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Working Paper

Patterns of Health Care Expenditures, Utilization and Demand for Medical Care in Sample Philippine Households

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Patterns of Health Care Expenditures,
Utilization and Demand for Medical Care
in Sample Philippine Households:
Evidence From Primary Data

Ma. Cristina G. Bautista

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June 1995

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**PATTERNS OF HEALTH CARE EXPENDITURES, UTILIZATION
AND DEMAND FOR MEDICAL CARE IN SAMPLE PHILIPPINE
HOUSEHOLDS: EVIDENCE FROM PRIMARY DATA**

A FINAL REPORT

Submitted to the
Philippine Institute for Development Studies (PIDS)
and the
Department of Health (DOH)

By
Ma. Cristina Ginson-Bautista

February 1994

**Patterns of Health Care Expenditures, Utilization and Demand
for Medical Care in Sample Philippine Households:
Evidence from Primary Data**

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ABSTRACT

Patterns of Health Care Expenditures, Utilization and Demand for Medical Care in Sample Philippine Households: Evidence from Primary Data

by

Ma. Cristina G. Bautista

INTRODUCTION & STUDY OBJECTIVES

Tight fiscal budgets have led health care planners to explore alternative financing mechanisms, particularly in personal care services covering outpatient and inpatient care and some preventive services. If health programs are to be effective and sustainable, such that people may be willing to shoulder some of the costs to obtain them, planners must understand the mechanisms that govern households' decisions to seek care.

Knowledge of health seeking behavior can contribute to policy in the following ways: First, variations in health conditions can be viewed as outcomes of households' differential behavior in engaging in health-improving activities and response to health technologies. The influence demographic conditions and household structures are therefore of policy interest. Second, knowledge of these determinants can guide planners to influence household behavior towards the use of various health care inputs by altering the way households perceive and respond to the costs and benefits of these inputs. Such understanding can help determine the wisdom of mechanisms to make people pay for health care. Impacts across groups are likely to be uneven and mitigating adverse impacts require understanding of how various groups are likely to respond to changes in financing policy.

The study looks into health seeking behavior of sample Philippine households using survey data in order to determine the implications for health care financing policy reforms. The survey, conducted in the latter part of 1992, was designed to answer three research objectives:

1. To describe the socio-economic and demographic determinants to health care utilization, particularly for outpatient, inpatient and prenatal care services;
2. To determine the responsiveness of households to changes in economic variables of prices, income and time costs to their demand for health care; and
3. To gain insights into risk-sharing participation by households.

The understanding of determinants for health care demand from an examination of health of household decisions regarding the choice of provider, hospital length of stay and prenatal care will enable policymakers to identify patterns of service use, especially by income groups and households willingness to pay. Knowledge of these issues can point to certain policy

instruments that will promote appropriate use, enhance equity in health service utilization and provide a means for harnessing household payments as a steady source of financing for the health sector.

BRIEF REVIEW OF LITERATURE

Health care demand in the Philippines has been the subject of pioneering work in the area. The work by Akin, et. al (1985) on the demand for primary health care services in the Bicol region broke ground for current global initiatives in health financing. The study noted an almost total lack of statistical significance of the economic variables, i.e. time and prices. Work by Ching (1985; 1986) on the same data base yielded similar findings.

For the outpatient analysis, the study utilized the framework introduced by Gertler and colleagues in their analysis for Ivory Coast and Peru. The advantage of their approach is that the equity issue is more directly tackled and an estimate of willingness to pay is made. Ching (1990) applied a similar analysis to Philippine data using a sub-sample of children. This study differs from Ching in terms of the use of generalized sample (children and adults combined) as well as in the estimating technique used. Our outpatient provider choice model used a nested multinomial logit full-information likelihood technique. This study also analyzed welfare effects of price changes for both urban and rural samples.

The analysis on demand for hospital care is largely exploratory. We have not come across any local study dealing with the topic. An earlier work by this author for this same project, using secondary data, and following the model in Russo and Herrin (1991), showed that demand for hospital care is highly responsive to changes in income. This study extends that analysis using survey data to look into the factors that affect hospital utilization of individuals. The use of multivariate technique is applied in the examination of hospital length of stay.

The study on demand for pre-natal care extends an earlier work on prenatal care use by Wong, et. al. (1987) and Schwartz, et. al. (1988) on infant delivery choices. These studies utilized Cebu-based samples. Aside from differences in techniques and in the use of certain variables, this study also estimated for quality of care not as an independent variable but as one of the dependent variables of interest. The quality variable highlights a productivity aspect of the visits made.

FINDINGS

A. Outpatient Provider Choice

1. Prices and income play important roles in the demand for medical care. A low income individual will choose to have additional consumption (of other goods) than additional health/health care. Demand for one provider is sensitive to another provider's change in price.

2. Household composition (having more adults or children) in the household significantly explains demand. Being male and older would more likely lead to care-seeking from government hospitals. If older means more serious and acute medical cases, then government hospitals are likely to deal with more expensive cases then. Public clinics are well-targeted in terms of client base; with being female and having more children significantly explaining use of public clinics. Health status variables did not come out to significantly explain choice of provider.
3. The poor are more price sensitive than the rich. Price increases for private doctors and government hospitals are likely to lead to a greater than proportionate reduction in demand. For public clinics, price changes are likely to cause the middle income group to reduce demand.

Health care financing reforms, particularly those than intend to levy fees in government facilities are likely to be regressive – resulting in reductions in lower income groups’ utilization. With careful targeting, the upper income groups can be levied fees without the proportionate reduction on their utilization.

4. Compared to price elasticities, the poor’s responsiveness to time is of smaller magnitude, implying *that prices determine their demand for government hospitals more than time costs*. An implication of this findings is that public pricing policy can discriminate in terms of location. Centrally-located facilities can charge higher relative to sub-central levels. Charging of upper income groups’ use of government facilities should be made to improve services for the poor, rather than expanding services geographically.
5. *For urban areas, imposing prices in public facilities will see people shifting to private sources of care. In rural areas, imposing prices in public facilities will cause people to drop-out of the market and go into self-care instead.* If public facilities are priced the same as private, people would prefer private facilities. Any public pricing policy is likely to increase private facilities’ revenues, holding other things constant.
6. Prices changes in public facilities result in individuals being generally worse off. The amount of subsidies needed to accommodate price changes would comprise from 5 to 10 percent of household budgets. If these subsidies are not realizable , and no alternative financing scheme will be in place, then households are better off without the price change.

However, reinterpreting the subsidy levels in terms of payments for voluntary risk-sharing participation, basic medical insurance coverage, like Medicare I, can be affordable to those with incomes of P2,500. Higher level health insurance or maintenance will hardly be affordable even for those with incomes of at least P6,600 per month, at current prices.

B. Demand for Hospital Care

1. There was relatively little variation in length of stay (LOS) across hospital types, i.e. government hospitals, private hospitals, and private clinics.
2. Average costs in private hospitals were double that of the two other types. While the lowest cost is incurred for government hospitals, the lowest income group incurred the highest per capita cost of confinement in government hospitals. This may be indicative of the lower health status of the poorer group which require more intensive use of hospital services. (Unfortunately, we cannot analyze for cost differentials by controlling for case-mix). Cost per person in private clinics was highest, with the middle income group reporting the highest per person cost. Higher costs in private clinics indicate relative inefficiencies.
3. Of the total average cost of hospitalization, MEDICARE reimbursement covered only a small percentage of total cost ranging from one percent of government hospitals to 3.4 percent of private clinics. The higher support from MEDICARE for private clinic costs confirms findings from another study (Griffin, et. al.) regarding the importance of MEDICARE reimbursement in smaller private clinics' operations. These point to the relatively inefficient of these facilities. The extent to which MEDICARE reimbursement is contributory to such inefficiencies needs further investigation.
4. Majority (57%) reported financing hospitalization from savings, followed by borrowing. Medicare as source of financing was reported by 7 percent of respondents. One-fourth of the lowest income group reported borrowing as compared to just 10-14 percent of the other income groups. Mean reported interest for borrowing was 20%. The sale or mortgage of property was reported by the most number of households reporting selling or mortgaging a property. Mean value of animals sold was P2,858. Appliances were the next popular item sold, followed by land (ave. value P40,000) and jewelries.
5. The length of hospital stay (LOS) is determined by the price of hospital care, the income of the household and being in urban areas significantly influenced LOS. Personal characteristics and health status variables did not influence LOS. But length of hospital stay is relatively insensitive to changes in price and income. A 10 percent increase in gross hospital price reduced the number of days' stay in the hospital. A 10% increase in income will result in a 0.8 percent increase in length of stay. The number of doctors and clinics in the area reduced length of stay. It appears that increasing a number of doctors and clinics can be expected to decrease length of stay probably due to early detection, precluding the need for longer stay. It could also be related to the service structure where majority of doctors may not directly be affiliated with the hospitals, hence, lowering incentives for intensive use of hospitals.

C. Demand for Prenatal Care

1. Determinants of the Month of First Visit

The higher the visit price, the less likely that early prenatal care will be sought. The less travel time required the more likely an early visit will be made. That the attendant to the visit would be a doctor also increases the likelihood that the prenatal care visit would be made earlier. The presence of an adult woman in the household may postpone one's seeking early prenatal care. This implies that the target of information drives for maternal care need not be the pregnant woman herself but those who have some influence to her decisions, like her mother. The more years of schooling, the more likely early prenatal care will be made.

2. Determinants of Demand for Quality Prenatal Care

Quality here is defined in terms of mean visit prices of attending personnel expressed as an index number relative to the price of public health nurse or midwife. Gross visit price, which include transport costs, significantly explained demand for the higher priced alternative. A 10% increase in price will increase demand by 8.3 percent for the higher quality care. Prenatal care services perceived to offer relatively higher quality can charge for the service and not expect any reduction in revenue. The increase in transport cost may see a substitution away from quantity of visits towards quality. The longer the TIME it takes to visit the higher quality option, the less likely the demand.

3. Determinants of Prenatal Care Choice of Provider

The demand or choice for government hospital is explained strongly (and in the expected directions) by price, number of children below 5 years, transport costs, the spouse being in skilled occupations, the opportunity cost of time of woman, and that the attending personnel is a doctor. Women are more willing to travel far for prenatal care so long as the visits are outside work time and that their wages are not affected by seeking care. This signifies the importance of public clinic schedules in care-seeking by pregnant women. Changes in economic variables impact weakly in the probability of seeking care, especially in the rural areas.■

Chapter One

INTRODUCTION

1.1 Study Objectives and Scope

This is a study on health seeking behavior by households using primary-gathered data. The study seeks to answer the following policy and research questions:

- 1.1.1 What factors influence health seeking behavior by households? How do these factors vary by socioeconomic conditions of households?
- 1.1.2 How sensitive are utilization and demand patterns for health care to changes in socioeconomic factors like income, household composition, etc.
- 1.1.3 What policy recommendations, especially for health care financing, stem from an analysis of household health care behavior?

Aspects of health seeking behavior analyzed in the study include provider choice for outpatient care, demand for hospital services and demand for prenatal care services. The analyses comprise the next three substantive chapters of this report.

This chapter sets out to provide an overview of the data set and a descriptive analysis of health status and health seeking patterns by sample households.

1.2 A Description of the Primary Data Set

A household survey was conducted during the last quarter of 1992 in 4 regions of the country to examine the role of economic factors, particularly income, prices and time costs, in health seeking behavior.

1.2.1 Sampling

A household survey was conducted in four regions of the country, namely: Regions II, VII, X, and the National Capital Region. A multi-stage sampling was used. The regions were chosen on the basis of socioeconomic conditions (GDP, population and health indicators and facilities), encompassing a poorer region (Region II), middle to upper (VII and X) regions, and a metropolitan area (NCR). Within each of the regions (except NCR), two provinces were selected as sample sites, again, representing a poor and an economically progressive area. In the NCR, study sites chosen were more widespread across cities and towns based on population weights used by the National Statistics Office (NSO).

After the provincial selection, cities or municipalities were stratified within the province according to the category of hospitals located (primary, secondary and tertiary), as well as ownership (public/private). From the city or municipal levels, barangays (villages) were drawn by first stratifying them according to the following categories:

- barangays in cities
- barangays in municipalities with government hospitals
- barangays in municipalities with private hospitals
- barangays in municipalities with no hospitals

Thereafter, the household selection process followed after determining from local authorities the most recent count of the number of households in the barangay and an ocular survey to determine boundaries. Households were randomly selected. Every fourth house after the random start is included in the study. The respondents were household heads of their spouses. For validation purposes, questions related to specific details of illness or use of facility (i.e. hospitalization) were asked on member user for every 10th household.

A total of 2,800 households were covered by the survey. The distribution of households in the provinces and the regions covered are shown in Tables 1.1, 1.2 and Fig. 1.1. In terms of socioeconomic profile, 55.4 percent of sample households reported owning their own house, with home ownership more widely reported in the rural areas than in the urban areas (Table 1.4). Households in regions 2 and 10 reported the highest homeownership. Compared to the national capital region, nearly double of households in region 2 reported access to electricity (Table 1.5).

1.2.2 Questions Covered

The questionnaire covered the following areas:

- a. basic household information
- b. household conditions
- c. employment
- d. income and expenditures
- e. health status of family members: self-reported illness, disability, chronicity, mortality
- f. family health service use
 - consultations (past four weeks)
 - hospitalizations (past 12 months)
 - usual source of care
 - source of care for prenatal and immunization
- g. health care financing data: membership/participation in schemes
- h. knowledge, attitudes and practices
- i. work environment
- j. time allocation

In particular, the survey provides benchmark data on health care financing membership by households.

Table 1.1
Distribution of Sample Households, By Location

| Location | No. of Sample HHS | % |
|---------------------|-------------------|------|
| Greater Manila Area | 1489 | 53.2 |
| Cagayan Valley | 167 | 6.0 |
| Quirino | 65 | 2.3 |
| Cebu | 560 | 20.0 |
| Bohol | 218 | 7.8 |
| Misamis Oriental | 199 | 7.1 |
| Sur. Del Norte | 100 | 3.6 |

Table 1.2
Distribution of Sample HHs, by Region: Urban – Rural

| Region | Urban | Rural | Total |
|-----------|----------------|---------------|-------|
| NCR | 1489 | - | 1489 |
| Region 2 | 53 | 179 | 232 |
| Region 7 | 408 | 370 | 778 |
| Region 10 | 187 | 112 | 299 |
| Total | 2137 (76.4) | 661 (23.6) | |

Table 1.3
Distribution of Sample Households Owning a House

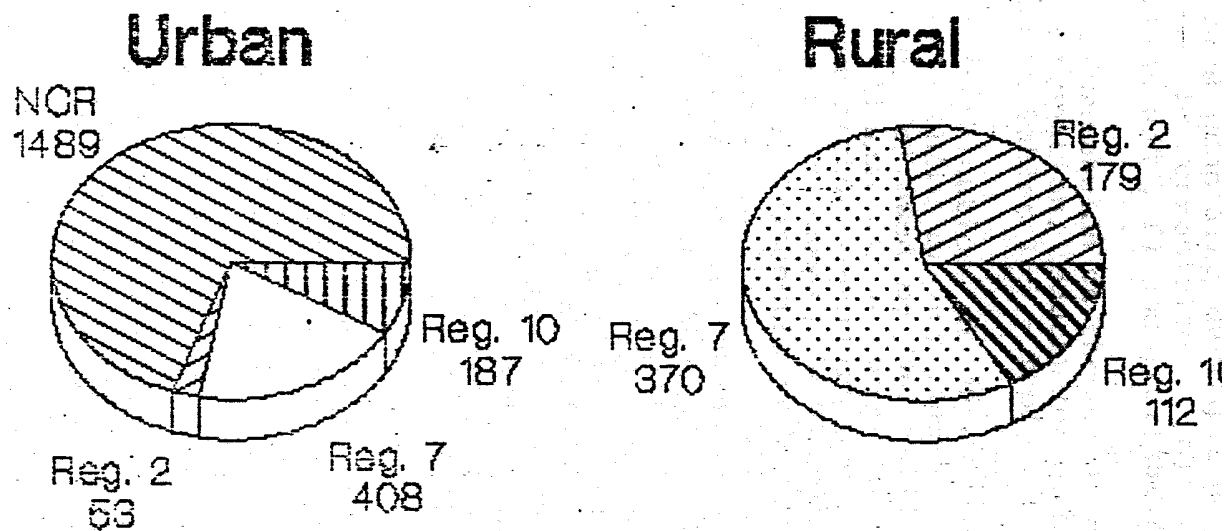
| | Urban | Rural | Total |
|-------------|----------------|----------------|----------------|
| NCR | 565 (37.9%) | - | 565 (37.9%) |
| Region 2 | 38 (16.4%) | 163 (70.2%) | 201 (86.6%) |
| Region 7 | 225 (28.9%) | 332 (42.7%) | 557 (71.6%) |
| Region 10 | 121 (40.5%) | 39 (33.1%) | 220 (79.6%) |
| All Regions | 949 (44.4%) | 594 (89.9%) | 543 (55.4%) |

Figures in parentheses are percent of households with electricity.

Table 1.4
Percentage of Households with Electricity

| | Urban | Rural | Total |
|-------------|-------|-------|-------|
| NCR | 98.7 | - | 98.7 |
| Region 2 | 94.0 | 44.7 | 56.0 |
| Region 7 | 90.4 | 38.1 | 65.6 |
| Region 10 | 78.6 | 50.9 | 68.6 |
| All Regions | 95.3 | 42.0 | 82.7 |

**Fig. 1.1 : Distribution of Sample HHs
By Region: Urban - Rural**



1.3 Health Status and Health Service Utilization of Households

The following health status measures can be gleaned from the survey: a) morbidity, captured by the question whether at least one member of the household got sick or unable to do usual activities due to illness complaint during the past four weeks preceding the survey; b) chronicity; c) disability; d) pregnancy; e) immunization; and f) hospitalization.

The distribution of households on these various health status measures by type of occupation, education and income of the household head is shown in Tables 1.5 – Tables 1.7.

The occupational distribution of households is unevenly distributed with nearly a third of our sample belonging to the sales/service work group, followed by the skilled and farmer sectors. Morbidity or illness was a common experience for all groups, with the skilled sector reporting the highest sickness incidence at 61.5 percent of sample households. The lowest incidence reported was by the domestic workers' group, at 48.8 percent. Chronicity affects nearly a fifth of all households classified by occupation, with the highest group reporting presence of chronic members coming from the unidentified sectors. Households headed by professionals report the second highest chronic complaints. Pregnancy do not appear as common as immunization. More than a fourth of households report having at least one member immunized during the past year. Mortality and disability experiences in households appear to be quite low. Between 11 percent to 19 percent of households classified by occupation reported a hospitalization experience during the past year, with the highest reported by the professional and administration/clerk – headed households.

In terms of education, the highest sickness incidence was reported by the post-college group, although the group comprise only a small proportion of overall households. Among households headed by elementary graduates, more than half reported sickness, more than a fourth reported presence of members with chronic complaints and nearly a fifth reported hospitalization experience during the past year. Nearly the same pattern holds for households headed by high school and vocational graduates, except that the latter group reported the highest immunization experience. Nearly a fifth of college-educated households reported hospitalization.

