and 2) the evolvement of demographic representation over time for probability- and opt-in samples in a 4-wave panel

Why study attrition in different samples?

- Probability sampling is the "gold standard" for cross-sectional studies, but panel attrition make this advantage less clear in longitudinal studies

- If differences in accuracy between probability- and opt-in samples evens out over time, survey practitioners and researchers may want to consider opt-in sampling for longer panel studies

- Lower economic costs, less time consuming....

Research questions

- RQ1: How well does a probability and opt-in sample represent the total population in terms of distribution on gender, age, education, ethnic background, residential area, and marital status?

- RQ2: Do differences in representativeness of a probability and opt-in sample change over time, in terms of demographic distributions?

- RQ3: Is there an association between (non)-response patterns in a panel survey and the procedure through which one was recruited (probability vs. opt-in)?

Data

- The Knowledge Resistance Panel (KR Panel)
  - Four-wave panel survey with Swedish citizens conducted annually in February from 2020 to 2023 (originally invited = 10 948)

  - The KR Panel investigates relationships between media use, media trust, and knowledge resistance on societal issues that enjoy academic and expert consensus

  - Length of survey: approximately 20 minutes

  - Participants were selected from the The Swedish Citizen Panel (SCP), a non-commercial non-incentive online panel at the University of Gothenburg with over 70 000 active participants

Sample selection

Sample type	n	Recruited	Answered surveys in SCP before KR panel launch?
New probability	2 004	Dec 2019 - Feb 2020	NO
Old probability	3 444	2011 - May 2019	YES
Opt-in	5 500	2011 – Feb 2020	YES

- Full sample was stratified on sex, age, and education to resemble to Swedish population as closely as possible

- All individuals originally selected to receive the panel invitation were invited to all waves, regardless of whether they had participated in earlier waves

Measures

(Non-)response pattern

    1 = "Answered no wave"

    2 = "Answered only baseline wave"

    3 = "Answered several but not all waves, excl baseline wave"

    4 = "Answered several but not all waves, incl baseline wave"

    5 = "Answered all waves"

Demographics that can be compared with validated population benchmarks

    Sex; age; education; residential area (urban, rural); ethnic background; marital status

Analytical methods

RQ3: Association between (non)-response and sample type.

Multinomial logistic regression. Controlling for demographic background and political interest (proxy for survey topic interest).

RQ1: Demographic representation at baseline (wave 1), and **RQ2:** over time.

- Differences in means between survey populations and population benchmarks (retrieved from Statistics Sweden) on 6 demographic variables.

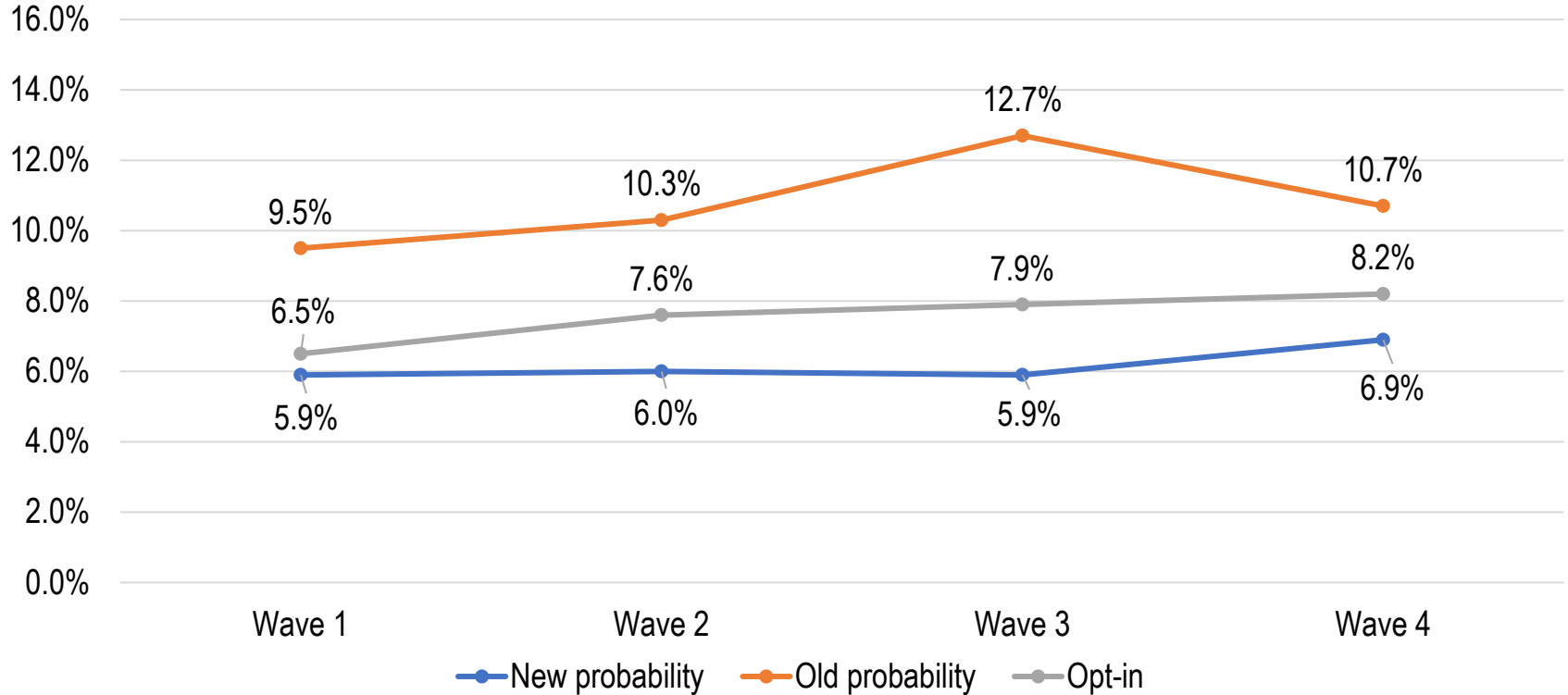- Total Survey Error (TSE)
- Average mean difference (AMD):

