

Poverty Estimation: Measuring food consumption



Designing Household Surveys to Measure Poverty

Perugia, Italy

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Overview – Food consumption

- Motivation: Most courses begin with the assumption that the poverty line, poverty measure and the measure of wellbeing have been determined.
- Many analytical decisions take place before we get to the point of having a poverty line, and measures of poverty and wellbeing. These decisions are rarely reviewed in textbooks or course work.
- What measure of poverty we use affect inference.
- The choices we make in collecting food consumption data affect our measure of wellbeing.

Overview – Food consumption

- Consumption / expenditure on food is a primary module in Household Income, Expenditure and Consumption Surveys.
- Consumption versus expenditure - differences and purposes
- Recall versus diaries
- Reference period
- Comprehensiveness & Specificity of food list
- Respondent burden, non-response, meta data

Consumption versus Expenditure

Common uses of the data, differing purposes

Total consumption, expenditure

- Consumption, $\text{Price}(p) * \text{Quantity}(q)$: –
 - Includes consumption from purchases, home production, gifts, payment in kind
 - Poverty: directly improves wellbeing, serves as the welfare measure for identifying the poor and nonpoor
 - Poverty is primarily about quantity consumed
 - Prices are simply a vehicle for adding up quantities
 - Hunger: Food quantity (q) can be used to estimate calories.
 - HFCE: In some cases, is an input to national income accounting statistics, in particular household final consumption expenditure (HFCE)
 - “Value of goods and services purchased by households including the value of imputed rent of owner occupied dwellings”
 - Consumption shares, Levels

Total consumption, expenditure

- Expenditure, pq –
 - Includes all market expenditures, regardless of whether consumed or not
 - Does not directly improve wellbeing, but reflects purchasing patterns
 - CPI: In the absence of a household budget survey, expenditure data from living standards surveys are sometimes used to estimate expenditure shares for CPI weights
 - Example from Mauritius: Every 5 years CPI basket reviewed,
 - CPI is about movement in prices, focus is on market transactions (home production excluded)
 - Expenditures on q help to think about how to add up changes in price movements
 - $p_1\omega_1 + p_2\omega_2 + p_3\omega_3 + \dots$ where the weight attached to price of i , ω_i is typically an expenditure share
 - NIA: In some cases, may serve as input to national income accounting statistics

When does consumption \neq expenditure?

- Home production (food produced home and consumed)
- Payment in kind
- Gifts
- Adding to inventory, drawing from inventory
- Waste

Consumption, Expenditure

Discussion : What we ask matters

Ethiopia Socioeconomic Survey (ESS3)

SECTION 5A: FOOD LAST 7 DAYS

F O O D I D	1.	2.	3.	4.	5.	6.				
	Over the past one week (7 days), did you or others in your household consume any [ITEM]? INCLUDE FOOD BOTH EATEN COMMUNALLY IN THE HOUSEHOLD AND THAT EATEN SEPARATELY BY INDIVIDUAL HOUSEHOLD MEMBERS. YES...1 NO...2 ► NEXT ITEM	How much in total did your household consume in the past week? SEE UNIT CODES	How much came from purchases? IF NONE RECORD 0 AND SKIP TO Q5. SEE UNIT CODES	How much did you spend?	How much came from own production? IF NOT CONSUMED FROM OWN PRODUCTION RECORD 0. SEE UNIT CODES	How much came from gifts and other sources? IF NONE RECORD 0. SEE UNIT CODES				
		QUANTITY	UNIT CODE	QUANTITY	UNIT CODE	BIRR	QUANTITY	UNIT CODE	QUANTITY	UNIT CODE

CEREALS										
1	Teff									
2	Wheat									
3	Barley									
4	Maize									
5	Sorghum									
6	Millet									
60	Other cereal (SPECIFY) _____									

Consumption, Expenditure Discussion and questionnaire examples

Can we estimate total food consumption (at home)?

Can we estimate total expenditure on food?

Can we estimate price of food item? For what reasons might we want this?

Why might we be interesting in guest meals?

- Does the answer to this question affect estimated calories per person? Hunger estimates?
- Does this information affect price per calorie for the food poverty line?
- Does this information affect estimated cost of the food poverty line?