Variations in health status and health service utilization by income group classification of households yield similar trends. Morbidity, chronicity, immunization and hospitalization notched two-digit percentages for each group. There appears to be less variability in terms of income, except for hospitalization, where there are 10 percent more upper income groups reporting over the lowest income group. The upper income groups also reported higher sickness incidence than the lower income groups.

Table 1.5
Health Status Variables By Occupation of Household Head

| | % of Sample | % Reporting w/ Health Complaints | W/ at Least One Member w/ Chronic Complaint | W/ at Least One Member Pregnant | W/ at least One Member Immunized | W/ at least One Death Past year (%) | With Disability | With Hospitalization |
|-------------------|-------------|----------------------------------|---|---------------------------------|----------------------------------|-------------------------------------|-----------------|----------------------|
| 1. Professional | 4.0 | 56.6 | 22.1 | 5.3 | 29.2 | 0 | 1.8 | 19.5 |
| 2. Admin/Clerical | 5.4 | 60.0 | 19.6 | 0 | 26.1 | 0.6 | 8.4 | 19.0 |
| 3. Farmer | 14.1 | 51.6 | 18.5 | 6.8 | 28.3 | 2.5 | - | 11.1 |
| 4. Sales/Service | 33.2 | 57.4 | 18.7 | 4.3 | 27.1 | 3.4 | 1.9 | 14.0 |
| 5. Skilled | 18.8 | 61.5 | 19.7 | 6.1 | 31.1 | 2.7 | - | 13.7 |
| 6. Laborer | 5.5 | 58.2 | 16.3 | 9.2 | 34.0 | 3.3 | 3.3 | 11.1 |
| 7. Domestic | 1.5 | 48.8 | 22.0 | 0 | 24.4 | 2.4 | 2.4 | 14.6 |
| 8. DK | 16.4 | 53.7 | 34.3 | 4.1 | 18.7 | 3.9 | 9.6 | 17.8 |

Table 1.6
Health Status Variables By Education of Household Head

| Educational Status | % | % w/ Health Complaints | W/ Disabled Members (%) | W/ Chronic Members (%) | W/ Mortality in HH Past Year (%) | W/ One Member Pregnant | W/ Immunization (past 12 mos.) | W/ Hospitalization |
|--------------------|------|------------------------|-------------------------|------------------------|----------------------------------|------------------------|--------------------------------|--------------------|
| 1. Elementary | 0.1 | 50.0 | - | 50.0 | 25.0 | 25.0 | - | 25.0 |
| 2. Elem. Graduate | 31.7 | 54.7 | 7.3 | 22.8 | 3.0 | 5.7 | 24.6 | 11.8 |
| 3. High School | 35.2 | 57.5 | 4.9 | 19.8 | 3.5 | 7.5 | 29.0 | 13.2 |
| 4. Vocational | 4.9 | 60.4 | 3.0 | 19.4 | 3.0 | 8.2 | 34.3 | 17.2 |
| 5. College | 27.4 | 58.0 | 5.1 | 22.2 | 1.9 | 4.8 | 27.2 | 19.8 |
| 6. Graduate School | 0.7 | 77.8 | - | 16.6 | 11.1 | - | 16.6 | - |

Table 1.7
Health Status Variables By Income Group

| | % w/ Health Complaints | W/ Disability (%) | W/ Chronic Members (%) | W/ Mortality Past Year (%) | W/ Pregnant Member | W/ Immuni- zation (past year) | W/ Hospital- ization (past year) |
|----------------|------------------------------|-------------------------|------------------------------|----------------------------------|--------------------------|-------------------------------------|--|
| 1. < 1500 | 59.7 | 5.6 | 19.2 | 3.0 | 5.4 | 27.2 | 9.8 |
| 2. 1501 – 3000 | 56.8 | 6.3 | 17.6 | 3.1 | 7.8 | 28.9 | 10.9 |
| 3. 3001 - 4500 | 58.0 | 5.7 | 20.0 | 2.2 | 5.7 | 25.9 | 16.8 |
| 4. 4501 - 7906 | 59.3 | 5.3 | 25.0 | 2.8 | 5.3 | 26.3 | 17.2 |
| 5. 7907 | 59.6 | 5.5 | 26.3 | 3.4 | 5.9 | 26.4 | 19.0 |

Remedy to complaints by income group (Figure 1.2) shows widely differing health care seeking patterns. Only the seeking out of health professionals other than doctors, like nurses and midwives, appear to show clear income class bias, with the lowest income group (group 1) more than twice likely to seek out other health professionals than any other income group. Self-prescription and home remedies appear to be a middle-class option.

In terms of place of consultations, the choice for hospitals and private clinics in the urban areas (Figure 1.3) increases with income, although a higher proportion of the fourth income group reported higher use of hospitals than the highest income group. A higher proportion of upper income households reported use of government clinics than the lowest income group. In the rural areas (Figure 1.4), there appears to be mixed use of various facilities. But a larger proportion of the lowest income groups reported utilization of hospitals and government clinics than any other groups.

1.4 Household Expenditures and Health Care Financing Sources

The diagrams in Figure 1.5 try to show the composition of household budgets by quintile groups and compare differences among households reporting chronicity and hospitalization experience with all households in the sample. Expenditures for food remain the single biggest item in household budgets, comprising between 50 to 60 percent of total expenditures. Economists believe that the proportion of household budgets spent on food indicate the income standing of families, with upper income groups reporting relatively less budget share for food relative to other income groups. The balance is spread out among four other expenditure items, with medical care expenses comprising less than a percent of household budgets. It is differences in

spending among these four other items, i.e., clothing, housing, education and others, that are discernable across income groups.

Food expenditures among households reporting hospitalization experience during the past year are comparable to the overall average of households. Households with chronic complaints have overall low spending for food compared to other households except for the fourth quintile group.

Budget shares for clothing comprised the next biggest expenditure item for all households with the average pulled up by the third and fourth quintile spending. Education budget shares were pulled down by the same groups, with all other groups reporting higher shares. Education expenditure shares among households with chronic complaints exceed those of hospitalized households for the first, second and fifth quintile groups.

The relatively low spending for medical care from our primary data is confirmed by other data sets at the national level. Questions on trade-offs with other items in case of greater health need or health spending cannot be categorically answered as they are difficult to discern from the data. Information from case studies may provide some clues.

Figure 1.6 shows the various sources of financing for health care expenditures. Direct payments by households from their own pockets were reported by 59.6 percent of households. This is followed by 28 percent of households reported making no payments for health care expenditures. Less than a percent of households report third-party insurance payments as their source of financing for health care expenditures. This shows the relatively low impact of institutional sources on household health care financing.

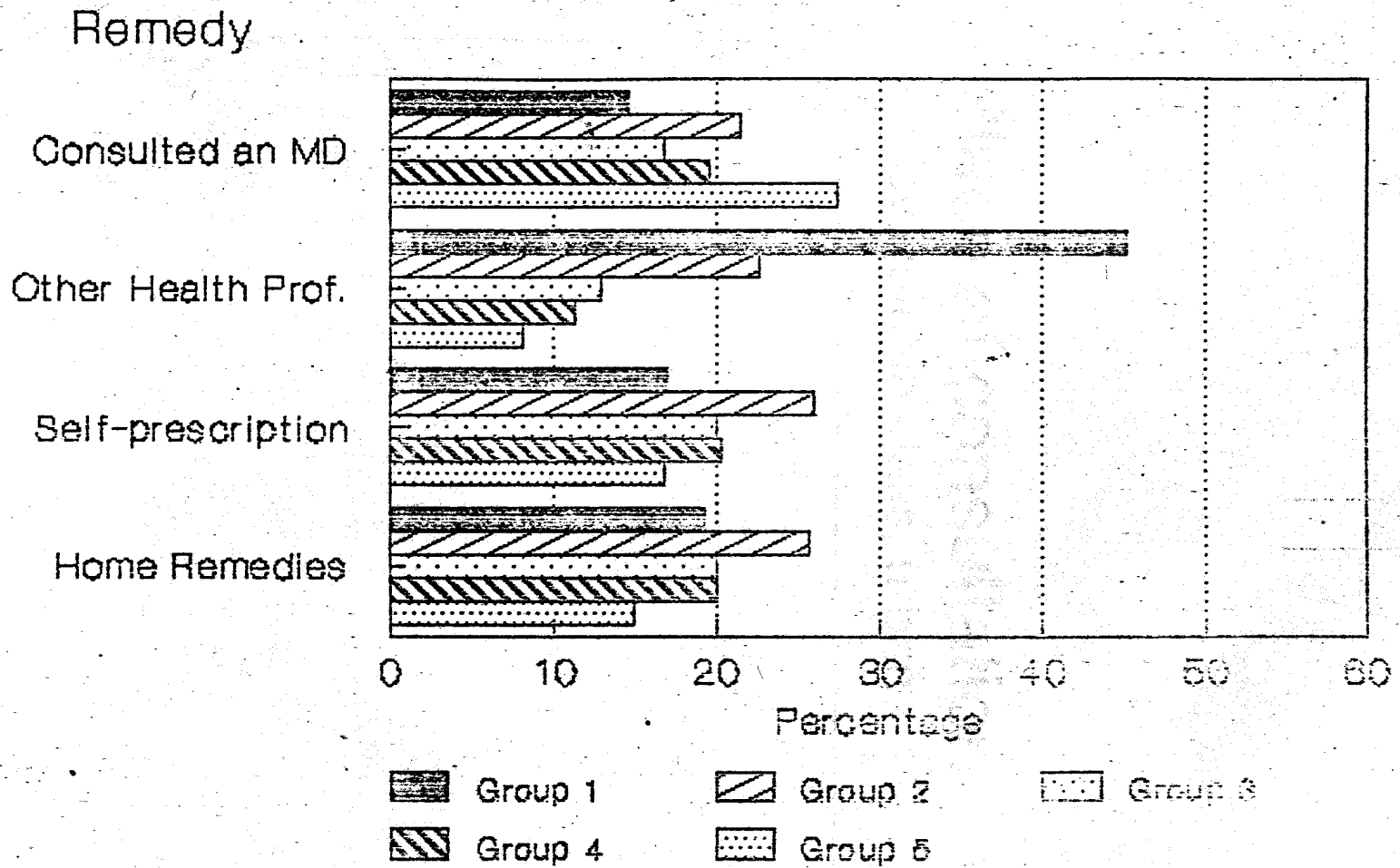
1.5 Participation in Health Care Financing Schemes

Membership in three types of health care financing schemes was probed by the interviews. These schemes include the following: a) Medicare; b) employer-provided/private insurance/health maintenance organizations (HMOs); and c) community financing. Majority of households, 40 percent, reported membership in percent reported no participation in any health financing scheme and 8 percent reported private insurance coverage (Table 1.8). There were more community financing participants than participants in private schemes.

1.5.1 Non-Medicare Participation

This analysis does not go into details of non-Medicare participation due to small samples. But from the limited data available, we note from Table 1.9 that mean premiums paid for private insurance coverage is 1,534 pesos annually. Employers were reported to contribute an average premium of 1,552 pesos for their employees. Mean reported premium by members was 1,099 pesos.

**Fig. 1.2 : Remedy to Complaint
By Income Group**



Place of consultation by quintile class, urban

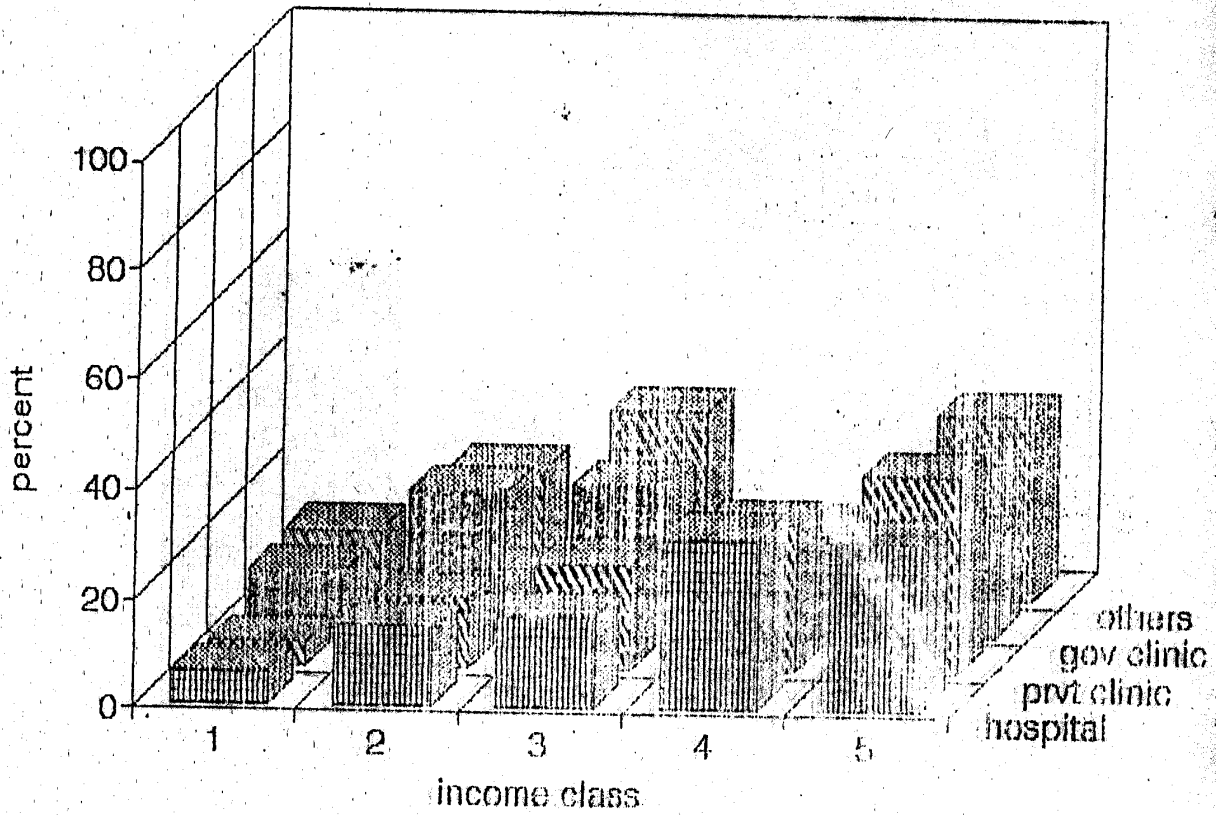


Figure 1.3

Place of consultation by quintile class, rural

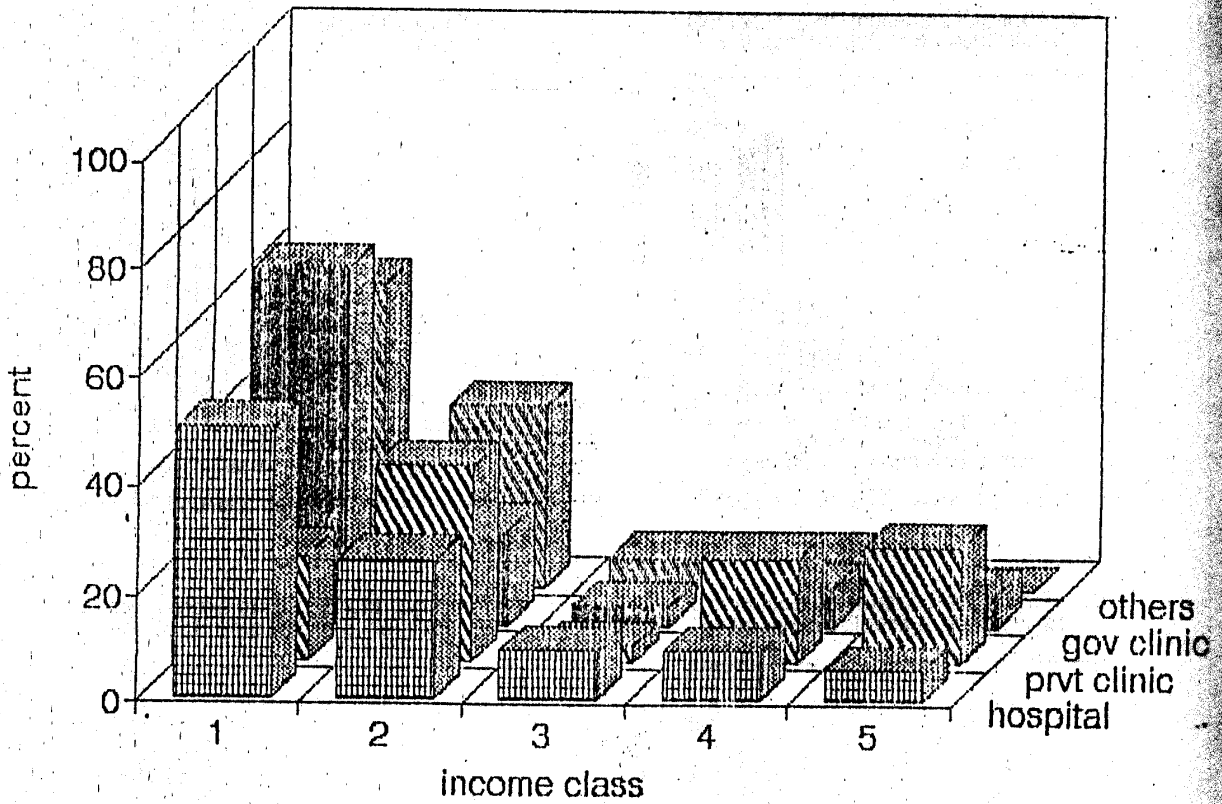
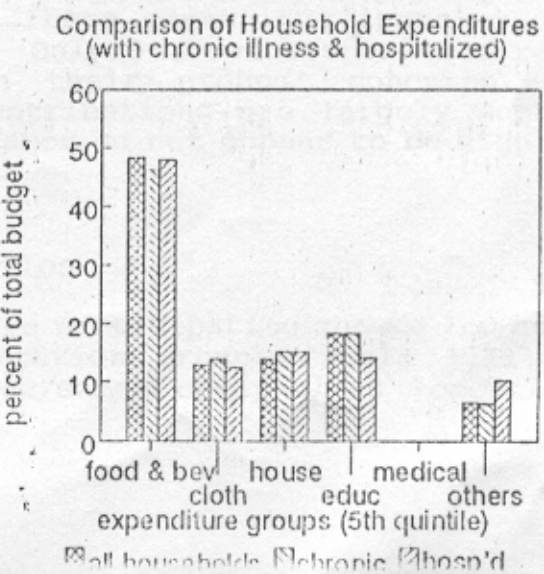
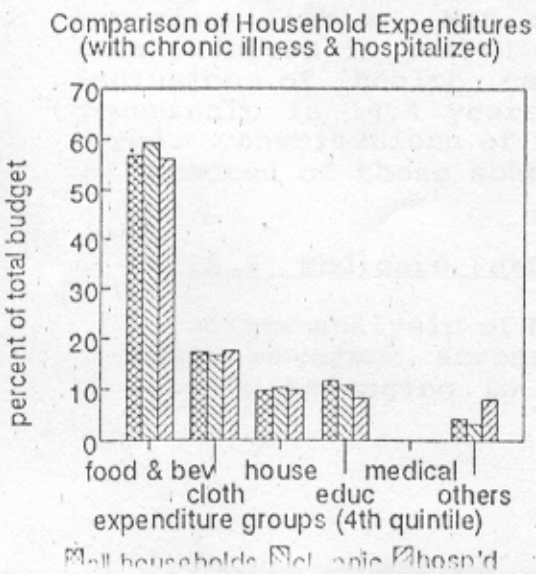
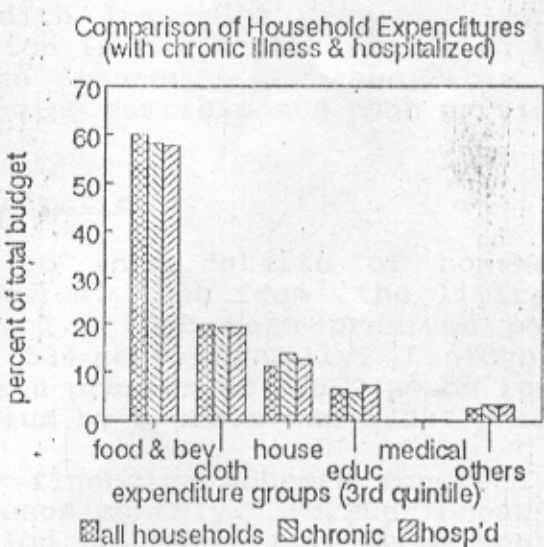
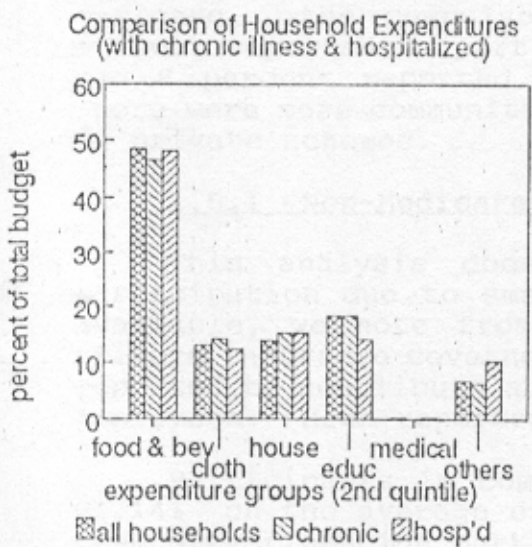
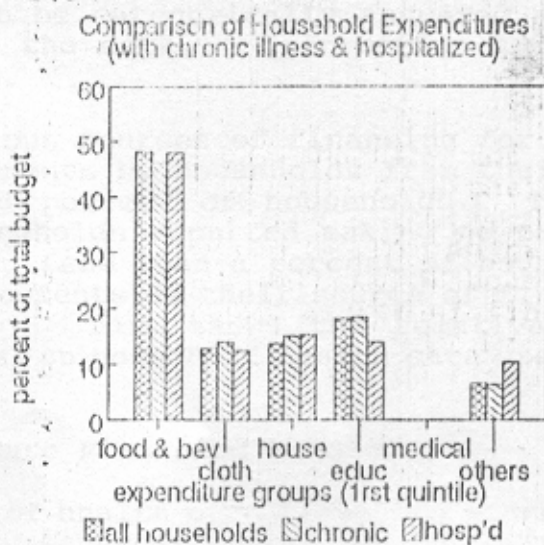
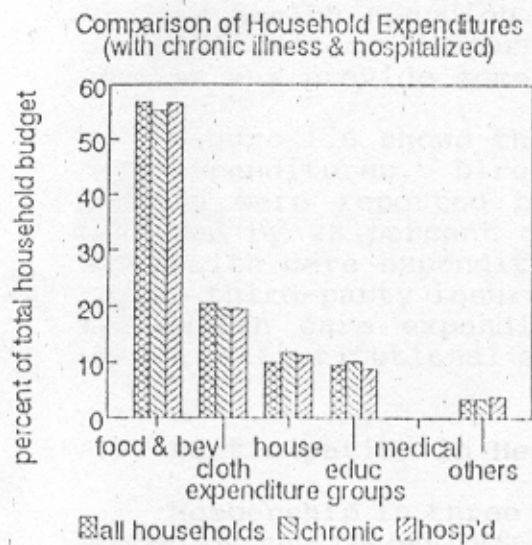


