Noncontacts in the Swedish Labour Force Survey – impact on survey quality, costs and survey operations

Anton Johansson, Statistics Sweden

Introduction

As is well known, increasing nonresponse rates in general and increasing noncontact rates in particular have a large impact on both survey quality and costs. In addition to this, decreasing probability of contact puts a lot of strain on survey operations – especially in interviewer administered surveys.

In this paper we describe ongoing work at Statistics Sweden concerning data collection strategies and data collection monitoring for the Swedish Labour Force Survey (LFS). The part of the work described here is conducted as a collaboration within the BADEN-project (http:/ / www.cmist.manchester.ac.uk/ research/ projects/ baden/) between Statistics Sweden and University of Southampton.

Increasing noncontact rates and higher workload – an example

As the probability of contact at each call attempt decreases, the workload for survey operations increases. There will be more cases to follow up at the second, third and fourth call attempt and so on.

A fictive example is used to illustrate this increase in workload and its implications for survey budget. Imagine a survey with 1000 sample units where the contact strategy specifies that 12 contact attempts (telephone) should be made before giving up. Assume that the probability of contact at each attempt is known and constant. For this example, let's say that P(contact at attempt *k*) is 0.18. Given these assumptions 5000 contact attempts are needed and this is also what is allowed within budget.

Now assume that the probability of contact at each attempt changes and that P(contact at attempt *k*) decreases to 0.15. In Figure 1a and Figure 1b we can see that this change in probability will lead to that the 5000 contact attempts (the budget) is used up already after the 8th or 9th attempts. In order to make 12 contact attempts before giving up the budget would have to be increased – which is not an option. In order to keep within budget, prioritizations must be made between sample units.

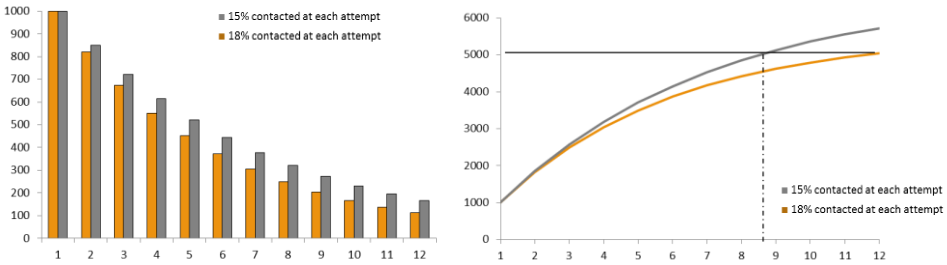

Figure 1a. Number of cases left at each call (left).
Figure 1b. Cumulative number of call attempts after the 1st, 2nd, 3rd … call (right)

Bud how to reduce the number of calls in the "best" way? Which criteria should be used when prioritizing among sample cases? When making these decisions, how will survey estimates be affected?

Prioritization among sample units is not new. Survey operations (e.g. survey management or individual interviewers) have always had to make these decisions on a day-to-day basis – with our without involvement of methodologists. The aim of our current work is trying to reduce the number of calls (stop calling some sample units earlier), but at the same time take the effect on survey estimates into consideration.

Finding stopping rules for the Swedish LFS

The Swedish LFS is a longitudinal monthly survey with a rotating panel design. Our main focus is therefore to look at strategies for sample units that have been noncontacts in several waves of data collection. As a starting point we study wave 8 (the last wave) for the LFS. Data from wave 8 in LFS-January 2016 is used as an example in this paper.

2014			2015				2016
April	July	October	January	April	July	October	January
W1	W2	W3	W4	W5	W6	W7	W8

Figure 2. LFS-rotating panel design.

We started by defining subgroups based on data collection history of the sample units. What combination of interview/ noncontact/ refusal did the sample units have in wave 1-7? The purpose was to find groups that, based on the data collection history, would have a high probability of being nonrespondents also in wave 8. The effort put into the eighth attempt might have a low return in terms of completed interviews (that is the data we get for the effort).

In Table 3 these categories are summarized. The ones considered for "stopping" are highlighted. They add up to approximately 20% of the sample units in wave 8.

