



Contents lists available at ScienceDirect

## Food Policy

journal homepage: [www.elsevier.com/locate/foodpol](http://www.elsevier.com/locate/foodpol)

## A comparison of recall and diary food expenditure data

Matthew Brzozowski<sup>a</sup>, Thomas F. Crossley<sup>b,\*</sup>, Joachim K. Winter<sup>c</sup><sup>a</sup> Department of Economics, York University, 4700 Keele Street, Toronto, Ontario, Canada<sup>b</sup> Department of Economics, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, United Kingdom<sup>c</sup> Department of Economics, University of Munich, Ludwigstr. 33, 80539 Munich, Germany

## ARTICLE INFO

## Keywords:

Expenditure  
Survey data  
Measurement error  
Recall bias

## JEL classification:

C81  
D12

## ABSTRACT

Recall food expenditure data, which is the basis of a great deal of empirical work, is believed to suffer from considerable measurement error. Diary records are believed to be more accurate. We study an unusual data set that collects recall and diary data from the same households and so allows a direct comparison of the two methods of data collection. The diary data imply measurement errors in recall food expenditure data that are substantial, and which do not have the properties of classical measurement error. However, we also present evidence that the diary measures are themselves imperfect.

## 1. Introduction

Information on household food expenditure is crucial for a broad range of economic and policy research, including research on consumption and demand behaviour, and on living standards, poverty and inequality. This is in part because there is a long tradition of treating food consumption as a welfare measure, and because food expenditure feeds into nutrition and health. Additionally, and more practically, household surveys in developed countries that have a panel structure, or that collect other important information from households, often collect only limited expenditure information because of response load considerations. Such surveys usually do ask a recall food expenditure question. Well-known examples are the Panel Study of Income Dynamics (PSID) in the U.S.,<sup>1</sup> the British Household Panel Survey (BHPS), and longitudinal surveys of aging such as the English Longitudinal Study of Ageing (ELSA) and the Survey of Health Ageing and Retirement in Europe (SHARE). Developing and middle-income countries are facing new social and economic challenges and those challenges make longitudinal and multiple-domain surveys critical inputs to good policy making. A good example is population aging, and the China Health and Retirement Longitudinal Study (CHARLS), first fielded in 2011, includes a simple recall question on expenditure for food consumed at home.

Measurement error in expenditure data has been an important concern of researchers who employ such data. Given the prominent role of food expenditure data, measurement error in food expenditure data

is of particular interest. This paper provides new evidence on the extent and character of measurement error in food expenditure data. Our specific focus is a comparison of food expenditure measures obtained from simple recall questions and from expenditure diaries, as the latter have long been viewed as providing superior measures but come with high respondent load.

The literature on survey response behaviour noted early on that questions that require recalling quantities from memory are difficult to answer (Gray, 1955). There is now substantial evidence of ‘forgetting’: that memory declines with the length of the recall period, leading to under-estimation; see Sudman et al. (1996) for a review. The situation is complicated by the fact that forgetting does not occur at random but might be differential across respondents and types of questions. The existing evidence on the measurement of consumption expenditure, and on sources of measurement error, is summarized by Browning et al. (2014) and Crossley and Winter (2015).

Interestingly, despite the growing concern about the quality of recall data, there are few systematic comparisons of simple recall expenditure questions with diary measures. The Canadian Food Expenditure Survey (FoodEx) provides a unique opportunity to study how food expenditure measures constructed from simple recall questions compare to those obtained from expenditure diaries. The survey asks respondents to first estimate their household’s food expenditure over the past four weeks, and then to record food expenditure in a diary for two weeks. Thus it allows for *within-subject* comparisons. Most existing studies of measurement error in expenditure survey use *between-*

\* Corresponding author.

E-mail addresses: [brzozows@yorku.ca](mailto:brzozows@yorku.ca) (M. Brzozowski), [tcross@essex.ac.uk](mailto:tcross@essex.ac.uk) (T.F. Crossley), [winter@lmu.de](mailto:winter@lmu.de) (J.K. Winter).<sup>1</sup> Though the PSID has been increasing the breadth of the expenditure information it collects. See Andreski et al. (2014).<http://dx.doi.org/10.1016/j.foodpol.2017.08.012>0306-9192/ © 2017 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

subject designs. For example, Battistin et al. (2003) and Browning et al. (2003) compare data from different surveys, so that corrections must be made for differences in sample design, coverage etc. Gibson (2002), Beegle et al. (2012) and Battistin and Padula (2013) compare multiple samples from a single survey. This allows for a direct estimate of difference in distributions, it does not allow for an examination of the distribution of differences between recall and diary records. In contrast, a within-subject design allows for calculation of a recall-diary difference for each household, and for an examination of the properties of those differences. Of course this advantage must be balanced against potential disadvantages of a within-subject design, and we discuss this further below.

In their *Handbook of Econometrics* survey, Bound et al. (2001) emphasize that while econometric methods for dealing with measurement error typically assume that measurement errors are “classical”, much of the available empirical evidence contradicts this assumption. They also emphasize the usefulness of validation data in characterizing the joint distribution of error-ridden measures and their true values, and for testing the assumption of classical measurement error or other assumptions about measurement error. Bound et al. report evidence on measurement error in a variety of constructs (for example wages and earnings) but not food expenditure.

