Discussion- Sample Design and Weighting Research in Panel Surveys

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The four papers in the session were especially interesting to us since Statistics Canada has just launched three longitudinal social surveys in 1994. We always look forward to methodological research on other longitudinal surveys.

The first paper deals with the use of administrative records to reduce the variance of SIPP survey estimates. The idea of using an adminstrative data file to improve the estimates is attractive because a multi-stage sample design often does not efficiently sample certain groups (low/high income groups for example). In the current procedure, the SIPP sample file is matched to an administrative file (IRS). For the matched records (i.e. filers), a post-stratification is done using characteristics of the matched file. This adjustment reduces the variance of the estimates. The authors want to see if post-stratification of the unmatched sample records could further improve the data.

One surprise in the article is the low matching rate; only 56% of the SIPP sample matched the IRS file. This may lead one to question the adjustment. The authors have indicated that the low match rate is due to the exclusion of many spouses. The match rate would otherwise be well over 90% . These records are excluded because the adjustment is made using the primary filer characteristics. The adjustment factor for the primary filer is then used for the spouse.

The results of the study show no consistent gains in the quality of the estimates by doing a post-stratification for the non-filers and the authors made very interesting points in studying what "went wrong". It would be useful to provide more detailed information in order for the reader to fully understand the problem. SIPP respondents can be classified as belonging to one of three groups; primary filers, non-primary filers or non filers (this third group may include late filers and or wrong SSN, but in a much smaller proportion). The match rate of 56% relates to primary filers. However, it is not clear who is targeted in the present study. If the post-stratification is done for non-filers only, the adjustment will be applied to a lot less than 44% of the respondents (in Canada, non filers represent less than 5% of the population aged 16 years and more). If similar conditions hold, the adjustment for non filers may be for a very small sub-population, and it may be why the adjustment does not seem to improve the results. If on the other hand, the adjustment is for both non-filers and spouses that are non-primary filers, it may be interesting to see if the adjustment on filers could combine the characteristics of the primary filer and the spouses of the filer. A lot of information may be lost by doing the adjustment using characteristics of the primary filer only. If one is able to link filers together on the IRS file, an adjustment similar to an integrated weighting approach could be applied. This adjustment technique would allow the use of information from both spouses instead of limiting to the primary filer. References can be found in Lemaitre, G., Dufour, J. (1987). The integrated weighting has been generalised to a raking ratio adjustment by Stukel, D.M. , Boyer, R. (1992). The authors mention that they are planning to study other options and it will be interesting to see the follow-up of their research.

The second article deals with the an adjustment for movers. Our limited experience with longitudinal surveys shows that there are a number of differences between movers and non-movers. Movers are obviously undergoing a transition (change of dwelling); and if that transition is related to the characteristics measured, improvements should result from an adjustment.

Two adjustments are proposed in the paper; a mover adjustment incorporated with the non-response adjustement, or at the post-stratification stage, using the estimates from CPS as a benchmark. A third adjustement could have been performed with adjustments at both levels. This adjustment takes the form

$$\hat{Y}=\sum_{i\in U}\hat{y}_{1i}+\sum_{h}\left[\sum_{i\in s_h} w_i(\hat{y}_i-\hat{y}_{1i})+\frac{n_h}{n_h'}\sum_{i\in r_h} w_i[y_i-\hat{y}_i)\right]$$

where $\hat{y}_i=x_i^T\hat{\beta}_r$ is the estimate using sample level information and

$\hat{y}_{1i}=x_{1i}^T\hat{\beta}_{1r}$ is the estimate using population level information (CPS). The first factor in the adjustement represents the frame adjustment factor while the second and last terms are corrections of respondents to the sample. This has been extended to calibration estimators by Dupont, F. (1993). However, given that there are no real differences between the two adjustment procedures, it is very unlikely that this third estimator would be much better.

There are two difficulties in devising a good mover adjustment. The first difficulty is related to the problem of obtaining the correct response code. It may sometimes be hard for an interviewer, within a limited collection period, to distinguish if a "no contact" is due to the fact that one or more of the persons in the household have moved, or if they are temporarily absent. A few years ago, Statistics Canada conducted a panel survey called the Labour Market Activity Survey. The move status was sometimes but not always an excellent predictor of non-response. There were some problems in assigning the response code and consequently the impact of the move status on predicting non-response was sometimes quite different. For the new longitudinal surveys at Statistics Canada, computer assisted interviewing may help. Interviewers are encouraged to "send to tracing" households that have been telephoned at least five times without success. An attempt is made to try to trace the person, or at least determine if the person has moved vs being temporarily absent.

The second difficulty is that often there is no reason recorded for the move. Different reasons for moving may have a different impact on the non-response adjustment. People who move because of a marital breakdown may be more difficult to trace than people who move to upgrade their house, for example. Not much research has been done on this issue but it may be a worthwhile exercise.

The third article deals with the SIPP redesign. The SIPP old design was probably quite a challenge in terms of processing, and putting data out in a time fashion. The redesign is expected to make it easier given four year panels and no overlap.

Decisions on the rotation pattern of a panel is always difficult. In one sense, no overlap is easier; it gives a direct message that the survey's purpose is mostly longitudinal. All the sample can be allocated to one panel and does not have to be divided between overlapping panels. However, the study of a subject that depends on an event or a policy change that can be problematic depending on when it occurs in the life span of the panel. The possibility of using the panel survey to construct time series is also greatly reduced when a survey has no overlap between the panels, since the introduction of a new panel may cause breaks in the series. SIPP's new design may help to stimulate research on longitudinal data analysis.

The implementation of computer assisted interviewing can definitely reduce some of the problems that were faced with the "paper and pencil" approach, especially for a longitudinal survey. For example, longitudinal surveys often face what is called the "seam problem". The seam problem refers to the fact that there are a lot more transitions reported between the two months that are in two different collection periods, compared with transitions between any two given months within a collection period. A tool sometimes used to solve the seam problem is dependent interviewing, that is feeding back to respondents information collected in the previous interview. This is done to decrease recall errors. Computer assisted interviewing facilitates the use of dependent interviewing. However, some tests we have done seem to show that dependent interviewing should be used with caution since people tend to confirm information, even if it is not quite true. Dependent interviewing should not be applied blindly to all variables. Computer assisted interviewing also offers the possibility of implementing edits during the interview, but again this technique cannot be used to excess. Among other things, it adds complexity to the interview. A paper by Webber, M. (1994), ARC proceedings deals about some of the experience we have gained with the use of CAI.

The fourth paper presented very well the issues related to oversampling. Two options are presented; to oversample according to the measured characteristic or oversample indirectly using stable characteristics (such as race). SIPP used this second option and oversampled according to ethnicity. From table 4, one can see that variances for the estimates

not directly related to the oversampled charcateristics tend to increase with the oversampling plan, even for the hispanic people (one of the oversampled groups). The whole issue of oversampling is related to the different uses of the data. If one could know all the studies that will be done, the issue of oversampling would not be a problem. The survey would oversample according to the characteristics that will not be reliable enough. For a multi-purpose survey, especially when cross-sectional estimates are still required, it is not clear how much oversampling should be done. However, the paper is very useful in doing the theoretical exercise of making assumptions and seing the impact of oversampling. It leads us to ask ourselves more about the data uses and the impact of different design.

In conclusion, longitudinal surveys are a very powerful tool and we think that (at least in Canada) much research is needed to fully use the richness they provide. We will continue to monitor closely what is happening in other longitudinal surveys such as SIPP to benefit from all the experience and on-going research.

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