Food consumption, reference period

Experiment to test how we ask about consumption affects our measures

- Focus on food consumption
- Benchmark (“gold standard”) using a personal diary with daily visits – all adults given a personal diary, each dependent assigned to an adult
- Compare benchmark with 7 alternatives:
 - 2 household diaries and 5 unbounded recall modules
- Small highly supervised teams
- Tanzania: 168 survey clusters in 7 districts covering range of urban/rural and agro-climactic zones
 - 3 households per cluster per consumption module, about 500 households per instrument
- Fieldwork evenly spread over 12 months

Experiment to test how we ask about consumption affects our measures

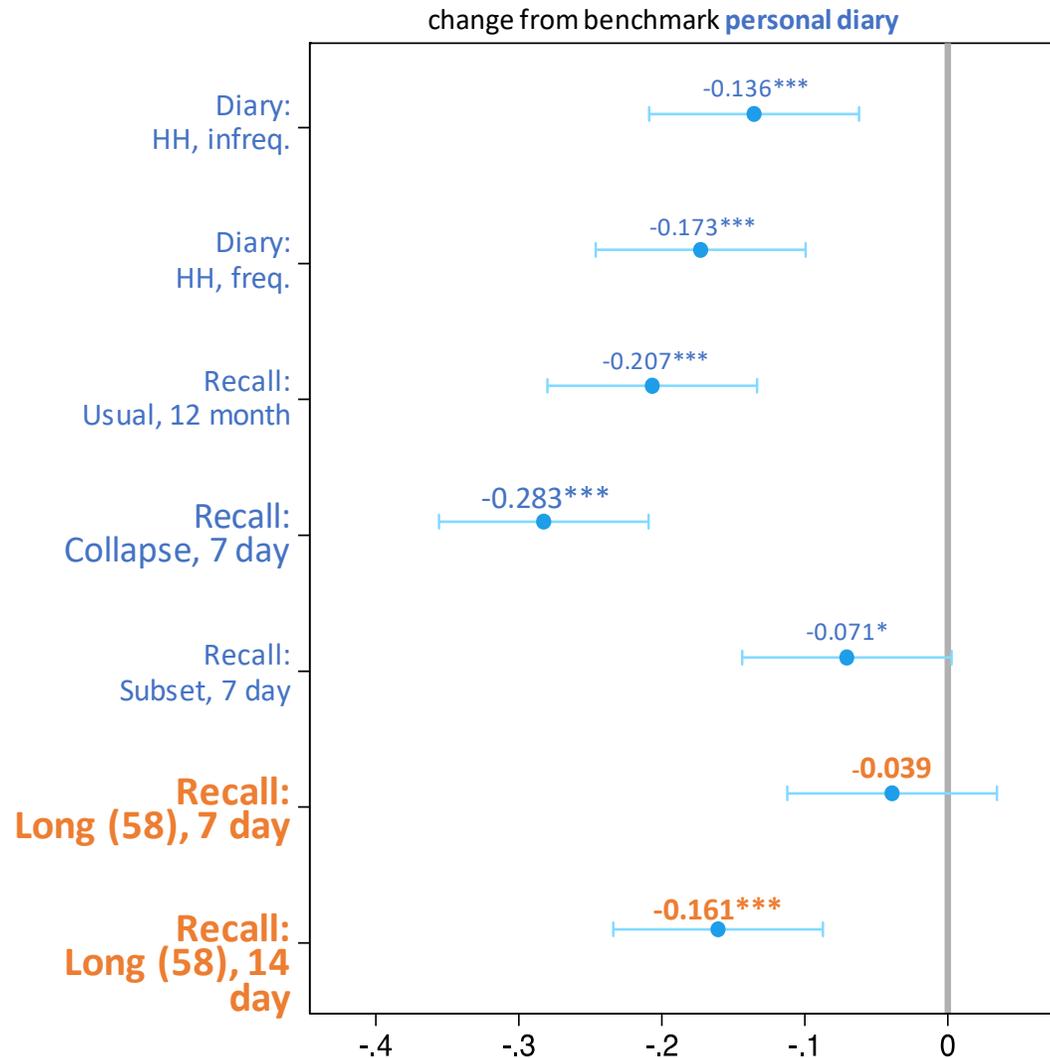
Module	Consumption measurement
1	Long list (58 items) 14 day
2	Long list (58 items) 7 day
3	Subset list (17 items covering 77% of total) 7 day
4	Collapsed list (11 items) 7 day
5	“Usual month” (58 items) (# months × usual quantity/value)
6	HH diary frequent visits (daily by the local assistant)
7	HH diary infrequent visits (days 1, 7, 15)
8	Personal diary frequent visits

