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THE DEMAND FOR CHILD HEALTH CARE IN A DEVELOPING COUNTRY: UNCONDITIONAL ESTIMATES FROM THE PHILIPPINES

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ABSTRACT

THE DEMAND FOR CHILD HEALTH CARE IN A DEVELOPING COUNTRY: UNCONDITIONAL ESTIMATES FROM THE PHILIPPINES

By

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This study uses discrete-choice econometric methods to examine the determinants of the demand for curative health care for children in a poor country. It looks specifically at the impacts that health care access, price, and quality have on utilization of outpatient services from different segments of the health care market for infants in one region of the Philippines.

This research adds to the health care demand literature in several ways. First, it is relatively unusual in its focus on services for infants and toddlers; this is an important age to examine as the first three years of life are the most crucial period in terms of physical and mental development, and illness during this time can have detrimental long-term health effects. Second, in addition to information collected from a broad, multi-wave survey of households, the study uses a unique set of data on quality of health facilities and characteristics of health personnel to examine how specific service aspects drive demand for care. Third, the study uses BOTH distance and fees for service as measures of price; most studies in this genre use only distance. Fourth, traditional health providers, which are used very frequently in developing countries but which are not always considered in demand studies, are included in the set of modeled health care alternatives. Fifth, the empirical approach allows differential price and quality responses by type of health care; most studies constrain price and quality coefficients to be equal across health

care alternatives and assume that the same set of health care characteristics impact the probability of visiting different types of providers, which greatly limits the insights of what influences improving quality or raising fees at different types of facilities will have on demand. Sixth, and finally, the model provides estimates of price and income responses that are not conditioned on self-reported morbidity status; this approach avoids the selection bias inherent in using a sample of only those who report themselves as ill.

Results from our baseline flexible MNL model strongly reject the equality of price and quality coefficients across different health care alternatives; findings indicate that when differential price and quality influences are allowed, there are very different within-characteristic demand responses by type of service.

Choice of health provider for child curative care is influenced by health care price and quality, child age and sex, household socioeconomic status, maternal human capital, and household composition. Distance to services have large negative effects on demand for care. Controlling for distance, monetary fees do not in general have significant influences on use. Results for public user fees, however, are quite sensitive to whether non-health facility community characteristics are controlled for in the analysis. Fees have strong negative impacts on demand for public care when other community attributes are either replaced by district-level dummies or omitted altogether; their impacts, however, are close to zero and insignificant when these influences ARE controlled for. This is an important finding since results from these types of studies may be used to set pricing policies for public health care in developing countries: without the detailed community controls we would conclude demand is price sensitive, whereas with them we would come to a very different conclusion.

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INTRODUCTION

This study examines the determinants of the demand for curative health care for children in a poor country. It looks specifically at the effects that health care access, price, and quality have on utilization of outpatient services for infants and toddlers in a region of the Philippines. The research is relevant for two primary reasons. First, because many developing countries have had to cut social spending due to structural adjustment and stabilization programs which ensued after the debt crises of the 1980's, new approaches to raising revenues for the provision of health care have taken on greater importance. Second, young children have not been a primary focus in much of the health care demand literature.[1] Given that most of the underlying causes of their morbidity and mortality are from infectious diseases, which are in principle medically treatable or preventable, improving our knowledge about the underlying factors that most influence utilization of basic primary health services for children deserves greater attention.

Many poor countries have large public health care delivery systems; most were originally designed with the intention of providing universal access; the delivery approach normally involves two complementary policies: (1) prices for care are set extremely low or close to zero, and (2) there is no low-income eligibility criteria that limits access to services by those of higher socioeconomic status (De Ferranti, 1985).

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[1] Among those that do examine demand for children's health care are Alderman and Gertler, 1997; Ii, 1996; Deolalikar, 1993; Gertler and van der Gaag, 1993; Cebu Study Team, 1992; Dor and van der Gaag, 1987; Wong, Popkin, Guilkey, and Akin, 1987; and Akin, Griffin, Guilkey, and Popkin, 1986.

Motivations for the direct provision of medical services by government have several underlying dimensions. Health status is positively related with economic productivity, and it is one direct indicator of the well-being of a country's population. Therefore, improving health status is one major rationale for government provision of subsidized health care. Another motivation is to reduce inequity in access to health care services. This could be desirable on the grounds that (a) more utilization improves health outcomes, (b) equity is socially desirable, and (c) increasing access is politically expedient. Yet another rationale is to help remedy well-recognized market failures existing in the health sector, namely public goods and insurance market failure, through the provision of services with public goods aspects and targeting services to those least able to insure against health shocks--the poor.

Government subsidization with the intention of increasing use of basic health services is a reasonable goal, particularly considering that overall rates of utilization are generally low in most developing countries. Whether universal access is the appropriate vehicle by which to achieve this goal, however, is increasingly being questioned for several reasons, including the geographical distribution of services that has often resulted from this approach, the types of the services that normally end up being subsidized, and because of the severe budgetary reductions for health in most poor countries.

The first point is illustrated by data on the distribution of public hospitals and clinics; the majority of public hospitals and clinics are in urban areas. While this may be efficient from the standpoint of being able to serve large numbers of people, concentrating facilities in urban areas may not be consistent with increasing equity in access or reducing market failures in health care.

Concentration in urban areas most likely exacerbates instead of improving inequities in access because (a) urban dwellers usually have higher incomes--if wealthier individuals heavily utilize free or low cost public services, subsidies accrue to segments of the population with higher ability to pay and less financial need; and (b) the overall access costs for care in urban areas are already lower because travel time and travel costs for are much less because services are closer and more plentiful. Even if public user fees are uniformly low or zero across areas, total costs faced by urban dwellers are less.

Market failure in the health sector may not be improved because the wrong kinds of services are subsidized. Social financing of preventive services which are not patient-specific, such as vector control or sanitation, is justified for reasons of nonexcludability of services and external benefit: more than one person is able to receive a unit of the service at any given time, and benefits of the service, such as reduction in transmission of pathogens, benefits more than just the direct recipients. Patient-specific preventive care, such as child immunizations, while excludable, are candidates for government subsidization because they create the positive externality of reduced transmission of disease. The same holds for patient-specific curative care for the treatment of infectious diseases; Because the external benefits of such treatments are not factored into any one individual's calculation of whether to seek care, demand for such services may be less than what is desirable from society's point of view. Hence, subsidization is a way to bolster consumption of externally beneficial types of medical care. The case for financing other kinds of curative care, particularly services not related to preventing the spread of infectious disease, is weakest because externalities are much lower. (The argument usually put forth for government support of these services is that access to medical care should be a basic right and that financial barriers are not socially desirable. Furthermore, public provision of care is often justified on equity grounds because it is viewed as a means to redistribute income (Gertler and Sturm, 1997).)

Considering that a large amount of public spending on health care goes to patient-specific non-basic curative services from hospitals in urban areas, these two sources of misallocation in public funding--inequity in access and subsidizing inappropriate types of care--are interconnected and mutually reinforcing.

These problems have led to the suggestion of raising prices for public curative health care visits, especially in urban areas for adults, whose ailments are less often caused by infectious disease than are children's. While raising fees is certainly not expected to remedy all these problems, it could have several positive effects: (1) allocative efficiency could be improved by moving prices closer to marginal costs--price signals indicate to consumers that they are consuming valuable resources; (2) government subsidization of adult non-basic curative care for the nonpoor could be reduced; and (3) net financial outlays by the government for health services could *possibly* be reduced because fewer expensive non-basic services would be subsidized.

Obviously there are negative aspects of introducing fees for public care too, chief among them being that access by the poor to modern health care would be reduced. While other modern providers are sometimes available, they usually charge very high fees for services. The effects of reducing subsidies for public care depend ultimately on the sensitivity of utilization to price changes. If individuals are sensitive to small increases in fees, raising them will generate little revenue and the public health care system may lose the virtue of helping insure poor individuals against the costs of illness

(Gertler et al., 1995). Furthermore, a uniform increase in fees in urban and rural areas may worsen already existing geographic inequities in access to care, and demand among the rural poor could therefore decrease disproportionately.[2]

The impact of raising fees also depends on other factors including not just own- but cross-price elasticities of demand, whether public fees are raised from zero rather than from some already existing positive price, and what the private sector supply and price responses are to public price increases.

With a government price hike, individuals may opt out of the health care market altogether; alternatively, they may switch to less preferred types of care. Most health care demand studies examine the expected results public fee changes will have on demand for *modern* public and private care only. Other types of health services are usually not explicitly considered; traditional health practitioners are used frequently, however, as an alternative to western medicine in many poor countries. Higher public prices could result in such services being used more frequently; thus, it is important to consider traditional health providers as an alternative when examining the effects of policy changes. In modeling demand for services, traditional care is normally subsumed under the category of "self-care" instead of being treated a distinct and separate alternative for which prices are levied for service and whose use influences health outcomes.[3]

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[2] Moreover, if much of the curative care that rural poor households seek for their children is treatment of curable infectious diseases, negative externalities may result if utilization for such illnesses falls substantially.

[3] Studies that have included traditional practitioners in the choice set are Alderman and Gertler, 1997; Deolalikar, 1993; Hotchkiss, 1993; Wong, Popkin, Guilkey, and Akin, 1987; Akin, Griffin, Guilkey, and Popkin, 1986; and Mwabu, 1986.

Quality of health services is another critical element affecting demand. Low rates of utilization observed at public clinics in many developing countries are sometimes attributed to the poor quality of care offered; poorly trained or insufficient levels of staff and inadequate drug supplies may inhibit visits to public facilities even if services are affordable and geographically accessible. This has important implications for the question of raising fees: if prices are raised when quality is already low, utilization may drop off even more. However, if fee increases could somehow be accompanied by quality improvements, decreases in demand may be dampened; raising quality may enhance both demand for and efficacy of services in terms of improving the health outcomes of users.[4]

Knowledge of service quality is crucial for analyzing the determinants of demand for health services. Because prices and quality are expected to influence demand in opposite directions, if data on quality are not available to control for it in our analysis, the effects on demand of other factors may be biased because they could be picking up omitted quality. For instance, if price is positively related to the quality of service

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[4] How improvements in services could be financed and carried out is another topic of debate. If quality is to be raised concurrently with or preceding a fee increase, resources would need to be available in advance to fund these improvements; one proposal for accomplishing is community-level prepayment schemes. Others have observed that when fees are increased, low collection rates, poor use of funds, and rising costs of medical care equipment and supplies often preclude major structural improvements. Low-cost quality improvements which are probably very important to patients, such as waiting time, cleanliness, and staff efficiency and attitude, may be the only realistic kinds of upgrades in some areas (Collins, et al., 1996).

Even if funds were available and could be efficiently used to enhance quality, it is not at all clear how revenues would ultimately be affected. This is in part because the costs of such improvements are not well known; more importantly, however, is the fact that we still do not have a good idea of how various aspects of quality affect demand for health services.

offered, unobserved positive aspects of a more expensive consultation could result in price effects appearing to have less of a negative effect than they actually do, or possibly even being positive. This is a concern not only from the standpoint of academic analysis, but also for policy making. If empirical results are incorrect due to omitted variables bias, this could lead policymakers to the conclusion that demand for care is insensitive to price changes when it may in fact be very sensitive. Those responsible for making pricing and distribution decision would have the mistaken impression that raising fees would not significantly reduce demand and could increase revenues. Implementing such policies based on incomplete or incorrect empirical findings could have unintended negative results. The take-home message here is that assessing the behavioral changes expected from a price reform requires knowledge of how both price *and* quality affect demand.

SECTION 1

DESCRIPTION AND SIGNIFICANCE OF THE RESEARCH

DESCRIPTION

This research uses a unique set of data from the Island of Cebu, Philippines to examine the impacts of price and quality on the demand for curative health investments for young children. The data is exceptional because it consists not only of large, comprehensive, multiwave household survey, but there is also detailed information on characteristics of each community, AND on health facilities and health personnel in the study communities. The household data consists of bi-monthly interviews conducted at fourteen intervals, covering a period of just over two years. Moreover, the community and health services data are available both at the baseline period before the launch of the household survey, and immediately after its completion. Discrete choice models are used to investigate factors affecting demand for services from modern public, modern private, as well as from traditional health practitioners. The great breadth and detail of the survey data allows us to tease out not only how individual and household characteristics influence utilization, but also to see what impacts travel time, user fees, and quality of providers have.

CONTRIBUTIONS OF THE RESEARCH

This research adds to the literature in several ways. First, it is relatively unusual in its focus on services for infants and toddlers. While we are beginning to understand the factors influencing demand for adult health care in poor countries, less evidence exists on in

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the determinants of utilization for young children; this is an important line of inquiry as the first three years of life is the most crucial period in terms of physical and mental growth and development (Martorell, 1995). Illness during this period, much of which is due to treatable infectious disease, can have devastating effects on development because feeding, appetite, and absorption of nutrients can be severely reduced (Adair, et al., 1993).

Second is the unique information available on quality of health facilities and the characteristics of health personnel at the time of the survey. This provides the opportunity to examine how specific aspects of services drive demand. The health service data can be matched with sample households in the communities to augment the already rich individual- and household-level data.

Third, the study uses BOTH distance and fee for service as measures of price. The majority of studies use only distance to service to measure price. (This probably based on the presumption that there are no charges levied for "free" public services, which may or may not be true. Even if it is, fees are usually always charged for non-publicly provided care.). If travel-related costs are large relative to the fee for service, it is entirely possible that utilization of public services may not be reduced as much as might be expected with a small fee increase at the point of care. This question can only be answered when travel prices AND user fees are included in the analysis.

Fourth, traditional health providers are a distinct and separate element of the choice set. It is important from the perspective of designing a health care delivery system to understand who, when, and for what purposes these kinds of services are used. It may be wrong to assume that even good quality public care provided at a low price will be used in all situations given historical and cultural influences surrounding health and medicine.

Fifth, and finally, the model provides estimates of price and income responses that are not conditioned on self-reported morbidity status. This approach avoids the selection bias inherent in using only those who report themselves as ill. Since there are likely to be unobservables common to the reporting of illness and the seeking of medical treatment, using only the group who self-define as ill is likely to result in biased estimates of the determinants of health care demand.

Furthermore, the results from the unconditional approach can be considered long-run in nature. This is because the role that health care utilization plays in the likelihood of falling ill is factored into the analysis (Dow, 1995a). While we expect prices and incomes to affect use of care once an illness occurs, it is also true that prices and income help determine health status itself via their impacts on input choices. For example, mothers can influence the probability of child illness by adjusting the mix of health inputs they provide their children, such as breastfeeding behavior, the timing and composition of weaning foods, and the use of preventive and curative health care, among others. Obviously the input mix chosen is influenced by the prices and attributes of each factor. Fees and quality of health care, therefore, influence BOTH who becomes sick, AND treatment-seeking behaviors once an illness is experienced.

This analysis, therefore, captures the sum total of these health status and utilization influences on the ultimate demand for care, while avoiding the selection bias inherent in using only those who self-report an illness.

Results such as these are important for informing policy because they capture not only factors affecting utilization among the self-defined ill, but they also include in the calculus who is likely to become ill. Knowledge of unconditional price and quality responses is in many ways more useful for setting health care policy than responses of only those who are sick at any particular point in time.

SUMMARY OF MAIN FINDINGS

Our results indicate that long-run demand for child curative services is influenced by health care quality, household socioeconomic status, maternal human capital, and household composition. Distance to service substantially reduces demand for care. Controlling for distance, monetary fees do not in general have significant effects on use. Results for public user fees, however, are quite sensitive to whether community characteristics, other than those directly related to health facilities, are controlled for in the analysis: fees have strong negative impacts on demand for public care when other community attributes are NOT specifically accounted for (i.e., when they are replaced by district-level dummies or when they are omitted altogether). However, they are close to zero and not significant when these detailed influences ARE controlled for. This is an important finding because results from these types of studies may be used to set pricing policies for care: without the detailed community controls we would conclude demand is price sensitive, whereas with them we come to a very different conclusion.

