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from Household Level Data**

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Philippine National Health Accounts: Estimating Individual Person Health Expenditures from Household Level Data¹

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ABSTRACT

The NHA of the Philippines has steadily been providing data important to health policy-making for more than a decade now. To maintain as well as further expand its usefulness, the Philippine NHA underwent major restructuring in 2004-2005 specifically in classifying health expenditures by uses of funds. The revised, new NHA now includes several types of breakdown by uses, and among these is the breakdown by age group of beneficiary of health care spending. The primary sources of data for household out-of-pocket (OOP) spending for health of the Philippines NHA are the two surveys regularly conducted by the National Statistics Office (NSO) and these are: the Family Income and Expenditure Survey (FIES) and the Annual Poverty Indicator Survey (APIS). These two surveys, however, only report health expenditure totals at the household level and, thus, actual health expenditures by individual household members are not known. To generate the age breakdown of household out-of-pocket health expenditures for the NHA, a number of approaches were explored including the (1) household per capita approach, (2) the regression approach and (3) the use of related or proxy information or the equivalent scale approach. Results from the application of these three approaches were generally found to be consistent – the age profiles all had the expected U-shape, higher mean spending for the very young and the elderly.

I. Introduction

The revised Philippines' National Health Accounts (NHA) now includes a table showing national health expenditures with a breakdown by age of beneficiary of the health care spending. This expenditure breakdown by age is shown for every type of payor for health. Payors for health in the Philippines include the national and local governments, PhilHealth, private health insurance, employer provided schemes, households (out-of-pocket for health care), and others such as non-profit institutions.

The primary sources of household out-of-pocket health expenditure data in the Philippines are the two household surveys regularly conducted by the National Statistics Office (NSO.) The Family Income and Expenditure Survey (FIES) is conducted every three

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years, for example in the years 1997 and 2000, and the Annual Poverty Indicator Survey (APIS) is conducted during non-FIES years, starting in 1998. These two surveys report health expenditures only at the household level. That is, data on health expenditures of individual household members are not available. Thus, the data needed to fill up the new NHA Table showing breakdown of health expenditures by age could not be obtained through direct methods from either the FIES or the APIS.

The surveys, however, include information on the ages of members of households as well as on other health-related variables including individual members' health/illness status and health facility utilization. These additional data together with household health expenditure data can be used to estimate individual level health expenditures through various "indirect" approaches. Three such approaches (described in Section 2) were applied to the 1999 APIS data. Results of the computations are presented and discussed in Section 3. Section 4 provides a summary of findings and some conclusion.

II. Approaches to Estimating Individual Level Expenditures from Household Level Data

NHA Data Requirement

The basic data required to fill the new NHA Table (with the age breakdown) is the age profile of out-of-pocket health expenditures. Thus, the outputs needed from the application of the three approaches discussed below are estimates of average health spending per person for every single year of age.

Household Per Capita Approach

In this approach (Racelis, et. al, 2004), the age profile of household health spending is generated in two steps. First, the total health expenditures of a household is divided by the total number of members. The computed value for household per capita health spending is then assigned as an estimate of the individual spending of every member of the household. An underlying assumption being made here is that all household members had incurred (equal) health expenditures during the survey year.

Second, when the assignment of individual member health expenditures has been done for all households (i.e., Step 1 completed for all households), pool all individual

persons or members of all households and sort by age. Then compute for the average health expenditures for every single year age group.

Regression Approach

In the regression approach (Racelis, et. al., 2003), a regression equation is estimated using ordinary least squares (OLS.) Household health expenditures “H” is the dependent variable, the numbers of household members “n_i” at each age “i” (in single years) are the independent variables and the intercept is set to zero as follows:

$$H = b_0n_0 + b_1n_1 + b_2n_2 + \dots + b_in_n + e$$

The estimated regression coefficient “b_i” is the estimated average health expenditure per person for individuals age “i” years. That is, the estimated regression coefficients together constitute the age profile for out-of-pocket health spending.