$$\text{AMD} = \frac{\Sigma(y_i - \hat{y}_i)}{n}$$
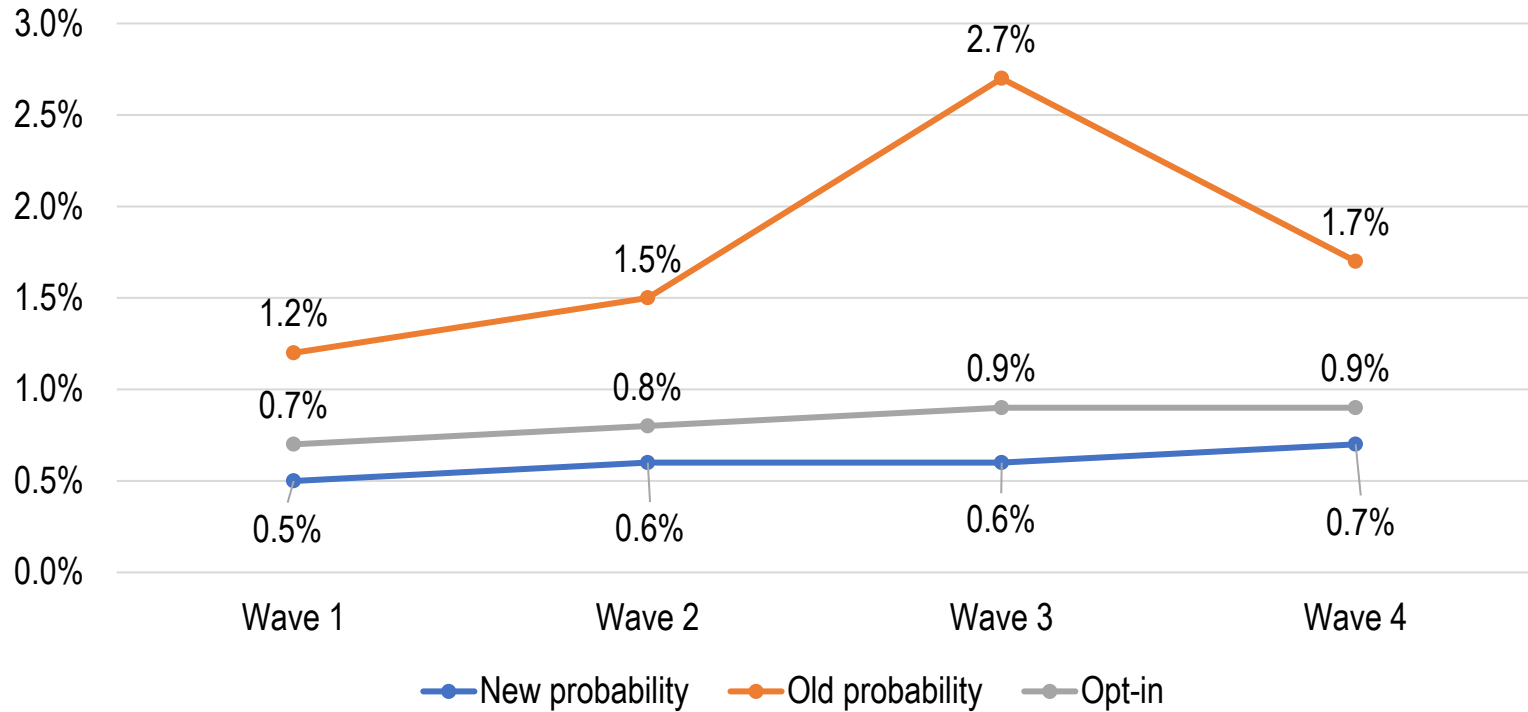
- Mean squared error (MSE):

