



How accurate are recall data? Evidence from coastal India [☆]



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ABSTRACT

This paper investigates the accuracy of recall data by comparing administrative records with retrospective, self-reported survey responses to income and asset questions for a sample of self-employed households from coastal India. It finds that the magnitude of the recall error increases over time, in part because respondents resort to inference rather than memory. Monthly earnings that are higher than the median are also better recalled. These results have implications for the accuracy of the moments of the self-reported earnings distribution. It also finds that income earners are more accurate than their wives. In addition, the use of time cues can worsen accuracy if they are not relevant to the respondent, and the position of the recall questions in the two-hour long survey does not affect accuracy.

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1. Introduction

Self-employment is a major source of income and employment in developing countries, especially among low-income households (OECD, 2009). Accurate data on employment, income and profits are therefore critical for measuring poverty and inequality and for making sound, evidence-based, policy prescriptions. For example, Poterba and Summers (1986) find through audits of employment surveys that correcting employment self-reports can change the estimated duration of unemployment by a factor of two. Similarly, if consumption is regressed against income, and income is measured with error, attenuation bias may lead the policymaker to conclude that there is risk-sharing when in fact households may not be protected from idiosyncratic income fluctuations. If accurate records on consumption, income and profits existed, there would be no reason for concern, but the majority of individuals engaged in self-employment do not keep records. In practice, income and consumption data typically come from self-reports collected in surveys that are subject to recall and measurement error.

Panel survey data are typically collected by either interviewing the same set of households over multiple times, or by surveying households only once and asking questions about their current and past situations. The first method is regarded as more precise and reliable but it requires tracking households over time with potential attrition problems and often rehiring enumerators for each round of data collection as they tend to happen several months or even years apart. These factors can substantially increase the cost and thus motivate the growing interest in retrospective panel survey data. Being collected all at once, they abstract from attrition problems and minimize the cost of gathering information. However, their reliability may be compromised if respondents are asked about events that are recalled imprecisely. As researchers engage more and more in primary data collection, especially in developing countries, it is critical to assess how accurate retrospective data are to decide on the most appropriate way to collect reliable data.

In this paper, we investigate the accuracy of recall data by comparing administrative records with retrospective survey data from a developing country. Self-reported data come from a sample of self-employed households engaged in fishing in coastal India. To the best of our knowledge, this is the first study on recall error using actual and reported data on self-employment in a developing country, thus contributing to the large econometric literature concerned with measurement error (see Bound et al., 2001) for a review).

We assess recall error using two different events in the lives of small-scale boat owners. The first is the date of purchase of the boat, which constitutes the single largest productive asset. The second is the monthly gross earnings from fishing over the 34 months prior to

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the survey. We focus on boat owners for two main reasons. First, because the two events of interest are relevant to the respondent and easy to elicit, allowing us to minimize reporting error not due to imperfect recall. Indeed, small scale boat owners in coastal India are exclusively self-employed and their earnings account for most of the household income. In addition, earnings from fishing are perhaps easier to elicit than overall income because the concept is well defined and familiar to respondents. When monthly income is asked in surveys, its definition is typically left to the judgment of the respondent or is preceded by a cumbersome preamble that can be imperfectly understood.¹ Since we only focus on one source of income, we also minimize the misreporting that arises when omitting other sources of income. The second reason why we use boat owners is access to unique administrative data that allow us to validate the survey data and to identify key patterns of recall error.

For both events considered, we find that the absolute value of recall error increases with the recall period, confirming a well-known fact in the cognitive science literature (for example, [Tourangeau, 2000](#)). Because the length of the recall period is correlated with the magnitude of the error, the assumption of classical measurement error (i.e. that the error term is white noise) does not hold in the data. We suggest a plausible explanation for this correlation. As respondents are asked to remember events further back in time, they rely less on memory or recall and instead infer earnings based on the history of past earnings (see [Tourangeau et al. \(2000\)](#) and references therein). To test this hypothesis, we study whether self-reports revert to the boat owner's mean or his most recent earnings (relative to the date of the interview) as the recall period increases. Consistent with evidence from the U.S. by [Bound et al. \(1989\)](#), using the Panel Study in Income Dynamics (PSID) data, and [Angrist and Krueger \(1999\)](#), using the Current Population Survey (CPS) data, we find evidence of convergence to the mean but not to the most recent value.

Because respondents rely less on memory and more on inference as the recall period increases, some moments of the self-reported income distribution will be error-ridden for long enough recall periods. If one is interested in the mean of the income distribution, then recall data are appropriate because the mean of the self-reported income process matches well that of the realized process. However, when estimating the volatility of the income process, recall data will yield a lower variance than the true one as the recall period increases. Using a moving window of 12 months to estimate changes in the mean and variance over time, we find that with a 2-month recall period, the variance of the self-reported income is indistinguishable from that of the actual income, but when the recall period is 24 months, the variance of the self-reported income process is 13% lower. In contrast, the mean of the recall period is only 2% below the actual mean, irrespective of the recall period.