Figure 1.4

Figure 1.5



Sources of HC Financing

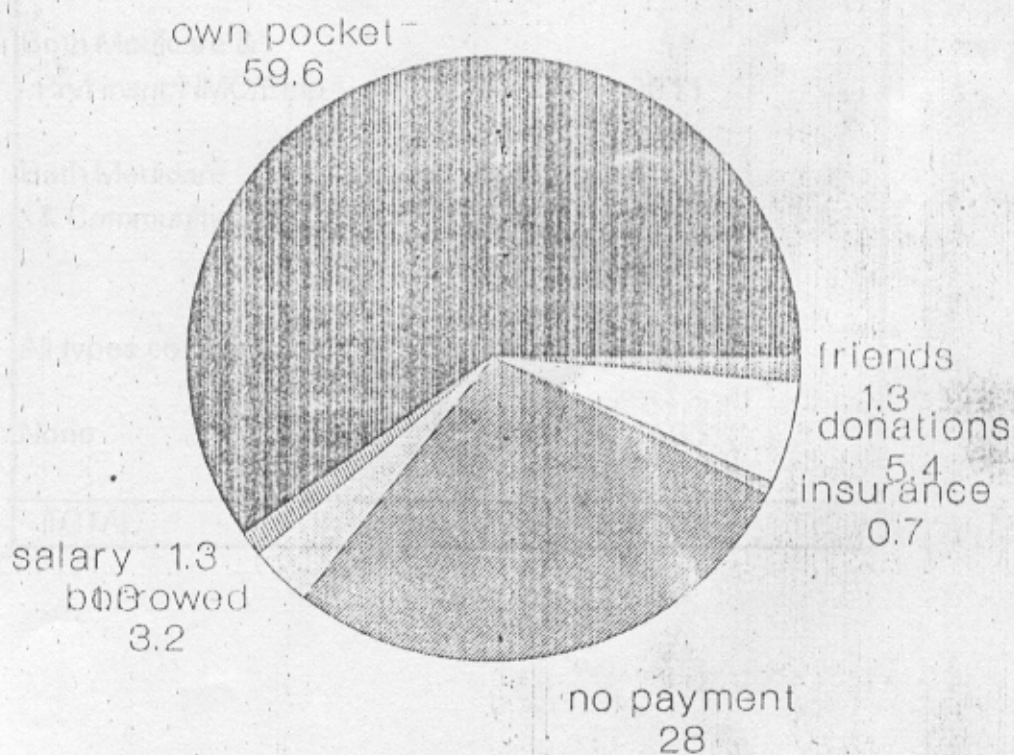


Figure 1.6

Table 1.8
Health Care Financing of Sample Survey Households

| Type of Financing | No. | % |
|---|--------------|---------------|
| Medicare | 1,120 | 40.03 |
| Private insurance/HMO/ Employer-provided | 212 | 7.58 |
| Community-financing | 73 | 2.61 |
| Both Medicare & Private Insurance/HMO/Employer | 3 | 0.11 |
| Both Medicare & Community | 2 | 0.07 |
| All types combined | 410 | 14.65 |
| None | 978 | 34.95 |
| TOTAL | 2,798 | 100.00 |

Table 1.9

| | Mean premiums paid (pesos) | Percentage share |
|-------------------|-------------------------------|---------------------|
| Private insurance | | |
| Employer | 2,359.09 | 56.7 |
| Member | 1,798.27 | 43.3 |
| Total | 4,157.36 | 100.00 |
| Community | 1,141.05 | |

Table 1.10
Community Financing

| Type of organizations involved In health care financing | No. | % |
|--|-------|--------|
| Community-founded | 19 | 22.09 |
| People-organization | 12 | 13.95 |
| Cooperatives | 12 | 13.95 |
| Church | 9 | 10.47 |
| Pbma | 5 | 5.81 |
| Others | 29 | 33.72 |
| Total | 86 | 100.00 |
| No. involved in health care | | |
| Yes | 47 | 54.70 |
| No | 37 | 43.00 |
| Can't say | 2 | 2.30 |
| Mean membership in years | 14.40 | |
| Manner of contribution | | |
| | No. | % |
| Membership | 57 | 66.28 |
| Premium | 8 | 9.30 |
| Free labor | 3 | 3.49 |
| Daily payments | 2 | 2.33 |
| Salary deductions | 6 | 6.98 |
| Donation | 4 | 4.65 |
| Annual dues | 3 | 3.49 |
| Weekly payments | 2 | 2.33 |
| Raffle | 1 | 1.16 |
| Total | 86 | 100.00 |

Participants in community financing schemes reported paying P1,141 on the average or 35 pesos monthly. Further breakdown of community financing participation in Table 1.10 shows that these organizations are community-founded, people's organizations and cooperations. The others' group comprise those singly reported and non-classifiable. Not all of these community financing schemes were involved in health care. Only 54.7 of respondents reported inclusion of health care in their group's concerns. Mean membership is 14.4 years. Contributions are largely membership based. Contributions of free labor do not appear to be significant as expected of these schemes.

1.5.2 Medicare Participation

Further analysis of Medicare participation showed low overall Medicare coverage across occupation groups (Table 1.11), with households belonging to service/sales occupations reporting the highest membership at 28.7 percent. The least covered sectors are the farmers.

Of these Medicare members, 47.6 percent reported ever availing of medicare benefits despite the reported mean years of membership at 9.4 years. Households reporting manual labor occupations reported the youngest membership in the Medicare program. Majority of those interviewed were from the private sector, with SSS members comprising 79.6 percent of households.

Majority of those reporting Medicare membership belonged to the upper income quintile group. Of this quintile group, 47.6 reported ever availing Medicare benefits. The same group reported the longest participation in membership, with mean years reported at 10.3 percent.

In terms of the household head's educational attainment, majority of members were college educated, followed by households whose heads finished high school. The lowest coverage was reported by households headed by vocational graduates. The same group also reported the youngest membership with Medicare.

Non-availing of benefits was attributed largely (48 percent reporting) to too much paperwork and inconvenience in processing papers (Table 1.12). And this is considering that Medicare covers a negligible portion of total costs incurred. From the response to the second part of Table 1.12 we detect limited understanding and appreciation of the insurance concept, particularly as 58 percent can't respond whether it is a good idea to contribute to Medicare even if they do not get hospitalized.

Table 1.13 highlights areas where, for those who responded to our questions on Medicare, improvements can be made. Majority wanted improvements, largely in terms of increases, in benefits. Claims processing, that is faster claims processing, was the next biggest area where improvements can be made. This is surprising that households can be affected on this when cheques would normally be

reimbursable to facilities. On questions related to coverage, a greater number reported expanding or increasing the number of Medicare members. Questions related to premiums merited the least concern. This seems to indicate the limited impact on budgets made by Medicare contributions.

1.6 Risk-Sharing and Health Care Attitudes

From table 1.14, we note that there is an overwhelming acknowledgement of the need to save and that health care tops the possible contingencies they could save for. There is also some acceptance of insurance, if not for total health care (31.2 percent) at least for hospitalization (19.4%). Emergency hospital treatment is likely to be financed by own savings (50 percent) and borrowing (43 percent).

Table 1.15 on knowledge, attitudes and practices of households on health care is self-explanatory. Overall, there is a general acceptance of modern medicine. Notable though are the following responses: a) on the sufficiency of facilities to take care of needs in the country; b) the preference for private hospitals, even given the acceptance that doctors in public hospitals are just as good as those in private hospitals; and c) the reluctance to have additional salary deductions to have more Medicare benefits.

Table 1.11

| | Medicare Coverage | | Number Aailed | | Years Member | Member | |
|---|-------------------|---------------|---------------|---------------|--------------|--------------|--------------|
| | No. | % | No. | % | (Mean) | SSS (%) | GSIS (%) |
| Occupational Group | | | | | | | |
| Professional | 95 | 12.84 | 54 | 17.14 | 10.07 | 58.82 | 41.18 |
| Farmer | 3 | 0.45 | 3 | 0.95 | 10.25 | 100.00 | 0.00 |
| Admin/clerical | 128 | 19.34 | 83 | 26.35 | 8.80 | 78.13 | 21.88 |
| Service/sales | 190 | 28.70 | 93 | 29.52 | 9.26 | 80.00 | 20.00 |
| Skilled | 143 | 21.60 | 55 | 17.46 | 9.51 | 95.07 | 4.93 |
| Laborer | 44 | 6.65 | 18 | 5.71 | 7.60 | 95.45 | 4.55 |
| Prvt helpers | 12 | 1.81 | 2 | 0.63 | 9.42 | 100.00 | 0.00 |
| Others, can't say | 57 | 8.61 | 7 | 2.22 | 9.10 | 87.72 | 12.28 |
| Total | 662 | 100.00 | 315 | 100.00 | 9.36 | 79.62 | 20.38 |
| Income Group (mean income) (pesos per month) | | | | | | | |
| I (790.67) | 8 | 1.21 | 6 | 1.95 | 6.19 | 100.00 | 0.00 |
| II (1,957.34) | 61 | 9.21 | 23 | 7.47 | 8.72 | 82.81 | 17.19 |
| III (3,222.30) | 127 | 19.18 | 57 | 18.51 | 9.46 | 88.28 | 11.72 |
| IV (5,093.67) | 214 | 32.33 | 102 | 33.12 | 8.70 | 82.24 | 17.76 |
| V (13,446.56) | 252 | 38.07 | 120 | 38.08 | 10.20 | 78.97 | 21.03 |
| Total | 662 | 100.00 | 308 | 100.00 | 9.36 | 79.62 | 20.39 |
| Household head's educational attainment | | | | | | | |
| Elementary | 97 | 14.65 | 35 | 11.48 | 8.60 | 87.64 | 12.36 |
| High school | 226 | 34.14 | 92 | 30.16 | 8.40 | 88.80 | 11.11 |
| Vocational | 39 | 5.89 | 21 | 6.89 | 7.44 | 87.18 | 12.82 |
| College and higher | 300 | 45.32 | 157 | 51.48 | 10.24 | 74.83 | 25.17 |
| Total | 662 | 100.00 | 305 | 100.00 | 9.68 | 79.62 | 20.38 |

Table 1.12

| Why were Medicare benefits not availed of? (top 4 answers) | No. | % |
|---|-------|--------|
| Too much hassle in processing papers | 64 | 48.12 |
| Covers a negligible portion of cost | 32 | 24.06 |
| Not aware of benefits | 22 | 16.54 |
| Not covered | 15 | 11.28 |
| Total | 133 | 100.00 |
| Do you think it is a good idea to contribute to Medicare even if you do not get hospitalized? | No. | % |
| Yes | 1,042 | 37.24 |
| No | 124 | 4.48 |
| No answer | 1,632 | 58.33 |
| Total | 2,798 | 100.00 |

Table 1.13

| What specific improvements do you want To be done for each of the following aspects of Medicare? | No. | % |
|--|-----|-------|
| A. Benefits | 168 | 50.30 |
| Free medicines | 18 | 5.39 |
| Increase benefits | 118 | 35.33 |
| Refundable (if not availed of) | 14 | 4.19 |
| Can get benefits, even if for consultation only | 3 | 0.90 |
| Should shoulder all hospital expenses | 1 | 0.30 |
| Include professional fees | 1 | 0.30 |
| More public announcements | 4 | 1.20 |
| Extend benefits to relatives | 9 | 2.69 |
| B. Claim processing | 86 | 25.75 |
| Verification of claims | 2 | 0.60 |
| Accessible branches | 2 | 0.60 |
| Faster processing | 77 | 23.05 |
| Amount received not shown | 2 | 0.60 |
| Claims may be filed in local branches | 1 | 0.30 |
| “Walang palakasan” | 2 | 0.60 |
| C. Related to premiums | 11 | 3.29 |
| 15% deduction | 1 | 0.30 |
| Payments deducted from SSS contributions, not salary | 3 | 0.90 |
| 5% deduction | 1 | 0.30 |
| No increase in premiums | 6 | 1.80 |

Table 1.13 (cont'd)

| | | |
|---|-----|--------|
| D. Related to coverage | 49 | 14.67 |
| May be used even if unemployed | 2 | 0.60 |
| No age limits | 10 | 2.99 |
| Expand coverage for spouse and children | 6 | 1.80 |
| Other benefits for those not hospitalized | 1 | 0.30 |
| Increase no. of members | 23 | 6.89 |
| Those who are listed can avail | 3 | 0.90 |
| Can avail even if treated at home | 1 | 0.30 |
| Cover all sickness | 1 | 0.30 |
| Include housemaids | 1 | 0.30 |
| Include surgical expense | 1 | 0.30 |
| E. Related to legal procedures | 20 | 5.99 |
| Shorted time | 3 | 0.90 |
| Straight to the point | 1 | 0.90 |
| Immediate results | 3 | 0.90 |
| Increase amount received by doctors/ hospitals | 4 | 1.20 |
| Less fees for hospitals | 2 | 0.60 |
| Minimize requirements for computations | 1 | 0.30 |
| Give members summary of contributions | 6 | 1.80 |
| Total | 334 | 100.00 |

Table 1.14
Risk-sharing Concepts

| | No. | % |
|---|------|--------|
| Do you believe that people should save For certain contingencies? | | |
| Yes | 2739 | 97.9 |
| No | 60 | 2.1 |
| If it were possible, what sort of contingencies would you save up for? (top 3 answers) | | |
| health care | 877 | 31.3 |
| children's educ | 827 | 29.6 |
| accidents | 703 | 25.1 |
| If you were to contribute to a fund that Would help you in the time of need, for What contingency would you like to be Prepared or insured against? (top 3 answers) | | |
| total health care | 873 | 31.2 |
| college education | 683 | 24.4 |
| hospitalization | 543 | 19.4 |
| If someone in your family needs emergency hospital treatment today, how would you finance it? | | |
| savings | 1379 | 49.52 |
| borrow | 1191 | 42.76 |
| sell asset | 61 | 2.19 |
| mortgage | 82 | 2.94 |
| relatives | 47 | 1.69 |
| employer | 13 | 0.47 |
| government | 5 | 0.18 |
| hospital plan | 1 | 0.04 |
| medicare | 6 | 0.22 |
| Total | 2785 | 100.00 |

Table 1.15

| Knowledge, Attitudes & Perceptions of Households on Health Care | (Percent saying "YES") (N = 2,798 Households) |
|--|--|
| We have enough facilities to take care of our needs. | 71.3 |
| Doctors in public hospitals are just as good as those in private hospitals. | 57.4 |
| A person with health insurance likely to seek a doctor more often than those without. | 55.9 |
| Traditional medicine is only for the poor. | 40.2 |
| The rich have less health problems than the poor. | 49.6 |
| If the charge of the public hospital is the same as that of a private hospital, I would prefer to go to the private hospital. | 76.6 |
| A doctor who charges more has better expertise than a doctor who charges less. | 36.8 |
| It is a good idea to follow the system adopted in some Countries wherein a patient first consults a general practitioner before going to a specialist. | 60.0 |
| Getting a health insurance is a waste of time. | 10.2 |
| Filipinos should have the best care that money can buy no matter what the cost. | 83.6 |
| If I need to be hospitalized now, I prefer to be admitted to a private hospital. | 63.2 |
| Care for indigent patients should largely be in the government system | 72.8 |

Table 1.15 (Cont'd)

| Knowledge, Attitudes & Perceptions of Households on Health Care | (Percent saying "YES") (N = 2,798 Households) |
|--|--|
| Medicare benefits should be for all, not just for employed members. | 84.2 |
| A person who experiences intermittent headaches for 2 weeks which are partially relieved by analgesics should be seen by a doctor. | 93.2 |
| A person suffering from diarrhea for 1-2 days should be seen by a doctor. | 89.4 |
| A person who has been suffering from low to moderate grade fever (<39 C) for 3 days must be seen by a doctor. | 91.4 |
| A person who has had a productive cough for 3 days should be seen by a doctor. | 87.0 |
| A person who experiences chest pains should be seen by a doctor. | 95.5 |
| For households covered by Medicare: I am willing to have additional deductions from my family's income to have more benefits. | 21.6 |
| For households not covered by Medicare: I would like my household to be covered by medicare. | 47.7 |

Chapter Two

WILLINGNESS TO PAY FOR HEALTH CARE: EVIDENCE FROM HOUSEHOLD DATA

2.1 Introduction

This chapter presents a choice of provider perspective to health care demand. In particular, it seeks to answer the following questions:

- 1) What factors influence an individual's decision to choose a particular provider, i.e. private doctors, government hospitals and public clinics, for outpatient consultations?
- 2) How responsive are these decisions to price and time costs?
- 3) How will pricing policies at public facilities affect utilization, revenues and welfare?
- 4) What insights do these impacts impart to risk-sharing participation by households?

