Discussion of Plans for Designing the Recall Period for the Consumer Expenditure Interview Survey

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The Issue paper on the recall period describes the background and ongoing research that is being conducted as part of the redesign of the Consumer Expenditure Interview Survey (CEQ). The paper discusses redesign plans as they relate to the recall period and relevant design parameters. The discussion below is organized into two sections. In the first section two issues are discussed that are particularly important to consider when designing an effective recall strategy. The second section addresses selected questions posed in the Issue paper.

Important CEQ Design Features Related to the Recall Period

The recall period is related to a number of other aspects of the survey interview, including the burden placed on the respondent, the mode of data collection, the use of proxy reporting and the questionnaire. The plans for the redesign of the CE are covering virtually all of these topics in one form or another (BLS, 2010). Two that are particularly important to consider for deciding on the best recall strategy is the burden placed on the respondent and the performance of interviewers when implementing the survey.

Burden and the Recall Task

The burden placed on respondents is a critical driver in the response process associated with retrospective recall. The recall and dating of events is one of the most difficult tasks that are asked of the survey respondent. If respondents are not motivated to perform these tasks, data quality will suffer. A corollary to this is that recall can be significantly improved by increasing the engagement and effort of the respondent. The event history calendar (EHC) is successful partly because it actively engages and encourages the respondent to systematically think about events over the reference period (Belli and Callegaro, 2008: 36-37). Similarly, a common methodology of cognitive interviewing is to conduct detailed debriefings of respondents to assess the quality of information reported during the main part of the interview. The premise is that if given the time and proper assistance, most individuals can significantly improve on their memory search and retrieval.

It is clear the redesign team recognizes the significant burden placed by the CEQ. The emphasis on splitting up the current interview and addressing proxy reporting are clear examples of this. On the current CEQ, the respondent is asked to report on a wide range of expenses, including those for other household members. Given the difficulty in completing the recall task, it is hard to imagine respondents have much time to devote to a thorough search of memory for all items. The survey documentation states the average interview length is 1 hour. When I took the interview as part of preparation for this workshop, the interview lasted 2.5 hours and we did not finish. My interviewer was not a well-practiced field staff and I was also asked a module that is only asked on the first visit. Nonetheless, my sense is that 1 hour is a significant underestimate of the actual burden when all of the questions are read as required and for anyone who takes the response task seriously.

The interview should be limited to less than an hour. This parameter could change if there are new methods in place that significantly ease the response task. For example, if there were a way to significantly increase the use of records on the survey, one could increase the overall length of the survey. In terms of cognitive burden, respondents will begin to fade after 30 to 45 minutes when repeatedly asked to recall the detailed information that is required by the CEQ. This is not based on any scientific study, so the parameter of 1 hour may not be well-grounded. It is based on conducting numerous cognitive interviews and focus groups. We have learned through this experience that to go beyond 1 hour in a cognitive interview is usually not worth the effort. Respondents become fatigued and are just not able to maintain the cognitive effort to produce quality data. Note that this experience is based on paid volunteer respondents who have made a special trip to a central location just to participate. If these respondents become fatigued at 45 minutes to 1 hour, a less motivated person would not last as long.

Monitoring Interviewers

The interviewer plays a central role when collecting auto-biographical data. Just as these questions require significant effort on the part of the respondent, they also require the interviewer to work. The minimum requirement is that they read all of the questions as intended. For example, the current CEQ interview relies on a large number of examples, or memory cues,

when asking questions about expenditures. The idea is that cues will help respondents search their memory in ways they may not have otherwise done. When asked a global question about a class of expenses, there may be a tendency for respondents to conduct cursory memory searches. This is sometimes called failures of "metamemory", where respondents prematurely abort searches because of a false global feeling that they have nothing to report (Biderman, et al., 1985). Methods to promote recall, such as the use of extensive cueing are ways to combat this tendency.

Assisting respondents in an exhaustive memory search conflicts with the interviewer's other main task of getting a high cooperation rate. Respondents may not be receptive to sitting through the entire interview, with all protocols being read. I suspect this is partly how the current interview is only taking 1 hour to complete. Interviewers may be taking shortcuts through the instrument to get a completed interview.

