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journal homepage: www.elsevier.com/locate/devengDo financial diaries affect financial outcomes? Evidence from a randomized experiment in Uganda[☆]Joeri Smits^{a,b,*}, Isabel Günther^c^a Yale School of Management, New Haven, CT 06520, USA^b Harvard Kennedy School, Harvard University, Cambridge, MA 02138, USA^c Chair of Development Economics, NADEL, ETH Zurich, Switzerland

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ABSTRACT

Survey data on income and expenditure is often of low quality and does not capture the volatile and irregular nature of cash flows of poor households. Financial diaries are increasingly used to improve the precision and accuracy of consumption and income estimates. In this paper we analyze whether keeping track of income and expenditures changes financial behavior and outcomes, which could reduce the validity of diaries as a measurement instrument. Members of urban Ugandan microcredit groups were, through random assignment, offered financial diaries to keep a record of their daily cash flows for more than a year. We find no evidence that financial diaries change numeracy skills, loan repayment, reported income, or food consumption. We only found a difference in savings, but this is unlikely to represent any impact of the financial diaries, as it does not exceed the amount provided as an incentive to the respondent for participation.

1. Introduction

The day-to-day cash flows among poor households in general, and microentrepreneurs in particular, tend to be highly temporally variable, an aspect often not captured by one-time recall household surveys eliciting household income or expenditures. Another measurement problem with standard recall data on income and expenditure, apart from not capturing temporal volatility, is that such data is typically subject to recall error. Household consumption expenditure, and especially household income, are typically under-reported, with the error being relatively larger at lower incomes (Azzari et al., 2010; Hoderlein and Winter, 2007). Such differential measurement error contrasts with non-differential, or classical, measurement error, which is statistically independent of the ‘true’ variable itself, and of the covariates. In ordinary least squares (OLS) regression, non-differential measurement error in the dependent variable does not generate bias, but only inflates standard errors. However, differential measurement error in the dependent variable generates substantial biases in estimates of treatment effects across a range of estimators (Gutknecht, 2011; Millimet, 2011).

Researchers have used techniques like financial diaries to take high frequency recordings of individuals’ or households’ cash flows for prolonged periods of time in order to get a more insightful picture of their financial lives and/or income and profits. More intensive measurement techniques such as financial diaries may also allow for data that is to a lesser extent subject to differential measurement error (and could therefore potentially serve as validation data for standard recall data). Perhaps the most well-known example is the series of financial diary studies in South Africa, Bangladesh and India reported in Collins et al. (2009), along with those in the US (Hannagan and Morduch, 2015).

The approach we took in this study was to have respondents record their own cash inflows and outflows in cashbooks designed specifically for this purpose; example entries are depicted in Appendix A. This approach is similar to Kamath and Ramanathan (2015), who asked ninety respondents in Ramanagaram (India) to record their own cash flows. We follow their procedure and asked the participants’ children to write the diary if they are illiterate or unable to write. For this approach to data collection, it is still largely unknown whether having

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individuals track their cash flows - or having an enumerator track them - alters financial behavior and outcomes. Such behavioral responses would potentially jeopardize the validity of such diaries as a measurement instrument, and could reduce or offset any accuracy gains over standard, recall-based approaches. The book “Portfolios of the poor”, by Collins et al. (2009), in which 300 individuals from three countries are interviewed on a biweekly basis for over a year (i.e., a slightly different approach than ours), notes:

“There is [...] doubt as to whether participating in the diaries changed the behavior of some respondents. In some cases it may have done so. [...] However, without a different type of study design, it is difficult to tease out exactly how much of an influence we might have had.” (pp. 209–210).

This could happen through various mechanisms. First, being interviewed on a biweekly basis for over a year - as in the case of Collins et al. (2009), or keeping record of one’s cash flows in a cashbook for an extended period of time (as in the current study), may increase financial awareness, perhaps reducing temptation expenditures, saving some business costs, or changing business strategies more generally. Second, being repeatedly interviewed or keeping track of one’s financial data could alter people’s effort levels, in the sense of observer or Hawthorne effects. Third, in the case of our study, some participants wrote the names of people who bought goods from them on credit in the book and made a ‘check’ sign when the money has been repaid. This may help those using the cashbooks to keep track of their lending relationships and increase repayment, or lend differently, than they would without the use of the cashbook. Disentangling changes in reported expenses (e.g., reported food consumption) from changes in the underlying behavior (e.g., actual food consumption) is, however, difficult.

