EXPENDITURE QUESTIONS THAT CONFORM TO CONSUMPTION PATTERNS

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Overview

The Indonesian Resource Mobilization Study (IRMS), a panel study of health status and health care provider utilization in 5300 Indonesian households, measured consumption of food and durable goods. While we also measured household members' income from labor force participation and productive assets, the consumption questions form the primary and most robust estimator of a household's ability to pay for health care. Limitations on the total interview time in IRMS demanded that consumption be reported by a single respondent on behalf of the entire household. The components of consumption on which we focused were foods purchased by the household and expenses for goods and services, from personal care items to transportation and tuition. Costs for all these items were gathered for a varying reference period of one day to one month and aggregated up to the 12 months preceding the interview.

While measuring consumption in developing countries may *a priori* be easier than measuring income from work and other sources, a large potential for measurement error still exists. Our goal in designing and pretesting the questionnaire was to develop a series of questions that was thorough in the information it delivered, but economical in size and in the demands it placed on respondents. In order to do this, we focused on ways to make the questions cognitively appealing for the respondents—that is, conforming to actual consumption behaviors rather than to the convenience of the analyst—and informative as to the purchasing patterns of respondents.

The Study

The format of the questions about household consumption resembles that used by many surveys in developing countries. A household respondent, usually the female responsible for regular marketing, is selected by the interviewer to report estimates of costs for purchasing different food and non-food items during a set reference period. In the Indonesian Resource Mobilization Study, the categories of food were based on those developed for the SUSENAS, a repeated cross-sectional survey of Indonesian households conducted by the Biro Pusat Statistik, the Indonesian equivalent of the US Bureau of the Census.

Each household respondent was asked to report expenditures for 34 different foods or groups of foods, organized according to type (staples, vegetables, dried foods, foods cooked with rice, spices, prepared and other foods), values for 13 different home-produced foods, and expenditures for 27 non-food items, including personal care and household supplies and regular expenses. For all these types of expenditures, we asked respondents to consider how many months out of the past 12 months each item was purchased (to correct for seasonality) and then to report both the *average frequency* of purchase and the *amount paid* at each purchase.

In reviewing existing consumption questions, we identified several problems which might lead to erroneous recall and estimation processes:

- Most questionnaires group individual items under category headings. While these categories may reflect generic similarities (e.g., coffee, tea and chocolate as ingredients for drinks), they often fail to reflect the actual market basket of products that consumers put together. In a consumption questionnaire, the typical taxonomy of items is less important than how foods are purchased by consumers. To the extent that a questionnaire forces respondents into grouping foods that they rarely or never purchase together, the estimation of individual costs may be inaccurate.
- Questionnaires that seek only *total* expenditures for items during the reference period force respondents either to use some heuristic to estimate the total (which may increase error) or to calculate a sum (which is burdensome). In the first case, respondents may simply use an estimating heuristic (Tversky and Kahneman, 1974), for example using an "anchor" for frequencies of purchase (I buy most items weekly . . .) and adjusting individual items' frequency through rough estimation (. . . but I buy rice more often). Depending on the question form and tendencies of individual respondents, use of estimating heuristics may overestimate expenses for infrequently-purchased items and/or underestimate expenses for frequently-purchased items. In the second case, respondents have the burden of recalling the frequency of purchase during the reference period, the average size of the purchase if the item comes in variable units, the average price of the purchase, and finally calculating the total expenditure based on frequency times average price.

To address these potential sources of errors, we designed a questionnaire that allowed respondents to report purchases of items in combination, and to vary the reference period. As in a conventional questionnaire, items of interest were listed individually under categories headings (for food, meats, vegetables, spices, etc.; for durables, entertainment expenses, electronics, books and magazines, etc.). However, the questionnaire was formatted so that respondents could report costs for both *groups* of items as well as *individual* items. For example, the questionnaire could accommodate the following exchange:

Interviewer: How much do you usually spend when you buy coffee?

Respondent: I always buy milk at the same time that I buy coffee.

Interviewer: How much do you usually spend when you buy milk and coffee together?

In a conventional questionnaire, the exchange above would require that the interviewer ask the respondent to estimate the individual prices for each item. Our revised format allowed the interviewer to record "combination code," allowing a single price for both items but recording which items were purchased in combination.