There is evidence that increased monitoring of activities can be a deterrent to interviewers from taking shortcuts. Experimental and quasi-experimental research on the National Crime Victimization Survey (NCVS) found that centralized telephone interviewing produced significantly higher rates of victimization than de-centralized field interviews in two separate field experiments (Hubble and Wilder, 1988; Biderman, et al., 1985: 111-155). The assumption is that because the centralized telephone interviewers are being monitored, interviewers are more likely to read through the screener which elicits reports of victimization.

An important component of the CEQ redesign, at least as it relates to promoting recall, is to institute methods to train, monitor and provide feedback to interviewers on an ongoing basis. Dijkstra et. al., (2008) discuss the importance of these aspects of the design when administering the EHC. The monitoring can be done through use of paradata from the computerized interview (e.g., section timings) and use of Computer Audio Recorded Interviews (CARI). The Census Bureau is now instituting CARI within their household surveys. Interviews can be recorded, either all or on a sample basis. Supervisors would review the interviews to check interviewer practices and provide feedback on performance.

Selected Questions Posed by the Issue Paper

The remainder of this discussion will address selected questions posed by the Issue paper.

Q1. What are the key aspects of recall period that CEQ should address during the redesign process?

The Issue paper focuses on the length of the recall period as a key issue to be assessed. Research on the CEQ (Neter and Waksberg, 1964; Silberstein and Jacobs, 1989; Sudman and Ferber, 1971), as well as on other topics (medical events – Cannell, 1965; hunting and fishing - Chu, et al., 1992; and victimization – Bushery, 1981) all come to the same conclusion. Longer recall periods lead to more measurement error. For the CEQ, there are two important characteristics related to error. One is whether the expense is reported at all. The second is the detail associated with the event. The two critical details for the CEQ are the date of the purchase and the amount of money spent.

Prior to and/or in conjunction with experimenting with different recall periods, the CEQ research agenda should concentrate on the optimal methods to promote recall. Research has shown that significant gains in validity can be realized through the use of methods that assist in the recall of events (Belli and Callegaro, 2008; Biderman et al., 1985). It would be useful to experiment with several different approaches to increase recall. As noted above, the current CEQ methodology uses a list of global questions covering each of the major expenditure areas. Within each area, the interviewer reads a set of specific cues to assist the respondent to define and remember relevant expenditures. The respondent is provided a show card that lists the information that is being read by the interviewer (Exhibit 1).

Elaboration and/or modification of this methodology might look at several areas. One should be the types of cues provided to the respondent. Memories can be triggered by not only specific references to items, but also activities associated with purchases (e.g., shopping; vacations; commuting to work). Consideration might be given to changing, modifying or supplementing the cues that are currently being used. This might also imply a different

organization of the interview – for example by shopping trip or even retail outlet. A second area would be the use of a calendar. A calendar might be a particularly useful for improving the dating of events. It might be as simple as having the respondent provide meaningful dates for the reference period and training the interviewer to probe using the calendar when going through the list of cues. More elaborate protocols could also be applied (e.g., Belli, et al., 2008).

A third area would be formalizing the role of the interviewer. A protocol should be developed for how the interviewer should move through the interview, with specific emphasis on promoting recall of expenditures. This would include directions on the proper pace and how to administer effective probes. It might also include methods to assist the respondent when trying to estimate or reconstruct expenses (e.g., recall of episodic memories vs. recurring events). A fourth area of research is the use of visual aids. The material shown to respondents of the CEQ should be optimized for memory search. For example, research using eye-tracking and response latencies (Redline, et al., 2009) has found grouping responses within major subheadings, such as the CEQ Information Card, leads to some confusion. Formatting the visuals aids like this should be tested and coordinated with what the interviewer is saying. One might also consider other types of displays, such as pictures of items, which might be easier to coordinate with interviewer questions.

Q2. How should CEQ approach balancing low item-incidence levels and sample size requirements with a shorter recall period?

If the CE is to move to shorter reference periods, and maintain the same level of precision, the sample size will have to be increased. It is possible that there will be some gains in precision per sampled unit with shorter reference periods, especially for smaller expenses. This gain would be achieved by an increase in the total expenditures reported per month. However, it is unlikely that this gain will make up for the reduction in the number of interviews that can be completed if no increase in the budget is realized.