Analytically, if community-level health care attributes are included in the regressions, remaining non-health facility community influences cannot be controlled for by using community-level dummy variables because the facility variables would be swept out: t

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out; therefore, unless other aspects of the setting are also specifically accounted for, it is possible that the health service variables are picking other omitted community influences. This implies that results of other health care demand studies, where non-health facility characteristics may or may not have been adequately controlled for, should be interpreted carefully; it is possible that even with district-level dummies included, other results could also be greatly influenced by non-health-care community influences.

Strong, though varying, quality effects were found for each variety of curative care. Current stocks of ORT, the range of vaccines and family planning services available, as well as the composition of staff were found to have important *positive* effects on demand for public services. More sophisticated diarrhea treatments (intravenous) appear to increase the demand for private care. Demand for traditional care was increased by the practitioner having had some type of formal health training.

With higher socioeconomic status, households are more likely to use modern private sector services instead of public and traditional care. Education of the mother raises demand for *modern* services generally, and for private, higher-priced, better-quality care in particular. Paternal education has a similar but smaller effect on private care, but greatly reduces the demand from services from traditional practitioners. Maternal height also raises the chances of a private health care visit; this variable is a measure not only of genetic influence on child size and health, but it also picks up unmeasured characteristics related to family background and maternal human capital because it captures investments by the mother's parents in her health early in her life.[5]

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[5] In poor countries, nutrition and health investments made by parents during pregnancy and early in a child's life, particularly the first three years, have very large influences on subsequent height (Ruel, et al. 1995) and health (Chen, et al. 1980).

Evidence of differential health investments between older and younger children, and between boys and girls, is also found. Demand for curative services rises between birth and six months of age and declines sharply thereafter, even though illness rates do not decline after six months of age. Utilization rates are higher for male children despite the fact that their overall morbidity levels do not differ statistically from those of girls.[6] Boys are also more likely to be taken to more expensive, higher quality modern private facilities. Furthermore, additional male infants in the household who are younger than the index child reduces the likelihood of taking the index child for a curative care visit; their presence also decreases use of the two more expensive types of care, modern private and traditional, for the index child. The presence of younger female infants and older children in the household does not have significant effects for the pooled sample; however, additional male *and* female infants in residence reduces the probability of a private care visit for the subsample of female index children.

Additional females in the household over age fourteen increase the chances that the index child is taken for a private facility visit, even after controlling for household income and maternal education level.

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[6] When split by age, boys have statistically significant higher rates than girls in the first year of life, but the trend reverses during the second year when girls have higher rates. It should also be noted that overall illness is defined as having diarrhea, febrile respiratory infections (FRI), or any other condition. When disaggregated into the more well-defined symptoms of diarrhea and FRI, boys have statistically significant higher rates than girls in both the first and second years of life.

Section 2

DISCUSSION OF THE LITERATURE

Health Policy and Health Outcomes

To motivate the discussion of the literature, it seems reasonable to ask why it is important to examine the determinants of health care demand in the first place. One reason is equity in access; this was discussed earlier as one of the primary motivations for government subsidization of health services. Policy levers can make access to health care more even by lowering fees, reducing travel time to care, and improving the quality of the services used by the poor. Knowledge of how these policies influence demand across different segments of the population is needed to judge their effectiveness in reducing differentials in access.

Second is that a financing agenda for the health sector can be appropriately designed only when it is known how prices and quality affect utilization (Gertler and Rose, 1997). Willingness to pay for different types of care and the various attributes of those services determines which improvements in the system should and could be reasonably undertaken; it also helps guide the choice of financing schemes.

Third is that health care is expected to influence health outcomes. While this proposition is usually accepted as common knowledge, the evidence is not plentiful for several reasons. First is that measuring health status is difficult, as evidenced in the earlier discussion of self-reported measures. Second, use of health care is likely to affect health outcomes slowly, making its benefits difficult to capture. Moreover, many health care policies, such as prices and quality, influence health status only indirectly through na

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their effects on health input choices. Because input choices are affected by many other factors aside from the characteristics of health care, such as preferences, prices of other goods, incomes, etc., the effects on health directly attributable to health policy changes may not be of first-order magnitude.

There exists evidence at the micro-economic level of positive effects of health service availability and quality on health outcomes. Using the 1988 Ghana LSMS, Lavy, Strauss, Thomas, and de Vreyer (1996) find that availability of child health services offered in the community increases child survival rates; characteristics of health personnel are significantly associated higher with child height. For rural children, immunization services and drug stocks improve anthropometric measures, while price and distance to services have negative effects. Results for the health of adults is not as strong, probably due to the high mobility of the population; only drug availability had a positive and significant impact on adult BMI and only in urban areas for women.

Using this same Ghanian data, Benefo and Schultz (1994) find higher drug prices increase child mortality. Thomas, Lavy, and Strauss (1996) find drug supplies and immunization services are associated with an increase in child nutritional status (height) in Côte d'Ivoire, particularly among households with no education. Other studies that have investigated the effects of health care availability and quality on child health outcomes and survival[1] include Barrerra (1990), who finds an inverse relationship between distance to a clinic and child height in the Philippines; Strauss (1990) finds community perceptions of problems with local health services to be associated with lower

[1] These are cited in Lavy, Strauss, Thomas, de Vreyer, 1996.

child height and weight for height in rural Côte d'Ivoire; Rosenzweig and Schultz (1982) show that child mortality is lower in urban areas where there are more clinics and hospitals. Thomas and Strauss (1991), on the other hand, find in Brazil that child height is inversely related to the number of nurses and beds in the community.[2]

Moving from the micro- to the macro-level, the ability to associate health outcomes with health sector policy is not as strong. Cornia and Mwabu (1997) use country-level panel data to analyze the determinants of changes from 1960 to 1995 in infant, under-five, and maternal mortality rates of forty Sub-Saharan African countries. They find, controlling for time trends, that calorie availability, female literacy rate, per capita income, safe water supply, immunization coverage, and broad access to health care[3] all have negative impacts. The importance of each regressor, however, varies according to the specific group considered; access to health services had noticeable impacts only on *infant* mortality rates.

Filmer and Pritchett (1997) use cross-national data on under-five and infant mortality rates from 100 countries to examine the impact of nonhealth factors and public health spending on health. They find that the vast proportion of cross-national variation in mortality can be explained by the country's per capita income, the extent of women's education, the level of ethnic fragmentation, and the predominant religion; public health

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[2] This could be due to purposive placement of facilities in areas where children are sicker and less well-nourished. This would make the presence of facilities appear to have a negative effect on child health, when in fact, initial poor child health was precisely why the facilities were placed in the area to begin with.

[3] The health care variable is the percentage of the population having access to health services; however, the definition of "access" is not specifically given in the text.

spending has only a very small impact. Potential explanations for this non-result on public spending, the latter three of which are acknowledged by the authors, include (a) the fact that only part of health care consumption is represented by public spending: large amounts are spent by private individuals on the consumption of private and traditional services; furthermore, sizeable individual costs (travel costs, travel and waiting time, and sometimes user fees) are incurred even in the consumption of public services; (b) public spending is not always allocated to the most cost-effective services in terms of improvement in health status per dollar spent; (c) additional spending on public health care may merely substitute for private services that would have been consumed anyway, so there is no net increase in total health care consumed; and (d) more spending does necessarily represent increased consumption of services because of variations in the efficiency of service delivery: a dollar of public spending in one country may translate to more services, while in another it may not.

Another potential issue with both of these studies is that mortality is the health outcome used. While this indicator has the advantage of being widely available, and is less subject to measurement error and reporting bias than morbidity, it cannot capture potential health improvements, which may stem in part from consumption of health services, experienced by those who remain alive.

Demand for Health Services: Methodological Issues and Results de

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The empirical work on health care demand focuses on the impact of price on demand for services from various types of providers using discrete choice models.[4] Some studies have found that price decreases demand,[5] while others have shown demand to be price inelastic.[6] The differential results could be attributable to a variety of factors: (1) the price of health care is not defined in the same manner across studies; (2) different responses by socioeconomic groups are not always allowed for; (3) quality of services is often not explicitly taken into account, and if it is, limited and sometimes unreliable measures are used to proxy for it; and (4) the data come from different countries, settings, and periods of time. The first three issues are important from the standpoints of informing future data collection efforts and the choice of analytical methodology for health care demand studies, and therefore merit further discussion.

Health Care Price:

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[4] Other studies monitor the impacts of actual policy changes by observing utilization before and after a price increase. In most cases overall utilization is lower after the price increase, and it decreases more in poor areas. See Appleton, et al. 1996; Collins, et al. , 1995; Creese and Kutzin, 1995; Kutzin, 1994; Creese, 1991; Lewis, 1991a, b; Yoder, 1990; Santon and Clemens, 1989; Waddington and Enyimayew, 1989. One study, however, by Litvack and Bodart (1993), finds that utilization rises after a price increase; this is presumably due to concurrent quality improvements.

[5] Alderman and Gertler, 1997; Gertler and van der Gaag, 1990; Mwabu, 1989; and Gertler, Locay, Sanderson, 1987.

[6] Schwartz, Akin, and Popkin, 1988; Akin, Griffin, Guilkey, and Popkin, 1986; Birdsall and Chuhan, 1986; and Heller, 1982.

The price of care faced by households consists of user fees, travel costs, travel time, and time spent at the facility.[7] These price variables are the most immediate policy levers available to influence utilization; evaluating the impact of price on demand, therefore, means that clearly defining price is crucial. Often the only data on prices is household expenditure per medical care visit; this measure is not exogenous however because it reflects choice of provider which is likely to be influenced by variation in service quality (Deolalikar, 1993; Deaton, 1988) as well as individual and household level characteristics such as education and income. (For example, there may be price discrimination by socioeconomic status.) If expenditure is the only information available on price, one approach to minimize the endogeneity of this variable is to construct "unit prices" for each type of health service; this is done by aggregating per visit expenditure by provider and service type, e.g., a visit at a public clinic for basic curative care for a child. The "unit price" for this type visit is then defined as the median or mean value within a small exogenously-defined geographic area, such as a community or sampling cluster.[8] If available, price information from providers may be better than household expenditure data because it is less likely to be influenced by household characteristics; it may also reflect the price of what a provider considers a typical visit for a specific type of service offered; e.g., a routine visit for a child with diarrhea or a respiratory infection.

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[7] Time spent traveling, waiting for, and receiving services are opportunity costs in the sense that the time could have been used in productive activities or in leisure. The value of these time costs has often been approximated by the hourly wage the individual would receive had he or she been working for pay instead.

[8] Cell sizes of at least 10 observations are normally desired for this procedure in order to avoid the undue influence of outliers.

The accuracy of facility data may itself be a concern, however, because official fees may not be the same as those actually charged (Thomas, Lavy, Strauss, 1996); providers may offer better or more expeditious care to those willing to pay higher prices. For instance, fees may be accepted for better "free" services. The official fee data will show no variation in prices, when in reality there could be.

Obviously, lack of variation in a variable is problematic for analyzing responses to it. Even with zero or very low user fees, however, other elements of price, mainly travel time and costs, will vary across households and communities; furthermore, they are often a very large part of the total price of obtaining care.

Responses by Different Groups:

In terms of different responses by socioeconomic level, several studies find demand to be more price elastic for lower-income households.[9] These results suggest that fee increases may affect the poor more; demand also appears be more elastic at higher price levels, implying there is eventually a diminishing revenue return to increasing prices. It is important to note, however, that price was not defined the same way across these studies. If travel time (i.e., distance) is used as the measure of price, and its magnitude is large relative to the monetary fee for service, it is entirely possible that utilization of public services may not be reduced as much as might be expected with a small fee increase for service.

[9] Alderman and Gertler, 1997; Bitran, 1993; Ellis and Mwabu, 1993; Gertler and van der Gaag, 1990; Dor, Gertler and van der Gaag, 1987; and Gertler, Locay, and Sanderson, 1987.

Health Care Quality:

The effect of quality on demand has long been recognized as potentially important, but only recently has it begun to be specifically addressed. One obvious reason many past studies did not include it was lack of data. Alderman and Lavy (1996) review a handful of recent studies that use both household- and facility-level data to examine household responses to cost and quality of services. The results, mostly from African countries, indicate that distance to facilities and availability of basic drugs are the two strongest influences on the demand for adult curative care. A study of obstetric care choice from the Philippines (Hotchkiss, 1993) finds distance, waiting time, and availability of doctors to be significant determinants of choice of facility for child-delivery services; drug availability had effects only among more educated women.

Several of these papers performed simulations of demand responses to improving public services. They indicate large potential increases in utilization; much of the likely increase reflects switching from private into public care, although there also appears to be slight shifts from self care and traditional health care into public modern services. An important question is whether such improvements could offset the negative effect of fee hikes on demand. One example from Ghana (Lavy and Germain, 1994) finds that when quality enhancements were accompanied by fee increases in the simulations, demand for quality appeared to be high enough that doubling the value of several of the quality indicators simultaneously would not decrease overall demand at public facilities unless prices were increased by more than twelve times their original level.

Better quality financed through higher fees may not have equally beneficial effects across all socioeconomic strata however. The few analyses that have estimated differe

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differential responses by income, have shown willingness to pay for improvements such as drug availability, facility infrastructure, personnel, and range of services, rises with income.

An Extension Beyond What is Normally Considered

Unconditional Demand Estimates

Finally, most studies estimate demand for health care only for those individuals who report a current illness. Conditioning on illness makes some intuitive sense: healthy people will not demand curative services. However, selection bias is an issue if unobservables related to the self-reporting of illness also affect demand for care. Factors associated with seeking care during illness, both observed and unobserved, may also influence the self-reporting of the health status.[10] If such reporting biases were correlated with only observables, then that would not lead to biased estimates of short-run effects. The problem, however, is often one of unobserved attitudes toward care-seeking and morbidity. If these attitudes do not change as observables, such as income, change, then marginal income effects from conditioned estimates will be biased because self-reported health status will be correlated with the error term of the health care demand equation. For example, those who tend to under report illness may also tend to avoid modern health

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[10] An example from Peru shows the relationship between maternal education and maternal-reported incidence of child illness follows an inverted-U shape (Sindelar and Thomas, 1991). If more educated mothers have better information and greater awareness of illness symptoms, perhaps because of more experience with health care providers, they may be more likely to report their children as sick (Strauss and Thomas, 1995). More objective measures of health and nutrition, such as child anthropometric status, consistently show positive effects of maternal education.

care when sick;[11] conversely, a person with unobservably poor health may be more familiar with the health care system and be more likely to demand care when sick (Dow, 1995a; Schultz and Tansel, 1993; Dor and van der Gaag, 1993, 1987; Ellis and Mwabu, 1991).

Another reason health status is endogenous for the empirical estimation of health input demands is that individuals are to some extent able to *choose* their expected level of health through their choices of health inputs (Dow, 1995a). Therefore, over the long term, prices and quality of curative services influence not only demand for those services, but health outcomes as well.

The implication is that estimated responses to health prices which are conditioned on a self-reported current illness may be biased due to self-selection into reporting illness. Furthermore, they may only be valid in a short-run sense because they do not factor in how long-run health care demand is influenced by the mix of health inputs chosen which in turn affect health status. Unconditional estimates are free from the selection bias arising from morbidity self-reports; they may also better capture the effects of policy changes, such as fee increases, because they include not only the short-run demand effects, but also the longer-run feedback effects that reforms are likely to have through their impacts on health status.[12]

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[11] For example, an individual may currently be healthy and not demand curative services; however, when an illness does occur, if he/she forgoes treatment, health may be worsened in subsequent periods, and demand is actually increased in the long-run.

[12] Dow (1995a) points out that estimated long-run effects may themselves be difficult to interpret if changes in health prices or quality over time are unobserved.

In order to estimate both conditional and unconditional responses, both illness and health care utilization data must be available from all sampled individuals and for the same recall period.[13] In a study with such information from Côte d'Ivoire, short-run elasticities from the conditional, self-reported ill-subsample were found to be approximately twenty-five percent larger (i.e., more negative) than those estimated for the entire, unconditional sample (Dow, 1995a). While demand for most goods is thought to be more elastic in long-run because of substitution opportunities, this cannot be determined a priori for health care investments. It is possible that, regardless of reported health status, current prices reduce quantity demanded, making health worse enough in subsequent periods that quantity demanded is driven back up. Alternatively, with given a price increase for both preventive and curative care, preventive may not be as attractive a substitute for curative care.[14] This could have negative impacts on health, thus increasing long-run curative demand.

