Are trajectories of dataset representativeness during survey data collection generalizable?

Evidence from the 2011 Census Non Response Link Study

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Minimising (risks of) survey non-response bias

- NR bias = that part of survey measurement error due to non-response.
- To minimise risks, previously response rates maximised.
- However, declines in responses rate and low association with measured biases.
- Now, monitoring of response within and between sample subgroups recommended.
- Monitoring often undertaken during data collection, to inform adaptations to maximise quality and / or minimise costs.

Quantifying NR bias risks: representativeness indicators

- Measure similarity to sample (representativeness) in terms of variation in sample estimated response propensities.
- Attribute information on entire sample needed.
- Two indicators:

  R indicator = 1 – 2SD

  Coefficient of Variation of response propensities *(CV) = SD / r*

  where *SD* = standard deviation of response propensities

  r = response rate

- R Indicators close to one and CVs close to zero imply high representativeness.
- Indicators (specific to attribute covariates) also decomposable to assess impacts associated with different covariates / categories.

- For a review of representativeness indicators, see Wagner J. (2012) Public Opinion Quarterly 76: 555-575.

Applying these methods

- Still few reports.
- Sample information from population register or administrative data.
    - what if such sources don’t exist?
    - can linked census data be utilised?
- Patterns of representativeness during data collection (trajectories) & phase capacity points differ between surveys.
    - not generalizable?
    - or due to different samples?

The utility of Census sample attribute information

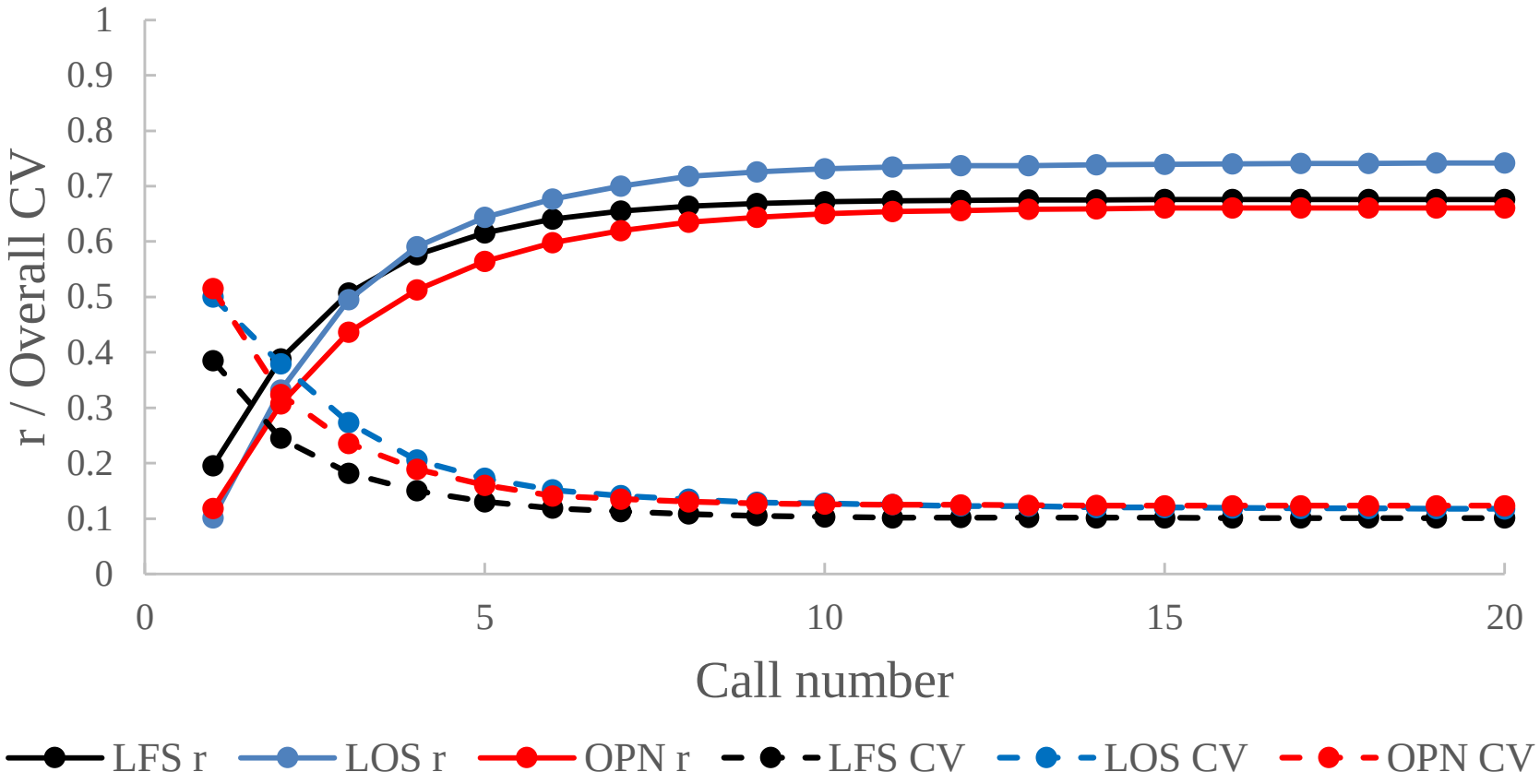
- We link call record data to census household (HH) attribute information on samples in three UK social surveys.
- Developing the ONS 2011 Census Non-Response Link Study (CNRLS).
- Surveys are the Labour Force Survey (LFS), Life Opportunities Survey (LOS) & Opinions Survey (OPN).
- Automated and (if imperfect) clerical linkage of HHs to 27th March 2011 Census records.
- Census data of great utility: >95% linkage rates & a rich suite of attribute variables available.
- Interviews <> 3 months of census day though, so question remains as to whether linkage rates drop further away.