It is possible to address this problem by trying to incorporate more self-administration into the interview process. For example, if it were possible to convert the interviewer-

administered instrument to an automated self-administered instrument, there could be substantial cost savings related to data collection. Going forward with this type of instrument would require significant investment in development and testing. The National Institutes of Health has been developing such an instrument for conducting a 24 hour dietary recall (Subar, et al., 2010). For purposes of the CEQ this development may not be within the Gemini Project Timeframe. Nonetheless, this should be an opportunity to begin this development process by focusing on effective memory aids (e.g., cues; frames of reference; visual displays).

Assuming the interviewer is still heavily involved in the CEQ, there are designs that could be used to mix reference periods both within and across surveys (see discussion below). However, at a general level, the decision on the length of the reference periods is a function of two general issues. One relates to the overall project goals. As discussed below, evaluation of the reference periods should be completed using some measure of total survey error (e.g., mean square error). An important issue to be considered is whether priority should be given to minimizing error for estimates of level or estimates of change. The main evaluation measure seems to be the estimate of level. This is what is needed for the CPI weights and a primary measure of quality seems to be the ratio between the CE and the National Accounts (BLS, 2010). However, measuring change also seems to be an important criteria. When developing evaluation strategies to choose the reference period, it is important to design studies that could measure both types of errors. The length of the recall period may affect estimates of change and level in different ways. Some argue, for example, that if there is constant bias over time, estimates of change will relatively unbiased. Kobilarcik et al (1983) provides an example of this logic when evaluating the reference period of the National Crime Survey (NCS). A 3 month reference period had a lower MSE for estimates of level, but there was a strong suspicion that this was not the case for estimates of change. Since the highest priority for the NCS were estimates of change, a 6 month period was used.

A second important issue will be deciding on the expenditure categories that have highest priority. Prior work shows very large differences in effects of the length of the recall period by the amount of the expenditure (Neter and Waksberg, 1964; Sudman and Ferber, 1971). Smaller purchases were much more subject to recall error than larger purchases. If this pattern holds for

the redesigned CEQ, decisions will need to consider priorities across the different expenditure categories.

There are designs that can be used to mix different reference periods. One way is to change the content of the interview, either within the CEQ or between the CEQ and the CE Diary Survey. For example, there might be two different CEQ interviews. One would be conducted more frequently (e.g., monthly) and collect expenses that occur frequently. The other would be conducted less frequently, perhaps every six months, and would be used for low incidence items. One could imagine a similar split between the CEQ interview and the CE Diary Survey. This would essentially shift many of the more frequent purchases to the Diary Survey and keeping the less frequent purchases to the interview. The sample of the Diary Survey would be increased to account for this shift. The Interview Survey would be done fewer times (e.g., twice) and have a longer reference period.

It is also possible to mix reference periods within the same interview. There are a number of variations on this methodology. Two examples are:

> Method A - Conduct the interview asking for all infrequent purchases for an extended period of time (e.g., 1 year, 6 months, last month). Frequent purchases would be asked for the last month.
>
> Method B. Conduct 3 monthly interviews for the same housing unit followed by a fourth interview 12 months later.. All four interviews would ask about frequent purchases over a one month period. The first three interviews would ask about infrequent purchases over a one month period. The fourth interview would use longer recall periods for the infrequent purchases (e.g., 3 months, 6 months, 12 months).

There are, of course, a number of variations across these two models (eg. Different number of interviews; different recall periods). The critical difference in the two methods above is the extent the recall period is bounded by a prior interview. Method A does not have a bounded interview, while method B maintains a bounded interview for most interviews. We expect there to be significant telescoping effects for unbounded interviews across all types of expenses. Of these different models, therefore, Method B is preferable because it has the tightest control over telescoping.

A more unconventional option would be to vary the reference period within the same panel and use the information to statistically adjust the data from the longer reference period. For example, one could conduct consecutive monthly interviews and then conduct longer follow-ups (e.g., 3 months or 6 months). One could then adjust the data from the longer reference periods to resemble the shorter reference periods (e.g., Kobilarcik, et al., 1983). The advantage of this is that it may not require as many additional interviews as the direct collection methods proposed above. The disadvantage is that it isn't clear a robust adjustment model could be developed. There are a number of factors that would have to be taken into account, including any variations across important population groups and expense categories. Additional survey factors would also have to be considered, such as telescoping patterns and panel conditioning. Finally, it would be important to account for the sampling variability of the adjustment factors. Prior to planning an adjustment program, calculations would be needed to assess how precise the adjustments would have to be in order to significantly increase precision of the estimates.