Outpatient consultations when sick maybe considered as the most common form of health care utilization, next to the use of self-prescribed drugs. As such, they comprise a regular part of household spending for health. In the Philippine health care system, this component is of particular interest inasmuch as the compulsory health care insurance program does not cover this component of health care. Knowledge of utilization of this particular service, particularly across income groups, provides insights into the particular influence of household socio-economic characteristics in care-seeking.

The model utilized looks at the influence of price, not as a separate argument in the utility function, but as naturally interacting with income. That is, the price of care-seeking is viewed as it affects household consumption net of medical care costs. Therefore, responses to price of medical care is seen as closely related to the income of the household or individual. The demand by a higher income household is likely to differ from that of a poorer household, with the former being expected to choose a higher price-higher quality provider compared with the latter. The latter's choice of provider choice had zero price (as in public facilities), a household's consumption would still differ if time costs are considered. The poor are likely to be faced with longer travel time to get to public facilities, thereby affecting their income-earning capability. It is this consideration of prices and time costs as closely related to non-health care consumption (income) that current health care demand analysis is moving to.

While still considered to be in its infancy (Creese, 1991), demand analysis for health care viewed from this approach moved a step forward from its purely neoclassical

specifications (as applied in Akin, et.al., 1985, Heller, 1982); to the form we apply here. The present specification, patterned after Gertler and colleagues analysis for Ivory Coast and Peru, confronts the equity issue more directly and allows estimation of willingness to pay measures by income class. Sensitiveness as to type of provider chosen is also considered.

Ching (1990) applied a similar analysis to Philippine data using a sub-sample of children. This study differs from Ching's in terms of the use of a generalized sample (children and adults combined) as well as methodology. Ching used a conditional logit model which assumes market providers to be substitutable to self-care and not to one another. Our model sees a household as confronting three types of market providers and the option of self-care. Once the market option is chosen, the three provider-types are viewed as substitutable for one another, i.e., the choice for one is made vis-à-vis considerations of the attributes of other providers. In addition, the analysis is expanded further to look into revenue and welfare effects on demand of changes in prices.

The unit of analysis is the individual. Interchangeability with households can be made based on the neoclassical assumption of the homogeneity of household decisions. The analysis covers a sample of 2,039 individuals who reported an illness complaint during the past four weeks preceding the survey.

The theoretical and empirical specifications are shown in Appendix 1. Figure 2.1 illustrates the provider choice model used for the study. The model is specified as a nested multinomial logit, with the bottom choices as nested within the first set of choices.

2.2 Measurement of Variables

In this section, we clarify the specifications and definitions of the variables used and discuss the effects of certain variables on the choice of provider. Aside from self-care, three provider types are considered as source of care options; i.e. private doctors, government hospitals and public clinics.

Table 2.1 provides a description of the variables used in estimating for the parameters of the nested multinomial logit model used in analyzing for the determinants of provider choice. Consumption is our income measure estimated net of the costs of obtaining medical care. The use of the household's average monthly expenditures is generally accepted as an appropriate measure of permanent income, one which is less sensitive to seasonal fluctuations and includes the value of home production.

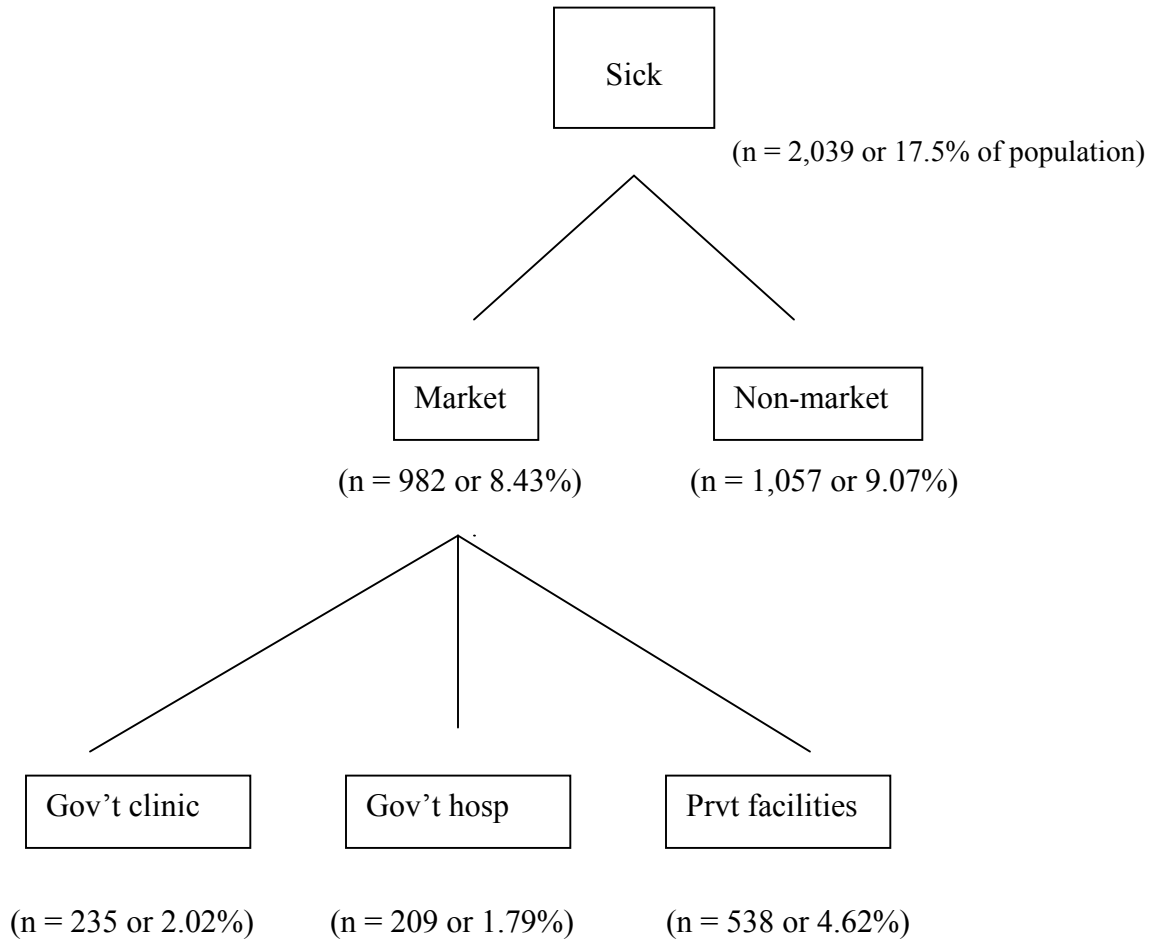
The costs of obtaining medical care, on an outpatient basis, includes the price of the provider, i.e. the direct payment to the provider, transportation costs and time costs. The price of a private provider was estimated from a hedonic form. Hedonic pricing allows the estimation of the influences of various elements on price, like location, competition from other providers, and individual characteristics. The equation specified price to be a function of age, sex, location, education, availability of health care services, region and type of complaint, whether cardiovascular, respiratory or infections.

Table 2.1

| NMNL Model of Provider Choice Estimated for Health Care Philippines, 1993 | | | |
|--|---|--------|--------|
| Variable | | Mean | s.a. |
| Consumption | log of (total expenditures-price - travel time cost) | 8.078 | 1.0524 |
| | total expenditures (pesos per month) | 5.408 | 8358 |
| | price (pesos per visit) | 44.3 | 85.82 |
| | time cost (pesos per hour) | 0.5 | 0.5 |
| | transportation cost (in pesos per visit) | 3.48 | 10.84 |
| Consumption squared | | | |
| Sigma | correction factor | | |
| Education | education in years computed | 6.811 | 3.30 |
| Severity | dummy (=1 if self-diagnosis of illness is severe) | 0.200 | 0.40 |
| Age | age of individual in years | 19.792 | 20.28 |
| Male | dummy (=1 if male) | 0.485 | 0.50 |
| Nchild | no. of children aged < 15 | 2.638 | 1.72 |
| Nadult | no. of adults aged > 14 | 3.137 | 1.56 |

Fig. 2.1

Health Care Provider Choice



Time cost is an opportunity cost of time concept and is the product of the travel time spent (in minutes) obtaining care from the provider and the individual's hourly wage rate. On a system where consultation fees may not be charged for publicly-salaried professionals, variation in travel time is deemed sufficient to identify the parameters of the demand function (Gertler and van der Gaag, 1990). For non-wage earning individuals and children, the hourly wage rate applied is the village-level agricultural wage rate. Transportation costs were considered separate from travel time costs so as not to muddle simulations using changes in opportunity costs. Transportation costs reflect not just distance but also the state of the roads, and transport supply factors.

A demand theoretic framework for health care assumes that an individual's utility from using or choosing a health care provider is derived from the expectations of improvements in health status. The expected health improvement, which is reflective of the quality of the provider, is therefore a function of the type of provider chosen and other characteristics of the choosing individual. Individual and household characteristics that are considered to influence the efficacy of care include education, severity, age, sex, number of children in the household and number of adults in the household.

Education can be viewed as an efficiency factor, one which improves the general productivity of non-market care (self-care) for an individual (Grossman, 1972). With more education, one can better implement treatment regimens on one's own. Alternatively, more education can mean health production functions which leads to a more healthier or less use-intensive lifestyles (Muurinen, 1982). Or one could have better information on health care sources with more education. With more education, one can also have higher earning capacities, hence the greater the demand for health care.

Age and severity may be considered as health status variables. Severity is a dummy variable indicated as one if the self-assessment (or mother's assessment in case of children) of illness is serious. Older individuals are likely to have illnesses requiring more specialist care, and therefore more costly at that.

Male is a dummy variable (=1) for gender. Males may be considered as more productive members of a household, who would incur higher wage loss if untreated, and therefore would merit immediate care, if not the better care, than females.

Household composition variables refer to the number of children or adults in the household. Having more children would mean greater anxieties and quicker response by seeking market care. While having more adults may mean a propensity to self-treat using the household's broader range of experience. Alternatively, household composition variables can be viewed as a productivity factor, indicating enhanced income-earning capabilities of the household. Having more children may also involve adult time, lowering income-earning capabilities. Having more adults on the other hand increases earning capabilities and therefore demand for health care.

2.3 Results

2.3.1 Determinants of Provider Choice

The results on Table 2.2 show that prices and income play important roles in the demand for medical care. The coefficients of the consumption term and its square are significantly different from zero. With medical care prices entering the consumption term and the consumption squared term including both a squared price and a price-income interaction term, the coefficients being significantly from zero indicate that income and prices influence the choice of provider. The signs of the coefficients also indicate that with health as a normal good, a low income individual would choose additional consumption to additional health and that the marginal utility of consumption is diminishing. The magnitude of the impact of prices and income on demand cannot however be discerned directly given their nonlinear specifications. A closer examination follows with the discussion on elasticities.

The estimated value of sigma (σ) is significantly different from zero but is close to zero, indicating that the alternatives are closer substitutes to one another than they are to self-care. One provider's demand is more sensitive to another provider's change in price than is self-care. A price change is likely to push individuals to another provider type than to totally drop-out of the market.

With health as a normal good, a higher income will lead to greater demand. In the like manner, a severely ill patient is likely to seek greater medical attention. Because an accident or illness may reduce income, the assumption of the exogeneity of income (consumption) introduces a simultaneity bias in our estimates. This bias is likely to create a downward impact on estimated price and income effects, bringing them closer to zero. Estimated price elasticities therefore should be on lower bounds of the true elasticities (Dor, et.al., 1987).

Analysis into the impact of other household characteristics in the choice for private doctors, government clinics and government hospitals shows that the influences are likely to have varying effects.

The demand for a private practitioner is shown to be highly influenced by sex and the composition of households to which the individual belongs. Males are more likely to seek care from a private doctor. Having more children in the household is likely to lessen the likelihood that care will be sought from a private doctor, while having more adults will increase that likelihood. Having more adults could imply higher earning capacities and the higher priced alternative of private doctors is chosen. Years of schooling and age influence the choice for a private doctor rather weakly. The older the individual the less likely will a private doctor be chosen. Adult health complaints, largely of the chronic type, are likely to be more costly from private sources.

Table 2.2

| NMNL Model of Provider Choice Estimated for Health Care Philippines, 1993 | | |
|--|-------------|------------|
| Variable | Coefficient | T-value |
| Consumption | 5.310 | 1.91 * |
| Consumption squared | 11.629 | -53.37 *** |
| Sigma | 0.275 | 4.43 *** |
| Private doctor | | |
| Education | 0.027 | 1.75 * |
| Severity | 0.086 | 0.80 |
| Age | 0.008 | -1.85 * |
| Male | 0.359 | 2.70 *** |
| Nchild | 0.090 | -2.89 *** |
| Nadult | 0.028 | 5.63 *** |
| Government clinic | | |
| Education | 0.000 | -0.48 |
| Severity | 0.007 | 0.04 |
| Age | 0.006 | -1.42 |
| Male | 0.400 | -2.58 *** |
| Nchild | 0.261 | 5.91 *** |
| Nadult | 0.274 | -4.97 *** |
| Government hospital | | |
| Education | -0.019 | -1.011 |
| Severity | -0.079 | -0.51 |
| Age | 0.012 | 3.10 *** |
| Male | -0.080 | -0.59 |
| Nchild | -0.128 | -2.81 *** |
| Nadult | -0.007 | -1.58 * |
| Sample size | 2039 | |
| Log-Likelihood | -1449.097 | |

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

The same highly significant variables that influence private doctor choice also influence, albeit in opposite directions, the choice for government clinics. However, while being male would influence demand for private doctor positively, the influence is negative for government clinics. Males are unlikely to choose public clinics. The number of children has a positive and significant effect on the demand for care from public clinics, while the number of adults reduces the demand for this provider option. This may be due to the fact that the focus of activities in public clinics is mostly preventive care (maternal and child health, family planning, well-baby care, etc.) directed at mothers or children. Furthermore, public clinics are likely to be largely staffed by women. Understandably, having more children will likely increase the choice for public clinics, as they comprise the clinics' major target clientele.

The demand for government hospitals is strongly influenced by age and household age composition. The age effect is highly significant at one percent and negative. This is in direct contrast to our private doctor estimates. Older individuals are likely to seek care in government hospitals. Health complaints of an older individual are likely to require more medical skills which hospitals can provide and more cheaply than from a government hospitals.

Having more adults and children influence the demand for public hospital care significantly as in the other provider types. However, the direction of the effects are both negative for public hospitals. Interpreted as a productivity factor, having more adults increases households earning capacities and therefore greater preference to use private care as opposed to public hospital and clinic care. For the latter, adult chronic illnesses are likely to be effectively serviced in hospitals than clinics. Having more children on the other hand reduces both private and public hospital care demand but increases the demand for public clinics.

The non-significance of the health status variable, severity is surprising. Health demand studies earlier cited would have this factor. This may be due to the limits of our data which rely on self-reported morbidity and the individual's own assessment of the severity of his/her complaint. Furthermore, severity self-assessments may also interact with other factors which we were unable to capture.

2.3.2 Degree of Responsiveness of Demand to Changes in Prices

The outpatient health care demand analysis undertaken here considered medical care prices to be the direct price paid to the provider, time costs and transport costs. Time costs were estimated as an opportunity cost, with travel time multiplied with the average daily wage rate in the area.

The degree of responsiveness of demand to changes in prices is known as the elasticity concept in economics. It provides a useful indicator of the magnitude of the impact of changes in price to health care demand. In addition, it serves as a

good starting point for further analysis on revenue impacts as well as welfare effects of these changes.

To examine the effects of consultation price on the utilization of medical care, across income class and provider type, arc price elasticities of demand were estimated. Three levels of fee changes were examined. Table 2.3 shows the arc price elasticity estimates. Reading across a row shows the change in price elasticities as income rises, holding price constant. Reading down a column shows the changes in price elasticities holding income constant.

The general trend confirms the theory's expectation that price elasticity of demand falls with income, i.e. the poor are more price sensitive than the rich.

Our estimates show that for private doctor demand, lower income groups exhibit greater price sensitivity than higher income groups. Generally, however, health care demand is less than one, that is it is price inelastic, except for the lower income group. Lower income groups have an elasticity greater than one at the highest fee level. This implies that the poor are likely to experience a fall in demand when high fee levels are set.

For government clinics however, demand is generally inelastic, such that price changes are unlikely to alter demand significantly. Government clinics are barangay health stations or rural health centers and they serve as frontline units for the government's public health care activities. The norm is for services offered at these levels to be free and exceptions to the norm are likely to be largely voluntary. As expenses are likely to be small compared to overall incomes, then demand is likely to be inelastic. Gertler and van der Gaag (1990) study for adult health care demand in rural Peru yielded similar results. The trend on the impact across households is as expected, i.e. price elasticity of demand falls with income. The largest response appear to fall on the middle income group, the group which are likely to move out of public clinic facilities towards private facilities.

Demand for government hospital care by the poor is most responsive to price increases. It is also in government hospital care demand that the price response differential is widest across income groups and across fee level changes.

The lower income group appears to be more price sensitive when it comes to government hospitals than to private doctors. The highest income group on the other hand exhibit the lowest price sensitivity for government hospital care relative to other provider types.