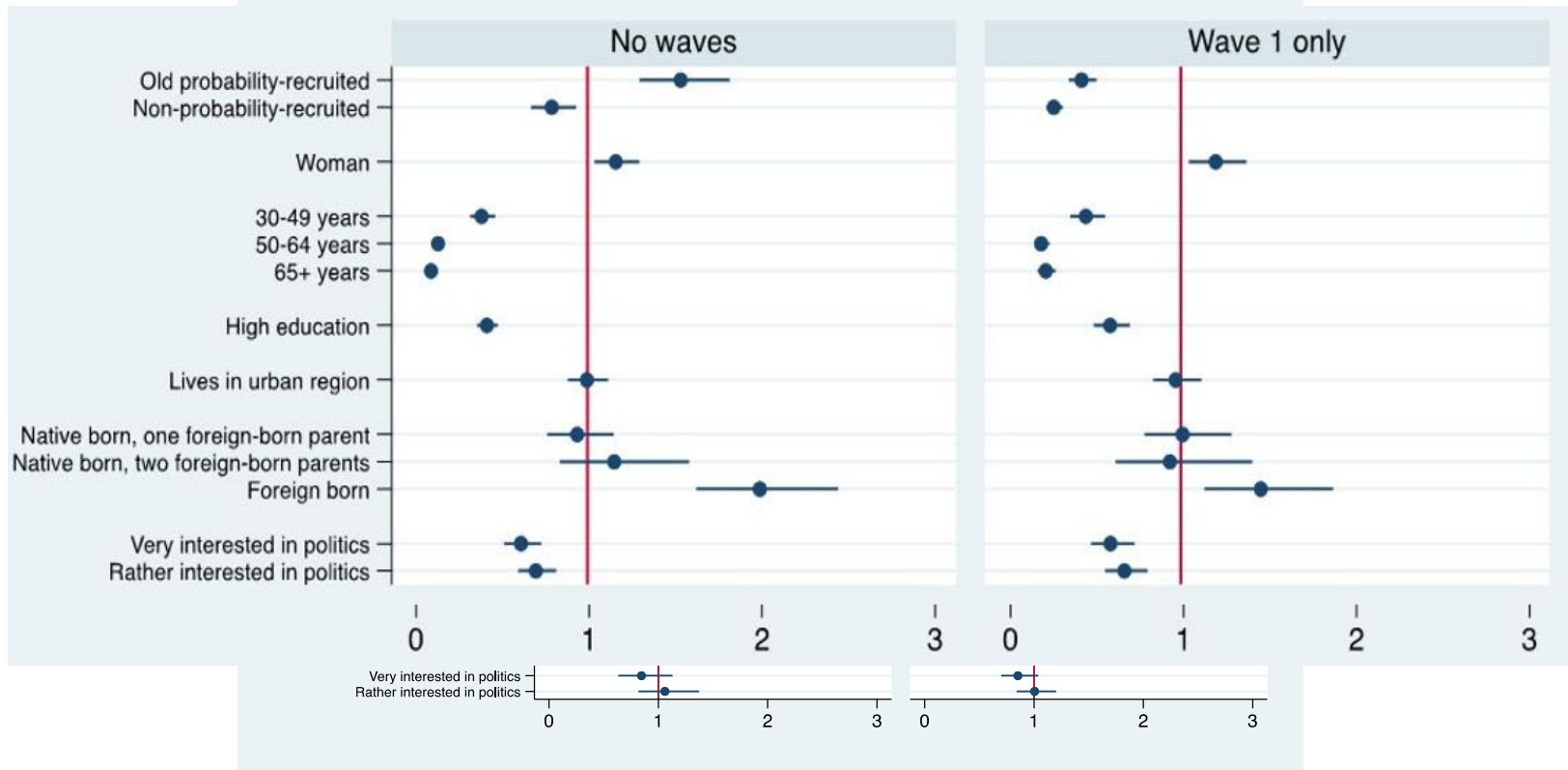$$\text{MSE} = \frac{\Sigma(y_i - \hat{y}_i)^2}{n}$$

Results RQ1 & RQ2 – Average mean difference between samples

Results RQ3 – predictors of attrition

Conclusions

Survey accuracy (RQ1 & RQ2)

- At baseline, both measures of TSE (AMD, MSE) suggests that that the new probability sample is better in terms of overall accuracy, opt-in the second best, and old probability has the highest TSE.

- TSE remains fairly stable over waves, and new probability still smallest TSE in wave 4 → differences in survey accuracy <u>does not</u> even out over time.

Predictors of attrition (RQ3)

- Under control for demographics and political interest (survey topic proxy), relationships are similar between no waves and only wave 1 participation (except for old probs).

- Compared to old probs and opt-in, new probability-recruited are likelier to attrite after one survey wave but remain closest to the target population of the samples in all waves, regardless of attrition.

To maintain accuracy and minimize survey error in panel surveys, (new) probability sampling procedures remains the "Gold standard".

Thank you for listening!

Felix Cassel
Deputy Chief Analyst
The Swedish Citizen Panel
SOM Institute
University of Gothenburg
felix.cassel@gu.se

Elina Lindgren (PhD)
Postdoctoral researcher
Department of Journalism, Media and
Communication
University of Gothenburg
elina.lindgren@gu.se