In a review of the literature on the measurement of consumption expenditures, Crossley and Winter (2013) identified only two studies, both from the UK, that investigate effects of expenditure diaries on behavior. In the first, Kemsley et al. (1980) report on a small scale experiment on a subsample of the UK Family Expenditure Survey, in which household members aged over 15 were asked to keep a diary of their expenses. Making a payment to record-keepers improved the response rate substantially, with the response rate increasing in the payment. In the second, McKenzie (1983) concludes that there is no evidence that keeping a diary affects telephone usage (when comparing diary records to metered usage). Of course, the latter result does not necessarily generalize to other categories of expenditures. In an experiment in Tanzania by Beegle et al. (2012), who randomized 4000 households into different methods of data collection, recall modules also lead to lower (reported) consumption than a personal diary, with the gap being larger among poorer households.

Whereas the aforementioned studies looked at expenditure diaries, De Mel et al. (2009) randomly handed ledger books to microenterprises in Sri Lanka so they could record business revenues and profits. They found that the use of diaries led to significantly higher (reported) business expenses and to higher (reported) revenues of similar magnitudes (hence having no effects on profits), suggesting that standard recall surveys lead firms to under-report both revenue and expenses.

None of the studies we reviewed here, however, explicitly analyzed the impact of diaries on financial behavior and outcomes and contributes to the literature on improved measurement of income and expenditures. It is to our knowledge the first study to randomize access to cashbooks for the self-recording of cash flows to gauge its effect on financial behavior and outcomes. Our overall findings are reassuring for financial diary-type approaches to the measurement of cash flows, and can be summarized in one sentence: we do not find any evidence that diaries affect financial outcomes. The lack of effects detected in this study of diary-logging on financial outcomes indicates that diary

studies may be a way to obtain more credible cash flow measurements compared to standard recall surveys.

There have been other approaches to measuring income and expenditures, with varying success. An alternative approach to measuring microenterprise profits, which are a main source of income for the substantial share of self-employed people in many developing countries, was attempted by De Mel et al. (2016) in Sri Lanka. They used radio frequency identification (RFID) tags as a means of objectively measuring stock levels and stock flow in small retail firms, but found that RFID was difficult to use and time-consuming for the business owners, and that they performed very poorly for most products sold by microenterprises. Yet another approach is being piloted by Carletto (2013), who conducted a randomized experiment comparing standard recall with enumerator visits twice a week (which he considers a gold standard) and telephone calls twice a week. Although Carletto (2013) measures crop output, their approach should be applicable to other development indicators. The question that remains is whether being interviewed repeatedly over the telephone affects an individual’s and a household’s effort levels and economic and financial outcomes.

The rest of this paper is organized as follows. Section 2 describes the experimental design and the data. Section 3 describes the econometric approach, section 4 reports the results, and section 5 discusses and interprets the results and offers recommendations for further research.

2. Data and design

To test the null hypothesis that the use of cashbooks has no effect on financial outcomes, a clustered randomized encouragement design study was carried out.¹ We collaborated with a major microfinance institution in Uganda in order to sample microcredit borrowing groups for an unrelated research project on the impact of microcredits. Specifically, three types of groups were interviewed during the baseline study from September 2013 until March 2014:

- Village Groups: individuals who have a ‘Village Group Loan’, a non-collateralized loan product with joint liability² from the microfinance institution. These groups have ten or more members.
- Applicant Village Groups: these individuals have formed a group and have applied for their first Village Group Loan, but have not yet received their loan at the time of the baseline survey.
- Small Groups: these individuals have a ‘Small Group Loan’, another loan product from the same microfinance institution. Some of the larger loans for this loan type are collateralized. The group size varies between five and ten members.

Within each of the three group types, the groups were alternately assigned to either treatment (T) or control (C) based on the order of being interviewed. Within each group type, the alternating sequence starts with a treated group as follows:

- Village Group Loan: T,T,C,C,T,T,C,C,T,T,C,C,T,T
- Applicants to Village Group Loan: T,T,C,C,T,T,C,C,T,T,C,C,T,T
- Small Group Loan: T,C,T,C,T,C,T,C,T,C,T,C

The members of groups (i.e. clusters) assigned to treatment (22 groups, $n = 207$) were offered a cashbook free of cost, while members of groups assigned to control were not (18 groups, $n = 110$).

¹ When the study was initiated, only a dozen RCTs had been registered at the American Economic Association’s (AEA) RCT registry - the current study was not among them. We recognize the value of public pre-registration of RCTs and hope future, larger-scale pre-registered RCTs will aim to replicate our study design.

² Each member receives his or her own loan, and has to repay it individually. Joint liability means that if one member is late on repayment or refuses to repay the loan, the other members have to make up for it (possibly after a grace period), or the lender can withdraw from their compulsory savings that are part of the repayment installments.

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