By adding this change to the typical sequence of consumption questions, we hoped to increase the ease and accuracy of the data collection without significantly increasing time of administration. In a pretest of the sequence with 50 households, we found the changes posed required a high degree of interviewer training but appeared to function satisfactorily. The remainder of this paper examines the results of changes in the 5300-household survey data.

Results

We hypothesized several elements that might define the success of the combination code: (1) the extent to which it was used; (2) patterns with which it was used; and (3) net time savings, if any, for questionnaire administration. The first of these elements is superficially the most important—if the combination code was not used frequently by respondents, then it was superfluous. Tables 1 to 4 describe usage rates for the combination codes by several different criteria.

As Table 1 indicates, use of the combination codes across all households was high, although more household items were reported in combined purchases than were foods. Slightly under one-fifth of each type of purchase was reported in combination, and combined purchases account for slightly over one-tenth of expenditures reported by all households. Across respondents, use of the code was widespread—45 percent of respondents used the codes at least once in reporting food expenditures, and 56 percent reported two or more household goods in combinations.

Table 1. Differences in Proportions Using Combination Code by Items Purchased, Total Expenditures and Households

Expenditure type	Percentage Using Combination Code[a] Of purchases	Of total expenditures	Of all households
Foods	14.0%	12.8%	45.5%
n			5304
Household items	21.4	13.5	55.9
n			5308

[a] Rows and columns do not add to 100% because only proportions *using* code are presented.

Location of sample households had mixed effects on use of the combination code (Table 2). Use of the code did not differ significantly for reporting purchases of household items; however, urban households were more likely to use the code in reporting foods than were rural households (56 percent versus 42 percent). A similar interaction exists with household income (Table 3). While high income households were somewhat more likely to use the code in reporting food purchases (48 percent to 42 percent), these same households were less likely to use the code in reporting non-food purchases (50 percent to 61 percent).

Table 2. Differences in Proportions of Households Using Combination Code by Urban/Rural Locations

Expenditure type	Percentage Using Combination Code In urban households	In rural households	In all households
Foods	56.3%	42.0%	45.5%
n	1310	3994	5304
Household items	53.9	56.5	55.9
n	1315	3993	5308

Although we were not able to address the sources for these interactions empirically, the difference in shopping choice sets could serve as an explanation. On the whole, wealthier and urban households purchase more goods and therefore are more likely to use the combination code in reporting purchases. At the same time, those households have a larger choice set for sources for shopping, particularly for non-food expenditures (for example, shampoos and toothpaste, movies, private education, insurance, etc.). Because their choice set is larger,

urban households and households in the top income quintile are more likely to divide their non-food purchases among different vendors and times, reducing the likelihood of combined purchases. The reverse is true for foods: rural residents tend to purchase goods from many small vendors daily, while urban shopping is increasingly concentrated in larger markets and distinct shopping trips separated by several days, producing higher reporting of combined purchases.

Table 3. Differences in Proportions of Households Using Combination Code by Level of Expenditures

Expenditure type	Percentage Using Combination Code: Top quintile	Bottom quintile	In all households
Foods	47.7%	41.6%	45.5%
n	1057	1065	5304
Household items	49.6	61.1	55.9
n	1061	1065	5308

Finally, usage varies somewhat by size of household, particularly for non-food purchases. As one would expect, larger households used the combination code at a higher rate, by about 3 percentage points for foods and 17 points for non-foods. Analysis of other differences in households that might produce different patterns in use of the combination code, including presence of servants and head of household, produced equivocal results.

Table 4. Differences in Proportions of Households Using Combination Code by Size of Household

Expenditure type	Percentage Using Combination Code: One to four members	Five or more members	In all households
Foods	43.8%	47.2%	45.5%
n	2646	2658	5304
Household items	47.3	64.4	55.9
n	2650	2658	5308

While a combination of one or more items was used by a high proportion of households and with some consistency, less than 4 percent of food expenditures and 7 percent of non-food expenditures overall were reported in combination. Moreover, the large majority of respondents combined the same few items in their reports of expenditures. Table 5 presents the proportion of expenditures reported singly and in several combinations for food and non-food expenditures using *expenditures* rather than households as the denominator. The data show that the large majority of households combined the same items—for foods, sugar and coffee or garlic and fish paste; for non-food items, adult and children's clothing.