Quantifying representativeness trajectories

- Interviews face to face, up to 20 attempts.
- Successful HH member interview = response (else non-contact or refusal).
- For each survey, compute *CV*s and partial variants at each call (1 to 20).
- Estimate response propensities using / compute partial indicators for 10 HH attribute covariates:

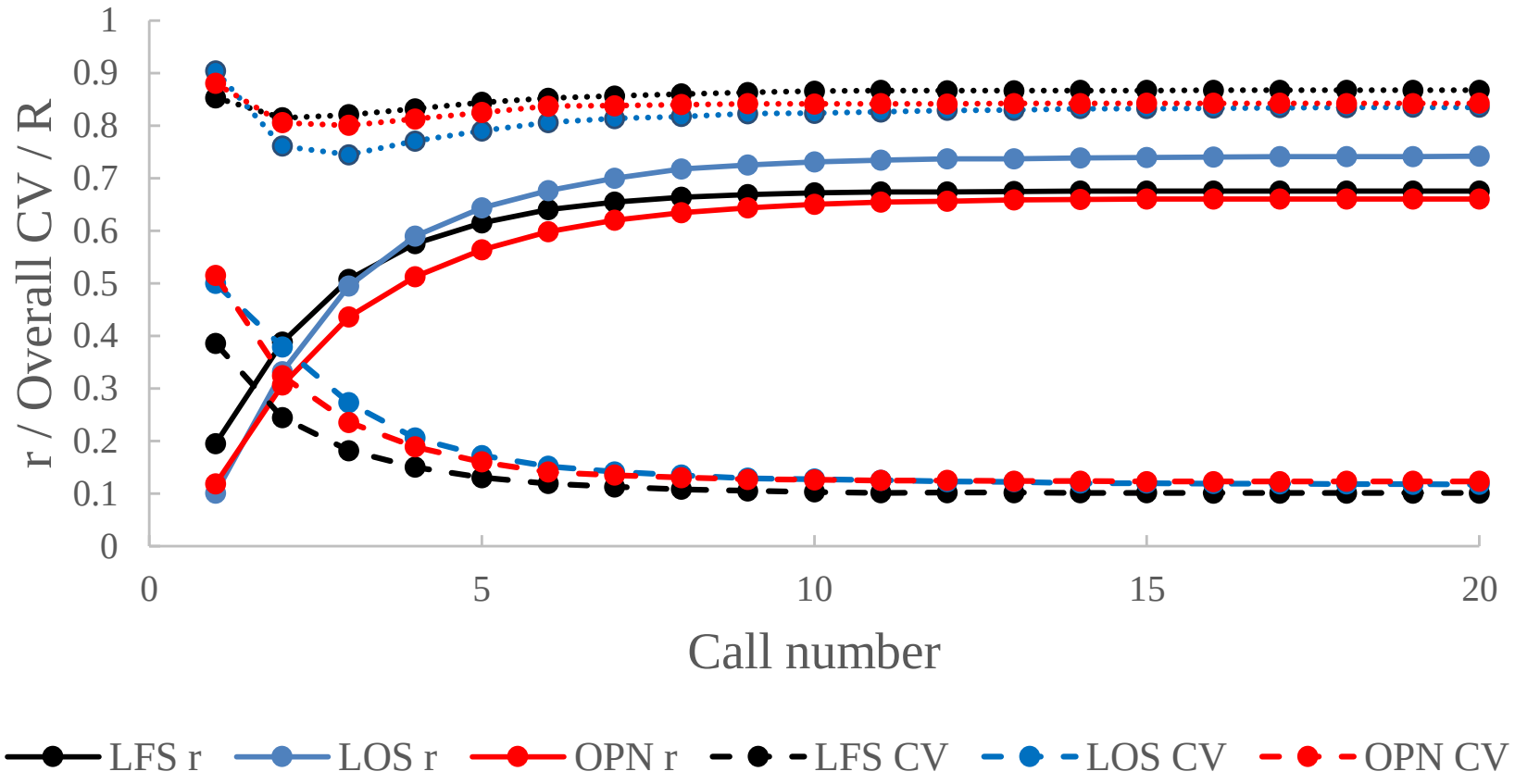
  HH Economic Status, HH Structure, Accommodation type, Tenure type, Cars available, Ill Health individual in HH, Impaired individual in HH, Retiree in HH, English fluency in HH, Located in London / SE.