This paper also found *signs* and *significance* of income, age, and gender variables differ between the conditional and unconditional estimates. The estimated wage had significant negative impacts on hospital utilization when conditioned on an illness being reported, but no influence in the unconditional estimates. Age had significant negative effects on demand for hospital and clinic care in the conditional sample; however its

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[13] In this data the health care utilization questions were not preceded by screening question "Was the individual ill in past two months?" We know, however, whether the visit was for curative or preventive care. Unfortunately, the health data is not available for the same recall period as the health care data. Therefore, conditional demand cannot be estimated and compared with the unconditional estimates.

[14] This assumes that the same facility is used for both preventive and curative care.

influence was positive and significant for both types of care when the estimates were not conditioned. For those reporting an illness, being male had a positive influence on hospital, but not clinic visits; however, using the unconditional sample the male effect is strong and negative for clinic visits, but has no significant impact on demand for hospital care.[15]

Using data from Indonesia, Deolalikar (1993) estimates the probability of seeking care from modern and traditional providers, first conditional on an illness having been reported and then for the entire unconditional sample. Contrary to Dow's results, he finds long-run own-price elasticities to be *larger (i.e., more negative) than those from the ill subsample*. One possible explanation for these results is that the sickest of the sick are more likely to report an illness; if these individuals consider themselves to be in dire need of medical care, perhaps they are less responsive to price than others who have not defined themselves as ill. This would lead to downwardly biased estimates (more toward zero) in the conditional price elasticities. This does not, however, reconcile the differences in the findings between the two studies.

One cross-price effect differed between the long- and short-runs: modern service prices significantly increased demand for traditional services in the short-run, but not in the long-run.

Changes were also observed on key household and community variables. For modern services for children, schooling of the household head significantly increased short-run demand, while in the long-run its influence was negative and non-significant;

[15] Dow (1995a) demonstrates that long-run, unconditional elasticities are equal to the sum of the short-run elasticity of curative care, plus the elasticity of health with respect to the covariate of interest.

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child age had no noticeable short-run effects, but was strong and negative for the unconditional sample; organized trash collection in the community had positive but small effects in the short-run, whereas in the long-run the influence was large and negative.

While these two studies use data from different areas, and do not define price variables nor handle certain specification issues in the same manner,[16] the dissimilarities in the findings call for further research into the nature of long-run demands for health services.

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[16] One specification difference is that Dow allows varying degrees of cross-alternative substitution by using nested multinomial logit and multinomial probit structures.

Section 3

BASIC MODEL OF HEALTH CARE DEMAND

The model presented here is a household production model for health inputs and outcomes; it is similar to that used in previous health care demand studies. It is assumed that the household maximizes a utility function, the arguments of which consist of health of the infant (H) and consumption of a composite good (G), conditional on (Z) which is a set of taste and preference shifters[17]:

(1) $U = U(H, G; Z)$

Health of the sample infant is produced by combining inputs in the manner implied by the health production function. This function is modeled as a relation between the health outcome and a set of health input choices; its shape will depend on the underlying health technology. The production function is written

(2) $H = H(C, F; S, M, E, \upsilon)$

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[17] Such a unitary model of household decision making, in which households are assumed to make decisions which maximize household utility, does not allow one to delve into the processes of intra-household decision making. The unitary approach is used because information is not available in these data on individual non-labor income or individual ownership of assets within the household. Information is available, however, on characteristics and health-related behaviors of mothers of the sample children.

where the first two arguments are endogenous inputs into health: C is the quantity and quality of health care chosen and F consists of other health inputs, such as food and nutrient intakes and health-related behaviors such as cooking, food storage, santitation and excreta disposal practices. S, M, and E are exogenous characteristics that influence infant health: S is the set of individual attributes of the child such as age and gender; M consists of household characteristics including age, education, and family background of the the child's parents, and E is the set of community characteristics which influence health, such as sanitation, water quality, rainfall, temperature, and the general disease environment. It should be noted that S, M, and E can have both direct effects and indirect effects through C and F. υ represents child- and household-level unobservables such as inherent healthiness of the child.

The household also faces a budget constraint:

(4) $Y = p_C C + p_F F + G$

where Y is household income, p_C is the price of health care, and p_F are the prices of other health-related inputs; the price of the composite good is normalized to one. The price of health care is comprised of the user fee and access costs such as travel time to the facility.

(5) $p_C = B + wT$

where B is the user fee, w is the wage rate, and T can represent travel time to or waiting time at the facility. Substituting (5) into (4) gives the full-income budget constraint

(6) $Y = (B + wT)C + p_F F + G$

Substituting (6) and (2) into (1) gives the conditional utility function for health care choice j

(7) $U_j = (H_j(C_j, F_j^*; S, M, E, \upsilon), Y_j - B_j C_j - wT_jC_j - p_F F_j^*; Z)$

where F_j^* is the optimal choice of other health inputs given health care choice j.

To specify the utility maximization problem for choice of health care, suppose the individual (the child's mother) faces J feasible health care alternatives. The unconditional maximization problem is

(8) $U^* = \max_j (U_1, \ldots\ldots, U_J)$

where U* is maximum utility. The solution to the utility maximization problem gives the health care alternative that is chosen. When stochastic terms are added, the probability that an alternative is chosen can be interpreted as a demand function in a discrete choice model such as the one specified here.

It should be noted that the processes and dynamics of health production are not taken into account in this analysis. It is assumed, however, that (1) inputs chosen in previous periods affect current health, and (2) health in the previous period affects current health. These assumptions imply that in a dynamic model both lagged and expected future values of exogenous variables would enter the reduced-form demands. In the empirical work, several covariates enter with current and past values (e.g., rainfall and food prices), others are time-invariant (e.g., parental education), and the remainder are assumed to change slowly over time (e.g., health care availability and quality). The very young age of the children in the sample, and hence the short time-period over which their existing stock of health is based, makes these assumptions more tenable.

Section 4

DATA, SETTING, AND VARIABLES

THE SURVEY

Household, community, and health facility data from the Cebu Longitudinal Health and Nutrition Study are used for this study. The Cebu data are a rich resource for examining issues related to child and maternal health. The survey period, 1983-1986, coincides with the introduction of structural adjustment and stabilization programs and severe economic downturn in the country. Unemployment, inflation, and poverty increased during this period; nutrition, health, and education indicators also worsened (Herrin, 1990, 1992). The region to which Cebu belongs saw the proportion of underweight children increase during this time; by 1987 this area had the highest prevalence of low weight-for-age children in the country. Furthermore, in this particular sample, half of the children at the age of two years had heights two or more standard deviations below the WHO reference median for their age, suggesting a high prevalence of chronic under nutrition (Glewwe, King, Adair, Jacoby, 1994).

The site is Metropolitan Cebu, an area in the central Philippines, which includes Cebu City, the second largest city in the country, and surrounding urban and rural communities. The area is located on the eastern coast of Cebu Island and includes a number of coastal, island, and high elevation villages which vary in environmental, socioeconomic, and agroecological conditions. Following an initial pilot survey in 1982, seventeen of the 158 urban, and sixteen of the 85 rural, barangays (villages) in the area were randomly selected to be included in the sample. The sample consisted of all pregnant women and their households in these 33 sample barangays who could have delivered a single child between May 1, 1983 and April 30, 1984. Baseline pre-birth surveys were conducted with the 3327 women who fit this criteria. Subsequent interviews were conducted immediately following each woman's delivery and then every two months through the first two years of each index child's life. A few women were lost to the sample immediately after the baseline survey and a handful more following the post-delivery survey due to out-migration, twin births, stillbirths, miscarriages, and refusal to be interviewed. At the beginning of the bi-monthly longitudinal surveys, the sample consisted 2884 woman-infant pairs.[18]

The household surveys collected information on household composition; human capital of household members; value and composition of household asset holdings (at the baseline and final longitudinal round); household income and detailed information on labor supply and sector of employment of the index child's parents (in survey rounds 1, 6, and 12); household sanitation conditions; health insurance coverage; mother's contraception behavior and fertility history; infant feeding practices; maternal prenatal behaviors during her pregnancy with the index child (at baseline); type of practitioner used for child delivery services (post-birth interview); mother's postpartum health care utilization; and health care utilization for each index child.

Besides the 3327 households, eighty-two modern health facilities, mainly public and private hospitals and clinics, used by the sample population, were also surveyed. A broad range of information was collected on types and number of personnel, drug

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[18] The mean number of completed longitudinal surveys per individual was 10.5 out of a possible 12. Missing surveys were due to migration, withdrawal from the sample, and a few infant deaths.

availability, hours of operation, kinds of services offered, prices, and intensity of patient use of the facility. Two separate health personnel surveys, which covered both modern and traditional practitioners, gathered data on education, training, knowledge, and attitudes of individual health providers.

In addition to the household and health facility surveys, information was collected on a wide range of characteristics of each sampled barangay. This survey, conducted at the time of the baseline household survey and again after the completion of all the household surveys, contains information on population, water and sanitation infrastructure, other physical infrastructure (including roads, availability of transportation, electricity, and other services), the agroecological setting, prevalence of local community groups and organizations, and the presence of different types of health and educational institutions as well as commercial and retail establishments and activities.

Community-level market food prices were gathered at ten equally-spaced intervals during the survey period. These covered a large number of food items. For each type of commodity, prices were collected on several different brands so that a range of qualities for each product was represented. Furthermore, careful attention was paid to measuring the units, weights, and volumes of each product. This ensured that price per standardized unit could be derived for each food item.

Monthly rainfall levels for the area from 1973 to 1986 were also available; information on current and rainfall lags up to two years were used in the analysis.[19]

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[19] The author would like to thank Agnes Quisumbing for sharing this data.

Current and lagged rainfall levels are expected to be important determinants of morbidity and income and therefore to have large effects on health care utilization.

CONCEPTUAL FRAMEWORK: DEMAND FOR INFANT CURATIVE CARE

The demand for health care and other health inputs is a function of many different factors. These can be grouped loosely into the categories of preferences for health relative to other goods, the household's budget constraint, fixed inputs, and the child's health endowment.

Preferences are associated with observed and unobserved household characteristics. Observed characteristics could include education, sex, and age of the health care decision makers (e.g., the child's parents). Factors influencing preferences which are normally unobservable could include tastes for higher-quality health care; perceptions of child health care needs; beliefs concerning appropriate types of health care for children of differing ages and sex; the seriousness with which child illness is viewed; *inter alia*. Many of these could be related to education, cultural or ethnic affiliation, and family background.

The budget constraint is determined by the household's income; the prices it faces for health care such as user fees, transportation time and costs, waiting times, etc.; prices for other health inputs such as food; prices for non-health consumption goods; and the market wage (i.e., the opportunity cost of time).

Fixed inputs which affect health input choice can be at the household or community level. At the household level these could include education, age, and family background of the mother. Better educated mothers, for example, may not only have stronger preferences for health utilization, they may also make better decisions regarding choice of health inputs.

The child's health endowment reflects the innate healthiness of the infant. This is expected to be an important influence on child health care choices made by the mother; this factor, however, is not directly observable to the researcher.

The choice of which health inputs to use and the amount of each to use depends on all the exogenous variables that are observable to the researcher and those which are unobservable. The relationship between the observable exogenous factors and the demand for health care is the health care demand function. (The derivation of demand is laid out in more detail in the modeling section).

PREPARATION OF DATA FOR EMPIRICAL ANALYSIS

We now turn to a discussion of the data, starting with a general description of activities related data exploration, quality checks, and cleaning. We then discuss the construction of the health care characteristics data, followed by an explanation of how the health care choice set used in the analysis was determined. We then describe health care utilization patterns of the households at the time of the survey. This is followed by a discussion of the exogenous explanatory variables at the individual-, household-, and community-levels used in the analysis; we then present summary statistics for the regressors used in the analysis.

DATA EXPLORATION AND CLEANING

In general, construction of the data sets used for the analysis was labor-intensive and time-consuming because of the complexity, size, and breadth of the survey. The survey covered 3327 sample mother-infant pairs and their households. Each of these sample pairs was surveyed 14 times, once at baseline, once just after delivery, and at twelve bi-monthly longitudinal rounds. This resulted in approximately 42,000 total person-observations in the sample. For each person-observation there was a vast variety of information collected on the child, the mother, and their household of residence. In addition, data was collected on the general attributes of each of the 33 barangays sampled; furthermore information was also gathered from *each* health facility used by sample mothers and infants.

With a data set of this size, the first activity undertaken for empirical research is to explore the files for basic content. This includes investigating which specific variables each file contains. It is also crucial to know how these variables were actually measured. For instance, non-labor income in one survey could mean just remittances received, while in another it could also include interest on savings, remittances given, pension income, etc. It also important to know how each question was phrased to ascertain whether the desired information was collected in an accurate, unbiased, clear manner. In a multiple round survey, it is necessary to explore how frequently each type of information was obtained and for what recall length, *and* if the question was asked in the same way each time. If a question was asked at every survey round, each different temporal observation is matched to the base individual for each period. On the other hand, if a different piece of information was asked only once in the survey, this single value will be attached to that individual for every round.

In general, matching records from surveys with multiple observations not only on children, but also on households and communities is not straight-forward. It is critical that, to the extent possible, errors are identified and the data matched correctly. It is not uncommon, for example, in these sorts of surveys for an individual's identifier to change across rounds. At the household level, questions are often asked of each individual in the household. For analysis this means that for each of these person-records, variables had to be created and then combined into one single record which is tied to the index child. For community-level data, each relevant piece of information is attached to individuals currently residing in that community. Another issue with community-level data is that it can be collected at different times, at different intervals, and for slightly different geographic boundaries than the individual and household data is. This implies that various levels of matching are required to get the correct value attached to the desired person in the appropriate village and for the right period of time.

For discrete categorical variables in a repeated survey, it is important to check that the response codes are the same across rounds. Often after the first round of data collection, the researcher often learns more about the particular setting he/she is working in which, and this calls for changes in coded responses to better reflect the setting. If responses are added or changed, it is important to know whether and how these can be matched to the previously used codes so that responses for each period of time can be used in a consistent manner.

In terms of data quality, it is important to check outliers to see how they compare against values for other similar individuals (or households) in the file for same period of time, and against values for that same individual or household over different rounds. Sometimes obvious mistakes in data entry can be detected in this manner.

Rules checks are another important category of data cleaning. One type of rule are nested "if, then" type of questions. With an affirmative response to a screening question (such as whether health care was sought), if questions within that nest have no values attached to them, their values should be set to missing and not to zero. Another type of rule is the consistency of mathematical or accounting relationships. For example, a child's age in any survey round should be the difference between his/her birth date and the survey date (many mistakes were found in this variable in our data). A final type of rule relates to conditional relationships between different variables. For example, an individual coded as being the mother of an index child should not be coded as being male in gender.

It was tedious, but very important, that these types of subtleties and errors be examined before doing the analysis. Furthermore, it is crucial that each change be documented in a program file for future reference.

CONSTRUCTION OF HEALTH CARE QUALITY AND PRICE VARIABLES

The Cebu data contain a large amount of information on health facilities. Two surveys of all modern facilities used by the sample households, both inside and outside the sample barangays, were conducted for the study, once at baseline and once near the end of the survey in 1986. Information on prices for different types of services, the range of health services offered, and staffing levels were collected at both rounds. Data on drug stocks in facilities were available in both surveys (the drug information contained in the 1986 survey, however, was much more complete). Two health personnel surveys were also administered; these gathered data on education, training, beliefs, and practices of a wide range of staff in modern facilities, as well as traditional providers and midwives. Official service fees were collected from modern providers; however, no user fee data was collected from traditional practitioners.

Health Care Quality:

The following is a list of some of the specific measures that were attained about services in modern facilities. These include general availability of services, including hours per day and days per week the facility was open, as well as whether payments were accepted in kind and whether there were sliding fee scales which changed with the income of the user. We also know the total number of personnel and how many of each particular type were in each center; these include medical doctors, student intern doctors, registered nurses, nurses aides, midwives, etc. For treatment of each of six types of adult illnesses, (pneumonia, bronchitis, gastroentiritis, TB, primary complex, and influenza), we know what type of practitioner usually attends patients in the facility, the usual cost for one visit, and whether drugs are available for this type of illness. For child-related services, (prenatal care, child outpatients, immunization, and well-baby), we know whether the facility even provides the service, usual cost and waiting times per visit, and the type of practitioner who normally treats.