Table 5. Patterns of Combinations for Food and Non-Food Expenditures

Type of combination	Proportion of expenditures
Food expenditures n=96,295	
No combination—single items	96.2%
Some combination—two or more items	3.8
Sugar and coffee	12.5
Garam (spice) and fish paste	12.2
Fresh fish and salted fish	9.8
Leafy vegetables and legumes	8.1
Garam, fish paste and other spices	6.6
Meats and poultry	5.1
Coffee and tea	4.7
Other combinations	41.1
Non-food expenditures n=51,428	
No combination—single items	93.0%
Some combination—two or more items	7.0
Adult's clothing and children's clothing	65.2
Bath soap, toothpaste, shampoo and washing-up soap	7.2
Adult's clothing, children's clothing and fabrics	4.5
School uniforms and school supplies	4.0
Bath soap and toothpaste	3.9
Bath soap and washing-up soap	2.8
Other combinations	12.3

Among all expenditures reported in combination, the average number of items combined was 2.7, with a range of 2 to 24 items. Among all expenditures, the average number combined was 1.07.

We examined two proxies for data quality: (1) between-interviewer differences in use of the combination code; and (2) differences in times of questionnaire administration between respondents who did and did not use the combination code. In the case of interviewers' use of the code, anecdotal evidence from the field suggested that interviewers had different levels of understanding of how and when to use the combination code, which could lead to different utilization rates by respondents. Indeed the percentage of items reported in combination varied significantly by interviewer, ranging from zero to 19% (mean=.040, SD=.038). We have no way to parse out how much of this difference was due to interviewer effects as opposed to response effects. However, all interviewers received very similar assignments

in terms of size and geographic distribution, so that location or urbaness of assignments is unlikely to account for much difference in use of the code. We conclude that a subset of interviewers had widely differing understanding of, and use for, the combination code. As is often the case, these interviewers' own discomfort translated into inadequate explanation and use of the code for respondents.

Finally, we examined differences in time for questionnaire administration using differences in use of the code and controlling for interviewer. Use of the combination code was a significant predictor ($p \leq 0.00$) of the whole questionnaire length (mean=107 minutes). Since the consumption section was one of the single longest sections of the questionnaire, economies in administration time for that section result in lower overall times for administration.

Unlike the combination code, the additional question which allowed respondents to select varying reference periods for each expenditure failed unequivocally. While respondents grasped the concept easily, interviewers frequently confused units and time period in recording responses. For example, a respondent who said she purchased shampoo once every two months should have been recorded by the interviewer as "every 2 months" or "every 8 weeks." However, interviewers frequently misinterpreted such responses as twice a month, and recorded "every 2 weeks." While the percentage of responses known to be recorded incorrectly was minimal, between-interviewer differences were tremendous—one interviewer, whose error rate was 14 percent, accounted for the majority of error. We conclude that, while conventional fixed reference period questions may force respondents into less precise estimating processes, their simplicity minimizes data recording errors.

Discussion

Our analysis shows that the combined expenditure code was used in more than half of household interviews, although use varied by type of household, expenditure and by interviewer. However, most of the market baskets consisted of the same few items purchased in combination. The usefulness of the revised format should be considered as a trade-off between ease of administration and reduction in burden against data quality. Our results suggest that, with pretesting, one could arrive at a similarly efficient but simpler format by simply offering common market baskets rather than combinations of individual items. However, our format would be useful when (1) consumption patterns are a substantive focus of the survey or (2) when the contents of market baskets vary widely among the survey population. The costs of using the code, informally assessed, are not very high: the instrument must be formatted to allow for the combination code, the training curriculum for interviewers must be altered to include use of the code, and data entry must be designed accordingly. As our analysis by interviewer indicates, the highest cost (and benefit) is likely to be in training: the frequency with which the combination code is used is directly affected by how well interviewers explain and use it. Inadequate preparation will increase the potential to confuse both interviewers and respondents, reducing data quality.