Balance on basic characteristics of households by experimental modules

	Recall Module					Diary Module		
	1	2	3	4	5	6	7	8
Head: female	18.8	19.8	20.6	20.8	21.6	18.1	21.1	20.9
Head: age	47.6	46.2	46.0	46.4	46.5	46.6	47.0	46.8
Head: years of schooling	4.7	4.8	4.7	4.7	4.8	4.7	4.7	4.7
Head: married	74.2	73.2	72.0	73.0	71.8	74.8	73.8	76.3
Household size*	5.2	5.2	5.2	5.5	5.3	5.3	5.3	5.3
Adult equivalent household size*	4.1	4.1	4.1	4.3	4.2	4.2	4.2	4.3
Share of members less 6 years	17.6	17.0	18.3	18.7	17.7	17.3	17.7	17.7
Share of members 6-15 years	24.1	24.8	24.8	25.0	24.8	24.3	23.5	24.3
Concrete/tile flooring (non-earth)	25.8	25.4	26.0	25.8	26.4	25.8	26.2	25.0
Main source for lighting is electricity/generator/solar panels	11.7	10.7	9.3	11.1	11.7	11.7	10.7	10.7
Owns a mobile telephone*	30.8	30.6	29.4	29.8	30.8	34.0	29.8	28.8
Bicycle*	43.1	44.2	40.5	44.2	42.3	43.7	48.1	46.5
Owns any land	80.6	78.4	78.4	79.0	81.3	80.9	79.3	81.9
Acres of land owned (incl 0s)	3.3	3.1	3.1	3.5	3.5	3.2	3.5	3.2
Month of interview (1=Jan,12=Dec)	5.9	5.9	6.0	6.0	6.0	5.8	5.8	5.8
Number of households	504	504	504	504	504	503	503	503

Notes: * indicates statistical difference in mean across at least two pairs at 5 percent. See NBS (2002) for details on the adult equivalence scales.

Questionnaire changes lead to changes in consumption, poverty, & shared prosperity



- Beegle et al. (2012) provide experimental evidence on change in recall period
- Exact same instrument except increase recall period from 7 days to 14 days
 - => 12% drop in avg consumption
 - => 8 point (%) increase in poverty

Food Consumption, comprehensiveness

Bridging Surveys: a methodological experiment of food consumption data in Indonesia

BPS review of SUSENAS design

- Long-running HHS, pivotal role in poverty estimates
- Consumption module variation over 12 years
- Data quality and comparability less reliable

Susenas Consumption Experiment (SCE)

Improve data quality and reduce burden

Test shorter food lists & better design

Evaluate interviewer field methods

Also examined “bounding”



SUSENAS experiment: questionnaire modules

1. Benchmark (food items, 229)
 - 7 daily visits, 24 hours recall (All other modules 1 visit, 7 day recall)
2. Susenas 2014, as implemented (food items 229)
 - Provides a link to compare CE with actual 2014 Susenas
3. Susenas 2015, as implemented (food items 126)
4. Susenas 2015, Plus common design recommendations (126)
 - Yes/No filter question on all food items, ask both quantity and expenditure
5. Collapsed instrument (food items, 21)
 - Frequently used as shortcut for wellbeing
6. Short list version (food items, 94)
7. Bounded visits (food items, 94)
 - 24 hour recall on 1st visit (day 1), 7 day recall on 2nd visit (day 7)
 - Can examine value of bounding, can also compare within sample on recall lengths

Study Design: Sample & Instrument

SAMPLE design: 3 provinces (regional variation), 126 EAs. 24 HHs/EA – 4 in each treatment, 3,024 HHs total (500 per treatment group)

INSTRUMENT design, constructing short lists:

- **Regional Variation.** Susenas 2011. 6 geographic subsamples
- **Consumption Value & Diversity.** Ranked all food items by consumption share
 - top 25 overall food items in each regional sub-sample (total value coverage)
 - top 3 food items in each food group (food diversity)
- **Differentiation / Sorting.** Examine correlation (drop-out consumption gradient) between expenditure on each item and total (item drop-out) expenditure.
 - Steep gradients as useful 'sorters'. Included 3 largest and 3 smallest gradients.
- **Manual Editing.** Seek qualitative feedback on food list (selective)
- **Union.** Create union of various lists, examine, iterate until target %.