Equivalence Scale Approach

In this approach (NTA, n.d.), the age profile of household health spending is generated in three steps. First, equivalence scales for household health spending needs to be obtained. The equivalence scales basically indicate the relationships of the mean expenditures of the different age groups (relative) to the mean expenditures of a reference age group. For example, per person teen-age health spending is estimated to be a ratio f^{13-19} and the elderly spending to be a ratio f^{65+} of (per person) prime age adult health spending, where f^{13-19} is generally less than 1 and f^{65+} is generally greater than 1. The ratios are referred to as the equivalence scales. The equivalence scales from another country with similar health conditions may be used. Or these can be generated using country data on health-related, non-expenditure variables such as that done for the application presented in this paper. Data on health facility utilization of individual household members were used to construct the equivalence scales.

Second, as in the Household Per Capita Approach, the household health spending (H) is allocated to members. But instead of equal allocation, the equivalence scales (f^i) are used as weights to compute for the share (H^i) of every member. The health expenditure of an individual household member of age “i” is estimated as follows:

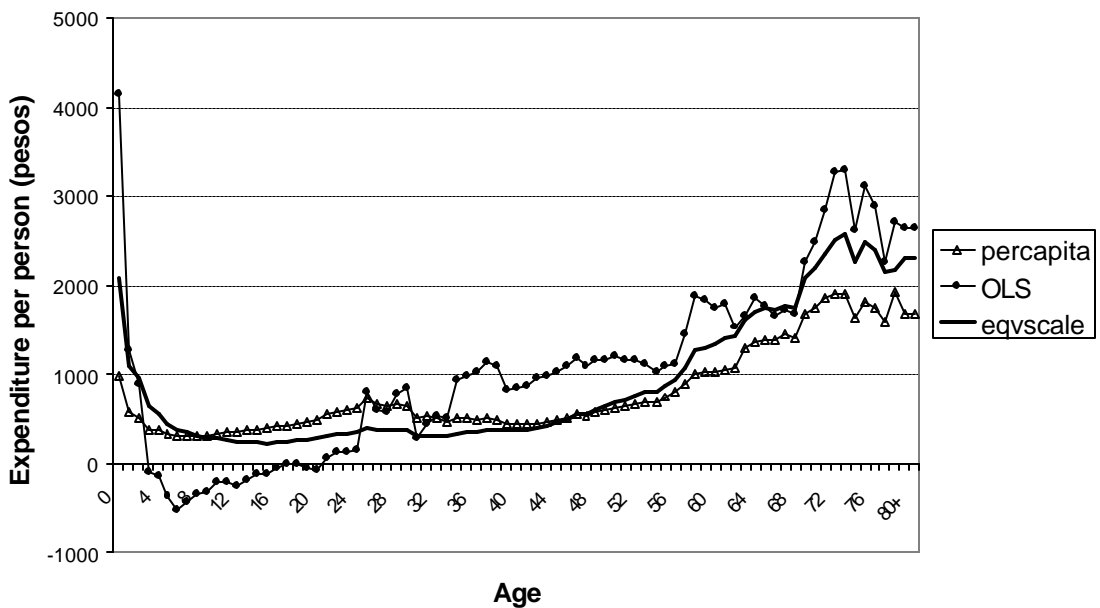
$$H^i = H \times (f^i / (S_{\text{all members}} f^i))$$

Third, as in the Household Per Capita Approach, after the assignment of individual member health expenditures has been completed across all households then average health expenditures for every single year age is computed.

III. Applications Using the 1999 Annual Poverty Indicator Survey (APIS)

The three approaches were applied to the 1999 APIS data and the age profiles generated are shown in Figure 1.

