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How can we better capture food away from Home? Lessons from India's linking person-level meal and household-level food data

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ABSTRACT

Despite acknowledged shortcomings, household consumption and expenditure surveys (HCES) are increasingly being used to proxy food consumption because they are relatively more available and affordable than surveys using more precise dietary assessment methods. One of the most common, significant sources of HCES measurement error is their under-estimation of food away from home (FAFH). In 2011, India's National Survey Sample Organization introduced revisions in its HCES questionnaire that included replacing “cooked meals”—the single item in the food consumption module designed to capture FAFH at the household level—with five more detailed and explicitly FAFH sub-categories. The survey also contained a section with seven, household member-specific questions about meal patterns during the reference period and included three sources of meals away from home (MAFH) that overlapped three of the new FAFH categories.

By providing a conceptual framework with which to organize and consider each household member's meal pattern throughout the reference period, and breaking down the recalling (or estimating) process into household member-specific responses, we assume the MAFH approach makes the key respondent's task less memory- and arithmetically-demanding, and thus more accurate than the FAFH household level approach. We use the MAFH estimates as a reference point, and approximate one portion of FAFH measurement error as the differences in MAFH and FAFH estimates. The MAFH estimates reveal marked heterogeneity in intra-household meal patterns, reflecting the complexity of the HCES's key informant task of reporting household level data, and underscoring its importance as a source of measurement error.

We find the household level-based estimates of FAFH increase from just 60.4% of the individual-based estimates in the round prior to the questionnaire modifications to 96.7% after the changes. We conclude that the MFAH-FAFH linked approach substantially reduced FAFH measurement error in India. The approach has wider applicability in global efforts to improve HCES.

1. Introduction

Understanding diets and designing and monitoring effective food and nutrition programs and policies requires food consumption data. While 24 h recall and observed-weighted food records are widely regarded as the most precise dietary assessment methods, their technical and resource requirements put these methods out of the reach of most countries. Relatively few surveys employ these methods, and those that have are generally small and not nationally representative. The resulting food consumption information gap has given rise to the growing

use of Household Consumption and Expenditure Surveys (HCES).

The use of HCES data to proxy food consumption has grown steadily over the past 25 years despite the fact that they have acknowledged shortcomings (Fiedler, 2013). Their use has grown because they are relevant, available, accessible and affordable: they contain a great deal of information about food acquisition and consumption; are conducted routinely in most countries; are statistically representative at national and sub-national levels; and are already being paid for by government. Although HCES vary substantially by country, most share some common shortcomings stemming from the design of their

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questionnaires (Fiedler et al., 2012).³ For this analysis of specifically the food and nutrition data collected by HCES, the most common question-related shortcomings are that they:

- consist of household-level—not individual-level—data,
- contain a mixture of consumption and purchases,
- include unstandardized units for reporting food volume or weight,
- do not adjust for food that is wasted, given to animals or given to persons who are not household members and
- they inadequately capture food that is prepared and consumed outside of the home (Smith et al., 2014).

This paper analyzes measurement error due to questionnaire design, focusing on just the food consumption and expenditures data of HCES and in particular on food away from home. HCES have been conducted in low- and middle-income countries for more than half a century. HCES collect data using either diaries or household interviews, with interviews being the most common approach, roughly 70%. The typical interview form collects food expenditure data using a close-ended list of roughly 100 common food items. The early HCES questionnaires included relatively short lists of commodity-like foods, much like the FAO's Food Balance Sheets. Over time, countries have added increasing numbers of processed foods, but it is only in the last decade or two that most have even begun to ask about FAFH. As eating away from home has become increasingly common worldwide, countries have come to recognize that adequately capturing food expenditures requires collecting accurate data on FAFH. A recent review of the HCES of 100 countries, found that 90% of countries now collect some information about FAFH. The ways in which they do so, however, vary substantially, reflecting the fact that most of the approaches are “*ad hoc* and unsatisfactory” (Smith et al., 2014). Few have been carefully empirically assessed and to our knowledge there has never been an experiment or a comparative analysis of the strengths and weaknesses of alternative approaches.