For drug availability, in the first facility survey for each of the illnesses mentioned above, the general question was asked whether drugs to treat this illness were available at the facility. In the later survey, much more detailed information was obtained; here two questions were asked, first, whether the drug was usually available in the facility, and second, what was the current stock of each of a list of drugs to treat various conditions. In addition, both the usual and current availability of vaccines for children and pregnant women (for BCG, DPT, polio, measles, and tetanus) and vitamin A and iron supplements is given.

Information on traditional providers from the health personnel survey included the individual's education level, types of training received (including who conducted the training session, the duration of the class, and when it was attended), whether infant curative services are offered, attitudes about breastfeeding, contact with infant food company representatives and the provider's self perceptions of the influence of these reps on their treatment practices.

While the Cebu survey provides much data on quality, ironically, the sheer breadth of the data itself means that many of the variables are highly correlated, and that degrees of freedom for estimation could become an issue. The data reduction method employed was to construct indices which summarize different sets of aspects pertaining to service quality (Peabody et al., 1994). This method was favored over other data reduction methods, such as principal components or factor analysis, because the influence on demand of specific sets of quality attributes can be directly assessed. The approach, therefore, provides planners and policy makers with more useful information than an aggregate quality index can.

In practice, the strategy is to create composite measures of different categories of quality. Possible categories generally fall under one of three: structure, which refers to the physical presence of resources and staff at the facility; process, which are the practices followed by the health practitioners; and outcome, which refers to health outcomes resulting from the care received (Donabedian, 1980, 1988). As laid out above, much of the data collected in the Cebu health facility instruments describe structural attributes. While such structural measures cannot ensure higher quality care, they are probably necessary for it. In addition, they can often be easily recognized by potential users, so they may have a strong influence on demand (Garner, Thompson, and Donaldson, 1990). Furthermore, the state of a facility's structural elements should reflect resource availability, so that in an environment where resources are severely limited, as in many developing countries, they may also serve as indicators of access to services (Peabody, Rahman, Fox, and Gertler, 1994).

Health care attributes in our data which describe the physical presence of staff and resources at the facility are staffing and drug supplies.[20] The staffing variables were defined as total number of personnel and the proportions of doctors and nurses relative to total staff. Number of personnel may capture scale effects which could indicate shorter waiting times and/or a wider variety of service availability. A higher proportion of doctors to total staff may be perceived as providing better quality, while a higher proportion of nurses may be viewed as providing services better than those of a midwife

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[20] Other studies have also included measures of facility infrastructure, such as electricity, and plumbing, and equipment and supply availability, such as scales, thermometers, stethoscopes, syringes, needles, bandages, etc. (Peabody, Rahman, Fox, and Gertler, 1994). These types of data were not collected in the Cebu health facility surveys, so are not among our quality indices.

or untrained practitioner; it may also be indicative of care that is more patient-oriented and nurturing than a physician-attended visit. We experimented with numbers of doctors and nurses also, but proportions were used because staffing requirements at different facilities vary according to level of care provided and size of facility, so actual numbers of doctors and nurses cannot be directly compared meaningfully. We did not experimented with other personnel types, such as dentists and pharmacists, because the are not directly involved in providing basic curative services for infants.

Drug supplies are defined as usual and current availability of ORT, intravenous diarrhea treatments, child vaccines, and family planning methods. We used current, as opposed to usual, availability. It was deemed to be a more objective indicator since it is probably less subject to respondent bias; furthermore, current supplies could potentially have been observed at the time of the survey by the interviewer, whereas usual supplies could not without having many observations over time on the same facility.

As stated above, this detailed drug information was available only in the 1986 survey which made it more attractive for modeling health care demand. The year 1986 was the time period immediately following the completion of the last household surveys. To address the issue that the 1986 survey would not reflect the actual health care quality situation faced by households from 1983 to 1986, perhaps because health facility characteristics could have changed between the periods, means tests were performed on several sets of the variables which were collected at both points in time explore differences between years. Results indicate that the null hypothesis of no difference between the two time periods could not be rejected for eight out of nine tests performed.[21] Since characteristics measured in both periods were not significantly different in 1986 than in 1982, this strengthened our confidence in using just the 1986 data so that we could have the advantage of including drug supplies in the models.[22]

We produced indices using most of the drug information collected in the survey. In reference to diarrhea drugs, we expected these to be crucial determinants of demand since they can have immediate influences on child health. Vaccines and the range of family planning methods are obviously not related to child curative care, but may indicate an orientation of the facility toward infant and maternal health services which could be important to a mother in deciding whether this is where she takes her child. Furthermore, mothers may be more likely to visit facilities with more vaccines and family planning supplies for child curative care if they can access these supplementary services during the child's visit. We also tried including the availability of micronutrient supplements and maternal tetanus vaccines. These, however, were not powerful predictors of curative care demand, so were eventually dropped from the analysis.

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[21] The variables for which means tests were performed included doctor and nurse ratios (discussed more below), number of child outpatients treated per week, and outpatient waiting times. Separate tests were performed for public and private facilities. The only test for which the null of equality between the two time periods could be rejected was outpatient waiting time in public facilities, which rose from 2.5 to 6.8 minutes between the surveys. The test of the equality between the periods of the deflated provided-reported user fee for private care could also not be rejected. A similar test was not performed for public user fee because public facilities reported zero user fees in both years.

[22] It could be argued that drug supply characteristics can change more quickly than some other health care attributes, and therefore, they could have differed between the two time periods. However, we have no data with which to test this hypothesis.

Other more process-oriented variables we experimented with included an indicator of whether the establishment treats child outpatients at all, average waiting times for child services, and the number of child outpatients treated per week at the facility. The latter two variables were not kept because their predictive power was low.

Regarding the traditional practitioner characteristics, while provider contact with infant food company representatives and attitudes concerning breastfeeding could influence the advice they give concerning child feeding practices, these were not viewed as being crucial determinants of infant curative care choice, so the education and training were chosen as the descriptors of traditional practitioner quality.

Price and Distance:

Although price information was collected in the health facility surveys, this data was not used in the analysis for several reasons. First, there was no provider-reported fee data collected for traditional practitioners. Second, there are many cases of missing values for price at facilities; and third, for public services there are no official fees reported, so there were only zeros reported in the data. Often in empirical work, if price data is not good or not available, expenditure data is used; the approach is to compute average prices per unit of the good within geographic sampling clusters and use these as measures of price. Unfortunately, however, expenditures on child curative care were not collected in the Cebu study. Data was collected, however, on expenditures for prenatal care visits. While this is a different type of service, it is the most complete source of user fee data in the survey. Using this variable we attempted to construct hedonic prices for each individual; the extent of information available in the survey on health care market conditions was not sufficient, however, to achieve identification of a hedonic price. This being the case, barangay median deflated prices were constructed for each provider type. We can compare these prices to those reported by providers in the facility survey where official user fees charged for prenatal care and for child outpatients were given (shown in Table 4.1). Public providers reported charging zero for both services; the average barangay median values for public care is 0.54 pesos (1980). Private provider fees for a prenatal and child outpatient visit were 3.25 and 8.75 pesos, respectively, while the barangay median prenatal fee constructed from the household expenditure data is 4.83 pesos. Barangay median user fee for a prenatal visit to a traditional provider was an average of 1.06 pesos.

Regarding distance and travel costs for care, information was collected in the baseline survey on travel times and travel costs to providers used by mothers for prenatal care. This information could have been used in the choice analysis, but in a strict sense it is endogenous because distance is a function of health care choices made by mothers. Another alternative would have been to use barangay average or median values of these travel variables. Supplementary data was available[23], however, on distances from each household to each of the modern health facilities used by sample mothers.[24] This enabled us to have distance from each household to the nearest of each type of health facility, which is an exogenous measure because it is not a choice variable.[25]

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[23] The author would like to thank David Hotchkiss for providing this data.

[24] Strictly speaking, the distance is that between each health facility and 49 geographic points in the area with represent household clusters.

[25] This assumes that households have not migrated to this location because of attributes of health facilities in the area. It also assumes there is no purposive placement of facilities in areas with high demand due to high morbidiy or high incomes.

Distance data from each household to the nearest traditional provider was not available in this same data (probably because many work in less formal settings than modern providers, making them more difficult to locate). For these providers, community-level information was used on whether there was a traditional provider in the community; if there was, distance was set to zero; if there was not, distance to the closest available one outside the community was used.

DEFINITION OF CURATIVE HEALTH CARE CHOICES

The manner in which the different facilities choices are defined is critical to the analysis. The household survey originally included responses for ten different types of facilities that were used infant outpatient curative care. Retention of all the original ten facility types would have resulted in a discrete choice model with small cell sizes for several of the outcomes; this would have been particularly problematic for analysis of responses by different subgroups.

Given that one of our primary interests in this research is to investigate household responses to *public* health care policies, we definitely want to separate public care from other types of care. Furthermore, because western and traditional providers vary in their treatment approaches, we may also wish to separate traditional care from "modern" health care services.

The next stage of disaggregation to consider is a breakdown within public and private services by facility level. In many studies, hospitals and clinics are separate choices. In the Cebu data, however, child curative visits to hospitals, both and public and private, were extremely infrequent. Only 2.5 and 1.1 percent of the total 31,000 person-observations were for a public and private hospital visit, respectively. The options were to either drop the hospital observations or to aggregate hospitals and clinics into a single category for each of the modern sectors. The latter strategy was followed even though some facility attributes differed, as presented in Table 4.2. Quality variables are displayed for modern services, broken down by clinics and hospitals; public clinics are divided into levels as well, barangay health stations being the smallest and most basic. In the public sector, user fee, nurse ratio, and vaccine and family planning indices are somewhat similar in clinics and hospitals; in the private sector, user fee and family planning index are somewhat similar. The final health care alternative set used consists of public, private, and traditional health providers.

Matching Households with Facilities:

Quality attributes in the data analysis files represent the attributes of the closest facility of each type to each household; for modern facilities this matching was accomplished using the distance data. For traditional providers distance to households was not available, so we constructed barangay-level median values for each of the traditional provider characteristics in the health personnel survey.[26]

PRICES AND QUALITY OF THE RESPECTIVE FACILITY TYPES

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[26] Some traditional providers used by the sample households were outside the sample barangays. In order to use data on all these providers, we assigned each traditional provider outside sample barangays to the closest sampled barangay. We then took the median value for each quality aspect as the barangay-level value used in the analysis. There were three barangays for which no traditional providers were interviewed; for these we used the value of the closest barangay of same urban/rural type.

As seen in Table 4.2, distance to the nearest provider and user fees are greatest for private facilities. Public services are closer and charge either no fee or an extremely low one; traditional providers are the most accessible geographically, and while their fees are low, they are higher than those charged by modern public establishments. Differences in services at the three types are also wide: public and traditional facilities all provided child outpatient care; however, ten percent of the private facilities did not. Private facilities have more staff and higher ratios of doctors to total staff relative to public facilities; nurse ratios are similar for public and private. A very large percentage of public centers had ORT supplies on hand, but very few had more complex diarrhea treatments. On the other hand, less than half of all private establishments had ORT available, but quite a large proportion had more complex diarrhea treatments, such as intravenous solutions, in stock. Vaccines and family planning supplies are slightly more available at public centers. For traditional providers, there is only one staff member in the 'facility'; by definition doctor and nurse ratios are zero; modern drug supplies are also set to zero. Service quality for these providers is measured by education level and whether any formal health training had been received.

DESCRIPTION OF PATTERNS OF HEALTH CARE UTILIZATION

Health care utilization patterns are given in Table 4.3. For the entire sample over all rounds, a curative health care visit in the two months prior to each survey occurred forty-nine percent of the time. Among the three types of visits, traditional practitioners are used most frequently, followed by private, and then public services.

By log of household asset value, overall visits increase gradually with values up to the first tercile of the distribution, and then level off. Health care visits are only slightly greater among high asset households; however, the composition of visits differs by asset status. Utilization of public care is nearly constant up through the first tercile value where it begins to diminish; private visits, alternatively, rise slightly through the second tercile and then increase dramatically. Traditional care is used at about equal levels for households in the first two terciles and much less by the high tercile households.

By maternal education, visits increase with the first eight years of mother education and more slowly thereafter. Public use increases slightly up to the sixth year of schooling (primary school completion), then rises very sharply between six and eleven years, and then decreases; composition of the visits is very different for the low and high education group. Use of private care rises with maternal education, especially after grade ten, while visits to traditional practitioners drop if the mother has more than a primary school education.

By child age, demand rises up to the child's six or seven month and then falls. Use of modern care, especially private, is much higher for children in the first six to eight months of life relative to older infants: approximately forty percent of all 0-6 month old visits are at modern facilities versus only twenty-five percent for those in the 7-24 month old group.

Trends by calendar month indicate that utilization of private care is lowest in the wet season, June-September (a high diarrhea period), and greatest in the dry season, February to May (a high FRI period). Traditional visits peak in the middle of the dry- and wet-seasons. Demand for public services appears to be lowest during the dry season.

COMMUNITY-LEVEL NON-HEALTH FACILITY VARIABLES

Construction of the food price variables used for the analysis was a multi-step process. Market food prices were measured at the community-level at ten different periods of time during survey. We first assessed completeness of price and unit data for each item, in each community, during each round. Within broad food groups, we aggregated brands so that a range of prices that reflected different levels of within-food group quality would be present. The major food items of interest for our purposes were infant formula, corn, which is the major staple commodity, and cooking oil. Foods that came in different size containers were transformed to a common unit (e.g, ml, gram, etc.), so that unit prices could be constructed for each community and for each round. These unit prices were then deflated using month-year CPI information (Philippine Statistical Yearbook, 1988). Finally, for communities with missing values for a particular item in a particular month, prices from neighboring barangays from the same time period were used for purposes of imputation. Food prices are generally lowest between the dry and rainy seasons, begin to rise in the dry season, and peak during the wet season.[27]

Other non-facility community variables describe the health and sanitation infrastructure, the disease environment, and other non-health physical infrastructure.

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[27] It is probable that these prices follow the agricultural calendar where the interim season is when the harvest occurs; the dry season is when food stocks start begin diminish and energy required to prepare fields for planting is high; the wet season is when cultivation begins and food stocks are at their lowest.

These are described in Table 4.5 with summary statistics in Table 4.6; they include the proportion of households in each community having, respectively, piped or pumped water to their house, a refrigerator, a modern toilet, and sanitary garbage disposal methods; whether the community has frequent water shortages (a common problem in the area), the availability of a bank, or improved roads. Also included are community elevation, which helps capture infrastructure and temperature, present and lagged values of rainfall levels and present and lagged values of infant formula, corn, and cooking oil.

INDIVIDUAL- AND HOUSEHOLD-LEVEL VARIABLES

Individual- and household-level variables included in the analysis, described in Table 4.5 with summary statistics in Table 4.6, include age and sex of the index child, mother's father's education and age, mother's height[28], and a dummy indicator for whether each parent was physically absent from the household during the entire first two years of the child's life.[29] Furthermore, because household characteristics should include measures of accumulated human capital of parents, maternal height is used to capture some of these attributes which are not picked up by her education.[30] We also include household structure variables which may reflect household-level time and resource constraints relevant for child health care utilization and for child health production. For instance, the presence of other infants in the household may contribute to index child

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[28] Unfortunately, father's height is not available in these data.

[29] If absent for all twelve survey rounds, the person's characteristics are set to zero in the regressions. If the person was only temporarily absent, her or his individual demographic information is retained for every round.

[30] Even with these variables, however, parental human capital is probably still not measured completely.

illness and/or resource crowding; the presence of the elderly who require care could make for greater household time constraints; additional adult females in the household, however, may have positive effects for child health inputs if this group has stronger preferences for child health.[31] Maternal age, education, and height are also used to capture exogenous underlying determinants of the mother's wage rate.[32] Deflated value of household assets at the baseline survey are used to capture household resources. The asset variable was constructed from detailed information on ownership and values of items in the following categories: houses, land, vehicles, livestock, agricultural and business equipment, furniture, household appliances, and kitchen equipment.[33]

Several of the household variables are entered as linear splines; these include child age, mother and husband education, mother height, and household asset values.