The FoodEx was not a designed validation study. However, because diary measures are widely considered the gold standard for collecting expenditure information, and because of the within-subject design, it is possible to use treat the FoodEx as an approximation to a validation study of the recall data, and to carry out analyses similar to those discussed by Bound et al. At the same time, how well the FoodEx approximates a genuine validation study depends on how well the diary measures capture true expenditure, and we also investigate this question.

The next section of this paper describes the Canadian Food Expenditure survey as well as a second, more widely used Canadian expenditure survey (the Family Expenditure Survey or FamEx), which also collects recall food consumption data. This section also provides a preliminary analysis of the different food expenditure measures available in the two surveys.

In Section 3, we calculate errors in recall food expenditure, using the diary measures to construct “true” food expenditure in a number of different ways. Under the assumption that true food expenditure can be constructed from the diary records, measurement errors in recall food expenditure data appear to be substantial, and they do not have the properties of classical measurement error. In particular, they are neither mean independent of true expenditure nor homoscedastic. They are also not well approximated by a normal distribution. However, we also show evidence that diary measures are themselves imperfect. This suggests alternative interpretations for the differences between recall and diary expenditure measures.

Finally, Section 4 offers some concluding remarks.

## 2. Canadian household expenditure surveys

The 1996 Canadian Food Expenditure Survey (FoodEx) was a large, nationally representative survey of Canadian households. Respondents were asked basic demographic questions and recall food expenditure questions. In addition, they were asked to record every food purchase in a diary, for two contiguous weeks. Conducting the survey involved three visits to each household. At the initial visit, demographic and recall food expenditure questions are asked. In addition, respondents were instructed on the proper technique for filling out the food expenditure diaries. After a week the first diary was collected and the household received another second blank diary in which to record purchases made in the following week. This second diary was collected during the third visit. During the second and third visits, the interviewers double-checked the diaries and verified the exactness and fullness of the responses. The survey was run continuously throughout

the year so that the seasonality of purchases is not an issue. The initial response rate was 76 percent, and there were 10,898 responding households. Attrition between the first and second week was less than 2 percent. Statistics Canada provides household weights that take account of the survey design and non-response, but not of attrition between the two weeks. Further details can be found in Statistics Canada (1999).

For the purposes of this paper, the key feature of the FoodEx is that each household is asked recall food expenditure questions as well as recording food expenditures in diaries. As noted above, this allows for a within-subject design. For a validation study, a within-subject design has the important advantage that the difference between the data being assessed (here the recall data) and the superior data (the diary) can be calculated for each responding unit. This allows for a direct analysis of these differences. If the superior data closely approximate the truth, these differences reveal the measurement errors in the data being assessed at the level of the responding unit. This in turn reveals key properties of the measurement error (such as whether the measurement error correlated with the true value).

Against this, there may be important disadvantages of a within-subject design. Perhaps the most important is the possibility of cross-contamination between the two measures. It may be that the expectation of completing a diary influences the effort that households put into their recall estimate of food expenditures or other aspects of the recall response. Equally, it may be that having offered a recall estimate affects diary behaviour. A between-subject design does not suffer from this possibility. Below we describe how we use a second Canadian expenditure survey to provide some evidence on cross-contamination.

A second possible concern with comparisons such as the one allowed by the FoodEx was raised by Gibson (2002).<sup>2</sup> He notes that in the FoodEx, the beginning of the recall period is not marked by a visit from an interviewer, whereas the diary period is. This may lead to “telescoping errors” in the recall data. We believe this is not a problem, for two reasons. First, most of the empirical evidence on telescoping is for larger, irregularly purchased items, like home repairs, and not for more regularly purchased expenditure categories like food.<sup>3</sup> Second since almost all simple recall expenditure questions longitudinal and multiple-domain surveys in developed countries share this possible problem, the FoodEx allows the appropriate comparison: between diary collection and recall information as usually collected in such surveys. A study of recall expenditure data from a survey in which the recall measure was marked by a visit from an interviewer would not be as informative about the recall expenditure data in the longitudinal surveys listed in the Introduction.

The exact wording of the key recall food expenditure questions is as follows:

*In the last four weeks...*

*Q1. How much do you estimate this household spent on food and other groceries purchased from stores (including farmer stalls and home delivery)? Exclude periods away from home overnight or longer. Report bulk purchases of food for canning, freezing in question 3.*

*Q2. About how much of this amount was for non-food items such as paper products, household supplies, pet food, alcoholic beverages, etc.?*

Surveys that ask simple sets of recall food expenditure questions do differ somewhat in their formulation. For example, the PSID refers to the amount the household “usually” spends on food at home, while the FoodEx refers particularly to the last four weeks.

<sup>2</sup> Gibson was responding to a very early version of Ahmed et al. (2010).

<sup>3</sup> A key development in the literature on recall expenditure questions was the identification of ‘telescoping’ as a significant problem by Neter and Waksberg (1964). This is the phenomena of respondents erroneously including in their response expenditures that occurred before the specified recall period, leading to an over-estimation of expenditure in the recall period. See Browning et al. (2014) and Crossley and Winter (2015) for further discussion.

Download English Version:

<https://daneshyari.com/en/article/5070057>

Download Persian Version:

<https://daneshyari.com/article/5070057>

[Daneshyari.com](https://daneshyari.com)