2022

IARIW-TNBS Conference on "Measuring Income, Wealth and Well-being in Africa"

Determining Calorie Contribution of Food Consumed Away from Home: An Application to the Construction of a Cost-of-Basic-Needs Poverty Line

Kristen A. Himelein (World Bank)

While there are a number of variations in method, the objective in constructing a food poverty line is to determine and price a bundle of goods that meet the basic consumption needs of a household, which is calculated by "the food expenditure necessary to attain some recommended food energy intake… augmented by a modest allowance for non-food goods" (Ravallion, 1994, p26). Much of the research around these calculations has focused on determining the approach threshold value for the food energy intake or on setting the non-food component, while the calculation of the food energy intake itself was treated as a simple accounting exercise based on the amounts from the survey and calories per 100 grams from auxiliary data. These calculations have become more difficult as food consumed away from home has become a larger share of the consumption basket, due either to changing dietary patterns or improved efforts in surveys to accurately capture this information.

This paper describes a method developed using data from an experimental survey conducted in the Republic of the Marshall Islands (RMI) to translate spending of food away from home into calories for the purposes of the calculation of a poverty line. The paper proposes the use of a "multiplier" to convert food spending into calories by estimating the share of spending that is captured by the food vendor either to cover expenses or as profit. Central to these calculations is the assumption that food purchased outside the home is fundamentally similar to that which is consumed within, which is recognized as a strong assumption but testing it is beyond the scope of this work.

Data

To conduct this analysis, data from the RMI consumption experiment was used. Specifically, the following calculations make use of the partaker (non-household members joining for certain meals) and food away from home diaries conducted for the highly monitor paper and tablet arms of the experiment to calculate multiplier values for breakfast, lunch, and

dinner. Since the experiment was designed for a different purpose, the sample size available for this analysis was limited – only 120 households across six atolls – with 38 households having purchased at least one breakfast outside the household, 58 having purchased at least on lunch, and 30 having purchased at least one dinner – from a total sample size of 716 households out of a total national population of 9,214 households.

Analytical Approach & Results
        The diary arms of the RMI consumption experiment include detailed information on the household spending on food; the number, cost, and type of meals (breakfast, lunch, dinner, hot drinks, soft drinks, and snacks) consumed outside the household by household member; and the number and type of meals (breakfast, lunch, and dinner) consumed within the household by non-household members age 0-5, age 6-15, and age 16 and older. With this information, the number of per adult equivalent breakfasts, lunches, and dinners consumed within the household and the total household spending on food; the number of and spending on per adult equivalent breakfasts purchased outside the household; the number of and spending on per adult equivalent lunches purchased outside the household; and the number of and spending on per adult equivalent dinners purchased outside the household. The diary also included an individual-level question on the location of each meal (breakfast, lunch, dinner, hot drinks, snacks, and soft drinks) with the answer choices (1) away from home (paid), (2) away from home (free), (3) at home, and (4) did not eat, which allows for the construction of a reliable estimate of the per adult equivalent number of meals.

To compare the average cost of a single meal consumed outside the household with the average cost of the same type of meal consumed within the household, holding all else constant, it is possible to compare the ratio of the coefficients from two linear regressions.

For consumption within the home, the model is:

$$\ln(Y\_T) = \beta X + \alpha Z + \mu \qquad (1)$$

Where $\ln(Y\_T)$ is the log total food spending in a given household, including beverages; X is a vector of the number of per adult equivalent meals for breakfast, lunch, dinner, hot drinks, soft drinks, and snacks; α is a vector of dummy variables for the atoll of the household and an indicator variable for which arm of the experiment the household was in; and μ is the error term.

For consumption outside of the home, the model is:

$$\ln(Y\_i) = \beta X\_i + \alpha Z + \mu \qquad (2)$$

Where $\ln(Y\_i)$ is the spending on meal i consumed outside the household, X_i is the number of per adult equivalent meals of type i consumed by the household, and α and μ are as above. Equation (2) is limited to the sample of household that have non-zero spending on a given meal. The construction of the regression is a bit atypical in that it is a Regression Through the Origin (RTO) rather than a standard Ordinary Least Squares (OLS) formulation, but in this case an intercept does not make sense as it is not possible to have non-zero spending if no food or meals were consumed.

Comparing the ratio of the exponentiations of the β from equation (1) with the corresponding meal equation (2) regression, the following ratios are found: Breakfast 1.33, Lunch 1.10, and Dinner 1.52. Not every survey, however, captures food away from home at the level of the meal. Repeating the analysis with the spending and number of meals aggregated, the ratio of the exponentiations is 1.24.