Table 2.3

| Arc Price Elasticities for Health Care Demand | | | | | |
|---|-----------------|----------|----------|----------|----------|
| | Income Quintile | | | | |
| | Lowest | | | Highest | |
| | 1 | 2 | 3 | 4 | 5 |
| | (mean income*) | | | | |
| | 852.65 | 1,952.86 | 3,205.01 | 5,179.31 | 8,974.61 |
| Price change (in pesos) | | | | | |
| Private doctor | | | | | |
| 0-50 | -0.5153 | -0.4365 | -0.2352 | -0.1737 | -0.3640 |
| 50-100 | -0.7693 | -0.2017 | -0.1122 | -0.2258 | -0.0002 |
| 100-150 | -1.6515 | -0.4506 | -0.2383 | -0.2380 | -0.3528 |
| Government clinic | | | | | |
| 0-50 | -0.0094 | -0.0167 | -0.0784 | -0.0149 | -0.0293 |
| 50-100 | -0.0204 | -0.0362 | -0.1657 | -0.0298 | -0.0556 |
| 100-150 | -0.0216 | -0.0378 | -0.1771 | -0.0303 | -0.0562 |
| Government hospital | | | | | |
| 0-50 | -1.3123 | -0.0345 | -0.0203 | -0.0190 | -0.0087 |
| 50-100 | -2.0541 | -0.0380 | -0.0498 | 0.0188 | -0.0085 |
| 100-150 | -4.4581 | -0.0152 | -0.0092 | 0.00 | -0.0043 |

Mean income for each quintile is in pesos per month.

With these observations on differential price responsiveness across income groups and provider types, health care financing reforms particularly those that intend to levy fees in government facilities are likely to be regressive – reducing the lower income groups’ utilization of these facilities substantially relative to the upper income group. With careful targeting, the upper income groups can be levied fees without much effect on their utilization. With revenue retention powers, public hospitals can enhance revenues to expand or improve services for the poor.

Comparison with other studies. Ching’s 1990 estimates for children’s health care demand based on the 1981 National Health Survey data using the Gertler and colleagues framework support our findings on price elasticities falling as incomes increase. The study however distinguished the provider choice to just public and private and their substitutability with self-care and not with each other. Earlier estimates by the same author (1989) using a different methodology yielded price

elasticity estimates of smaller magnitudes, i.e. for both child and adult health care demand, the responsiveness did not alter with incomes. Regional variations in price responsiveness were however noted, and conforms to theory's prediction regarding price sensitivity increasing as one goes down the income ladder.

2.3.3 Degree of Responsiveness of Demand to Time Costs

In purchasing medical care, monetary resources are not only expended but also the time available for home production, work or leisure. The time loss is considered as part of the cost of seeking care and is estimated as an opportunity cost of time, with travel time multiplied with the hourly wage rate. Time spent traveling is a function of the location of facilities and signifies access to health facilities. Estimates of arc time elasticities (shown in Table 2.4) were made across provider options and income classes by considering three travel time levels, with each range equivalent to one hour change. Like the previous table, reading across the row reflects change in time elasticity as income rises and travel time held constant. Reading down the column reflects changes in time elasticity for increasing travel time, with incomes held constant.

For private doctor demand, demand is more time elastic at higher travel time, for all income groups but especially for the lower income group. The latter experienced drastic reduction in demand beginning at the second hour range.

Estimated arc time elasticities for public clinics are of greater magnitude compared to price elasticity estimates. This confirms that for clinic demand, time serves as a rationing device. Given negligible or token pricing, the demand for the care offered in public clinics (which is largely preventive care) is largely determined by time costs. The middle income group's responsiveness of changes in time costs is higher than that of the lowest and highest income groups. This reflects wage impacts, as the middle income groups are likely to experience the highest opportunity costs of time. The relative unresponsiveness of the highest income group relative to the lower income groups is probably due to lower demand from this group. Only 4 percent of those belonging to the highest income group used public clinic facilities.

For government hospitals, time elasticity increases with income, i.e. demand is more time elastic for upper income groups. Public hospital care demand for the highest income quintile is more than double the elasticity of the lowest income quintile. And this responsiveness begins for the upper income group at relatively lower time range. The behavior of this group is not unlike the lower income group's behavior with regards to private doctor demand. The trend for the upper income groups is reflective, not only of wage impacts, but it is also this group that can afford private doctors and therefore would shift utilization to private doctor when public hospital facilities are of some considerable distance.

Table 2.4

| Arc Time Elasticities for Health Care Demand | | | | | |
|--|-----------------|----------|----------|----------|-----------|
| (mean income*) | Income Quintile | | | | |
| | Lowest | | | | Highest |
| | 1 | 2 | 3 | 4 | 5 |
| | 852.65 | 1,952.86 | 3,205.86 | 5,179.31 | 18,974.61 |
| Travel Time change time cost | | | | | |
| Private doctor | | | | | |
| 0-1 | -0.2315 | -0.2070 | -0.1780 | -0.2062 | -0.2047 |
| 1-2 | -1.0517 | -0.7256 | -0.6421 | -0.2530 | -0.7002 |
| 2-3 | -1.1884 | -0.0902 | -0.9694 | -0.1230 | -1.1545 |
| Govt. clinic | | | | | |
| 0-1 | -0.3798 | -0.3101 | -0.7364 | -0.3348 | -0.0597 |
| 1-2 | -0.2416 | -0.2551 | -0.4866 | -0.3420 | -0.2124 |
| 2-3 | -0.1616 | -0.1711 | -0.3266 | -0.2315 | -0.1070 |
| Govt. hospital | | | | | |
| 0-1 | -0.1312 | -0.1813 | -0.2069 | -0.2134 | -0.2988 |
| 1-2 | -0.4730 | -0.6473 | -0.7451 | -0.7748 | -1.0618 |
| 2-3 | -0.7088 | -0.9700 | -1.1162 | -1.1606 | -1.5908 |

*Mean income for each quintile is in pesos per month.

Compared to their price elasticities, the poor's responsiveness to time is of smaller magnitude, implying that prices determine their demand for government hospitals more than time costs. For the highest income group, time serves as a rationing device more than prices for hospital care demand. More than direct fee charges, the demand for public hospital care for the upper quintile group is shown to be sensitive to time costs. This implies that for careful targeting of scarce public resources for hospitals, charging the upper income groups would largely be made for cross-subsidy purposes (to provide quality and affordable services to the poor) and not so much to expand hospital services geographically. Public pricing policy for hospitals can also price discriminate in terms of location; charges in centrally-located facilities should not be the same as those in the districts or municipalities. Our figures show that, of the government hospital users, only 9.2

percent belong to the lower income group while 11.7 percent are from the upper income quintile.

2.4 Policy Simulations

Information on the relative price and time responsiveness of different income groups provides valuable insights into the potential impact of health care financing reforms, particularly of pricing policies for public facilities. Revenue and utilization impacts can be estimated from the data. We can also estimate for the level of income needed to compensate households for any welfare changes arising from a price increase. Indirectly, this informs on the level of minimum income levels that can support participation in some risk-sharing schemes sufficient for current levels of utilization, if not higher.

The impacts of alternative fee prices were estimated for urban and rural settings in the sample. Some salient characteristics of these areas are shown in Table 2.5. We observe that in terms of relative distance of providers, travel time between urban and rural areas shows no difference except for government hospitals. But even for the latter, a less than one-hour difference does not appear to be significant. Hence, succeeding simulations emphasize price changes, especially in relation to private facility prices. This approach is considered appropriate in the light of the market-oriented nature of the health care market as well as our concern of linking our analysis to health care financing reforms, particularly directed at enhanced risk-sharing participation. To address the latter issue, the analysis focuses on current public utility users. They belong to an income range that are likely targets of risk-sharing mechanisms – the second to the fourth quintile groups.

2.4.1 Utilization Impacts

Four price scenarios were explored including the base scenario. Price changes were made relative to the reported private consultation prices. The base case price scenario assumed that public clinics and government hospitals charge zero fees. Scenario 1 assumes that government hospitals charge one-half the price of the private sector for outpatient services and clinics charge zero price. Scenario 2 assumes that government hospitals charge the same rate as private hospitals and government clinics begin charging one-third the price of private clinics. Scenario 3 sees both government facilities charging full price as the private sector.

Table 2.6 shows the changes in the probabilities of seeking care and the estimated changes in utilization arising from the assumed price changes.

For the urban areas, the probability of seeking care from a private doctor increases with each price change in the public sectors. Each price increase in the public sector lowers their probability of being sought for care. In the rural areas, the same trend is observed, albeit in smaller probability changes (Figure 2.2).

Table 2.5

| Urban-Rural Differences | | |
|--|------------|-----------|
| | Urban | Rural |
| | (N = 2137) | (N = 661) |
| Daily wage rates-pesos (ave. for commonest reported occupations) | 205.78 | 129.96 |
| Mean total expenditures (pesos per month) | 6290.02 | 2581.19 |
| Mean per capita food consumption (pesos per month) | 602.84 | 212.11 |
| Mean per capita non-food consumption (pesos per month) | 678.2 | 217.15 |
| Percent with piped water | 85.4 | 17.5 |
| Percent with toilet facilities | 13.9 | 5.3 |
| Percent with reported ill Member(s) | 57.7 | 53.9 |
| Percent sought market care | 38 | 10.2 |
| Distance (in minutes) of nearest health provider | | |
| government clinic | 20 | 24 |
| government hospital | 21 | 47 |
| private MD | 26 | 24 |

Table 2.6

| | Probability of Seeking Health Care | | | | | |
|------------|------------------------------------|------------|----------|------------|------------|----------|
| | Urban | | | Rural | | |
| | Pvt doctor | Gov clinic | Gov hosp | Pvt doctor | Gov clinic | Gov hosp |
| Scenario 1 | 0.268 | 0.221 | 0.267 | 0.247 | 0.182 | 0.255 |
| Scenario 2 | 0.217 | 0.287 | 0.206 | 0.248 | 0.329 | 0.223 |
| Scenario 3 | 0.216 | 0.192 | 0.237 | 0.205 | 0.189 | 0.223 |
| Scenario 3 | 0.563 | 0.057 | 0.152 | 0.298 | 0.079 | 0.105 |

| | Estimated No. Seeking Health Care | | | | | |
|------------|-----------------------------------|------------|----------|------------|------------|----------|
| | Urban | | | Rural | | |
| | Pvt doctor | Gov clinic | Gov hosp | Pvt doctor | Gov clinic | Gov hosp |
| Scenario 1 | 545 | 451 | 534 | 504 | 370 | 520 |
| Scenario 2 | 442 | 585 | 419 | 805 | 672 | 455 |
| Scenario 3 | 440 | 391 | 484 | 418 | 386 | 454 |
| Scenario 3 | 1,148 | 115 | 310 | 607 | 161 | 215 |

Table 2.7

| | Estimated Total Revenue from Persons Seeking Health Care | | | | | |
|------------|--|------------|-----------|------------|------------|-----------|
| | Urban | | | Rural | | |
| | Pvt doctor | Gov clinic | Gov hosp | Pvt doctor | Gov clinic | Gov hosp |
| Scenario 1 | 73,244.60 | 0.00 | 0.00 | 59,803.20 | 0.00 | 0.00 |
| Scenario 2 | 59,334.97 | 0.00 | 28,147.83 | 59,996.89 | 0.00 | 30,529.99 |
| Scenario 3 | 59,088.54 | 17,495.62 | 65,002.87 | 49,682.65 | 15,261.05 | 53,871.30 |
| Scenario 3 | 154,183.31 | 15,497.74 | 41,619.36 | 72,127.01 | 19,103.13 | 25,495.05 |

In terms of numbers, the number of those seeking private doctor care for outpatient consultations in the urban areas doubles from the base scenario to scenario 3. The number seeking clinic care drops dramatically in the urban areas. Charges at the public clinic levels drive people to the government hospitals, even if public hospitals charge as much as the private facilities.

While overall utilization in urban areas did not show declines, in the rural areas, price policy changes in government hospitals brings down utilization drastically. At the first price scenario, utilization shifts to the public clinics which did not change in price. The change in price at the clinic levels however brought down utilization at that level. Since the number seeking care from private doctors did not increase (in fact it dropped by 21%) when public clinic prices increase, we can assume that the 74% drop in clinic utilization dropped out of the market into self-care.

2.4.2 Revenue Impacts

The estimated revenue changes arising from price changes in public facilities are shown in Table 2.7. The overall impact of these price changes in the public sector has been to increase revenues in the private sector. In the urban areas, the dramatic drop in public clinic demand and the resulting shift towards public hospitals doubled the latter's revenues. The increase in public clinic revenues as a result of charging was much less than the increase in the revenues brought to public hospitals.

The impact of public charges on private facilities in the rural areas is much less than in the urban areas. The revenue increase for government hospitals in the rural areas is much higher than their counterparts in the urban areas for the first price level change. But while urban public hospitals may feel an increase in revenues thereafter, rural public hospital revenues tend to fall. This is due to the high drop-out rate from the health care outpatient market in the rural areas.

Revenues impacts can also be examined in terms of cost recovery. Unfortunately, we have no data on average costs at the outpatient facility levels to compare our revenue estimates.

2.4.3 Welfare Impacts

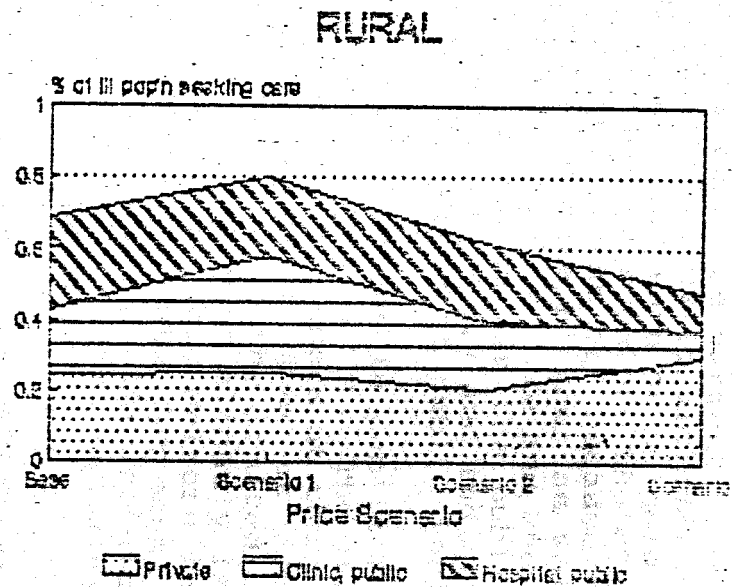
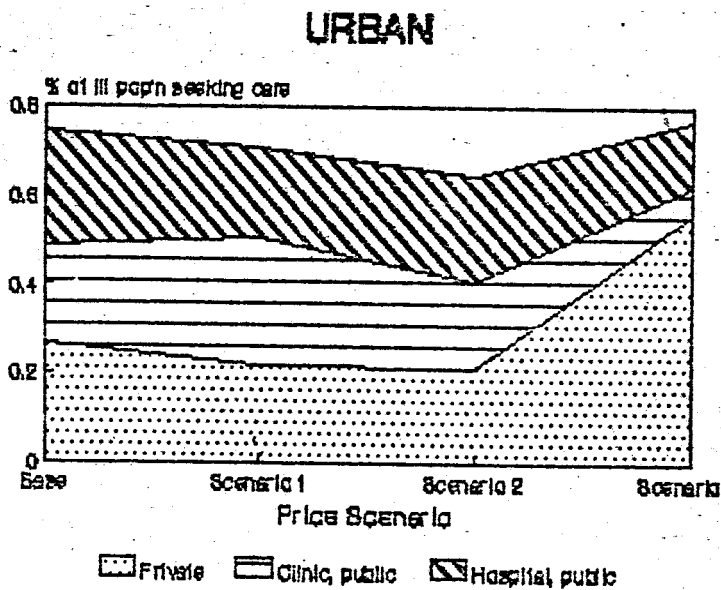
Economists interpret welfare changes arising from price changes as a willingness to pay measure. Economic models assume that price changes bring about a change in consumer welfare. To restore the consumer to his or her original welfare position before the price change, he/she must be compensated or have his/her income taken away. This income adjustment measure is known as compensating variation (CV). CV is interpreted as the amount of income that an individual must earn or be paid to make him just as well off after a price change as before the change. A negative CV means the consumer becomes worse off

because of the price change and must be given money to make him/her as well off with the new prices as he was with the old (Gravelle and Rees, 1981). Inasmuch as we dealt with price increases in the public sector, the CVs estimated were negative (Table 2.8) and indicate welfare loss for consumers as a result of charges at public facilities.

We observe that price changes in public facilities result in individuals being generally worse off. The impact however falls in varying degrees on the users. Users at the public clinic levels require much less compensation than at the public hospital levels. This is probably due to the limited services offered at these facilities. For a subsidy of slightly less than 200 pesos, urban consumers get back on the same welfare level. Rural clinic users experience greater welfare loss for equal pricing (i.e. same prices as private facilities) at the clinic level and would therefore require a slightly higher subsidy to prevent the households from leaving the market.

Equal pricing at public hospitals and one-third pricing at the clinic levels is the worst position among three scenarios and require the highest compensation levels, especially among hospital users. As these compensation levels indicate the amount needed to keep current users in a position where they are assumed to be better off before the price change, the price of the alternative, i.e. dropping out of the market, is high for society. The lower compensation levels at price scenario 3 indicates an adjusted welfare position and subsidies needed would be lower for those who can just as afford private market prices.

Viewing these income adjustments or subsidies as percent of total household and nonfood budgets yields insights into the burden of pricing reforms or the affordability of public facilities after some pricing reforms. Simplifying the pricing reforms into minimum price change (government hospitals charge one-half the price of private) and maximum price change (equal pricing at facility levels), Table 2.9 shows the impact of these income adjustments on household budgets. Based on average household expenditures, we classify the users into the quintile groups where they belong and interpret the subsidies according to quintile groups. Subsidies for minimum price changes comprise 4.84 to 7.96 percent of household budgets; while maximum price changes would require subsidies between 4.69 to 9.97 percent of household budgets. As a proportion of non-food budgets, the relatively well-off income groups' subsidy would comprise 8.66 percent compared to the relatively poorer groups' subsidy which comprise 13.46 percent at the minimum price changes. Maximum price changes require higher levels of subsidy, with the subsidy falling at higher income levels. Should these subsidies not materialize, we can reinterpret these percentages as the proportion that households must pay out of their budgets in order to remain at the welfare position prior to the price increases.



***Impact of Changes in User Charges
on the Demand for Health Care***

Figure 2.2

Table 2.8

| | Compensating variation due to price changes | | | |
|------------|---|----------|----------|----------|
| | Urban | | Rural | |
| | clinic | hosp | clinic | hosp |
| | Scenario 1 | 0 | -300.862 | 0 |
| Scenario 2 | -186.788 | -694.792 | -180.257 | -638.079 |
| Scenario 3 | -165.458 | -444.854 | -225.638 | -301.976 |

Table 2.9

| Quintile Group | C.V. as proportion of total HH expenditures | | C.V. as proportion of non-food budget | |
|----------------|---|----------------------|---------------------------------------|----------------------|
| | Minimum price change | Maximum price change | Minimum price change | Maximum price change |
| | 2 | 7.96 | 9.97 | 13.46 |
| 3 | 5.30 | 4.69 | 12.33 | 10.92 |
| 4 | 4.84 | 7.16 | 8.66 | 12.81 |

The proportions in relation to nonfood budgets are relative indicators of the willingness to pay for medical care by households. The accepted norm is that people are not willing to pay more than 5 percent of their household budgets to medical care (Gertler/Rand, 1993).

Of course, our analysis assumes that the pre-price change welfare situation of individuals were optimal. In the case of health care utilization, we cannot speak with confidence that it is so, without additional information on other health conditions in the area and medical opinion on the appropriate level of care. This consideration makes our estimates probably on the high side, overestimating for the degree of subsidies that may actually be necessary when in reality current utilization may not be optimal.