We also study whether months when earnings are higher than the median are better recalled relative to months when earnings are below the median. On the one hand, low earnings may be better recalled given that they are costlier in utility terms. On the other hand, individuals may dislike recalling unpleasant events ([Holmes, 1970](#); [Skowronski et al., 1991](#); [Thompson, 1996](#); [Wagenaar, 1986](#)). We test this potential asymmetry in recall in two ways. First, we explore whether boat owners tend to remember correctly the month with the highest earnings relative to the month with lowest earnings. Second, we assess whether recall error is higher in months when earnings were below the median. We find that earnings higher than the median and the months when they happen are recalled better, suggesting that individuals tend to forget unpleasant events.

Finally we explore several methodological issues related to the collection of retrospective data. First, we investigate *who* in the household provides more accurate information. While male boat owners are the ones directly earning income, their spouses handle the money received by their husbands as they are responsible for shopping and cooking. We find that boat owners provide more accurate responses and that these are not influenced by individual or household characteristics, unlike reports from their wives. Interestingly, however, we find no evidence of underreporting by females as would be the case if husbands secretly kept a share of total earnings to themselves before handing over the money to their wives. Second, we assess whether the provision of time cues improves the accuracy of recall. Perhaps unsurprisingly, we find that unless the time cues are relevant to the respondent, they can worsen accuracy because recall error is compounded with errors in the actual timing of the cue. Lastly, we study whether the position of the recall questions in the two-hour long survey influences the accuracy of recall and find no effect.

These results contribute to three related literatures. First, they relate to the work of social and cognitive psychologists investigating how respondents answer questions, the mental processes that are activated by recall, and the personal and environmental factors that influence autobiographical memory (see [Dex \(1995\)](#) and [Tourangeau et al. \(2000\)](#) for extensive reviews). Most of these psychological studies use lab experiments or compare diaries and survey answers ([Sudman and Bradburn, 1973](#)) from developed countries, mainly the U.S. and Europe.

Second, by using data from India, we also contribute to a small but growing literature that uses data from developing countries. [Beegle et al. \(2012b\)](#) compare different approaches to collecting consumption data in Tanzania, including variations in the recall period. [Beckett et al. \(2001\)](#) assess the accuracy of recall by contrasting the retrospective information in the second Malaysian Family Life Surveys (MFLS) fielded in 1988–9 with the answers provided 12 years earlier during the first round of the MFLS. A similar approach is followed by [Beegle et al. \(2012a\)](#), who compare self-reports of African farmers collected at two different points in time, although not as far apart as in [Beckett et al. \(2001\)](#). Conversely, comparing different survey frequencies, [Das et al. \(2012\)](#) study the prevalence and duration of sickness episodes and doctor visits. Finally, [De Mel et al. \(2009\)](#) are concerned with measuring profits among micro entrepreneurs. All these studies lack administrative data that can be used as an independent source of information to validate the survey responses.

The third literature to which this paper contributes is related to validation studies that combine censuses or large-scale panel surveys (such as the PSID, the CPS or the Survey of Consumer Finance (SCF)) with administrative data records from the Social Security Administration (see for instance, [Bound and Krueger, 1991](#); [Bound et al., 1994](#); [Duncan and Hill, 1985](#); [Kennickell and Starr-McCluer, 1997](#); [Pischke, 1995](#)) for the U.S. and ([Akee, 2011](#)) for a developing country). This literature assesses the nature of the measurement error by comparing self-reported earnings data with administrative records in the cross-section or in first-differenced data if more than one year of data is available. The results refute the assumption of classical measurement error but in the U.S., the use of self-reported instead of administrative data leads to little loss of accuracy. In a developing country, however, [Akee \(2011\)](#) finds larger losses of accuracy, especially if first-differenced data are used.

While this literature uses self-reported earnings elicited at different points in time to study “contemporaneous” measurement error, our paper is concerned with “longitudinal” measurement error by using self-reported earnings at different points in time elicited only once. Another key difference is that the literature uses wage workers while we use self-employed individuals. Recall errors may therefore be different because the income processes are different.

The rest of the paper is organized as follows. [Section 2](#) describes the context and the data used. [Section 3](#) examines the determinants of the recall error. [Section 4](#) addresses some practical issues about the collection of retrospective data and [Section 5](#) concludes.

¹ [McFadden et al. \(2005\)](#) provide an example of such a preamble: “Please state income before taxes, including fringes such as employer-paid health insurance, excluding income from sale of household goods or automobiles, excluding bonuses, etc.”

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