Q3. Are there any other tradeoffs that CEQ should balance when dealing with the topic of recall period?

Q4. What are best-practices for determining ideal the recall period for the various expenditure categories within the CEQ questionnaire?

Q6. What should the next steps be to explore and research this issue for a possible change in CE methods?

The standard methodology for optimizing the length of the reference period has been to conduct field experiments. These experiments typically compare the performance of two or more recall periods that vary in length. For example, the current design of the CEQ is based on a study that examined the reporting of jobs and expenses for alterations and repairs (Neter and Waksberg, 1964). This study varied both the length of the reference period, as well as the bounding status of the interview. The Issue paper mentions that a field experiment is currently ongoing that is examining different recall periods.

Ideally, the R&D plan should sequence the testing so that final design decisions are based on a field experiment testing the recall period using an enhanced interviewing protocol. As noted above, the effect of the length of the recall period will partly be a function of the methods used to conduct the interview. For this reason, it would be important to conduct a final experiment on the length of the recall period once the protocol has been fully developed. The initial set of research activities should focus on methods to enhance recall, regardless of the length of the reference period.

The research should make every effort to base the evaluation on a measure of total survey error. One such measure, for example, might be the mean square error (MSE). By definition, any measure of total survey error requires the collection of a gold standard to estimate the bias term. The gold standard that is used could vary by the scope and magnitude of the research. For small scale research (e.g., cognitive interviews; small field tests), one might use debriefing interviews which probe extensively on the time period. These debriefings could use methods similar to those used for an event history calendar. These smaller scale studies might also ask respondents to retrieve records as a way to validate reports that were given during the interview. Respondents would be administered the interview using recall without records and the debriefing would then use extensive debriefing, as well as review of selected records (e.g., credit card bills; computerized bank records) to measure the amount of error in the reports.

Validating data for larger scale research, such as a study that compares reference periods of different lengths, is more difficult. One possibility would be to sample purchases from different businesses and conduct the CE with those individuals who made the purchase. This "reverse record check" design is not ideal because it only offers a limited view of the universe of purchases any individual might make (Marquis, 1984). It may also be difficult to locate individuals based on a record of purchases --- it would require getting cooperation from a retailer willing to recruit customers for a study. Investigation into different vendors who provide consumer information may also be another source of validation data. While these lists may be imperfect, randomization distributes the error evenly across treatments and could be used in the comparison if the error is not substantial.

A second possibility would be to ask respondents to keep a diary of their purchases over all or some portion of the target recall period. Once turning in the diary, respondents would be interviewed using the CE protocols. The information from the diary would be used as the gold standard, based on the assumption that the information was recorded close to the time expenditures were made. Ideally, the diary would be delivered and picked up in short enough intervals to insure that data quality is maintained. For example, one could follow the CE Diary Survey procedures and drop off and pick up diaries once a week. The advantage of this method is that it would cover a wide range of expenses including those that are of most concern for the CE (ie, frequent purchases). A more labor intensive method would be to conduct frequent interviews with respondents, using very short reference periods (Rips, et al., 2003; Millen, et al., 2005). The disadvantage of these methods is that they are also subject to error, such as non-response and telescoping. It may also be the case that completing the interviews would lead to a greater likelihood the purchases will be remembered in a subsequent interview. Nonetheless, this type of design has been found to be effective in investigating issues related to the quality of retrospective recall.

If it is not possible to collect a gold standard based on externally collected data, then one could make the assumption that higher expenditures are generally indicative of better reporting. This is based on the idea that for a bounded reference period the major concern are errors of omission, rather than over-reporting due to external telescoping. A similar set of assumptions were used during the redesign of the NCS described above (Bushery, 1981; Kobilarcik, et al., 1983).

Is the "more is better" assumption justified for expenditures? The global comparison between the CE expenditures and the National Accounts seems to support this. Neter and Waksberg (1964) found that higher levels of expenditures were reported for shorter recall periods for the smaller expenses. For example, for their lowest category of expenses, the 1 month recall period produced approximately 40% higher expenditures than a three month recall period. However, this was not the case for the larger expenditures, which did not show a statistically significant difference between the 1 and 3 month reference periods. Theoretically this makes sense because larger expenditures should be less subject to recall error. However, it

isn't clear how this assumption would apply to expenses that are not recalled from episodic memory, such as regular expenditures like bill payments.