2.4.4 Implications for Risk-Sharing

Alternatively, we can interpret these compensating variations as the additional income available to households and check whether this is sufficient for participation in a risk-sharing scheme. Or these income adjustments can be made not as direct compensation to individuals but indirectly contributed to a health insurance scheme which can assure them of financial access to health care even beyond a single visit. It is a minimum income level since the amounts were computed based on a single outpatient basis. The assumption is that a single expense may go a long way when pooled with other funds for basic insurance coverage. We can therefore interpret compensating variation as the amount we can add to average monthly income figures, to estimate minimum income levels to support risk-sharing participation.

Based on our sample of public facility users (Table 2.10), majority of the users were not members of any health care financing scheme. Medicare coverage is the most common form of insurance coverage. Membership in cooperative-type risk-sharing schemes was common in the rural areas than in urban areas. And within rural areas, the highest reported membership among government clinic users was for co-op type schemes.

If we add the compensating variations to mean reported incomes of public facility users, locate their average expenditures in the quintile groupings and assume the minimum price they face at private facility prices, Table 2.11 shows estimates of minimum incomes households must have available to be at an optimum welfare given a price change for a single visit. The affordability column is based on the assumption that the affordable visit price should not be more than 5 percent of nonfood budgets. The lowest affordable price for a single visit approximates the current contribution premium for a Medicare coverage in the country. At the minimum therefore, those earning above 2,400 pesos can afford to be covered by Medicare. Medicare coverage entitles them to hospitalization benefits, a benefit which exceed the amount of a single visit. The fourth quintile can afford only

2,084 pesos worth of yearly insurance coverage. This amount may not be sufficient for a health maintenance type of insurance coverage.

Table 2.10
Membership in an HCF Scheme, Public Facility Users
(% of users)

| | None | Medicare | Private, Employer | Cooperative |
|-------------|-------|----------|----------------------|-------------|
| Urban | | | | |
| govt clinic | 69.93 | 24.48 | 4.20 | 1.40 |
| govt hosp | 55.26 | 34.87 | 7.24 | 2.63 |
| Rural | | | | |
| govt clinic | 86.57 | 4.48 | 1.49 | 7.46 |
| govt hosp | 76.47 | 14.71 | 2.94 | 5.88 |

Table 2.11

| Quintile Group | Minimum Monthly Incomes (pesos) | Affordable Visit Price (pesos)* |
|----------------|------------------------------------|------------------------------------|
| 2 | 2,489.40 | 66.98 |
| 3 | 3,535.70 | 75.75 |
| 4 | 6,657.85 | 173.64 |

* Based on the assumption of 5% of nonfood budgets

2.5 Conclusions

The study showed that prices and income significantly influence demand for outpatient care. The response differs across income groups and provider types. Price increases are likely to lead to greater than proportionate reduction in demand, especially for the poor. Price changes in government hospitals are likely to impact most on the poor. Inasmuch as majority of government hospital users are not likely to be the very poor, careful targeting in pricing policies can allow public facilities to impose sliding fee schedules.

More than time, the poor are most sensitive to price changes. The rich are more sensitive to time, such that public facilities in centrally located areas can impose positive charges without fear of reduced utilization. In the urban areas, price changes do not lead to overall reduction in utilization. There is just a shift in utilization from public to private facilities. But in the rural areas, price changes are likely to impact negatively on utilization.

Subsidies that may be required to cushion the impact of price changes would comprise between 5 to 10 percent of household budgets. But given these amounts, households can support participation in risk-sharing schemes.

Chapter Three

DEMAND FOR HOSPITAL CARE IN THE PHILIPPINES: RESULTS FROM HOUSEHOLD SURVEY

3.1 Introduction

The Philippine health care system consists of a network of health, diagnostic, and treatment facilities operated by the government, and a loosely linked network of private medical facilities. Public health care facilities provide promotive, preventive, curative and rehabilitative services through its hospitals and health centers and stations; while private facilities deliver more of the direct personal care which are curative and rehabilitative largely through hospitals. In the Philippines as in most developing countries the government plays an important role in the provision of health services. However, given the increasingly difficult fiscal constraint, issues regarding pricing or charging user fees have now increasingly occupy an important concerns of policymakers.

Analyses of the demand for health care have generally focused on many aspects. Most studies in developing countries, however, tend to focus in analyzing utilization and underlying factors affecting utilization of various types of health services (mostly, preventive) and choice of providers. Very few efforts except those mostly conducted in developed countries have looked into the analysis of hospital care.

This study extends current efforts on analysis of the demand for health care in the Philippines by looking into the factors that affect hospital utilization of individuals.

The paper is organized into three sections. Section two presents the conceptual framework used in the analysis of the demand for hospital care. Section 3 presents trend on hospital use by households. Finally, the last section presents the results of our multivariate analysis of the determinants of hospital care.

3.2 Conceptual Framework

3.2.1 Demand for Hospital Care

A common approach is to analyze the demand for hospital in the same way as the demand for goods and services. At the opposite end is the view that the demand for hospital care is supplier-induced, i.e., that hospital use is determined by the physician. The physician determines the demand for hospital care on the basis of his perception of correct medical practice, or self-interest or by seeking to use available resources in a way that optimally balances the potential contribution to the health of his own patient against the use of those resources for other patients. Feldstein (1977), however, argued that instead of considering the physician as a supplier of medical services, in-patient treatment decisions can be best explained

by viewing the patient-physician relationship as one of incomplete agency; i.e., treatment decisions do not reflect the patient's preferences and situation but also physician self-interest, medical ethical concern and concern to make good use of hospital resources. Accordingly, there will be variables that influence observed demand that would not enter the traditional household demand function.

Based on this consideration, the demand for hospital care is usually specified in the following general form:

$$(1) H_D = H(P, X, Z)$$

Where H_D is quantity demanded, P is a vector of relevant user money and time prices, X includes other individual/household determinants such as income, health status, insurance coverage, and family size and Z represents a number of availability indicators such as hospital beds and physicians.

3.2.2 Empirical Model

In the literature, equation (1) is usually estimated in terms of two dimensions of hospital use, viz.: (i) the use or nonuse of inpatient hospital care for micro analysis using individual data or in terms of admission rate for aggregate level analysis, and (ii) the volume of inpatient care consumed measured as length of stay (LOS).

Following the literature we analyze the demand for hospital care in terms of length of stay. It is pointed out that analysis of non or nonuse of hospital is not possible since almost all of the right hand side variables were not collected. This is so because the data collection was designed so that only those households which reported a member hospitalized had relevant information on the right hand side variables e.g., cost of hospitalization, health status, etc.

The empirical model for the demand for hospital is given as:

$$(2) LOS = f(\text{INFECT, CARDIO, RESP, TIMESHOSP, NCLIN, NDOCT, URBAN, INCOME, FSIZE, AGE, SEX, HOSPP, INSURANCE})$$

where LOS = length of stay in the hospital (days)

CARDIO = 1 if diagnosis of complaint is cardiovascular
0 otherwise

INFECT = 1 if diagnosis or complaint is infectious disease
0 otherwise

RESP = 1 if diagnosis is respiratory
0 otherwise

| | |
|-----------|---|
| TIMESHOSP | = number of times hospitalized the past year |
| NCLIN | = number of clinics and hospitals in the municipality per 1000 population |
| NDOCT | = number of doctors in the municipality per 1000 Population |
| URBAN | = 1 if household is located in an urban area 0 otherwise |
| INCOME | = household monthly income (pesos) |
| FSIZE | = family size |
| AGE | = age (years) |
| SEX | = 1 if male; 0 otherwise |
| INSURANCE | = 1 if insurance by MEDICARE or HMO 0 otherwise |
| HOSPP | = cost of hospitalization per day (P/day) |

Note that the right hand size variables represent four types of variables that influence the demand for hospital care. The first four variables (INFECT, CARDIO, RESP, TIMESHOSP) represent health status of the individual. The second set of variables (NCLIN, NDOCT, URBAN) captures supply availabilities of health facilities. The third set of variables (INCOME, FSIZE, AGE, SEX, INSURANCE) represent household or individual specific variables that influence demand for hospital use. Finally the last variable (HOSPP) captures the effect of the cost or price of hospital on the demand.

Health status of the individual is expected to positively influence length of stay in the hospital. The more severe the illness is the longer the individual is expected to stay in the hospital, other things the same. Thus, between a cardiovascular and respiratory illness, a patient having the former maybe expected to consumer more hospital care. The variable TIMESHOSP which is the number of times the individual was hospitalized last year is a proxy to health status. An individual who has had more incidence of hospitalization the past year, can be considered as relatively of poorer health. Consequently, such individual is expected to consume more hospital services.

As mentioned earlier, the variables NCLIN, NDOCT and URBAN, represent availability indicators. Pauly (1980) has pointed out that an empirically estimated availability effect of the number of hospital beds or physicians on the length of stay or admission rate does not necessarily imply that suppliers create demand for their own services. One explanation is chronic excess demand which allows for non-price rationing of services. Secondly, the availability effect may represent the response of use to changes in time or convenience cost of care. However, these explanations are likely to hold true for aggregate analysis. For individual data, it is unlikely that regional or supply of hospital beds and doctors at the municipal level will respond to individual demand. Thus, we expect these variables to have very little to insignificant effect on the demand of individuals for in-patient care.

Various studies have shown that personal characteristics affect the demand for hospital use. Since hospitalization entail substantial cost, income and availability of insurance are expected to significantly influence hospital admission and length of stay. In particular, studies in developed countries have found that the extent and health insurance coverage is an important determinant of health care utilization. This is not surprising since a health insurance reduces a patient out-of-pocket cost of hospitalization. In our sample and in the country as a whole, since only a small segment of the population is covered by formal health insurance, it is postulated that health insurance will have significant effect on hospital use.

In so far as home care can be a substitute for hospital care, family size (FSIZE) as a proxy for home care possibilities is expected to negatively affect demand for hospital care. On the other hand, older individuals are expected to consume greater volume of hospital care. This is because, it is usually assumed that the rate of physiologic deterioration increases during the later stage of the life cycle, suggesting that the propensity of the individual to use inpatient care and volume of inpatient care increases with advancing age. Finally, gender is entered as surrogate for medical needs that are not captured by measures of health status.

Following Feldstein (1977), the gross price of hospital care (HOSPP) measured as the cost per patient day is entered to assess the importance of the cost of hospitalization on demand for hospital care. As in standard theory, own price is expected to negatively affect demand. To capture the effect of reimbursement from insurance, second variable (HONSPNP) in which the price of hospital is net of reimbursement was also tried in the regression.

The above empirical model was specified in log-linear form and estimated using ordinary least-squares (OLS) techniques.

3.3 Results of the Analysis

3.3.1 Hospital Utilization of Households

Out of the total sample of households, 425 households or 16.2 percent of the total household sample reported a member who was hospitalized during the past year. Half of the individuals who were hospitalized used government hospitals while a slightly lower proportion (44.5%) were hospitalized in private hospitals. On the other hand, users of private clinics comprised only about 5 percent. Further, as expected users of both private hospitals and clinics had higher average incomes relative to government hospital users (Table 3.1).

Length of stay in the hospital averaged 6.1 days. Across types of hospital facilities, we observe little variation in length of stay. This is surprising considering the significant variation in average costs of a hospital day. Between government and private hospital, average daily cost of hospitalization in the latter is more than twice (P3313 vs P1492) of government hospital costs (Table 3.2). While government hospitals charge the lowest cost, it is observed (see Table 3.3) that individuals in the lowest income group incurred the highest per capita cost of hospitalization in going to government hospitals compared to other income groups. This may not be surprising considering that lower income individuals are likely to have poorer health status and therefore, given the relative cost of private and public health alternatives, the most intensive users of government hospitals. Unfortunately, the analysis could not control for illness to highlight the self-selection process that may have given rise to differential hospital costs across income groups.

Across types of facilities, one finds that cost per person is highest in private clinics (Table 3.3). This maybe due to a number of reasons. One is the type of illness treated. It is expected that more serious illness will entail more hospital services and therefore more cost. Second, higher costs may reflect relative inefficiencies of smaller operations. Controlling for the type of illness treated, hospitals are likely to enjoy the advantage of economies of scale. If this is the case, they are therefore able to charge lower cost than clinics.

Of the total average cost of hospitalization, MEDICARE reimbursement covered only a small percentage of total cost, ranging from one percent for government hospitals to 3.4 percent for private clinic. Private insurance, given its current limited scope is virtually nonexistent (Table 3.4). The higher support realized from MEDICARE by private clinics confirms findings from another study (Griffin, et. al., 1992) regarding the importance of MEDICARE reimbursement to smaller private hospital operations. If these facilities appear to be inefficient as shown above, then the extent to which MEDICARE reimbursement is contributory or the outcome of such inefficiencies needs further examination.

Table 3.1
Number Percent and Men Incomes of Hospital Users
by Type of Facility Used

| Type of Facility | No. of Users | Mean Incomes (P) |
|---------------------|---------------|------------------|
| Government Hospital | 216 (50.8) | 1,972 |
| Private Hospital | 189 (44.5) | 4,413 |
| Private Clinic | 20 (4.7) | 2,999 |
| Total | 425 (100) | 3,106 |

Figures in parentheses are percentages

Table 3.2
Mean Length of Stay (LOS) and Costs of Hospitalization
by Type of Facility

| Type of Facility | LOS Mean Days | Cost | |
|---------------------|---------------|---------------------|-----------------------|
| | | Ave. Total Cost (P) | Ave. Cost Per Day (P) |
| Government Hospital | 6.4 | 9,551 | 1,492 |
| Private Hospital | 5.7 | 18,886 | 3,313 |
| Private Clinic | 6.2 | 9,735 | 1,570 |
| All types | 6.1 | 13,659 | 2,239 |

Table 3.3
Hospitalization Cost Per Person, by Type of Facility,
by Income Group (in Pesos)

| Type of Facility | Mean Income Group | | |
|---------------------|-------------------|-------------|--------------|
| | I P594 | II P1674 | III P6801 |
| Government Hospital | 170 | 71 | 95 |
| Private Hospital | 207 | 230 | 337 |
| Private Clinic | 210 | 4351 | 372 |

Table 3.4
Cost of Hospitalization, Reimbursed Goods
by Type of Facility and Insurance

| Type of Facility | Mean Cost of Hospital (P) | Value of Medicine Reimbursement (P) | % Medicare | Value of Private Insurance Reimbursement (P) |
|---------------------|---------------------------|-------------------------------------|------------|--|
| Government Hospital | 9511 | 106 | 1.1 | 3 |
| Private Hospitl | 18886 | 526 | 2.8 | 181 |
| Private Clinic | 9735 | 335 | 3.4 | 0 |

Since the cost of hospitalization comprised of various hospital-related costs, it is useful to examine the components of the total cost. Table 3.5 presents a breakdown of hospital costs by expenditure component. It is to be emphasized that the averages reported here are relative to the number of individuals reporting these expenses. A more accurate presentation should control for the type of facility and illness treated. Given this qualification, these figures should be considered as indicative.

As indicated, the major components of hospitalization cost include operation room, professional services, drugs and medicine, diagnostic test, and room and board. Mean hospitalization cost reported was P13,659.

3.3.2 Financing Hospital Expenditures

Given the cost of hospitalization, how do households and or individuals finance their hospitalization? This question is an important policy question given the links between health status and productivity on the one hand, and its long-run effects on poverty. To examine this issue, sample households reporting incidence of member(s) hospitalized the past year were asked on their sources of financing. Table 3.6 indicate their source of financing. As shown in the table, around 57.7 percent of all individuals reported financing the cost of their hospitalization from savings, 16.2% by borrowing, 8.7% by a combination of both savings and borrowing while only 7% were able to have their hospitalization costs borne by MEDICARE. In general, about 80-90 percent of the cost of hospitalization is out-of-pocket expenses of households.

Across income groups, individuals in the lower income group I, had a higher proportion of their out-of-pocket expenditures coming out of borrowing, mortgage or sale of property and a combination of savings and borrowing. Moreover, a lower percentage of individuals in this income group are effectively covered by MEDICARE or by any form of private insurance. The result that show lower income households relying on mortgage to finance their health expenditure has important implications on intergenerational equity and poverty. The extent to which the mortgaged properties are productive assets, e.g., land, work animals, the subsequent loss of these will hamper the present and future earnings capability of the households. In which case, the loss of earning capability can lead to lower investment in human capital. This will in turn lead to an intergenerational transmission of poverty and deprivation.

Further analysis would show that 35.9 percent of households reported earmarking their savings for other purposes. Only 12 percent of savers earned interest from their savings. Of the borrowers on the other hand, or those who reported financing their expenses from loans, 79 percent reported borrowing with interest with mean interest reported at 20 percent. These reporting borrowing with collateral comprised 2.5 percent of borrowers. Those who sold property to finance hospitalization costs, sold animals (6 households reporting), household appliances (5 households), land (4), and jewelries (3). Mean values of these sold properties are shown below:

| | |
|------------|---------------|
| Animals | : 2,858 pesos |
| Appliances | : 1,520 |
| Land | : 40,306 |
| Jewelries | : 1,733 |

Table 3.5
Average Cost of Hospitalization by Type of Expenditure

| | Average Cost | % Share (Total Cost= 100) | Number Reporting | % |
|-------------------------|--------------|------------------------------|---------------------|------|
| Total cost | 13,659 | 44.45 | 383 | 38.0 |
| Room and board | 1,290 | 4.20 | 153 | 15.2 |
| Professional services | 2,382 | 7.75 | 117 | 11.6 |
| Diagnostic test | 1,387 | 4.51 | 98 | 9.7 |
| Drugs and medicine | 2,010 | 6.54 | 214 | 21.2 |
| Operation room | 3,325 | 10.82 | 16 | 1.6 |
| Others | | | | |
| X-ray | 230 | 0.76 | 9 | 0.9 |
| Food and transportation | 328 | 2.69 | 8 | 0.8 |
| Recovery room | 119 | 0.39 | 1 | 0.1 |
| Blood | 1,971 | 6.41 | 6 | 0.6 |
| Oxygen | 3,200 | 10.41 | 1 | 0.1 |
| Security | 325 | 1.06 | 2 | 0.2 |

Table 3.6
Percent of Users by Income Group by Hospital Financing (Major Sources)

| | Mean Income Group | | | |
|------------------------|-------------------|------|------|-----------------------|
| | I | II | III | Total (% of Users) |
| MEDICARE | 3.5 | 10.5 | 6.6 | 6.9 |
| Private Risk-sharing | 0 | 0.7 | 1.3 | 0.7 |
| Savings | 52.8 | 59.4 | 60.5 | 57.7 |
| Sold, mortgage | 4.9 | 1.4 | 0.7 | 2.3 |
| Borrowed | 26.1 | 14 | 9.2 | 16.2 |
| Own savings/Borrowings | 11.3 | 7.7 | 7.2 | 8.7 |
| Own savings/Medicare | 5.6 | 10.5 | 12.5 | 9.6 |

3.4 Determinants of the Demand for Hospital Care

A description of the variables used for the analysis is shown in Table 3.7. Using the empirical equation specified in log-linear form in equation (2), results of the regression are presented in Table 3.8. Regression results indicate that only hospital price (HOSPP), income and the three access variables are significant determinants of volume of hospital care. However, only hospital price, income and urban had the expected signs. The negative coefficient of the two other access variables, number of doctors (NDOCT) and clinics (NCLIN) suggest that increasing population access to these resources reduces length of stay in the hospital. This result seems to be contrary to earlier studies using aggregate data (see Feldstein, 1977) and individual data (Van Vliet and Van Doorslaer, 1988). It can be interpreted, however, that improving access can lead to lower incidence of hospitalization since increased access could contribute to early detection and cure of an illness, precluding in the process the need for inpatient care.