While it is widely recognized that FAFH is subject to considerable measurement error, just how much it contributes to under-estimating consumption is unknown. However, in light of the fact that FAFH is expected to continue to grow as a proportion of both total food consumed and total food expenditures, absent change in how information is collected, the magnitude of that under-estimation can be expected to increase. As it does, it will exacerbate the instability of HCES-based estimates of food insecurity and under-nutrition as currently measured, (Tandon and Landes, 2011; D'Souza and Tandon, 2014; Smith, 2015), obfuscate trends and prompt more to question whether even the general order of magnitude of our estimates of global under-nutrition should be accepted (Banerjee and Duflo, 2011). The inadequate collection of FAFH data urgently needs to be better understood and systematically improved.

While there is little argument about the importance of FAFH, or that its prevalence and significance are increasing, there remains a paucity of knowledge about even its major characteristics. More fundamentally, there is little discussion about how it should be defined. As its title suggests, FAFH is commonly defined by where food is consumed, regardless of where it is prepared. In other instances, it is defined by where food is prepared, regardless of where it is consumed; in which case, food that is prepared at home and taken outside of the home to be eaten—at work or at school, for instance—is considered FAFH. In this paper, we define FAFH to include only one of the four possible combinations of where food is prepared and consumed; i.e., it includes only food that is prepared and consumed away from home. Food prepared at home and consumed at home, food prepared at home and consumed

away and food prepared away and consumed at home, are all captured in home consumption and expenditures data, and as such are not FAFH.

There are other sources of HCES measurement error in FAFH as well, beyond the ambiguities of definition and the limited number and diverse nature of questions asked about it. HCES commonly rely on a single, key respondent to report all household members' food consumption and expenditures. Food away from home becoming more common has complicated the key respondent's task of accurately reporting household consumption: the key respondent is increasingly unlikely to be aware of events that occur outside of his/her purview. Larger households, and especially those with larger numbers of adults, persons living in urban areas, those with more complex lifestyles and greater physical mobility, and persons who commonly spend more than 24 h away from home, are particularly likely to have their consumption under-reported. Additional sources of measurement problems associated with FAFH include the need to capture multiple foods from multiple places with different menus and prices, the challenge of estimating the quantity of the different types of foods contained in processed foods, and how much of it was consumed. No doubt, this is challenging work and measurement error will never be eliminated. The relevant question is, how can it be reduced: how can we improve the measurement of FAFH in HCES?

2. Revisiting the great Indian calorie debate

Over the past decade, a lively debate has waged over the seemingly paradoxical National Survey Sample Organization- (NSSO-) based finding that India's income and its middle class have grown dramatically since the late 1980s, while its per capita caloric consumption has fallen. Explanations have been wide-ranging:

- Indians have less need for food: the average calorie requirements of Indians have fallen due to increased mechanization and relatively greater growth in less strenuous physical work (Rao, 2000; Deaton and Dreze, 2009; Eli and Li, 2012).
- Poverty has been inaccurately measured and its prevalence has actually increased (Patnaik, 2010).
- Indians are opting to spend relatively more of their income on non-food items (Banerjee and Duflo, 2011).
- There has been a food budget squeeze: general food demand has fallen due to increasing food prices (Patnaik, 2010).
- The relative cost of fuel in rural India has increased and crowded-out food (Basole and Basu, 2014).
- While it should be recognized that the NSS was not originally designed to be used for comprehensive food security analysis, it should be used to do so, and would do a better job if “some minor amendments in food data collection, particularly in respect of the part of food consumed outside home (and incorporating the) refuse factor of food items” (Chattapadhyay et al., 2010).
- Calorie consumption is inadequately measured by the NSS primarily due to the inadequate capturing of FAFH (Smith, 2015).

FAFH behaviors are highly variable: they vary by household composition and income, and the determinants of occasional eating out have been found to be distinct from those of persons who eat out more regularly (Naska et al., 2015; Liu et al., 2015; Orfanos et al., 2013). Among people for whom FAFH is an occasional behavior, it is not easy to determine whether the days that individuals or households do not report eating out reflect their usual habits or not. Depending upon the frequency of “usual” eating out patterns, the length of the recall period may exert undue influence on the estimates, and if too short will result in unstable estimates. This suggests that to be better able to design a survey to capture FAFH there is a need to better understand the frequency and general nature of patterns of FAFH. One common approach in attempting to develop a better understanding of eating away from home is to ask about the place of consumption. A number of studies

³ Measurement error occurs for a variety of reasons, some of which are attributable to the interviewee, others to the interviewer and still others to the questionnaire or data collection method (Biemer et al., 2004; Bradburn et al., 2004; Carroll et al., 2015).

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