Figure 1. Health expenditure per person by age: 1999 APIS and three methods



In general, the estimated age profiles of household health expenditures generated by all three approaches have the expected U-shape, where the per capita expenditures for very young children and the elderly are generally higher than for the rest of the population (Keehan, et. al, 2004; Lee, et. al, 2004; Racelis, et. al, 2003).

The U-shape profile is captured in the results of the Household Per Capita and the Regression Approaches because households with members who are “expensive” health-wise (i.e., the very young and the elderly) generally tend to have higher out-of-pocket

spending for health. In the Per Capita Approach, the computed per capita health spending is higher for such households on average; and, on the contrary, (on average) lower for households where there are neither very young or elderly members. In the Regression Approach, the estimated regression coefficients showed that the additional health spending to household is higher with the addition of very young or elderly individuals as members of the household. The age profile from the Household Per Capita Approach tends to be flatter compared to the other two profiles because of the “averaging” effect. The Regression Approach over-exaggerates the “smallness” of health spending for older children and teenagers, presenting negative coefficients.

The Per Capita and the Regression Approaches use only two sets of information to estimate the per capita health expenditure profile by age, i.e. total household spending for health and age composition of household members. The Equivalence Scale Approach, in addition to using total household health spending and membership data, incorporates information on differences in intensity of use of health services among persons of different ages. This third approach can also be described as a variation of the Household Per Capita Approach, wherein instead of the equal weights assigned to each household member, the member weights vary according to the intensity of use of health services. In general, the very young and the elderly in the Philippines have been found to be heavy users of health care services and health facilities (Racelis, et. al, 2003.) The resulting U-shaped age profile for health spending from the Equivalence Scale Approach (where the scales are based on health facility use) may then be viewed as a case of transferring the age profile of health facility utilization to health expenditures.

IV. Summary and Conclusion

Estimated Philippine age profiles for household out-of-pocket health expenditures generated using three different approaches have the expected U-shape. The profile based on the Household Per Capita Approach is generally flatter compared to those generated using the other two approaches. The Regression Approach generates negative values for mean spending for older children and teenagers.

Given alternative approaches for indirectly estimating the age profile of out-of-pocket health spending, how should one choose which approach to use? There are two sets of factors that should be considered – conceptual and practical considerations. Conceptual considerations include: (1) are the underlying assumptions of the approach realistic?; and

(2) are the results (e.g., negative mean spending) acceptable? Practical considerations include: (1) are additional (non-expenditure) health-related data available?; and (2) can the computational procedures easily be carried out?

Some of these considerations will prevail over others, more particularly data constraints. One important rule to follow in the selection of the approach is to fully utilize or optimize every piece of data available. With the use of more information, the estimated age profile would hopefully be a closer or more realistic representation of the true profile.

References

Keehan, Sean P., Helen C. Lazenby, Mark A. Zezza and Aaron C. Catlin, *Age Estimates in the National Health Accounts*, Health Care Financing Review, Vol. 1, No. 1, December 2004.

Lee, Ronald, Sang-Hyop Lee and Andrew Mason. Individual Earnings and Consumption Profiles: What Do We Know? (November 29, 2004 Rough and incomplete draft)
www.ntaccounts.org

National Transfer Accounts. Flow Account Methods: General Guidelines. (no date)
www.ntaccounts.org

Racelis, Rachel, Gerard Russo and Andrew Mason. "Baseline Estimates of Health Care Expenditures of Older Persons: Philippines, 1994." Honolulu: East West Center, Aging Populations: Health Systems and Policy Reform Project, November 2003

Racelis, Rachel H., Fe Vida N. Dy-Liacco, Racquel Dolores V. Sabeñano, Maylene Beltran and Thiel Manaog. "The National Health Accounts of the Philippines: Continuing Development and New Findings." Paper prepared for the Forum on Population, Social Services and Development in the Philippines in Honor of Dr. Alejandro N. Herrin held at C. P. Romulo Hall, NEDA Building, Makati City, 14 August 2006.