Overall representativeness trajectories



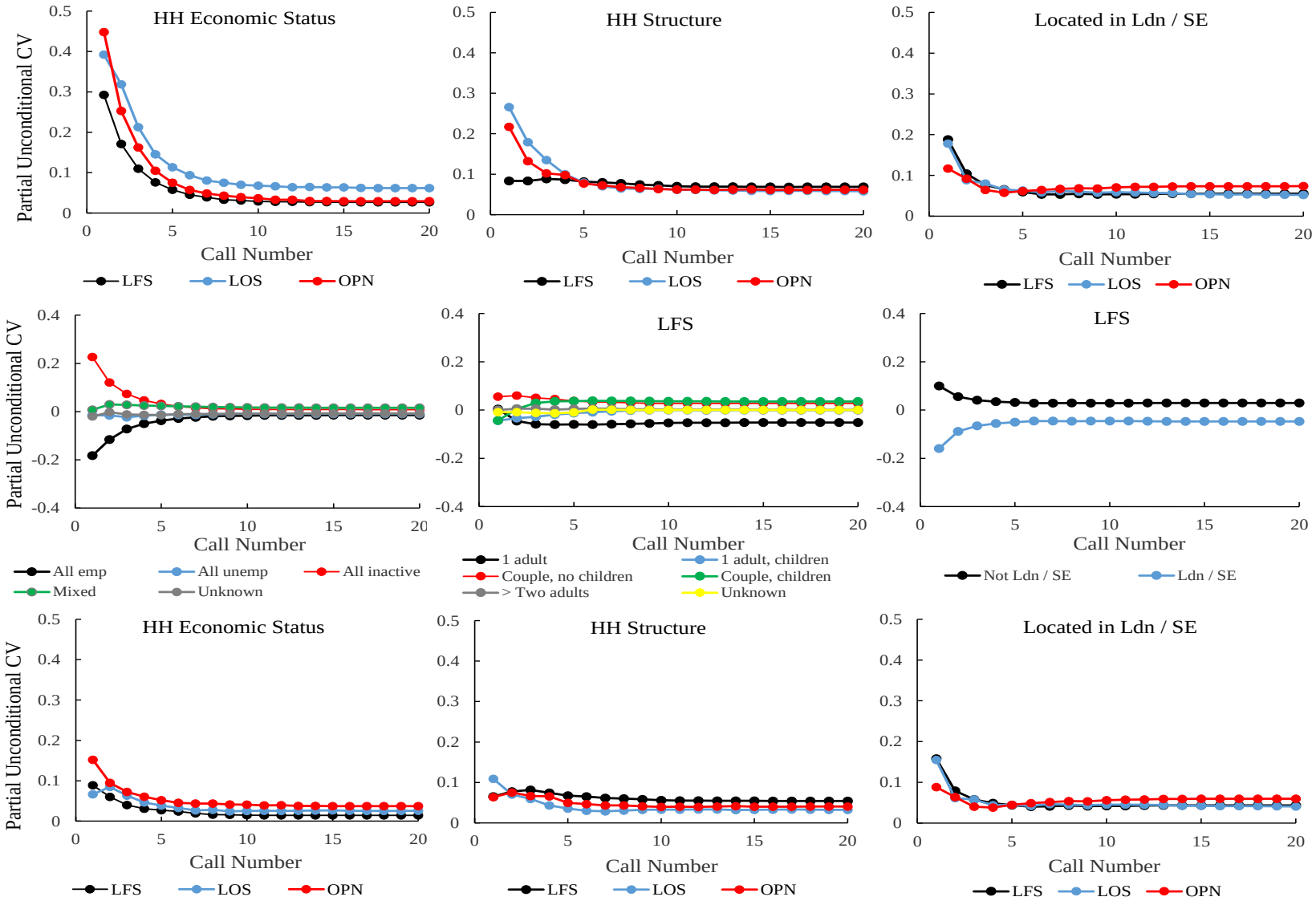
- LFS *N* = 18997, final *r* = 65.7%; LOS *N* = 6469, final *r* = 70.1%; OPN *N* = 6249, final *r* = 64%.

Overall R indicators



- Low *r* = limited potential for response propensity divergence and *R* indicator positive bias.

Partial by covariate (category) *CV*s



Phase capacity points

- When indicator within 0.02 of minima (adaptive strategy) or previous value (responsive); points earlier when threshold increased.
- Overall:

Survey	Adaptive point (% calls saved)	Responsive point (%) calls saved
LFS	6 (7.6%)	5 (12.2%)
LOS	8 (15.2%)	7 (18.2%)
OPN	6 (13.4%)	6 (13.4%)

- By covariate (adaptive strategy):

Survey	HH Economic Status	HH structure	Located in Ldn / SE
LFS	6	1	4
LOS	7	6	4
OPN	7	5	4

Summary

- The census is a high quality source of attribute information for assessing dataset representativeness when surveys are within 3 months of its date.
- Its utility further from this date though, needs to be studied.
- Representativeness increases at a decreasing rate over call records similarly in the three surveys.
- Sources of non-representativeness are under-representation of economically active HHs, HHs located in London / SE, and single adult HHs.
- Despite the above, data collection phase capacity points differ between surveys.
- Hence, in this case we recommend caution when generalising strategies.

Further / other work

- Similar analyses at the level of the individual respondent (rather than HH).
  - Interviewer effects and proxy responses.
- Actual biases in survey answers during data collection.
  - MSEs as well.
  - Negotiating access to linked survey data for this.
- Record linkage.
  - Methods here can be used to evaluate linked datasets compared to sources.
  - Apparent there are two components to dataset representativeness: who consents to linkage, & who, given linkage methods, is linkable.

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