LFS-January: Wave 8 only	n	Part of sample
Total	**2465**	
Interview in all waves	946	38%
Interview in last wave, nonrespondent in at least one previous wave	429	16%
Interview in last wave, noncontact before that	134	5%
Refusal in last wave, have been interviewed before	113	5%
Refusal in last wave, have never been interviewed before	46	1%
Noncontact in last wave, interview in next to last wave	93	4%
Noncontact in all previous waves	144	6%
Noncontact in last and next to last wave, have been interviewed before	213	9%
Other	347	14%

Table 3. Data collection histories, LFS January 2016, wave 8.

A decision not to call these sample units again in wave 8 would of course reduce the workload. But we also have to take the survey estimates into consideration. There might be cases that are worth the effort, since the data are valuable in terms of – for example – bias reduction.

Therefore response rates in subgroups after wave 7 were considered. We created the subgroups based on information available on the frame: age group; employed/ not employed (from register); high education/ not high education.

The response rates are given in Table 4. Groups with low response rates are highlighted (e.g. the younger age groups, with low education and/ or unemployed according to register).

Age group	Employment & Education		
	Not employed	Employed and Low education	Employed and High education
-19 years	63%		
20-24	58%	49%	
25-29	48%	53%	78%
30-34	55%	62%	72%
35-39	62%	67%	77%
40-44	54%	73%	85%
45-49	48%	69%	83%
50-54	43%	67%	79%
55-59	68%	76%	90%
60-64	69%	80%	91%
65-69	82%	87%	
70+	87%		

Table 4. Response rates within subgroups after wave 7.

In the highlighted groups the effort of calling also in the eighth wave should be considered, while the others could be stopped.

Two types of stopping rules were evaluated by simulation. The first rule is a "cost reduction only" rule. In this case all sample units within the highlighted categories identified in Table 3 ("data collection history") are stopped. This stopping rule would have applied to approximately 20% of the sample units in Wave 8. So it would lead to a reduction in contact attempts - but might also risks increasing the imbalance of the response set, since the low propensity group (e.g. young with low education) would also be stopped.

The second stopping rule tries to take both cost reduction and balance into consideration. It starts out with the highlighted categories based on data collection history (Table 3), but any sample unit belonging to a low propensity groups (Table 4) are not stopped. With this rule, only about 10 % of the sample units in Wave 8 should have been stopped.

Evaluation of suggested stopping rules

The stopping rules were evaluated by simulating the result if the they had been applied in LFS-January 2016.

Table 5 presents results from the simulation. Measures of imbalance in the response set (Särndal and Lundquist, 2014) and measures of relative bias related to auxiliary data on income are given. The number of contact attempts that would have been saved in LFS-January 2016 if the stopping rule had been applied is also given.

				Income			
LFS-January 2016	***P***	***IMB***	CV_s	RDF_{exp}	RDF_{cal}	***Interviews***	***Contact Attempts***
Actual data collection	67,7	1,67	19,1	10,5	3,36	1670	13584
				Income		***"Cost* /Savings"**	
Strategy applied in retrospect	***P***	***IMB***	CV_s	RDF_{exp}	RDF_{cal}	***Interviews lost***	***Attempts "saved"***
Cost reduction only	65,2	1,98	21,5	12,0	3,95	3,8%	27,5%
Cost reduction + Balance	66,7	1,62	19,1	10,3	3,44	1,6%	13,1%

Table 5. Results from simulation on data from LFS-January 2016.

The balance and bias indicators are higher when the “cost reduction only” strategy is applied. For the “cost reduction + balance” strategy the indicators are quite similar to the actual data collection in LFS-January. The results suggest that it would be possible to reduce the number of contact attempts without making things “worse” than in the current strategy (that is compared to the actual data collection in LFS-January). This is encouraging, although more investigation is needed.

If resources can be saved by applying the stopping rule, they could instead be used to target other sample units. For example, resources from the last wave could be used to recruit respondents in the first or second wave instead.

Topics for discussion

This paper has outlined ongoing work and all input is highly appreciated. Which criteria should be considered when identifying the “more important” sample units (i.e. that should not be stopped)? So far we have used response rates within subgroups, but there might be other criteria to consider.

It would also be most valuable to know more about experiences and thoughts on how to implement this kind of strategy in survey production.

References:

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