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[31] It is arguable whether household composition variables should be treated as exogenous in a model of health care demand; assuming that they are exogenous implies that fertility decisions and other household composition changes are exogenous for child health care demand. Including them does not change the signs or significance of the other household variables (as discussed in Section 6 and shown in Table 6.5), so they are retained in this study.

[32] Wages were investigated as explanatory variables but are not used in the estimation for several reasons. First, in the household survey, many individuals, especially women, report not having income from wages. Second, forty percent of the female wage observations come from the baseline survey when most of the women were in their last trimester of pregnancy. This value of time is probably not what it would be under normal conditions. Third, many of the wages are classified as "self-employment" wages. These values should not be used to infer market wages because of the difficulty of distinguishing net income from an enterprise vs. returns to entrepreneurship, risk-taking and capital investment. Fourth, barangay level data on wages from the community surveys was sparse and showed little variation. Finally, the community data do not contain sufficient information on local labor market demands, sectoral composition, unemployment rates, etc., to use as exclusion restrictions for identification of wages in the health care demand equations.

[33] Price shocks were large during this period, particularly during 1983 and 1984. Monthly price data collected for the region by the National Census and Statistical Office of the Philippines is used to deflate nominal values.

Spline transformations provide a way to assess the relationship between an explanatory variable and an outcome of interest semi-parametrically. The variable is divided into piecewise linear segments, and the coefficient on each interval represents *the slope* for that interval. For example, the coefficient on the first segment of the child age variable gives the effect of an additional month of age up to the sixth; the second segment gives the effect of an additional month of age after the sixth. For each regressor, the hypothesis that the slopes of the adjacent segments were equal was rejected in each case.

Section 5

EMPIRICAL MODEL

INTRODUCTION

The demand for curative outpatient services for children is the outcome examined in this study. It is defined as the initial facility type chosen for a consultation if in fact the child had any curative visit during the the two months preceding each longitudinal survey. This is as a discrete outcome since we are not modeling number of visits or expenditure on visits. For purposes of the analysis, the relevant service categories available are modern public, modern private, traditional private, or no provider. As discussed previously, these options differ substantially in terms of price and quality of service.

The demand for a particular alternative is the probability that it yields the highest utility among those available. In a discrete modeling framework, this probability is interpreted as the demand function. The functional form of the demand function depends on the functional form of the conditional utility function and the distribution of the stochastic terms. We assume utility is linear in health and consumption, which implies the conditional utility function shown in (7) is now

$$(9) \qquad U_j = \alpha_{1j} H_j(C_j, F_j^*; S, M, E, \upsilon) + \alpha_{2j} [Y_j - B_jC_j - wT_jC_j - p_F F_j^*] + \epsilon_j$$

where F_j^* is the optimal choice of other health inputs given health care choice j, and ϵ_j is a zero mean random disturbance term with finite variance and is uncorrelated across alternatives and individuals. Because the data do not provide sufficient information to construct a household income variable, we cannot directly model utility derived from consumption. We use the value of the household's total assets as a proxy for household income; assets are reflective of the household's long-run resources, so are highly correlated with income and consumption; moreover, liquid assets play an important role in consumption smoothing.

Parents are assumed to make health care choices based on the comparison of the indirect utility functions for each type of health care alternative available, including that of no treatment. In practice, specification of the demand across alternatives is based on the difference in the utility of each market care alternative from that of self care. Under the assumption that their are no user fees or access costs for self-care, the conditional utility function for self-care alternative is

$$(10) \qquad U_s = \alpha_{1s} H_s(C_s, F_s^*; S, M, E, \upsilon) + \alpha_{2s} [Y_s - p_F F_x^*] + \epsilon_s$$

So the difference in utility between each market health care option and self-care is

$$(11) \qquad U_j - U_s = \alpha_{1j} H_j (C_j, F_j^*; S, M, E, \upsilon) - \alpha_{1s} H_s (C_s, F_s^*; S, M, E, \upsilon) + \alpha_{2j} Y_j - \alpha_{2s} Y_s -$$
$$[\alpha_{2j} p_F F_j^* - \alpha_{2s} p_F F_s^*] - \alpha_{2j} [B_j C_j - wT_j C_j] + \epsilon_j - \epsilon_s \qquad \text{for } j \neq s$$

This is the structural demand equation. The option giving the highest $(U_j - U_s)$ is the one chosen.

Substituting out for the reduced-form determinants of H, Y, F, and C, we obtain the reduced-form indirect conditional utility function for each alternative. These equations express the conditional utilities in terms of income, prices, and other reduced-form determinants. This leads to the estimated specification

$$(12) \quad V_j = \beta_{0j} + \beta_{1j} S + \beta_{2j} M + \beta_{3j} A + \beta_{4j} E + \beta_{5j} B_j + \beta_{6j} wT_j + \beta_{7j} Q_j + \beta_{8j} P_F + \beta_{9j} \upsilon + \epsilon_j$$

$$\text{for } j = 1 \text{ to } J$$

where j is the type of health care chosen; S is a vector of individual child characteristics; M is a vector of household characteristics; A is the value of household assets; E is a vector of community health characteristics; B_j is the user fee for health care choice j; w is the wage rate and T_j is the time incurred to obtain health care from choice j. The variable υ captures individual child and household unobservables and it includes elements such as innate healthiness of the child and household-level heterogeneity in health technology and preferences.[34]

The error term is assumed to have a Gumbel distribution, leading to the multinomial logit specification.

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[34] These unobservables are dealt with ultimately by employing robust standard errors which are corrected for repeated observations on individual mother-child pairs in the empirical work. Panel data methods are not used to address unobservables for two reasons: first, many of the variables of interest for this study, particularly certain health facility quality information, are observed only once in this survey; second, panel data methods for unordered polytomous limited dependent variables, such as the facility choice model in this study, are not well developed.

(13) $P_j = \exp(V_j)/\sum [\exp(V_k)]$ for k = 1 to J

For our model this would amount to estimating

(13') $$P_j = \frac{\exp(\beta_{0j} + \beta_{1j} S + \beta_{2j} M + \beta_{3j} A + \beta_{4j} E + \beta_{5j} B_j + \beta_{6j} wT_j + \beta_{7j} Q_j + \beta_{8j} P_F + \beta_{9j} \upsilon + \epsilon_j)}{\sum^{J}_{k=1} \exp(\beta_{0j} + \beta_{1j} S + \beta_{2j} M + \beta_{3j} A + \beta_{4j} E + \beta_{5j} B_j + \beta_{6j} wT_j + \beta_{7j} Q_j + \beta_{8j} P_F + \beta_{9j} \upsilon + \epsilon_j)}$$

for each of the four health care choices. If we simplify the notation and refer to the estimated set of coefficients from choice j as $\beta^{(j)}$ and the set of regressors as X, then we can write (13') as

(13") $P_j = \exp(X\beta^{(j)})/\sum [\exp(X\beta^{(k)})]$ for k = 1 to J

One feature of the multinomial logit (MNL) model is that it is unidentified in the sense that there is more than one solution to $\beta^{(1)}$, $\beta^{(2)}$, $\beta^{(3)}$, and $\beta^{(4)}$ that leads to the same probabilities for j=1, j=2, j=3, and j=4. To identify the model, one of the $\beta^{(j)}$s is arbitrarily set to zero; it does not matter which one. For instance, if we arbitrarily set the self-care alternative $\beta^{(4)}$ to zero, the remaining coefficients, $\beta^{(1)}$, $\beta^{(2)}$, and $\beta^{(3)}$ would measure the change relative to the self-care option. In the modeling, this is the category we set to zero for ease of interpretation of the coefficients. This yields the following probabilities

$P(1) = \exp(\beta^{(1)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) + 1$

$P(2) = \exp(\beta^{(2)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) + 1$

$P(3) = \exp(\beta^{(3)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) + 1$

$P(4) = 1 / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) + 1$

and the following relative probabilities

$P(1)/P(4) = \exp(\beta^{(1)} X)$

$P(2)/P(4) = \exp(\beta^{(2)} X)$

$P(3)/P(4) = \exp(\beta^{(3)} X)$

SPECIFICATION ISSUES

ALTERNATIVE-SPECIFIC INCOME COEFFICIENTS

Note the alternative-specific subscript on income in our baseline specification in (12). Gertler and van der Gaag (1990) argue that allowing separate, alternative-specific income coefficients in a discrete demand model of health care choice would violate rational choice axioms. The reasoning is that if two health care alternatives are available for same price *and* each gives the same improvement in health, then the income remaining after paying for health care is the same in either case. Therefore, if utility is affected only by health and consumption opportunities, individuals should be indifferent between the choices. One rationale for not constraining income effects to equality across health care types, argued by McFadden (1981), is that tastes for each alternative may depend on individual characteristics that are correlates of income, such as assets, and historical wages rates and income levels, and because income is typically measured *only by its correlates*, different income coefficients are justified.

FLEXIBLE HEALTH CARE PARAMETERS

Another unique feature our baseline model shown in (12) is that parameters on each of the facility attributes is allowed to vary by type of care. This approach is more flexible than that used by most other health care demand studies. Given the wide variation in the nature of the service types, e.g., personnel levels and training, drug availability, and inevitably other unmeasured aspects of service, one can make a strong argument that care from the different segments of the health care market can reasonably be considered to be different goods. In a recent paper which compares various assumptions underlying previous discrete choice models of health care demand, Dow (1995b) concludes that constraining price and quality coefficients to be equal across health care alternatives is the most strongly rejected of all. He also shows that imposing this assumption can have large effects on elasticities, which is important given the policy focus of responses to user fees. Another weakness of the constrained approach is it does not allow different *sets of health care characteristics* to impact the probability of visiting different types of providers. Forcing divergent flavors of health care to be influenced by the same set of attributes, and imposing the restriction that each of these attributes has the same effect on every kind of service, is unrealistic at best and could be highly misleading. It puts unnecessary limits on the insights which can be drawn concerning how prices and quality affect demand for care from different segments of the health care market.

In the empirical work we explore how imposing this constraint affects our results. Equation (14) gives a "constrained" version of the conditional indirect utility function, where all health care choices are forced to have the same set of attributes and the coefficients on these variables are forced to be equal across facility types. Note that the estimated coefficients for the health facility attributes, B_j, T_j, and Q_j, no longer carry the subscript j.

$$(14) \quad V_j = \beta_{0j} + \beta_{1j} S + \beta_{2j} M + \beta_{3j} A + \beta_{4j} E + \beta_5 B_j + \beta_6 wT_j + \beta_7 Q_j + \beta_8 P_F + \beta_{9j} \upsilon + \epsilon_j$$

This model is expected to yield very different results from the baseline flexible specification.

COMPLETE CROSS-EFFECTS VERSION

In both empirical specifications discussed above, the only provider attributes that enter each indirect utility function are own-characteristics. Those of the other alternatives enter the model when the decision-maker compares expected utility from each respective provider and chooses the one yielding the highest V_j. Another approach, shown in (15), is to allow characteristics of substitute providers to enter directly into each V_j. Allowing attributes of all health care choices to enter the utility of each choice j could be considered more analogous to a typical demand function.[35] An alternative interpretation is that agents employ forward-looking behavior (Dow, 1995b); for example, a person may choose to visit a public facility today depending on the price of a private (or traditional) visit tomorrow.[36] Note that the facility coefficients in this "full-effect" model now have "jk" subscripts:

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[35] See for example the discussion by Dor and van der Gaag (1987).

[36] This assumes that prices tomorrow will be the same as prices today. Note that dynamic objective and budget constraints are not explicitly dealt with here.

(15) $V_j = \beta_{0j} + \beta_{1j} S + \beta_{2j} M + \beta_{3j} A + \beta_{4j} E + \sum \beta_{5jk} B_j + \sum \beta_{6jk} wT_j + \sum \beta_{7jk} Q_j + \beta_{8j} P_F + \beta_{9j} \upsilon + \epsilon_j$

This model allows the exploration of cross-price and cross-quality effects which are not allowed in the baseline flexible model. One possible issue that may arise with this specification is that certain facility attributes, such as time prices for care, could be highly correlated across facility types, especially public and private modern care.

ECONOMETRIC METHODS

As discussed above, the model is estimated using multinomial logit; the choice probabilities are laid out in equations (13) and (13'). The marginal effects for the model are

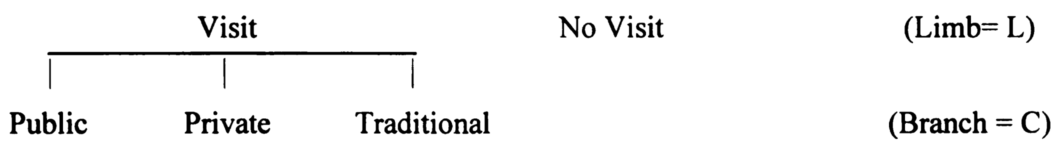
(16) $\partial P_j / \partial x_{ji} = b_{ji} P_j (1-P_j)$ (own)

$\partial P_j / \partial x_{ki} = b_{ki} P_j P_k$ (cross)

An important property of the multinomial logit model is the independence of irrelevant alternatives (IIA), which states that the odds of facility type i being chosen over facility type k is independent of the availability of alternatives other than i and k. This implies that an additional alternative could be added to the model without changing the odds ratios of the original alternatives. It should be noted, however, that if any of the alternatives are similar, this may be an unreasonable restriction to place on household behavior. The model produces equal cross-substitution between any pair of alternatives in the presence or absence of other alternatives because the error terms across alternatives are assumed to have zero correlation.[37]

A more general discrete choice model which is able to accommodate different structures of error term correlation is the nested multinomial logit model (McFadden, 1981). The NMNL allows for correlation across subgroups of alternatives and, therefore, nonconstant cross-price elasticities; it allows grouping of alternatives which are closer substitutes so that cross-price elasticities are more elastic within groups than across groups (Gertler and van der Gaag, 1990).

With this approach alternatives are partitioned into groups that are similar to one another. One possibility for our four health care choices would be to combine the market health alternatives into one group, with the reasoning that they are more similar to one another than each is to the self-care option. If we consider these to be different "levels" of a choice tree, the choice to visit a facility or not is in one level, and what type of facility to choose is in another:



Another more disaggregated version of the decision tree would be to group the modern public and private provider types together on the grounds that they differ from traditional practitioners.

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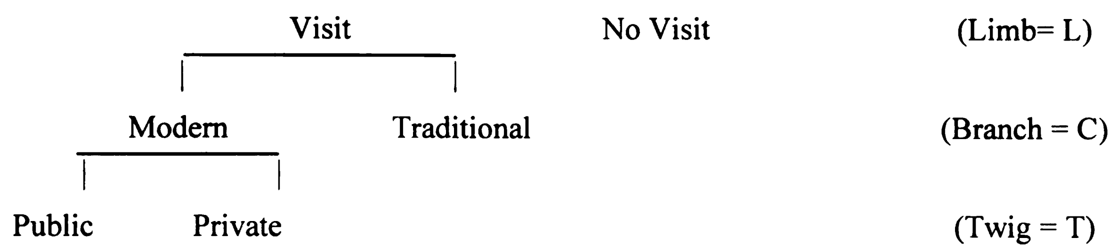
[37] In version of the model where cross-effects are introduced the Independence of Irrelevant Alternatives (IIA) assumption is relaxed.



Still other possibilities exist, such as separating hospital- from clinic-level care within each type of modern alternative. As explained in the data description, however, there were only a very small number of hospital visitors in this sample (four percent of the observations), so this was not a feasible method of dividing modern visit types for this study. The two decision trees above are the ones experimented with in the empirical work.