Results: List Length

- Findings consistent with existing literature, but different conclusion:
- Longer here is an overestimate (9-13%)
- ... and short is an underestimate (3-28%)
- *Our Collapsed*, is comparable (at home) but list is deceptively “short”

Food Consumption across Questionnaire Design (daily mean)

	Benchmark	2014	2015	2015- alt	Collapsed	Short	Bounded
Number of food items LISTED	229	229	126	126	21	94	94
Number of food items REPORTED	27.3	35.0	32.0	33.5	12.6	28.4	24
Food	52,224 (2,247)	54,081 (2,321)	52,805 (2,005)	47,326 (1,877)	41,730 (1,749)	44,982 (2,100)	32,724 (1,594)
- At home	35,416 (1,506)	40,895 (1,361)	39,107 (1,555)	38,863 (1,503)	33,512 (1,393)	35,163 (1,519)	24,650 (1,121)
- Less guests	49,076 (2,138)	51,419 (2,203)	50,178 (1,809)	54,070 (1,753)	40,214 (1,688)	42,224 (1,905)	31,194 (1,495)
- Away from home	16,808 (1,368)	13,186 (1,279)	13,697 (1,124)	8,463 (592)	8,218 (672)	9,819 (809)	8,074 (728)
Food, per capita	12,859 <i>(489)</i>	14,271 <i>(554)</i>	13,956 <i>(524)</i>	12,479 <i>(517)</i>	10,994 <i>(440)</i>	11,398 <i>(457)</i>	9,229 <i>(512)</i>
Coefficient of variation	3.81	3.88	3.75	4.15	4.00	4.01	5.54

Notes: Food, per capita is food at home less consumption by guests plus food prepared away from home, divided by household size. 24 hour is the first day of the bounded questionnaire. All values are in Indonesian Rupiah

Food consumption, recall or diary

Evidence is very mixed

Niger Consumption Experiment

- Objective: Assess the impact of survey methodology on poverty statistics. Survey experiment, n=205 households, 3 areas, 3 instruments.
- Motivation: Three different instruments had historically been used to collect food consumption data
 - 2005 CWIQ – Average monthly consumption, list of ~200 food items
 - 2007 HH Budget Survey – 7 day diary, open food list
 - 2011 LSMS Survey – 7 day recall
- Can comparisons be made about poverty over time in Niger?
- All questionnaires used the same module for non-food expenditures*

Source: Backiny-Yetna, Prospere, Steele, Diane, and Dijma, Ismael. 2014. The impact of household food consumption data collection methods on poverty and inequality measures in Niger. World Bank Policy Research Working Paper 7090. World Bank, Washington, DC. http://imagebank.worldbank.org/servlet/WDSContentServer/IW3P/IB/2014/11/05/000158349_20141105103930/Rendered/PDF/WPS7090.pdf