The positive and significant coefficient of income confirms similar results in the literature. Since as noted earlier, 80-90 percent of hospitalization is out-of-pocket cost, income therefore is expected to determine a patient's length of stay in the hospital. Cost of hospitalization as expected is a major factor that determines the volume of hospital services.

Estimates of household responsiveness can be directly gleaned from the coefficients. The estimated income elasticity is only .08. This indicates that a 10 percent increase in income will result in a 0.8 percent increase in length of stay. On the other hand, own price elasticity was estimated at -0.15 indicating that a 10 percent daily cost of hospitalization will result in a 1.5 decrease in length of stay. The relatively weak effect of income appears surprising if one takes a closer look on the manner by which households finance their health needs. As noted earlier, savings, borrowings and sale of assets more than current income represent the means by which households finance their contingent needs. Given that the households has determined its available resources, the cost of hospitalization becomes a binding constraint in the determination of the volume of hospital services that households consumes.

The negative coefficient of the two other access variables, the number of doctors (NDOCT) and clinics (NCLIN) suggest that increasing population access to these resources reduces length of stay in the hospital. This result seems to be contrary to earlier studies using aggregate data (see Feldstein, 1977) and individual data (Van Vliet and Van Doorslaer, 1988). It can also be interpreted that improving access can lead to lower incidence of hospitalization since increased access could contribute to early detection and cure of an illness, precluding in the process the need for inpatient care.

Contrary to results of micro studies, health status variables did not turn out to be significant variables in affecting the consumption of inpatient care. This maybe due to the fact that given the cost of hospitalization, households economize by substituting home care.

Table 3.7

| Hospitalization data, Philippines 1993 | | | |
|--|--|----------|---------|
| | | Mean | Std Dev |
| LOS | days stayed in hospital | 1.381 | 0.85 |
| HOSPP | hosp cost per day | 4361.666 | 1608.08 |
| HOSPNP | hosp out-of-pocket cost per day | 3716.441 | 1401.60 |
| LTOTEX | household income (pesos per month) | 3106.149 | 257.07 |
| HH | household size | 5.609 | 0.11 |
| MEDICARE | (=1 if with medicare) | 0.203 | 0.40 |
| AGE | age in years | 26.122 | 1.06 |
| MALE | (=1 if male) | 0.441 | 0.50 |
| Q91 | no. of times hospitalized past year | 1.289 | 0.05 |
| CIN | no. clinics per thousand in municipality | 0.051 | 0.01 |
| DOCT | no. doctors per thousand in municipality | 2.562 | 0.10 |
| URB | (=1 if urban) | 0.792 | 0.41 |
| CARDIO | (=1 if with cardio-vascular disease) | 0.122 | 0.33 |
| RESP | (=1 if with respiratory disease) | 0.349 | 0.48 |
| INFECT | (=1 if with infectious disease) | 0.105 | 0.31 |
| INSURANCE | (=1 if with private insurance) | 0.016 | 0.13 |

Similar to the other variables, the presence of insurance does not significantly affect the demand for hospital care. As earlier noted, this is because most of the hospital cost comes from out-of-pocket expenses of the household.

Table 3.8
Determinants of Hospital Utilization (Length of Stay)

| | Coefficient | T-value |
|--------------------------------|-------------|----------|
| A. Health Status Variables | | |
| INFECT | 0.126 | 0.858 |
| CARDIO | 0.145 | 1.037 |
| RESP | 0.159 | 1.585 |
| TIMES HOSP | -0.035 | -0.321 |
| B. Access Variables | | |
| NCLIN | -0.073 | 1.659*** |
| NDOCT | -0.083 | 2.514** |
| URBAN | -0.331 | 1.936** |
| C. HH/Personal Characteristics | | |
| INCOME | 0.082 | 1.818** |
| FSIZE | -0.032 | 0.294 |
| AGE | 0.019 | 0.779 |
| MALE | 0.141 | 1.61 |
| D. Economic Variables | | |
| HOSPP (Gross) | -0.149 | 5.179* |
| INSURANCE | 0.118 | 0.109 |
| Constant | 1.184 | 3.149 |
| R-square | 0.116 | |
| F-stat | 3.589 | |
| Sample size | 370 | |

* Significant at .01 level

** Significant at .05 level

*** Significant at .10 level

3.5 Summary and Conclusion

Results of the study indicate that despite significant cost differential between public and private hospitals, we observe little variation in length of stay. On the average, length of stay in the hospital was 6 days. Households finance their health needs by dissaving, borrowing and sale of assets. In particular, lower income groups were observed to finance a higher proportion of their hospital costs from borrowing and or sale of properties. This particular aspect raises important implication on intergenerational equity and poverty to the extent that the loss of such earning assets reduce the household earning capability and consequent ability to invest in human capital.

Viewing the demand of hospital care as an incomplete agency problem, results of the study confirm similar findings on the importance of economic variables, principally income and price, as important determinants of the volume of hospital care. Contrary to earlier results, health variables and personal characteristics do not significantly affect demand for inpatient care. The magnitude of the estimated income and price elasticities indicate that demand for inpatient care is income and price inelastic. As such, an increase in the price of hospital care will result in a less than proportionate decline in the volume hospital services consumed. However, given the manner by which most households finance their contingent needs for hospital care, such increase can have serious equity implications. This is especially true for the lower income groups who invariably have to resort to borrowings and sale or mortgage of assets to meet their hospital needs.

The importance of improving access to health facilities is underscored by the study. Although the results represent an initial attempt in the analysis of demand for hospital care, and thus require further validation, results suggest that increasing the ratio of doctors and clinics/hospitals can contribute or lead to lower incidence of hospitalization and hence, lower number of hospital days. Given the observed inequality in the distribution of health facilities disproportionately in favor of NCR, a reallocation of public health facilities and or expenditures can contribute to enhanced access and reduced out-of-pocket expenditures of the lower income groups most of whom are located outside the NCR.

Chapter Four

DEMAND FOR PREVENTIVE CARE: PRENATAL CARE SERVICES

4.1 Introduction

Health care financing reform initiatives are confronted with the question whether preventive care services should be included in a basic health care package. Preventive health care, of which prenatal care serves as a case in point, is the main thrust of public health care programs. How people decide to use preventive care, from which source and the quality of care given is a concern for both medical and policy reasons. Seeking early care, especially for prenatal considerations, would allow better management of complications arising from problem pregnancies and thereby mitigate against infant mortality. As the center of government public health efforts, prenatal services comprise the first base of care-seeking which leads to subsequent coverage for breastfeeding, immunization, nutrition and family planning campaigns.

This chapter presents an analysis on the demand for pre-natal care services using the PIDS-DOH household samples. The analysis aims to examine the determinants of the utilization of prenatal care services. It looks into the determinants of the period of pregnancy at which care is first sought, and the choice of type of facilities for care – government hospitals, private and public clinics. The analysis also highlights the sources of variation in the quality of prenatal care visits.

The study seeks to answer the following questions:

- 1) What factors determine the use of prenatal care services?
- 2) How does utilization vary with socio-economic variables?
- 3) What are the implications of the study to the financing of preventive care services?

The study uses multivariate techniques to examine the sources of variation of the following prenatal care demand decisions: a) the period of gestation at which care is first sought; and b) the choice of the types of facilities to use. The determinants of the quality of visits are also examined.

4.2 Analytical Framework and Estimation

Analysis of prenatal care use has been made using an economic demand framework (Wong, et. al., 1987). A similar analysis, albeit with slightly different emphasis, i.e. the choice of infant delivery modes, has also been undertaken (Schwartz, et.al, 1989). Following Akin, et.al. (1984; 1986), these studies on prenatal care and infant delivery sources assume a utility maximization of a woman to be a function of the health of her infant. This outcomes, i.e. the choices made, from this maximization process is assumed

to be determined by prices and quality of the services plus a set of socio-economic, demographic and community factors. The general relationship between service choice and these factors are presented as follows:

$$Y_i = f(P_i, T_i, H_i, Q_i, Z)$$

where Y = alternate measures of care, i.e. month of pregnancy care was first sought or the provider type;

i = type of personnel or delivery mode (at home, in clinics, etc.);

P = price paid to provider type i ;

T = time costs to provider type i ;

H = hours of availability of provider type i ;

Q = perceived quality of provider type i ;

Z = set of exogenous household and community characteristics (such as education of mother, insurance coverage, residence and income of household head, number of children, access to primary care services) affecting the income available to, the time constraints of, and the knowledge and preferences of, the mother.

A similar analysis is undertaken for this study. It differs only in terms of the use of quality not as an independent variable but as one of the dependent variables of interest. The study generates a separate demand curve for visit quality. The use of the quality variable on the left-hand side is meant to highlight the productivity of visits made. The approach follows Colle and Grossman (1978).

Three types of dependent variables were examined. The month (MONTH) of pregnancy of first visit was estimated by a double-censored regression technique using the Tobit model. Double censoring considers, not only visits made after the interview, considering that the pregnancy experience may not be completed by then, but also considers that the earliest time for the first prenatal consultation is at day zero or at the moment of inception. Demand function for quality (QUAL) was estimated by ordinary least squares. The choice (CHOICE) of type of provider, whether government hospital, government clinics or private doctor, was estimated through multinomial logit.

A description of the variables used in the various estimates is shown in table 4.1.

Some may argue that there is an element of non-randomness to pregnancy and that this should be taken into account in the estimates. The implication therefore is that there is an element of self-selection in our samples. If there is any, then its effect is supposed to overestimate the true impacts, therefore creating a downward bias in our estimates. Unfortunately, the author hasn't come across any literature on the matter and could not preclude the director of the bias.

Table 4.1

| Variable Name | Description | Mean | S.D. |
|---------------------------------|---|---------|----------|
| A. Dependent Variables | | | |
| FIRST VISIT | month of pregnancy when first visit was made | 2.60 | 2.29 |
| QUAL | quality of visit made estimated as an index number with quality of visit attended by public health nurse set to one | 3.55 | 2.80 |
| CARE CHOICE | use of govt hospital/home care | 0.06 | 0.24 |
| | use of govt clinic/home care | 0.40 | 0.49 |
| | use of private clinic/home care | 0.31 | 0.46 |
| B. Independent Variables | | | |
| PRICE 1 | price per visit (in pesos) | 17.73 | 30.48 |
| PRICE 2 | price per visit, including travel cost (in pesos) | 33.60 | 99.30 |
| TCOST 1 | travel cost (in pesos per visit) | 20.69 | 53.15 |
| TOTINO | household income in pesos per month | 7689.00 | 10158.00 |
| TOTEX | household expenditures in pesos per month | 4032.00 | 45717.00 |
| EDUCMO | woman's education in years completed | 8.54 | 4.16 |
| AGEMO | woman's age in years | 33.88 | 11.02 |
| N5 | no. of children < 6 | 1.13 | 1.07 |
| PRES | presence of older women in household | | |
| | aged >15 (1=yes) | 0.40 | 0.49 |
| URB | urbanity code (1=yes) | 0.75 | 0.43 |
| WORK | if woman is engaged in wage work (1=yes) | 0.29 | 0.46 |
| HFARM | spouse's occupation is farming (1=yes) | 0.16 | 0.36 |
| HPROF | spouse's occupation is professional (1=yes) | 0.05 | 0.22 |
| HCLER | spouse's occupation is clerical (1=yes) | 0.17 | 0.39 |
| HSKILL | spouse's occupation is skilled (1=yes) | 0.42 | 0.49 |
| OPP1 | opportunity cost of time (in pesos per hour) | 5.81 | 0.29 |
| NFAO1 | no. of clinic/hospitals per thousand population | | |
| | in the municipality | 0.17 | 0.13 |
| NDOCT1 | no. of physicians per thousand population | | |
| | in the municipality | 3.83 | 4.47 |
| TIME | travel time in minutes, average for municipality | 0.32 | 0.33 |

4.3 Data

In the data set used for this study, there is an overrepresentation of urban samples in the survey. The empirical analysis is restricted to utilization of prenatal care services by a subsample of pregnant women, which during the survey numbered 173. Of this number, 75 percent reported use of prenatal care services. A greater proportion of urban women did not seek care. The average month of pregnancy a first visit was made was 2.6 or the third month.

An occupational profile of the women showed that 68 percent did not have any work outside the home. Forty (40) percent of non-working sought government clinics and 33 percent preferred private facilities. Twenty-nine percent of the women were wage-earners. A majority of working women (12%) were involved in sales. Majority of these saleswomen (20%) did not seek care.

The mean reported age of the women was 34 years old. Mean educational attainment of women was 8 years. Forty (40%) of the sample reported the presence of another adult woman in the household. This variable indicates whether there is someone who can be left with younger children when the pregnant woman seeks care.

An income distribution profile of users of facilities showed that 55 percent of those which sought no care came from the bottom income bracket. Majority of government hospital users (45.5%) also came from the bottom income bracket. Private facilities were dominated (54.7%) those from the top income group. Government clinic users were largely (40.6%) from the middle income group. Monthly expenditures can also be used as proxy for income. It is considered a more appropriate measure of permanent income, less subject to seasonal and transitional incomes. Mean household monthly expenditure reported was around 4,000 pesos.

Mean peso price per visit by type of facility is shown below:

| | Mean price per visit (pesos) | | |
|-------|-------------------------------------|--------------------|-------------|
| | govt hospital | private facilities | govt clinic |
| Urban | 2.39 | 50.34 | 4.80 |
| Rural | 9.50 | 33.0 | 8.10 |
| Total | 3.68 | 49.36 | 5.94 |

Overall mean price of prenatal care is 18 pesos.

Seventy-three percent (73%) of women considered prenatal facilities to be accessible. The average trip to the facility would cost around three pesos.

4.4 Results

4.4.1 Determinants of the Month of First Visit

Table 4.2 presents the results of the censored regression model showing the variables influencing the month of first visit by a pregnant woman. The assumption is that the earlier in her pregnancy the woman seeks care, the better the prospects of managing difficult pregnancies.

Our results show that travel TIME and DOCTOR variables, significantly account for the early prenatal visit by women. The positive signs for these variables indicate that the less travel time consuming the visit would be for the woman, the more likely that an early visit (relative to the period of pregnancy, i.e. 0-9 months) would be made. That the attendant to the visit would be a doctor also increases the likelihood that the prenatal care visit would be made earlier.

The PRICE variable, which is price paid for the visit, surfaced significantly and in the expected direction. The higher the visit price, the less likely that early prenatal care will be sought.

The PRESENCE of an adult woman in the household weakly predicted that early care may be sought and the direction of influence predicted was also opposite as expected. The negative influence can only make sense if the presence of an adult woman were considered as confidence-building mechanism such that one may postpone seeking early care.

The EDUC of the pregnant woman also weakly predicted for early prenatal care, i.e. the more years of schooling the woman have, the more likely that she is aware of the benefits of early care.

4.4.2 Determinants of Demand for Quality

Estimates for the demand for quality are shown in Table 4.3.

Quality per visit (QUAL) was estimated from mean visit prices of the following types of personnel who may have attended to these women: traditional birth attendants (TBA), private doctor, public doctor, public nurse/midwife. It is expressed as an index number with the quality of a visit to a public nurse/midwife set equal to one. Thus, as shown below, if the woman made a visit to government hospital and was attended by a physician, quality per visit would equal to .80.

| | <u>Mean Price</u> | <u>Price Rel. to public nurse/midwife</u> |
|------------------------|-------------------|---|
| Traditional Attendants | 18.38 | 3.68 |
| Government MD | 4.00 | .80 |
| Private MD | 53.42 | 10.68 |
| Public Nurse/Midwife | 5.00 | 1.00 |

Table 4.2

| Censored regression results of the first month for prenatal care Philippines, 1992 | | |
|---|-------|---------|
| Variable | coeff | t-value |
| CONSTANT | -1.09 | -0.408 |
| PRICE | -0.02 | -1.94** |
| LNTOTEX | -0.02 | -0.09 |
| EDUCMO | 0.29 | 1.75* |
| AGEMO | 0.03 | 1.23 |
| N5 | -0.13 | -0.62 |
| PRES | -1.02 | -1.83* |
| URBAN | 0.10 | 0.26 |
| WORK | -0.77 | -1.64 |
| HFARM | 0.09 | 0.09 |
| HPROF | 0.21 | 0.31 |
| HCLER | -1.25 | -1.18 |
| HSKILL | 0.19 | 0.34 |
| OPP1 | 0.01 | 0.90 |
| TIME | 4.04 | 5.71*** |
| DOCTOR | 1.74 | 3.16*** |

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

Table 4.3
OLS Estimation of Prenatal Quality

| Variable | Coefficient | t-ratio |
|-----------|-------------|---------|
| Constant | -0.704 | -1.37 |
| TOINC | -0.028 | -1.49 |
| NFAC1 | -0.404 | -0.18 |
| NDOCT1 | 0.037 | 0.77 |
| EDUCMO | 0.028 | 0.55 |
| AGE | 0.005 | 0.22 |
| N5 | 0.280 | -1.57 |
| PRES | 0.837 | 1.66* |
| WORK | 0.296 | 0.70 |
| TIME | 1.385 | -2.19** |
| HFARM | -0.915 | -1.12 |
| HPROF | -0.442 | -0.47 |
| HCLER | 1.643 | 2.61*** |
| HSKILL | -0.704 | -1.37 |
| PRICE2 | 0.083 | 4.01*** |
| URBAN | 0.192 | 0.23 |
| R-squared | 0.26237 | |
| F-stat | 5.07853 *** | |
| N | 173.000 | |

*** Significant at .01 level

** Significant at .05 level

* Significant at .10 level

While higher fees in the private sector may not necessarily reflect quality in an objective sense, it provides useful information. For example, government MD prices being much lower than public nurse or TBAs, clearly do not reflect its quality. But by examining the determinants of choice for a relatively high-priced practitioner, or that there is willingness to pay for a higher priced alternative despite presence of a less costlier alternative, estimates can be made of how cost of prenatal care services can be affected by alternative government policies.

Demand for quality prenatal care can be significantly explained by gross price (PRICE2), or visit price plus travel costs. That is, the higher the cost of seeking care, the higher quality care is sought. Those who can afford the higher costs of quality care is sought. Those who can afford the higher costs of care are likely to seek out quality care. Even if we separate travel cost from visit price, these variables come out to be significant and positive. If transport cost is considered

as fixed cost to care (not dependent on quality), the increase in transportation cost is expected to cause a substitution away for quantity (in terms of visits) and toward quality (Colle and Grossman).

Travel TIME figures significantly in demand for quality of prenatal care services. The negative sign indicates that the longer time it takes, the less likely will the visit to the higher quality option be made. Women are less likely to take the time to demand a higher quality care.

The presence of another adult woman in the household and if the spouse is in clerical or administrative jobs have positive effects on quality demand. If these variables are considered as correlates of income, then we can say that the higher the income the higher the demand for quality in prenatal care.