For the two-level model, the probability of choosing any particular facility type can be expressed as the product of a conditional probability and a marginal probability:[38]

(15) $P_{c|\ell} = \exp(V_c)/\sum[\exp(V_n)]$ (Condit'l)

for n=1 to C facility type branches within the visit limb ℓ

and $P_\ell = P_{(visit,\ no\ visit)} = \exp(V_\ell + \tau_i I_i) / \sum [\exp(V_m + \tau_m I_m)]$ (Marginal)

for m=1 to L limbs, where $I = \log[\sum \exp(V_n)]$

and $P_{c\ell} = P_{c|\ell} * P_\ell$ (Product)

where P_c is the probability of each of the C conditional choices, i.e., the probability of choosing each of the market health care alternatives c within the "visit" limb ℓ. P_ℓ is the probability of choosing each limb ℓ, i.e., the probabilities of choosing a visit and no visit.

[38] See Appendix B for the derivations of (15)-(17).

The variable I is the logarithm of the denominator of the conditional choice within limb ℓ. This what is known as the "inclusive value" for the branches c in limb ℓ. The parameter, τ, of the inclusive value provides a basis for identifying the behavioral relationship between choice at each level of the tree. If the estimated parameter, τ, is equal to one, the two levels can be collapsed to one level. For this model, it would imply that the two-level NMNL model would collapse to the single-level multinomial logit structure.

In estimating the two-level tree, we allow the health care characteristics to enter only in the facility-choice decision, while the individual, household, and non-facility community variables enter both decision levels, implying that they influence both whether a visit occurs, and conditional on a visit, the type of facility chosen. Allowing the demographic and community variables to enter more than one level of the decision tree is an unusual innovation to the NMNL model. Most models allow any particular regressor to enter in only one level, which may not always reflect the decision-making process well.

The unconditional marginal effects for the facility variables were derived analytically for this specialized NMNL specification (see Appendix B) and are defined as:

(16) $$\partial P_c / \partial x_{ci} = b_{ci} \; P_{c|\ell} \, P_\ell \, [(1- P_{c|\ell}) + (1-P_\ell)\, \tau \, P_{c|\ell}] \qquad \text{(own)}$$

$$\partial P_n / \partial x_{ci} = b_{ci} \; P_{c|\ell} \, P_\ell \; P_{n|\ell} \; [\tau(1-P_\ell) -1)] \qquad \text{(cross)}$$

Unconditional marginal effects for individual, household, and non-facility community variables in this specialized NMNL model were also derived analytically and are given by:

$$(17) \quad \partial P_c / \partial x_i = P_{c|\ell} P_\ell [b_{ci}(1- P_{c|\ell}) + (\alpha_\ell + \tau P_{c|\ell} b_{ci})(1-P_\ell)]$$

The nested logit model can be estimated sequentially or simultaneously using maximum likelihood methods. For sequential estimation, the conditional facility choice is estimated as a MNL model, then the inclusive value is calculated for the conditional choice set and included as an regressor in the marginal choice of whether to have a market care visit or not, which in this case is estimated as a logit model. The parameters estimates for the facility characteristics are efficient for the subset of the health care users since these variables appear only in the facility-choice level of the tree. Those which also appear in the market vs self-care level, i.e., all the non-health facility variables, are consistent but not fully efficient due to the use of "estimates" in obtaining the inclusive value parameter (Amemiya, 1978). Since this estimate is used in accepting or rejecting the nesting structure, obtaining an efficient estimate is important. McFadden (1981) provides a correction procedure to adjust the standard errors of parameters in the marginal choice model; it is extremely complicated, however, even for a two-level model (Hensher, 1986).

An alternative route is to estimate the model simultaneously by maximum likelihood methods and obtain fully efficient estimates of the parameters. This is the preferred approach; in practice, however, obtaining FIML estimates for this model proved difficult for two related reasons. First, the model contains a large number of non-health facility explanatory variables whose effects vary by health care alternative. When estimating a FIML nested logit model, any variable that does not vary by alternative must be interacted with a choice-specific constant, otherwise it drops out of the estimation. This increases the number of parameters for this set of regressors from S to S*(J-1); in this model it means the number of non-health facility parameters was essentially tripled from 62 to 186. Second is that estimated parameters on the health facility variables are not constrained to equality. This is one of the primary features of the model, and means that instead of C of these we have approximately C*(J-1), increasing the model's size even more.

The method ultimately employed was to estimate the model sequentially and use the bootstrap sampling method to correct the standard errors for the fact that the inclusive vales are estimated.[39] This amounts to estimating the full decision tree many times over, with N observations being drawn each time with replacement from the N observations. In this random drawing, some of the original observations will appear once, some more than once, and some not at all. At each pass (called a replication), the estimator is applied to the data and the resulting parameter estimates are saved as a data set. Using the collection of the parameter sets resulting from these replications, one can calculate the standard deviation of each statistic, which is an estimate of its standard error (StataCorp, 1997).[40]

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[39] Bootstrap methods are detailed in Efron (1982) and Efron and Tibshirani (1986).

[40] Although the average of the bootstrapped statistic is used in the calculation of the standard deviation, it is not used as the estimated value of the statistic itself; the point estimate is the original observed statistic computed using the original N observations (StataCorp, 1997).

For this particular study, we have repeated observations on mother-child pairs. Referring to each of these pairs as a cluster, this intra-cluster correlation will result in artificially low standard errors if the repeated sampling is not taken into account when calculating the standard errors. We therefore identify these as clusters for resampling so that the sample drawn during each replication is a bootstrap sample of clusters.

A potential weakness of the sequential approach is that the lower levels of the model are estimated using observations only on those individuals who (1) had those particular alternatives in their feasible choice set, and (2) actually chose one these options. The first item is not problematic in this study because all persons had each of the alternatives available to them. The second issue is a concern, however, because persons choosing market health care at any point in time may be a select group and different in both observable and unobservable ways from those who do not; using only the subsample of individuals who chose to use market care in any particular period may result in biased parameter estimates (Hensher, 1986). For our study, only half of the sample observations had a health care visit; therefore, with the sequential NMNL approach only half the observations can be used to estimate the determinants of facility choice conditional on there being a health care visit.

Section 6

RESULTS FOR THE BASELINE POOLED MODEL

ANY VISIT

Results for the binary outcome of demand for any type of health care visit are presented in Table 6.1; these are logit estimates with standard errors corrected for the intra-individual correlation in the data which arises from the presence of repeated observations on the same mother-child pairs over the twelve rounds of the survey.

The health care variables, whose effects are allowed to vary by type of health facility they describe, were entered in successive steps in the regressions for the purpose of investigating how the impacts of health care attributes on demand change when moving from the commonly specified distance-only model to one that also includes user fees, and then to one that includes distance, user fees, and health care quality.

INDIVIDUAL AND HOUSEHOLD INFLUENCES

Across each specification, the influences of individual and household characteristics are virtually identical and will therefore be discussed first. The results, presented in Table 6.1,[41] reveal that all else being equal, male children are more likely to be taken for a curative care visit. Demand rises with child age up to six months and

[41] The results for the health care attributes from this same regression are presented in the first column of Table 6.2. The results for the non-health care community effects from this regression are presented in Table C1 of Appendix C.

declines thereafter, as was seen in the bivariate graphs.[42] These findings highlight the unconditional nature of the estimates. Boys are more likely to be taken for a health care visit despite the fact that boys' illness rates do not differ statistically from girls' over the entire age range of the data (2 to 24 months).[43] By child age, demand for health care and reported illness levels (using 24-hour recalls of detailed symptoms) increase up to the child's sixth month; however, demand falls after the child's sixth month, while reported morbidity remains relatively constant instead of declining.[44]

Maternal education and height increase the unconditional demand for services. Recall that the unconditional estimates are interpreted as the sum of the short-run elasticity of curative care, plus the elasticity of morbidity with respect to the covariate of interest. We expect maternal education to increase the former and reduce the latter

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[42] As explained in the data discussion of Section 4, the spline variables are constructed so that when, used in estimation, the coefficients represent *the slope* for that interval; i.e., the variable is divided into two piecewise linear segments. For example, the coefficient on the first segment of the child age variable gives the effect of an additional month of age up to the sixth; the second segment gives the effect of an additional month of age after the sixth.

An alternative method of estimation using spline variables is to have the second segment measure *the change* in the slope from the preceding interval. That IS NOT the method used here.

[43] See footnote 6 in Section 1 for a description of illnesses levels by child age and sex.

[44] Alderman and Gertler (1997) find in rural Pakistan, however, that conditional on an illness being reported, the probability that no health care is used (i.e., only self-care is chosen) for a daughter is only 0.015 percent higher than for a son.
An important issue, though, related to the conditional nature of their sample--only children who are reported to have been ill are included. If there promale bias for investing in child health, this could lead to under reporting of girls' illnesses, so that only girls who are very sick will appear in the sample. If this holds, it is possible that the pro-male bias could appear in an *unconditional* version of their model.

effect;[45] therefore, the net positive effect of education implies that its influence on curative demand is strong enough to outweigh its morbidity reduction effect. Maternal age reduces the probability of a health care visit; perhaps controlling for education, older mothers have more experience in rearing children and are better at producing healthier kids who in turn need less care; on the other hand, older mothers may have preferences for not using formal health care, possibly because they are less familiar with the service.

Household asset values up to the first tercile significantly raise the chances of a visit; assets beyond the first tercile do not have significant effects.[46] It is conceivable that after the first tercile value, most households can afford at least some type of health care and beyond this level, additional household resources probably influence more the type of care chosen; additional household resources could also reduce demand for curative care if higher resources contribute to better health status.

The presence of additional children, particularly males, in the household who are younger than the index child reduces the probability of a curative visit for the index child. This result could arise for a variety of reasons. Additional children could tighten household income constraints, thus reducing number of visits for all children. However, because the effect is greater for additional male than female infants, this is probably not just a simple resources crowding story, but may indicate a preference for newborn males.

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[45] Bivariate graphs reveal that the use of curative care increases at a relatively constant rate with maternal education; *reported* morbidity levels, on the other hand, remain constant up until the third education (around 9.5 years of education), when they fall. We expect actual morbidity levels, however, to decrease more or less monotonically with maternal education.

[46] Bivariate relationships reveal that visits increase with log asset values up to the first tercile and then level off; illness rates are relatively constant with log asset values in the first two terciles, and then decline with the third tercile of log asset value.

Furthermore, given that reported illness levels increase sharply during the first few months of life and boys' rates rise slightly faster than girls' during this period, parents may therefore be acting in a manner they see as rational by investing first in the health care of the youngest children, especially those who are male, because they may be (or at least perceived to be) the most vulnerable to illness.

Elderly men in the household also have a significant negative effect on the chances of a health care visit for the index child. Although it is possible that the presence of these men could reduce demand by lowering child illness, it is probably more likely that they impose additional time burdens on those who provide care to the very old and young in the household; they probably also compete for resources, reducing the amount remaining for child health investments.

In sum then, health care visits for index children are increased by their being male and younger than six months of age, and by maternal human capital and household resource levels. Maternal age as well as the presence of other very young children and very old men in the household reduce the demand for child curative care.

HEALTH FACILITY INFLUENCES

Turning to the influences of health care attributes, displayed in Table 6.2, in the initial model where distances to the nearest facility of each type are the sole health care attributes in the model, remoteness strongly reduces the chances of a visit: kilometers to the closest of each of the three provider types have negative and significant impacts on the demand for care.

With the inclusion of user fees, the only noticeable distance effect remaining is that to the nearest private facility, and its influence is strengthened both in magnitude and significance.[47] Among the user fees, public price appears to significantly increase the demand for care; traditional prices have smaller, but still positive and significant effects on demand. We would not expect these types of results unless the services of higher priced facilities are in greater demand because better services are offered.

When the quality data is added to the model[48], none of the distance results change from the distance-user fee version. Public price becomes virtually insignificant and its coefficient is reduced slightly, although it remains positive; we surmise that this remaining positive impact stems from still omitted service attributes. The private and traditional price effects lose any significance they had before quality was controlled for.

For provider quality, each attribute that was statistically significant had a *positive* effect on utilization. The number of personnel, range of vaccines offered, and availability of ORT stocks at public clinics have strong positive influences on demand for care. Private staff levels and doctor and nurse ratios increase demand for services. None of the traditional practitioner results were powerful predictors of a health care visit.

EFFECTS OF EXCLUDING NON-FACILITY COMMUNITY CONTROLS

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[47] Given signs of user fee variables, we would have expected the distance effects to have gone in the opposite direction. It is possible that correlations between distance and user fee within each facility type be affecting this. Distance-fee correlations: public: .0068; private: -.2488; traditional: .1470.

[48] This is the regression for which individual and household effects are presented in Table 6.1, and community effects are presented in Table C1 of Appendix C.

An important issue in measuring how provider attributes affect demand is the existence of many potential community influences, the difficulty of measuring them all, and the fact that many are likely to be highly correlated, both temporally and spatially. The Cebu data provide an unusually rich amount of information regarding a wide range of community characteristics, in addition to the facility data, to control for these influences. These variables were described earlier in the data section and were included in the specifications presented in Tables 6.1 and 6.2[49]; results of these effects are presented in Table C1 of Appendix C.

Unconditional demand for curative health care is reduced by the community being high in elevation (these are poor), greater barriers to water access, and high present and lagged infant formula prices. These factors probably operate primarily through negative short-term demand elasticities. Unconditional demand is also reduced by factors which relate positively to income and better health environments and are likely to have negative illness elasticities: the community having paved or concrete roads and a greater proportion of households with sanitary garbage disposal methods and modern toilet facilities.

The experiment of removing the community variables was performed to explore what impact this would have, if any, on the health facility results. If their exclusion changes the estimated impact of health care characteristics on utilization, this is an indication that detailed community effects should be accounted for when estimating

[49] The results from Table 6.1, the first column of Table 6.2, and Table C1 of Appendix C are from the same regression.

determinants of demand for health care services; otherwise, estimates of price and quality influences could be biased in unpredictable directions.

The results of this exercise are displayed in Table 6.3. The first column of this table is a similar to the regression in the first column of Table 6.2, only the non-health care community variables have been removed, and so on the the second and third columns. It is observed that in the distance-only and distance-fee versions, signs and significance of these parameters do not change. Results in the version with quality, however, are affected in important ways. Most notably, each of the three price effects is now significant, with public and traditional remaining positive and private changing to negative. The public price parameter increases only slightly, but its z-statistic rises from 1.85 to 3.06.[50] The traditional price effect goes from essentially zero to being slightly positive and significant.[51] The change in the private price parameter is not large in magnitude, but the sign switches from just greater to just less than zero and is now of consequence statistically.[52]

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[50] Correlation matrices reveal that higher public prices are associated with higher food prices and poorer community infrastructure, such as frequent water shortages, greater distance to water sources, a lower proportion of households in the community with running water, sanitary garbage disposal, refrigerators, and improved toilet facilities. Poorer infrastructure could increase demand for services through higher illness levels due to worse sanitation conditions.

[51] Traditional fees, unlike public fees, are correlated with better community sanitation and infrastructure. Perhaps these community influences increase the likelihood of a traditional visit through their income effects, as opposed to illness reducing effects.

[52] Private facility fees are associated with better community sanitation and infrastructure. It is possible these community aspects may reduce demand by lowering morbidity.

These changes indicate that non-facility community characteristics have important influences on other determinants of demand, and when omitted, lead to biased results. While the direction of the biases could not have been determined a priori, in this example, exclusion of non-facility community controls results in an upward bias in the public and traditional fee coefficients, and a downward bias in the effects of private fees.

For the health care quality effects, ORT supplies is the only public feature which remains important after removing the community controls, and its effect is virtually unchanged. Public personnel levels and vaccine availability lose their positive effects. This downward bias could signal that without non-facility community controls, these quality measures may capture community influences which decrease the likelihood of a visit. These two facility aspects are associated with better infrastructure, which could decrease demand by improving the disease environment in the community.[53]

The private characteristics which remain influential are the positive effects of personnel level and nurse ratio.[54] Private doctor ratio loses its significant positive effect, again, indicating that without the community controls, the parameter be biased toward zero because it captures omitted negative influences on demand.[55] The provision of family planning and postnatal services in private facilities now have important negative impacts on demand for child curative services; the change in these coefficients may also

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[53] Public ORT supplies are correlated with poor sanitation.

[54] Both are correlated with better community sanitation and infrastructure.