Niger key findings – food consumption

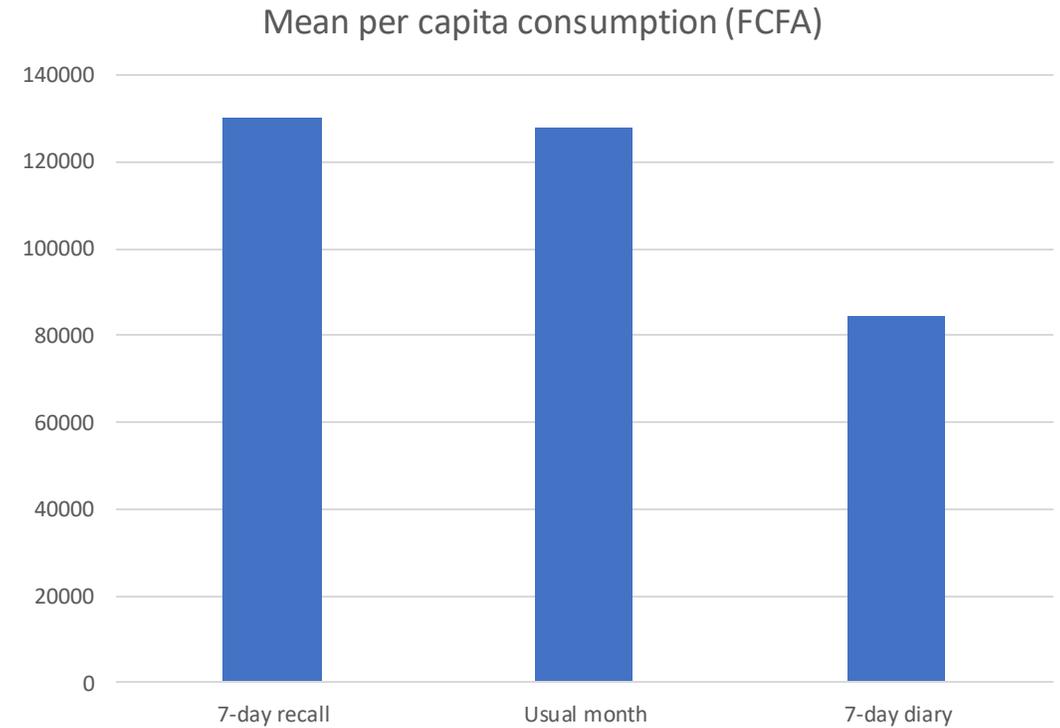
Experiment: Randomly allocate questionnaires to households within each stratum (area). Data suggests small samples are drawn from the same population. Most attributes similar across questionnaires.

Example: Questions on nonfood the same across 3 instruments, resulting distribution of non-food consumption:

- CWIQ avg month – 144,259 FCFA
- HBS 7-day diary – 131,033 FCFA
- LSMS 7-day recall – 143,343 FCFA

Check: Differences in food consumption remain with controls for gender and age of the head of the household.

7-day recall has the highest mean of per capita consumption; 7-day diary has the lowest



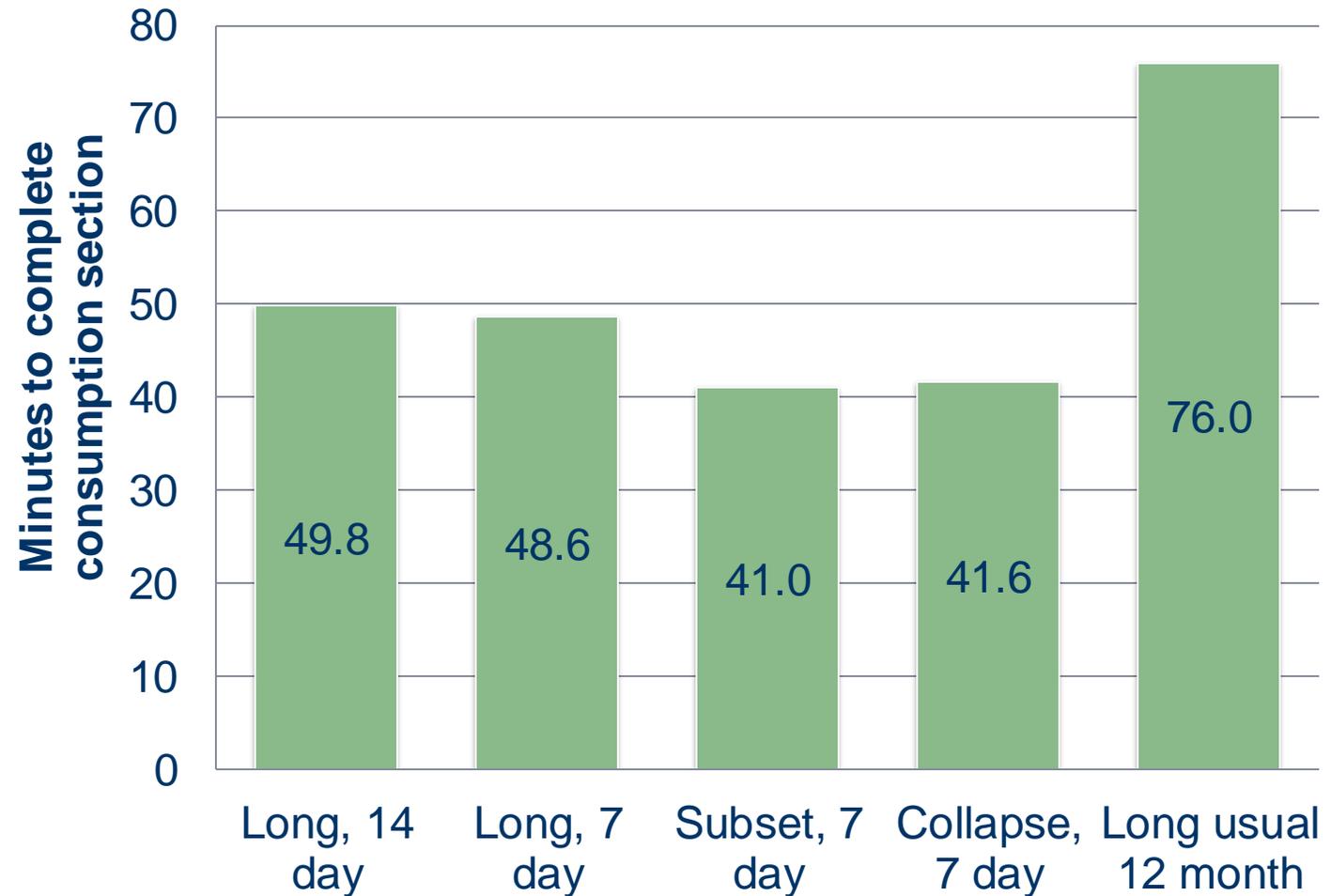
Some attempts to assess differences ...