One also has to be cautious about the "more is better" criterion when using enhanced interviewing and recall methods. These methods place greater demands on the respondent to actively search their memories. This might encourage external telescoping or at least bring in events that may not be eligible. For example, Kreuter et al., (2008) tested interleafed vs group filters. The former asks a single filter, which if answered positively leads to additional questions. The latter asks all filter questions at once. As expected, the group filter led to more reports of target characteristics. However, the group version did not prove to have a higher rate of validation when checked against external data sources. One possible explanation is that the group version encouraged respondents to report ineligible events which led to more external telescoping.

7. *How would you design a survey, or set of surveys, to collect detailed monthly data on a comprehensive range of expenditures? The proposed design should address recall period as well as other relevant survey design issues, while meeting the requirements specified in the CPI Requirements Document.*

With the existing information and cost constraints, it is hard to improve upon the current design of having two separate surveys. The logic used when it was first developed of using the interview to collect infrequent, larger purchases and the Diary Survey for the more frequent, routine purchases still rings true. To reduce burden on the Interview Survey, the design should seriously consider putting additional items on the Diary Survey. If necessary, the sample size for the Diary Survey would be increased to maintain required precision for the less frequent expenses. The Diary Survey should incorporate reporting by other members of the household, including children. It would be preferable to do this by having individual diaries for each person in the household, including children 12+. The Diary Survey would have several different modes of response, including the use of the internet.

The Interview Survey would collect expenses for the less frequent purchases and institute a protocol that promotes recall. Interviewers would encourage respondents to use whatever

electronic or paper records they have. The interview could be done while examining these records on the computer or by reviewing bills. If it is possible, multiple respondents would be encouraged to respond, perhaps to the point of returning to the household if there is another person with significant expenses to report.

After the first interview, respondents would be given the option of completing the survey on the web, in a self-administered format. As with the in-person survey, the survey would include protocols to promote recall. For example, there have been attempts to administer a self-administered EHC for sensitive behavior (Martyn, 2008). A more sophisticated example of this type of application is an automated self-administered 24 hour dietary recall (e.g., Thompson, et al, 2010; Subar, et al., 2010). This is a computerized interview available on the internet that is designed to conduct large-scale nutritional studies. Development of a similar type of instrument to collect data on expenditures could be developed for either an application for the diary and/or for an interview using a longer reference period. In the context of the Interview Survey, those that do not want to complete on the web or do not have access, an in-person interview would be completed. Similarly, non-responders would be followed up in-person.

Interviewers would be monitored using paradata. There would be follow-up when issues come up that violate the interviewing standards. For respondents, there would be selective follow-up of self-administered responses that indicate cursory or lack of effort in the response (e.g., missing data; low levels of expenditures; short timings).

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Exhibit 1. Example of Cues from CEQ Information Booklet

SECTION 6 – APPLIANCES, HOUSEHOLD EQUIPMENT AND OTHER SELECTED ITEMS (continued)

Part B – Household Appliances and Other Selected Items

SMALL HOUSEHOLD APPLIANCES

1 – Small electrical kitchen appliances, including –

blender	electric frying pan	mixer
breadmaker	electric iron	pizza oven
coffee grinder	electric knife	popcorn maker
coffee maker	electric timer	rice cooker
crockpot	electric wine chiller	sandwich grill
deep fryer	electric wok	slow cooker
electric barbecue	food processor	smoothie maker
electric can opener	hot plate	toaster
electric grill	ice cream maker	toaster oven
electric fondue set	juicer	waffle iron

2 – Electrical personal care appliances, including –

curling iron	electric toothbrush	make-up mirror
denture cleaner	facial sauna	massager
electric hair trimmer	foot bath	water-pik
electric razor	hair dryer	
digital scale	heating pad	

3 – Smoke detectors, including –

wired	battery operated	ionization chamber type	photo-cell type

4 – Electrical floor cleaning equipment, including –

vacuum cleaner	hand vacuum	rug shampooer	floor polisher

5 – Other household appliances, including –

trash compactor
air purifier
water filters
carbon monoxide detector
home security device (burglar alarm) including console, control modules, burglar alarm console, door and window transmitters

6 – Sewing machines (with or without cabinet)

7 – Office machines including fax machines and calculators, also including –

typewriters
copy machines

8 – Personal Digital Assistant or PDAs, including –

Palm
iPaq