[55] Private doctor ratio is associated with worse community sanitation which could raise illness levels.

signal that they now capture the effect of omitted community influences which reduce the probability of a visit.[56]

Neither of the traditional quality variables becomes significant when non-facility community effects are removed.

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[56] These two facility variables are associated with better sanitation and infrastructure which may reduce demand by lowering morbidity.

HEALTH FACILITY CHOICE

The provider choice model was estimated using the several different specifications, which were described in the empirical modeling section. Discussed first is the baseline specification: the multinomial logit model of the choice of public care, private care, traditional care, or no visit. The model has the attractive feature that it allows facility effects to vary by alternative. We also include a very comprehensive set of non-facility community variables to control for influences whose exclusion could bias the facility results. Alternative specifications are then presented and discussed.

For most of the following specifications of the facility choice model, the omitted category for comparison is "no health care visit"; this implies that the coefficients for each alternative give the effect of that variable on the chances of visiting a facility of this type versus not having a health care visit. Similar to the logit results for the "any visit" model, standard errors are corrected for the intra-cluster correlation which arises from repeated observations on the mother-child pairs over the twelve survey rounds. This itself is an unusual extension to the multinomial logit model with panel data; not adjusting for intra-individual correlation produces incorrect and misleadingly low standard errors.

INDIVIDUAL AND HOUSEHOLD INFLUENCES

MAIN RESULTS

Across each of the specifications, the impacts of individual and household characteristics are very stable and will therefore be discussed first. Table 6.4 shows a large number of important individual- and household-level influences on the choice of care. Starting with individual child-level variables, male children have a higher likelihood of being taken for a private provider visit. Private is the most expensive and highest quality type of care. Given that overall reported illness based 24-hour recall of symptoms does not vary by child sex for the sample as a whole,[57] this result may imply that male children are treated preferentially for health care investments. This could arise for several reasons: parents may have the perception that boys are more vulnerable to illness since their *reported* morbidity levels are slightly greater in the months immediately after birth; alternatively, if boys are more likely than girls to contribute to parent security in old age, perhaps their health needs are attended to first.[58]

Male children are also more likely than girls to have a traditional health care visit. Traditional services are also relatively high-priced compared to public care and may offer certain special types of treatments not available in modern centers. Similar explanations of preference for males or the perception of male child vulnerability to illness could hold here is with private visits.[59]

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[57] See Footnote 6 in Section 1 for a description of the differences in reported morbidity levels for boys and girls by age and by type of symptom.

[58] Alderman and Gertler (1997) also find in rural Pakistan that conditional on an illness being reported, there is a tendency to use high-quality providers more often for males than females. Given that theirs is an unconditional model, if it holds that bias exists against reporting girls' illnesses, then only the very sickest girls will appear in their sample. If this were the case, it is possible that the high-quality pro-male bias could be even stronger in an unconditional version of their model.

[59] In the conditional model of Alderman and Gertler (1997), boys' demand for traditional services is no greater than girls'. However, in their area study area, traditional practitioners have the lowest prices among all the health care alternatives, which is not true in Cebu.

Chances of a visit to each kind of care increase significantly with child age up through the sixth month after birth.[60] The strongest effect of this first linear segment of the child age variable is for traditional visits, followed by private, then public.

For children older than six months, age does not affect demand for traditional care, but it reduces demand for public and private care drastically. This is despite the fact that illness levels stabilize, but do not decline after six months of age. The nature of child morbidity does change, however, with age: "other" illnesses become more prevalent and diarrhea and FRI rates level off after the child's first six months. It is possible that traditional services are deemed more efficacious or appropriate for these "other" types of illness. Regarding modern treatments, perhaps parents become more accustomed to their child having diarrhea or FRI and may not be as likely to take them for a modern health care visit relative to when the child was a newborn; it is possible that the child may be viewed as being more able to withstand the experience of an illness episode after this perinatal period. Alternatively, parents may have learned to cope with these child illnesses by treating them at home.

Maternal education has strong positive effects on the probability of a private visit; the impact of additional years of schooling up to the fifth are particularly large. The first linear piecewise segment of the maternal height variable (up to 150 cm) also has a noticeable positive influence on modern private and public visits, indicating that this variable is probably capturing accumulated human capital and family background characteristics of the mother not picked by education. Maternal height over 150 cm

[60] This is the period when reported child illness levels accelerate most rapidly.

lowers the probability of a public visit, possibly through an income or illness reducing influence of this human capital/family background factor. Years of paternal education beyond the fifth, (i.e., the second linear piecewise segment of the variable) have negative impacts on the chances of a public or traditional, but not a private, visit. This may reflect paternal preference for fewer health care visits to lower quality facilities.

Insurance coverage and household assets up through the first tercile value greatly enhance the probability of a private visit. Assets reflect higher household income and perhaps preference for higher quality care. Insurance coverage probably also reflects greater income and preference for quality and may reduce the high price of private care.

Additional infants, particularly males, in the household younger than the index child decrease the chance of an index child's visit to the two more expensive providers, private and traditional. This result could arise for a variety of reasons. Additional children could tighten household income constraints, thus reducing number of visits to more expensive providers for all children. However, because the effect is greater for additional male than for female infants, this is probably not just a simple resource crowding story, but may reflect a preference for newborn males. Alternatively, reported illness levels increase sharply during the first few months of life for all infants, and boys' reported rates rise slightly faster than girls' during this period. Parents may therefore be acting rationally by investing first in the health care of the youngest male children because they may be (or at least may be perceived to be) the most vulnerable to illness.

Demand for private services increases with additional adult females in residence; this may reflect a preference on the part of adult females for higher-quality child health care services.

Additional elderly males in the household reduce child visits to the two more expensive types of care, private and traditional. Their presence may impose time and economic burdens on the household and therefore reducing allocations to child health investments.

ROBUSTNESS CHECKS ON HUMAN CAPITAL AND ASSET RESULTS

Robustness checks were performed on the individual and household effects. This was accomplished by estimating the facility choice model with community-time interaction dummies used in place of the facility and community variables to capture all community- and time-varying influences on demand. We first included all individual and household level variables. We then dropped the health insurance coverage dummy to see whether this would alter the asset and human capital results. Then the household composition effects were removed to examine whether this would change the influences of human capital, assets, or insurance. Finally, both insurance and household composition were dropped to examine the robustness of the impacts of human capital and assets.

The results, presented in Table 6.5, reveal that the exclusion of health insurance coverage results in no changes in individual and household impacts on the demand for public care; for private services, the positive effect of additional paternal education over five years becomes significant at the 10 percent level, although the magnitude of the effect is still not large. No changes are observed in the determinants of demand for traditional visits.

With household composition dropped, human capital, asset, and insurance results for public care are not altered. The positive influence of the second asset spline (values above the first asset tercile) on the probability of using the two more costly types care, private and traditional, is strengthened.

When both insurance and household composition are dropped, the negative impact of the second paternal education spline on a public demand is strengthened slightly, as is its positive impact on the probability of a private visit. The positive effect of the second asset spline on private and traditional care becomes slightly more statistically significant.

These results indicate that the health insurance and household composition coefficients reflect to some degree the impacts of human capital and household assets, but including them does not greatly alter the influences of these household human and economic resources.

HEALTH FACILITY INFLUENCES

BASELINE MODEL

We did the same experiment of including the facility attributes in successive steps here as we did in the binary logit "any visit" model. Results for the distance-only model, presented in Table 6.6, indicate very strong negative own-effects. Each of the facility z-statistics is greater than 4.2; the magnitude of the effect is largest for traditional visits, followed by public, and then private.[61]

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[61] Alderman and Gertler (1997) also find that health care providers which are considered inferior sources of care have the highest price elasticities.

With user fees added to the equation, distance does not lose any influence. All user fees are near zero and insignificant; the public user fee coefficient, although not significant, is positive and slightly larger in magnitude than the other two fee effects.

When facility quality variables are added, all the distance results remain negative and very significant. The public user fee effect is still insignificant and its coefficient moves closer to zero, possible indicating that some of its previous positive influence may have been capturing facility quality influences. It may continue to have a positive sign because of service aspects not included in the analysis, such as those relating to the process of delivering care: factors such as facility cleanliness, staff motivation and attitudes, etc.

The price effect for traditional care becomes positive and significant when provider attributes are included; this result was unexpected. Very little information pertaining to the quality of traditional services was collected, so the positive effect may arise from traditional provider attributes which are still omitted from the model, or from correlation between traditional quality and other regressors.

Among the quality influences, higher numbers of personnel and ratio of doctors in public facilities raise demand for public services. Private personnel do not influence demand at private establishments. The personnel measures relevant to traditional practitioners, the education level and the formal training indicator, have positive effects, particularly that of training.

Drug supplies show strong influences on public, and to a lesser extent, private demand. Currently available ORT treatments and vaccines at public facilities raise demand for public care, while public availability of intravenous diarrhea treatments reduces it. The first two effects are what we might expect; however, the latter result is not. The fact, however, that the drug variables are defined as those currently in stock could be driving this result. The availability of a drug at any particular time reflects the interaction of both supply and demand factors; if a certain drug is out of supply it may be due to excess demand for it. For instance, if public clinics with intravenous drugs are in areas with high demand--poorer areas with high diarrhea levels--their stock may be diminished quickly; this would produce a negative correlation between demand for services and availability of drugs (Mwabu, et al., 1993). The significant negative effect of intravenous diarrhea treatments may, therefore, indicate that they are high demand at public health facilities in high-diarrhea areas.

The supply of intravenous diarrhea treatments at private facilities increases the chances of a private visit. For the other four indices representing current availability of expendable supplies at private centers, each had important negative effects on demand; these were availability of simple ORT treatments, child vaccines, and family planning methods. It is possible that these items are in high demand in private clinics; the depletion of such supplies could be due to high rates of utilization of these services at such facilities.

The full set of results for the baseline flexible facility choice model, including parameters for all the community infrastructure and sanitation variables are presented in Table C2 of Appendix C. The table reveals that unconditional demand for public care is greater in communities which are islands, which have more frequent water shortages; it is dampened by high elevation status, the presence of improved roads, a bank, longer time to the nearest water source, higher lagged infant formula prices, and a higher proportion of households with sanitary garbage disposal.

Demand for private care is increased by lagged community vegetable oil price; it is reduced by greater distance to nearest water source, the prevalence of modern toilets, and by lagged rainfall levels.

The likelihood of a traditional visit is increased by community island status, the presence of a bank, a higher proportion of refrigerator owners, and higher lagged corn prices. Traditional demand is decreased, on the other hand, by more frequent water community shortages, greater time to closest water source, and higher current cooking oil prices, and a higher average number of households with sanitary garbage disposal methods and modern toilets.

EFFECTS OF REMOVING NON-FACILITY COMMUNITY CONTROLS

As in the "any visit" model above, we applied the experiment of removing non-facility community influences to investigate what effects, if any, this would have on the health care quality findings.[62] Table 6.7.1 presents the set of regressions where provider characteristics are included in successive steps, with the community controls excluded each time.

In the distance-only regression, the distance effects become more negative and significant for public and private visits relative to when non-facility community influences are controlled for; the downward biases in these effects imply that the modern

[62] Results on individual and household impacts are virtually unchanged, so they are not discussed.

distance results may now capture omitted non-health-facility characteristics of the community which have important negative impacts on the probability of a modern visit.

The impact of distance on traditional visits, however, is biased in a positive direction: its former negative parameter is reduced both in magnitude and significance to virtually zero. Traditional distance could now be capturing omitted community influences which as a group have a positive impact on demand for traditional services.[63]

In the distance-user fee version, distance has similar results to those we observed with the community controls included. Private and traditional user fees are also very close to what they were with the controls. The *public user fee result, however, changes dramatically*: its parameter is now negative, large in magnitude, and significant at the 10% level.

This finding of a large downward bias in the public user fee effect when other community influences are dropped from the analysis has important implications for how public price effects from these types of studies are interpreted. Without the community controls, we would conclude that raising public fees would have a very large negative impact on demand for public health care services. However, when infrastructure and other characteristics of the community, which may capture income levels and aspects

[63] Distance to the nearest of each facility type is associated negatively with community infrastructure and sanitation. Poorer infrastructure is likely to be related to low incomes which would have the effect of reducing demand for services; on the other hand, lack of infrastructure is likely to be related to poorer hygienic conditions which could increase demand for health care by raising morbidity.

related to the disease environment, are taken into account, we see that raising fees on the margin is not likely to influence *overall* utilization[64] of public services.[65]

In the model with health care quality included, distance is still a major inhibitor of public and private visits, as in the baseline model. Similar to the baseline results, private fees are close to zero. Now, instead of being positive and significant as in the baseline model, traditional fees here are close to zero in magnitude and significance.

Similar to the previously described distance-fee specification, the public user fee result is sizeable, negative and significant at the 10% level, unlike the findings from the baseline model where its magnitude was small and positive and its impact not statistically significant.[66]

As discussed above, this non-robust price effect could have important implications for the interpretation of results from other health care demand studies. Very few analyses of this kind have the detailed controls for non-facility community influences that we do here. At best, district- or region-level dummies are employed to account for any effects

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[64] The effects on utilization among different income and demographic groups is analyzed in a later section.

[65] As presented in Table 6.7.2, even when detailed community characteristics are replaced by dummies for the eight municipalities (the administrative unit just higher than the community level) which comprise the study area, the public user fee effect is negative, large in magnitude, and is statistically significant at the zero percent level.

[66] For this version of the model, replacing the community characteristics with the eight municipality dummies, results in a public user fee effect which is negative, large in magnitude, and is statistically significant at the fifteen percent level.

beyond the individual or household level. Therefore price responses from other health care demand studies could also potentially be affected by this issue.[67]

None of the quality results changed sign, although a few changed in magnitude and significance. Vaccine availability at public clinics loses importance, while public family planning now appears to significantly increase demand. For private visits, all the drug indices become unimportant. The negative influences of doctor and nurse ratio become significant.

In conclusion, because health care attributes are likely to be highly correlated with other community characteristics, the interpretation of price and quality effects on demand from models which do not include non-health-facility community controls, or which employ only district-level dummies to account for community influences, should be interpreted with caution.

CONDITIONAL LOGIT SPECIFICATION

In addition to the issue of other potential non-health facility community influences, many studies use a conditional logit approach in which each health care characteristic is forced to have the same impact on demand for each type of provider. Given, however,

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[67] One caveat, however, is that much of the research on this topic has used distance as the only price variable in the model. In this study, although the negative effects of distance on public and private care demand are substantially weakened when other non-health-facility community influences are controlled for, they remain statistically significant. Therefore, even though studies that do not measure price using *both* distance and user fees are less complete, if the distance influences are large to begin with, it is possible they could remain important even after controlling for non-facility community influences. This, however, is an empirical question which can only be answered by including both distance and user fees in the model, with the non-facility community influences first kept and then removed.

the wide variation in the nature of the service types, e.g., personnel levels and training, drug availability, and inevitably other unmeasured aspects of service, one can make a strong argument that care from the different segments of the health care market can reasonably be considered to be different goods. For example, an increase in the doctor ratio in an isolated clinic is likely to affect the nature of that service in a way which may impact demand very differently from the same percentage increase in doctor ratio at a modern urban hospital. Therefore, in the baseline model used for this study attributes which are relevant to each type of service (distance, price, number of personnel) are allowed to influence demand for each service type differently; furthermore, different *sets of attributes* are allowed to impact the probability of a visit at each.[68]

Using a conditional logit model similar to others estimated in this literature, we demonstrate how dramatically our provider attribute effects these diverse services are (a) forced to have the same set of elements describing them, and (b) each element is forced to have an identical impact on the demand for each type of care.

Individual and household effects are virtually unchanged from the baseline model so are not presented here. Table 6.8 shows the results of imposing identical effects of the health care attributes on each type of service, and of excluding non-health-facility

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[68] Analytically, this feature of the conditional logit model implies that each element of the choice set must contain the same set of explanatory variables; therefore, in transforming the facility data to be used for the conditional logit model, either (a) descriptors that do not apply to a particular choice must be included for that choice with the value set to zero, or (b) only the facility variables common to all choices are retained in the analysis; for this study (b) would imply that only the price and distance variables are kept.

community controls.[69] The previously observed differential influences of quality and price on demand for different types services are masked by this type of model; changes from the baseline results are quite large.