- Russia: Individual diaries gave 6-11% higher expenditure than a household diary
- Papua New Guinea: Diaries result in 26% more food consumption than recall

Burden to respondents, enumerator & budget

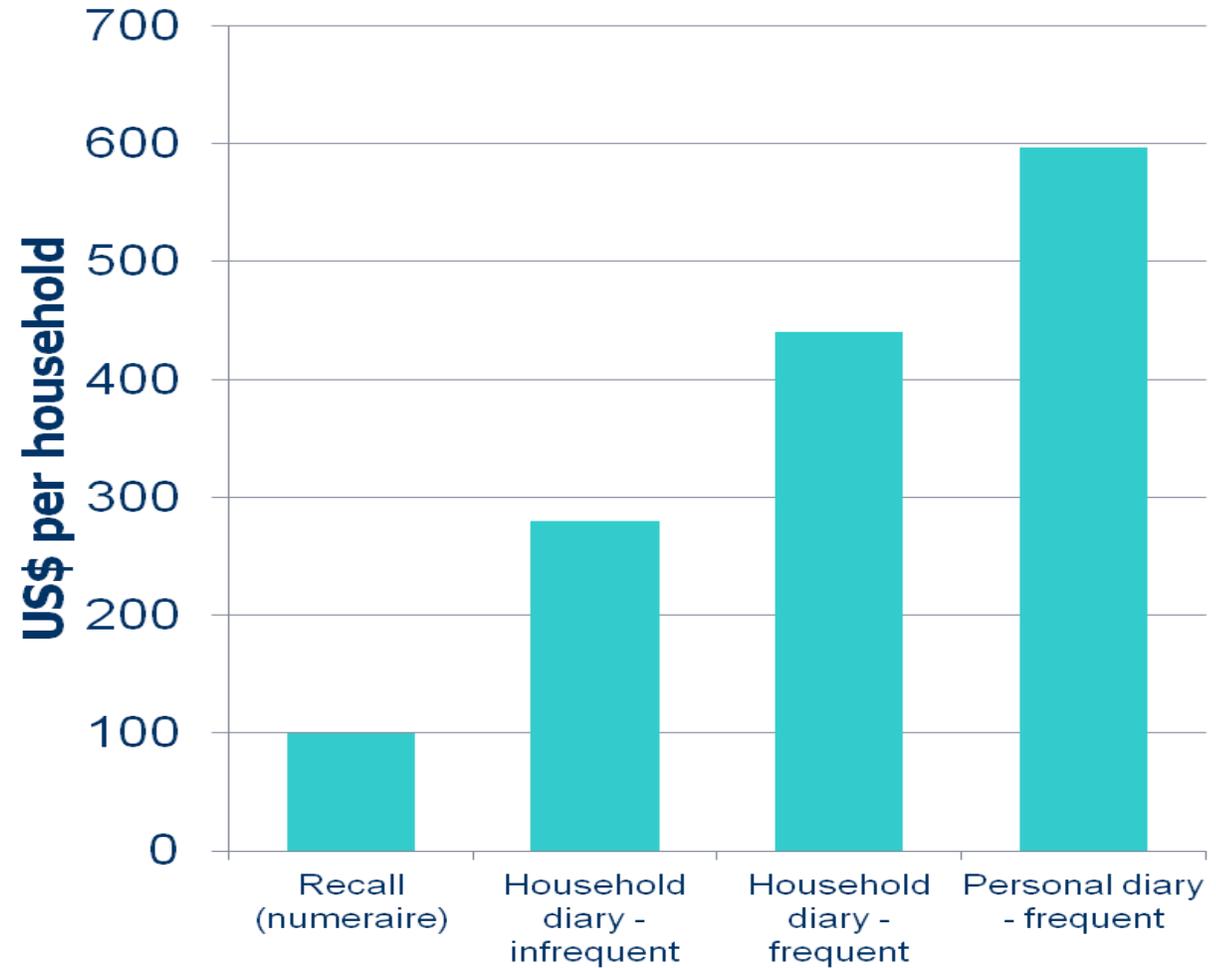
Tanzania experiment, Time requirements for recall