OLS estimation allow for direct elasticity interpretation. Our estimates show that demand for prenatal care quality is price inelastic. The table below shows that a ten percent increase in mean prices is likely to increase quality demand by 8.3 percent. This indicates that prenatal care services offering relatively higher quality can charge for the service and not expect any reduction in revenues.

4.4.3 Determinants of Prenatal Care Provider Choice

Table 4.4 presents the results of our multinomial logit model for prenatal care.

The demand or choice for government hospital is explained strongly by price, number of children below 5 years, transport costs, the spouse being in skilled occupations, the opportunity cost of time of woman, and that the attending personnel is a doctor. Demand is explained rather weakly by travel time and transport costs. The relationships are self-explanatory, except for the opposite predictions of two variables – the number of children below 5 years and travel time. These variables had a positive impact on government hospital demand. Having children below 5 years old may indicate a more recent experience with the government hospital, hence prenatal care may be sought there as a matter of course.

Travel time is significant and positive across provider types; indicating that women are willing to travel far for prenatal care. However, the opportunity cost of time variable is significant and negative across provider types. It appears therefore women are willing to travel far for prenatal care so long as the visits are outside work time and that their wages are not to be affected by seeking care. For private doctor and public clinic demand, the working status of the woman negatively influences demand.

Table 4.4

| Multinomial Logit Model of Prenatal Care Philippines, 1992 | | | |
|---|-----------------------|-----------------------|-----------------------|
| Variable | Govt hospital | Private doctor | Govt clinic |
| Constant | -51.119 (-7.04)*** | -19.513 (-3.91)*** | -10.044 (-2.96)*** |
| PRICE1 | -49.564 (-8.39)*** | 17.921 (4.31)*** | -6.255 (0.13) |
| LNTOTEX | -0.636 (-0.10) | 2.617 (0.46) | 6.734 (1.49) |
| EDUCMO | 2.230 (4.42) | 0.669 (1.79) | 0.068 (0.22) |
| AGEMO | -0.972 (-1.13) | 1.492 (2.09)** | -0.657 (-1.19) |
| N5 | 1.306 (2.10)** | 0.096 (0.20) | -0.191 (-0.55) |
| PRES | 1.174 (0.74) | 3.417 (2.75)*** | 0.936 (0.01) |
| URB | 5.742 (1.45) | 1.514 (0.96) | -1.072 (-1.00) |
| TIME | 93.669 (2.82)** | 64.435 (17.42)*** | 71.256 (21.52)*** |
| TCOST1 | -2.647 (-2.67)*** | -0.116 (-0.15) | -2.184 (-2.67)*** |
| WORK | -4.666 (-3.02) | -8.237 (-6.16)*** | -1.972 (-2.37)*** |
| HFARM | 1.161 (0.25) | -35.115 (-7.67)*** | -0.939 (-0.71) |
| HPROF | -1.230 (-0.33) | -6.127 (-2.21)** | -1.920 (-0.74) |
| HCLER | 0.222 (-0.08) | -2.658 (-1.57) | 1.724 (-1.13) |
| HSKILL | 8.725 (-3.56)*** | -7.770 (-6.11) | -0.440 (-0.46) |
| OPP1 | -5.898 (-6.51)*** | -3.720 (-7.34)*** | -4.966 (-10.58)*** |
| DOCTOR | 22.941 (10.62)*** | 5.919 (4.34)*** | 2.566 (2.21)*** |
| Log-likelihood | | -41.282 | |
| Chi-square | | 306.025*** | |

For private doctor demand, price is positive; supporting earlier findings on quality being associated with its price. Age of the woman and presence of another adult woman in the household are significant and positive only for private doctor demand. The occupational status of the spouse is significant only for private doctor demand. But the negative signs for both farming and professional households are perplexing.

For public clinic demand, price of the visit is not significant. This probably due to the voluntary nature of fee collection in public clinic facilities. Transport costs figure significantly for public facilities; with higher transport costs associated with negative demand.

4.5 Simulations on Provider Choice

Inasmuch as direct interpretation of MNL coefficients may be difficult as they are estimated from ratios of two probabilities in logged form, Table 4.5 presents simulations of predicted probability changes. These changes are estimated by looking into the changes in the probabilities for selecting the choice or the dependent variables when the sample means are inputted for reference group households.

From the first part of the table, for rural demand, we observe no probability change on demand arising from changes in the economic variables. For urban areas, we observe the generally low probabilities of changes in the demand for prenatal care arising from changes in price, travel and opportunity time costs for government hospitals demand. A price change is likely to reduce demand for government facilities.

For private facilities in the urban areas, however, a change in price and in the opportunity cost of time for the woman is likely to bring about an increase in the probability of demand for private doctor care. This is indicative of the high regards people have for private facilities. The opportunity cost of time for the woman captures more the wealth effect, such that those with higher opportunity costs are likely to seek private doctor care.

The working class status of women both rural and urban, increases the probability of no care being sought. This is probably reflective of the low wages earned by these women. That nonwage-earning urban women are likely to choose private facilities indicates that they are from the relatively higher income groups. In the rural areas, nonwage-earning women are likely to choose public clinics.

The presence of an older woman in a household can either be interpreted as having someone to entrust the kids when seeking care or having someone with conservative knowledge about pregnancy experience that market care may not be acceptable or deemed not necessary. Our simulations show that in the urban areas, having an older woman increases the probability of seeking care from private facilities, confirming our first observation regarding their value. In the rural areas, having an older woman is a reinforcing element for increasing the probability of seeking government clinic care.

Table 4.5

| Predicted Probability of Demand for Prenatal Care | | | | | | | | |
|--|---------|-----------|-----------------|-------------|---------|-----------|-----------------|-------------|
| | urban | | | | rural | | | |
| | none | govt hosp | prvt facilities | govt clinic | none | govt hosp | prvt facilities | govt clinic |
| Changes in Probability for Changes in the Mean for | | | | | | | | |
| 1. Price | -0.0020 | -0.0000 | 4.3451 | -0.3431 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| 2. Travel cost | -0.0110 | -0.0000 | -1.2171 | 1.2281 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| 3. Income | -0.0059 | -0.0000 | -0.0739 | 0.7397 | -0.0002 | -0.0000 | -0.0000 | -0.0000 |
| 4. Opportunity cost of time | 0.0007 | -0.0000 | 0.2235 | -0.2241 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| 5. Mother Working Status | | | | | | | | |
| yes | 0.250 | 0.065 | 0.308 | 0.373 | 0.430 | 0.000 | 0.081 | 0.488 |
| no | 0.183 | 0.069 | 0.417 | 0.335 | 0.271 | 0.066 | 0.074 | 0.587 |
| 6. Presence of older women | | | | | | | | |
| yes | 0.186 | 0.039 | 0.484 | 0.290 | 0.199 | 0.000 | 0.077 | 0.592 |
| no | 0.212 | 0.086 | 0.318 | 0.385 | 0.389 | 0.132 | 0.076 | 0.535 |
| 7. Presence of young children | | | | | | | | |
| yes | 0.220 | 0.080 | 0.358 | 0.342 | 0.367 | 0.063 | 0.041 | 0.530 |
| no | 0.159 | 0.077 | 0.386 | 0.378 | 0.304 | 0.004 | 0.133 | 0.559 |

Those without or with less number of young children have higher probabilities of seeking private facility care in both urban and rural areas. Having young children in the household increases the probability of no care or that at least government hospital care will be sought. Having children increases the probability that public clinic facilities will be sought. It appears that having children below six years old “ties” women to seek prenatal care. Initially, we assumed that prenatal care can be a start of the interaction with preventive programs in public facilities. It appears from the analysis that it is the other way around. Women become familiar with public health facilities through their children and thereafter realize the importance of prenatal care.

4.6 Conclusions

There is not one conclusion that can be made from our analysis of prenatal care demand. There appears to be a mixed picture on the factors influencing demand for prenatal care. Price and travel time influence prenatal care demand in all aspects. From the financing perspective, distance does not appear to deter women from seeking care, except if it is to a higher quality provider, but higher transport costs do impact negatively on public facility demand. It appears that government price-setting policies outside the health sector will have negative impacts on the demand for prenatal care.

Quality of care is still viewed as available only at a price and therefore for those with higher incomes or earnings. While government facilities appear to be generally acceptable, quality improvements can still be made.

Education of the woman is significant, albeit weakly, only for the period at which care is sought. Information on the benefits of early care is still necessary and this information can also be made available to older women, especially those who have influence on young mothers. It appears that women enter the public health care system through concern for their children. This interaction then can be made a starting point for educating women regarding the value of prenatal care.

Appendix 1

OUTPATIENT CHOICE MODEL

A.1 Theoretical Framework

Following Gertler, Locay and Sanderson (1987), we model the demand for health care services in a framework in which utility depends on health and on the consumption of goods other than medical care. Within this framework, an individual must decide to seek medical care if an illness is experienced. The benefit from seeking medical care is an improvement in health while the associated cost is the reduction in the consumption of other goods.

Individuals have to decide not only whether to seek care but also what type of care. Each individual is faced with a set of alternative providers (including self-care) that offers an expected improvement in health for a price. The expected improvement in health (efficacy) depends on the providers skills, individual characteristics (e.g., health status) and other factors. The price of each provider includes both monetary outlays and access costs such as the opportunity of travel time and waiting time. Taking account of this information and their incomes, individuals choose the alternative that yields the highest utility.

Formally, let the expected utility conditional on receiving care from provider j , be given by:

$$(1) U_j = U(H_j, C_j)$$

where H_j is the expected health status after receiving treatment from provider j , C_j is consumption net of the cost of obtaining care from provider j and T_j is the non-monetary cost of access to provider j .

The quality of provider j 's medical care is the expected improvement (marginal product) in health over the health status if the individual does not seek medical care or treated himself. Let H_0 be the expected health status without professional medical care or self-treatment. Then, the quality of provider j 's care is $Q_j = H_j / H_0$ which yields an expected health care production function of the form

$$(2) H_j = Q_j + H_0$$

The quality parameter depends on provider characteristics, and individual characteristics such as education, type of illness and its severity.

Let P_j be provider j 's price and Y be income, then

$$(3) C_j = Y - P_j - WT_j; C_j > 0.$$

Substitution of (3) into (1) yields

$$(4) U_j = U(H_j, Y - P_j - WT_j)$$

The unconditional maximization problem is

$$(5) U^* = \max(U_0, U_1, \dots, U_j)$$

where U^* is the highest utility the individual can attain.

A.2. Empirical Specification

The solution to the maximization problem in equation (5) yields a system of demand functions, whose forms are probabilities that the alternatives are chosen given that an individual experiences an illness.

Given that health is a normal good, then the demand for health increases with income. In a discrete choice situation, this implies that as income increases individuals are more likely to choose higher quality/higher price options. A necessary condition for normality is that as income increases the marginal rate of substitution of consumption for health diminishes, holding health constant.

Gertler and his colleague pointed out that to allow health to be a normal good and therefore to influence the choice, the functional form of the conditional utility function should not impose a constant rate of marginal rate of substitution. A parsimonious functional form for the utility function which is consistent with a stable utility maximization is semi-quadratic, which is linear in health and quadratic in consumption.

Substitution of (2) and (4) yields a conditional utility function of the form:

$$(6) U_j = a_0 H_0 + a_0 Q_j + a_1 (Y - P_j - WT_j) + a_2 (Y - P_j - WT_j)^2 + e_j$$

The quadratic term allows testing of the diminishing marginal rate of substitution.

Note that neither $a_0 H_0$ nor $a_0 Q_j$ in equation (6) are observed. The term $a_0 H_0$ can be ignored since it appears in the utility function for all the choices and its value does not vary by alternative and therefore does not influence choice of alternative.

To solve the unobservability of $a_0 Q_j$, we specify a quality of marginal product function for each provider type. Let the expected quality by individual i from provider j be

$$(7) a_0 Q_j = b_j + b_{1j} X + t_j$$

where X is a vector of individual's characteristics, and t_j is a random term. Gertler and van der Gaag (1990), citing Pollack and Wachter (1975), noted that demographic characteristics determine both the quality of household production and the marginal utility of quality of providers.

Substitution of (7) into (6) gives the reduced form conditional utility function for provider j ,

$$(8) U_j = V_j + e_j + t_j$$

where

$$V_j = b_{0j} + B_{1j}X + a_1 (Y - P_j - WT_j) + a_2 (Y - P_j - WT_j)^2.$$

The random disturbance terms in (8) capture the unmeasured portions of individual characteristics that affect providers' marginal productivity and quality functions. For the nonself-care alternatives, the disturbance terms may be correlated with each other. However with the quality of market providers normalized relative to self care, t_j is equal to zero.

Note that the intercept and coefficients on the demographic variable vary by alternatives, whereas the coefficients on the economic variables are constant across alternatives.

A.3 The Demand Functions

The demand function for an alternative is the probability that its utility is greater than from any other alternative. Most of the previous studies on the demand for medical care have assumed that these demand take on a multinomial logit form (MNL). McFadden (1981), however, argued that MNL suffers from the assumption of independence of irrelevant alternatives. This assumption is equivalent to assuming that the stochastic portions of the conditional utility functions are uncorrelated across alternatives, and it imposes the restriction that the cross-price elasticities are the same across alternatives. To relax this restriction, and following McFadden, we specify the function as a nested multinomial logit (NMNL). The NMNL allows for correlation across subgroups of alternatives and, therefore, nonconstant cross-price elasticities. Moreover, the NMNL allows the grouping of more similar alternatives so that the cross-price elasticities are more elastic within groups than across groups.

Thus, the probability that provider j is chosen given a decision to seek care and the probability of self-care, is shown respectively:

$$(9) \quad \Pi_j = \frac{\exp(V_j / \sigma)}{[\sum_{k=1}^J \exp(V_k / \sigma)]^\sigma}$$

$$(10) \quad \Pi_o = (1 - \Pi_j) \frac{\exp(V_o)}{\exp(V_o) + \left[\sum_1^J \exp\left(\frac{V_j}{\sigma}\right) \right]^\sigma}$$

where σ is one minus the correlation of the $j = 1 \dots J$ utilities, or a measure of the similarity of grouped alternatives introduced by t_j .

The log-likelihood function for this problem is:

$$\ln L_i = \sum_o^J D_{ij} \ln \Pi_{ij}$$

The estimated demand functions can be used to assess the effect of user fees on demand. The same functions can also be used to form the basis for the measurement of willingness to pay for reduced travel time to a medical facility measured in terms of compensating variation. Small and Rosen (1981) showed that the compensating variation is

$$(11) \quad CV = \left(\frac{1}{\lambda}\right) \left[\ln \left[\exp(V_o) + \sum_1^J \exp(V_j) \right] - \ln \left[\exp(V^1) + \sum_1^J \exp(V_j^1) \right] \right]$$

where V_j and V_j^1 are the initial and final values of the function, respectively, and where λ is the marginal utility of income.

Based from the functional form of the conditional utility function,

$$\lambda = \frac{\delta U}{\delta Y} = \alpha_1 + 2\alpha_2 (Y - P_j - wT_j).$$

Appendix 2

ESTIMATION OF ARC PRICE ELASTICITIES

From the conditional utility function, we have

$$(1) u_j = v_j + \eta_j + \varepsilon_j$$

where

$$v_j = B_{0j} + B_{1j}X + B_{2j}Z + \alpha_1 (Y - P_j) + \alpha_2 (Y - P_j) + \alpha_{3Tj} + \xi$$

Note from the above that since prices (P_j) and income (Y) enter the demand functions in a non-linear fashion, it is hard to assess the direction and magnitude of their effects directly from the estimation results of the NMNL. To allow for the estimation of price elasticities, we estimate arc price elasticities of the demand for private doctors, public hospital and public clinics by *income quartiles* using *sample enumeration*. (Train, 1986)

- STEP 1. Estimate the model of provider choice using NMNL.
- STEP 2. Categorize sample by quartile and get the *quartile means* of all the right-hand side variables used in STEP 1.
- STEP 3. Reestimate NMNL by quartile and get/compute cumulative probability of provider j . (j = private doctor, public hospital, public clinic) using the means of the quartile.
- STEP 4. Simulate a price increase by increasing or adjusting P_j by $x\%$. [NOTE: To be able to determine ΔP_j to be used in the initial simulation, print minimum, maximum and mean value of P_j .] Compute cumulative probability of choosing provider j . The estimate price elasticity is

$$\varepsilon_{\text{price}} = \frac{\% \Delta \text{Prob}_j}{\% \Delta \text{Price}_j}$$

that is, the percentage change in the cumulative probability of choosing provider j in STEPS 3 and 4 divided by the % change in the price of provider j . This is the initial price adjustment.

- STEP 5. Repeat STEP 4 by simulating another round of price increases *from the initial level in STEP 4*. Note that reference point or base is now the levels of demand and prices in STEP 4.

If hypothesis is borne out, we should get results that will show the following general trends:

- (1) inelastic demand at higher income levels
- (2) elastic demand at higher prices within a given income group

NOTE: Assume no corresponding adjustment in the price of providers in response to a simulated price increase in provider j.

ANALYSIS OF WELFARE EFFECTS OF ALTERNATIVE POLICIES

To estimate the welfare effects of alternative policies, we use the estimated demand functions to estimate the impact on demand (and revenues) and the number of people who do not seek care as a result of the policy. The demand functions are also used as the basis for computing welfare cost where welfare costs are measured by compensating variation.

Following Gertler and Vander Gaag (1991), using the estimated demand functions (NMNL or MNL), we project or simulate the effect on demand under the following policy scenarios:

Price Scenario 1: User charges on government clinics and hospitals at ½ the average price of private doctor

Price Scenario 2: User charges on government clinics and hospitals at equal the price of private doctor

Further, these price scenarios shall be analyzed under the following assumptions:

- (1) increases in user charges are imposed on:
 - (i) urban areas only
 - (ii) rural areas only
 - (iii) both urban and rural areas
- (2) we assume no price response on the part of private clinics/hospitals

To estimate effects, we follow the following steps:

1. Using the estimated NMNL/MNL, estimate the base run scenario, where (the base run refers to the situation) all prices are set at the average of each provider.
 - 1.1 Estimate probability of provider j.
 - 1.2 Estimate number of individuals seeking care to provider j.
= (prob.j) (no. of indiv. seeking mkt. Care)
 - 1.3 Get total revenues (TR) – government clinics/hospitals

$$TR = \sum (\text{Price of } j \text{ (Ave.)}) (\text{estimate of (1.2)})$$

2. Using the same equation, simulate price scenario 1 for the *whole sample*. Get estimates of (1.1) to (1.3).
3. Using the equation for *compensation variation* (c.v.), simulate price scenario 1.

$$\text{c.v.} = \frac{1}{\lambda} \left\{ \ln [\exp (V_o) + \Sigma (V_j/\delta)^\sigma] - \ln [\exp (V_o^1) + \Sigma (V_j^1/\delta)^\sigma] \right\}$$

$$\text{where } \lambda = \delta u / \delta Y = \alpha_1 + 2\alpha_2 (Y - P_j - uT_j)$$

Note that for c.v. to hold, λ (the marginal utility of income) must be independent of price and quality of the good. To compute λ , we use the average of the provider prices and time. That is, for each individual

$$\bar{P} = \Sigma P_j / n$$

$$\bar{T} = \Sigma T_j / n$$

where P_j = private doctor, government clinic and government hospital
 $n = 3$

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