- no time saving from shortening the recall list or recall period (in this low income setting)
- Asking about “usual” month almost doubles the time
- Why do we sometimes ask about usual?



Tanzania experiment: Variable Cost Comparisons

- personal diary with frequent (daily or 2-daily) supervision has variable cost at least 6x as much as recall
- → Better data, but at a price
- Household diary is 4-7x as much, and does poorly in urban areas and when more adults in the household (“walking around money”)
- frequent supervision of household diary didn’t make much difference in Tanzania, except for illiterates



Malawi: Impact of Survey length, burden

- Q: Will households answer the same questions differently when burden differs?
 - Yes. Questionnaire design impacts what we measure even for identical questions, with non-trivial implications on predicted poverty & inequality statistics
- Experiment details
 - Standard questionnaire: 83 questions, short: 33
 - Time burden: Short - 23 minutes, Long- 109 minutes (medians)
 - Interview structure: 2 visits, 3 months in between, w/ standard or light questionnaire in each visit (determined randomly). Half receive the standard questionnaire on first visit and light questionnaire on second visit. The order is reserved for the other half.

Key findings

- Experiment (shorter) questionnaire corresponds to higher reporting
 - 7.1 percent for food consumption
 - 12.4 percent for non-food
 - 7.9 percent for experience of shocks
- Predicted poverty rates between 3 and 7 percentage points lower than the standard sample

Non-response

- Unit Nonresponse, Does not participate in the survey
- Item Nonresponse, Participates in survey, but does not respond to all questions
- Nonresponse rates are increasing
 - Historically with LSMS surveys, unit nonresponse was very low (2% common)
 - Unit nonresponse rates between 10-30% in MICS now common as income levels increase
 - Implications
 - Loss of information and precision (relatively easier solution).
 - Non-response bias when nonrandom. (more challenging)

Nonresponse in LSMS-ISA Anthropometrics

	1-5 Y.O SAMPLE SIZE	NON-MISSING AGE, WEIGHT, AND HEIGHT	% LOST TO NONRESPONSE
UGANDA 2009-2010	2,274	1,834	19%
TANZANIA 2010-2011	2,415	2,037	16%
NIGERIA 2010-2011	3,642	1,816	50%
MALAWI 2010-2011	7,478	6,930	7%
ETHIOPIA 2011-2012	2,312	2,224	4%

Nonresponse, discussion

- Nonresponse is a growing concern in all countries: -
 - More attention to respondent burden, more creative data capture
 - More funds to increase effort to address nonresponse, repeated visits included in budget
 - Non-responder surveys, capture observables

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