Relative to the baseline flexible MNL model, user fee is strong and negative for each choice; previously each own price effect was either zero (the case of modern facilities), or positive (the case for traditional care). Doctor and nurse ratios are positive and influential for all types of care, whereas in the baseline version only public doctor ratio increased the chances of a public visit. The vaccine availability effect is now positive across the board; in the baseline model only vaccines at public facilities increased demand for public care. Family planning offerings are negative and significant for all types of visits, as opposed to the baseline results where only those at private facilities reduced the probability of a private visit. Access to intravenous diarrhea treatments has no effect on visits now. Training of traditional providers increases the chances of a visit to each facility type, instead of just to traditional facilities.[70]

To conclude, results from our baseline flexible MNL model indicated that when differential influences of price and quality on demand are allowed to vary by the type of care, there are indeed differential demand responses by service type. Furthermore, the flexible specification allows for the possibility of having a different set of quality aspects

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[69] It should also be noted that standard errors are NOT corrected for intra-individual correlation due to repeated observations on individuals. Therefore, the z-statistics presented are higher than they should be.

[70] If we compare these results instead to the flexible MNL model where community controls are also excluded (on the basis that they are more comparable with this model), we again find that many facility effects which varied by provider type in the flexible model, change sign and significance using the conditional logit specification.

affect the demand for each kind of care. Therefore, forcing different flavors of health care to be influenced by the same set of attributes, and imposing the restriction that each of these attributes has the same effect on every kind of service, is unrealistic at best and could be highly misleading. Furthermore, it puts unnecessary limits on the insights which can be drawn concerning how prices and quality affect demand for care from different segments of the health care market.

NESTED MULTINOMIAL LOGIT SPECIFICATION

Estimated next is the flexible two-level nested multinomial logit model with no-cross effects, as described by equations (15)-(17) in Econometric Methods section. The results are presented in Table C3 of Appendix C. Turning first to the inclusive value, its parameter is 0.36. The result that the inclusive value parameter is between zero and one tells us that the data reject neither the distributional assumptions nor the functional form of the utility function; therefore, the model is consistent with utility maximization (McFadden, 1981). The fact that it is less than one implies that the error terms in the conditional utility functions for the provider alternatives are correlated, implying that the simple MNL model is rejected in favor of this specification.[71] The magnitude and significance of this parameter is also very close to the results found for children in rural Côte d'Ivoire and rural Peru by Gertler and van der Gaag (1990).

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[71] We also experimented with the three-level nested MNL model that was laid out in the empirical modelling section: visit or not--modern or traditonal--public or private. We found that when public and private care were grouped into a "modern care" branch separate from traditional care, we could not reject that the inclusive value parameter on this branch was equal to one. Therefore, the three-level tree was collapsed into the two-level tree estimated here.

Because the choices are now divided into two levels, (1) a visit or no visit, and (2) the type of care chosen conditional on having a visit, there is no common base category for each nest of the decision. In the first level, the coefficients measure the change relative to no health care visit; in the second level, they measure the change relative to having a traditional visit. Because the base categories differ, the estimated coefficients from the nested model cannot be directly compared to those from baseline MNL model. For this reason, marginal effects for the unconditional probabilities of a visit to each facility type were calculated for both the MNL and NMNL models using equations (16)-(17). These are presented in Table 6.9.[72]

For public demand, we see that the marginal effect distance is reduced slightly in the nested version. Public user fee remains positive and increases in magnitude. (Its NMNL coefficient, however, is still not statistically significant.) The public quality results are not altered to a great extent. Nurse ratio is the only effect which changes direction, from positive to negative, and its NMNL effect is relatively large. The negative impact of availability of intravenous diarrhea treatments is increased by sixty percent.

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[72] In the MNL model, the base category for comparison was not a health facility, and hence did not have measured health care attributes which uniquely described it. Therefore, there were no characteristics of the base category which affected the indirect utility functions of the other alternatives.
In the NMNL model, however, the base category for this subset of alternatives is traditional care. The characteristics of this facility type to enter the lower level of the tree where facility choices are made conditional on there being a health care visit. Because this omitted base category is a health facility, which has measured attributes unique to it and which are not found in the indirect utility functions for the other alternatives, its characteristics enter the estimated equations for the other choices. (See Appendix B for more details.) Because parameter estimates are obtained for the attributes of this base facility, their unconditional marginal effects can be estimated.

The influence of private distance on private demand is very close to zero in the nested specification, instead of being negative as in the baseline model. The sign of the private user fee effect changes from negative to positive, but remains essentially at zero. None of the private quality effects changes direction; however, the magnitude of each, with the exception of the postnatal service indicator, is reduced. The negative impacts of vaccine and family planning availability are most affected: both marginal effects are smaller.

Nesting alters the impacts of some traditional provider characteristics. The impact of distance does not change. However, the positive influence of user fee is reduced to one-third its original value. The impact on demand of educational level of traditional providers in the community does not change with nesting, but the positive influence of their having participated in any formal health training is increased by sixty-five percent.

Some of the strong individual and household findings in the MNL model are different with the nested structure.[73] Maternal and paternal non-residence for the first two years of the infant's life appear to increase more the chances of a public or private visit. For private visits, the *positive* influences of being male, having health insurance, higher household asset levels, and adult females in residence are each diminished. The *negative*

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[73] Note that even though individual and household-level variables are included in both levels of the nest (i.e., they influence whether there is a health care visit, and choice of facility conditional on there being a visit), their unconditional marginal effects are not given for the traditional versus no visit choice. This is because traditional facility is the normalized base category in the conditional choice nest, which means that coefficients for individual and household variables are not available from this nest for which to calculate the final unconditional marginal effects for the nested specification.

effects of younger children and older males in the household are also reduced. The child 1-6 month age spline changes from positive to negative.

These results are based on a model which may be deemed more realistic analytically because it allows correlation in the error terms of the three health facility choices, thus allowing the choice among the three provider types to be more similar to each other than to the choice of no health care visit. However, self-selection issues arise with this specification because the results for the three-choice health facility level of the tree are based only on the subsample of children in each round whose mothers took them for a health care visit during the two-month interval preceding each survey. This source of selection may result in biased estimates for the sequential nested multinomial logit model. Direct comparison of the results to the MNL model where selection bias is not an issue should therefore be done with this caveat in mind.

FULL CROSS-EFFECTS SPECIFICATION

The final variation of the model is the "full cross-effects" MNL version in which all facility variables are allowed to enter each indirect utility function. Results are displayed in Table C4 of Appendix C. Individual and household effects are virtually unchanged from the baseline so are not presented. Several own-facility impacts change when cross-influences are allowed; the baseline results for public facilities are more robust than those for private facilities. Among the public attributes, the positive effects of price and family planning increase in magnitude and become significant; number of personnel is no longer significant.

Among the private impacts, price and provision of postnatal services both change direction (from negative and from positive, respectively) but neither is significant either here or in the baseline model. Doctor ratio switches from negative to positive and becomes significant; number of personnel gains significance but is still close to zero in magnitude. Family planning index loses significance and changes from negative to positive.

The positive effect of formal training of traditional providers loses its significant impact.

The cross-effects are in some cases of the expected sign and in other cases not.[74] For instance, increased public user fees now cause the demand for traditional services to rise, but they decrease the demand for private care. Greater numbers of public facility personnel lower the chances of using the other two types of care as we might expect; however, public availability of intravenous diarrhea treatments and vaccines is now related to increased demand for private and traditional services.[75]

Private provision of postnatal care decreased demand for public services, but raised the probability of a traditional visit. Private personnel and nurse ratios also had

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[74] In another specification, interesting cross-provider effects were seen in a distance/user fee regression before quality was included. Distance to a public facility increased the probability of using a traditional provider; analogously, distance to traditional raised the likelihood of a public visit. Public user fee also had a strong positive impact on traditional visits. These effects diminished somewhat when quality was added.

[75] As discussed previously, higher current supply of drugs at public facilities may be an indication that services for which these drugs are applicable may not be in very high demand at public facilities. If so, this result is not as counterintuitive as it first appears to be.

unexpected positive effects on traditional visits. Education of traditional practitioners decreased chances of a private visit, but raised the likelihood of a public visit.

The unexpected cross-effects may arise from high correlations in certain characteristics between facility types. For instance, public and private user fee are highly correlated, as are distance and many of the personnel measures. In our results, each of the significant cross-distance effects are negative. Ex ante, we may have expected greater distance to say a public provider to have increased demand for private or traditional services; this, however, did not turn out to be the case. Dor and van der Gaag (1987) obtain similar results when comparing models similar to this one which allow cross-effects and then restrict them to zero; their unexpected results are attributed to the actual and spurious correlations in their health facility data.

POLICY SIMULATIONS

Using the results from the baseline flexible MNL model (where facility effects are permitted to vary by provider type, but with cross-effects restricted to zero), simulations were performed to analyze the effects of hypothetical changes in public health care characteristics and in household attributes on the demand for health care services. Much of the policy discussion in this area focuses on the likely effects of reforms in the public health sector on utilization, both overall and among poor households. Therefore, several of the simulations involve changes to possible public policy levers; furthermore, separate sets of predicted responses are derived for the poorest households, for those who are better-off , and for the sample as a whole.

Simulated probabilities of utilization are obtained by first calculating the baseline probabilities using the estimated parameters derived the baseline regression model and the actual value of each explanatory variable; these probabilities are averaged. Next, the impact of a change to public facility or household attributes are examined by changing the value of the explanatory variable of interest, recalculating and averaging the probabilities, and comparing these results to the baseline probabilities.

It should be noted that the simulated responses to these hypothetical changes are derived using parameters obtained from the original regression model; therefore, the approach is valid only for *marginal changes* in the factors that influence health care visits.

Table 6.10 presents the results of these simulated demand changes for (a) all households, (b) households in the lowest asset tercile, and (c) households in the upper two asset terciles. Reading across a row gives the probability of choosing each provider for a given asset class; the probabilities for each row sum to 100 within each asset class.

We observe that making ORT available at each sampled public facility increases overall public utilization by 17 percent. Low-asset households respond less to this change than high-asset households, the estimated demand increases being 7 percent and 24 percent, respectively. The to public care among both high- and low-asset households comes from approximately equal percentage decreases in private, traditional, and no health care use.

Completely eliminating public ORT supplies reduces overall predicted public utilization by *one-half*. As with the ORT improvements, low-asset households respond less to this change. Their probability of a public visit is reduced by about one-third, compared to a 54 percent reduction for those of higher SES status. For both asset classes, this policy change would result in equal percentage increases in private and no health care, and a slightly lower percentage increase in the use of traditional care.

Increasing the available range of child vaccines at public centers raises the predicted probability of a public visit by 29 percent. Disparities in responses by asset class are not as strong as they were for ORT changes; the increase for poorer households is 25 percent and for richer households is 31 percent. Percentage reductions come equally in private, traditional, and no care use, and the reductions were similar regardless of asset category.

The effect of improving the number of family planning methods available at public facilities is to raise the overall probability of a public visit by 18 percent. Reactions by asset group differed however; this caused poor household to decrease their rate of public visits by 11 percent, while it raised the probability of a public visit by a better-off household by 36 percent. For the poor, percentage *increases* in private, traditional, and no care in response to this policy change were approximately equal. For high-asset households, the probability of using private, traditional, or no care we each *reduced* by about the same percentage.

Simultaneously enacting the three drug supply improvements increases the probability of public utilization by 74 percent overall, by 19 percent for the poor, and by a full 106 percent for better-off households. For the overall sample and for the upper-income group, the percentage increase for the simultaneous improvements is greater than the sum of the increases due to each of the three individual improvements; it is approximately equal to the sum for the poor. In the upper-income group, the new users are drawn largely from those previously having a private visit, a slightly lower percentage from those who had no visit, and a still lower percentage from former traditional users. There were approximately equal percentage reductions in private, traditional and none care use among the poor.

For the 25 percent of households furthest away from public facilities, we simulated reducing their barriers to access. In terms of policy actions, this could correspond to (a) building facilities only in under-served areas or (b) improving transportation infrastructure to reduce travel times. For the twenty-five percent of households furthest from a public facility, reducing their distance to that of seventy-fifth percentile results in a five percent increase over the baseline probability of using public care, with the increase coming from former traditional and non-users. While the response among low-asset households is less, at two percent, the increase comes almost solely from those who did not use care before, thus increasing this groups overall use of health care. For higher-asset households an eight percent increase is seen, with new users being drawn at equal percentages from private, traditional, and no care.

Raising mother education by one sample standard deviation (3.7 years) is expected to raise public demand by approximately 4 percent for the pooled sample. The increase among the poor, however, is much greater: their predicted probability of a public visit is increased by 13 percent, and the great majority of these new users are drawn from the group who had no health care visit before. Among upper-income households, the increase is very small at one percent.

Increasing the value of household assets by one sample standard deviation shifts overall utilization by reducing the chances of a public, and to a lesser extent, a private visit; it increases the likelihood of using private services and decreases only slightly the probability of not using health care. For the poor, increasing the value of assets boosts them into the non-poor category. Because of the very large positive effect of the first asset spline on private demand in the baseline model, the result of this simulation is that all the poor switch from public, traditional, and no care, into using private services. Upper-income households would also use more private care, the percentage increase being 4 percent.

In sum, the policy simulations reveal that improving aspects of quality at public facilities which can directly benefit children, specifically ORT availability and vaccines, raises demand for public health care, especially among the poor. The new users are drawn from former private, traditional and non-care users. Increasing the range of available family planning methods at public facilities, a policy which in theory could increase the likelihood of a child visit if the adult taking the child (usually the mother) highly values concurrent access to these services, raised public demand only among higher-asset households. The shift came as a result of reductions in private, traditional, and no care. Simultaneously expanding all three of these supplies had huge positive impacts on the upper asset group's public utilization, and positive but less striking effects for the poorest; percentage reductions were seen in each of the other three choices for all asset classes.

Reducing distance to public facilities led to positive but small increases in public utilization, and the effect was smaller for the poor. Increasing maternal education had large influences on public sector utilization among the poor; most new users were drawn from the pool of former non-users of health services. Raising the level of household assets r

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sector.

assets resulting in enormous increases in the demand for private health care services, especially by the poor, mostly as a result of former non-users being drawn into the health sector.

Section 7

RESULTS FOR THE DEMOGRAPHIC AND SOCIOECONOMIC SUBGROUPS

In setting health sector priorities, it is important to know if prices and quality of care affect demand differently depending on the specific demographic or socioeconomic group in question. Often public services are offered and/or subsidized with the intention of benefitting a particular type of individual. The aim may be to reach those with the lowest degree of access to the service, or those who could be expected to benefit most from using the service. In this study, relevant groups who may be targeted for the provision of basic curative health services include the poor who are generally under served; low-educated mothers who may have low utilization of services because, besides being poor, may not be aware of the potential health benefits of use; female children who may be discriminated against for health investments; or children in a particular age group who may have special health care needs due to their particular stage of physical development.

An important element in designing a strategy to target any particular group of individuals is knowing the determinants of service demand among that group. It is possible, and in some cases expected, that different types of individuals will have very divergent responses to price and quality changes. If policies are formulated based on responses of the average consumer, certain types of potential beneficiaries, some of whom may in fact be the primary targets of the intervention, may be affected differently than health care planners expected when they designed the intervention. For this purpose, we estimate demand responses for subsamples of individuals, disaggregated by four exogenously determined characteristics of interest: (1) sex of the index child, (2) education level of the index child's mother, (3) value of household assets, and (4) age of the index child. This provides us the opportunity to investigate whether demand for child curative health care investments are more price, quality, and/or income responsive among certain groups.[76]

For each subgroup the baseline flexible MNL was estimated. Then, as in the pooled model, the NMNL specification was used to explore the effects of relaxing the assumption of zero correlation in the error terms across facility alternatives. Community non-health-facility control variables were then removed to investigate how their exclusion would influence the health facility impacts. For each of the demographic cuts, the changes which resulted from using the nested specification and from the removal of the community variables, relative to those of the baseline flexible model for each group, were very similar to what was observed for the main pooled model. Therefore, in the discussion that follows we do not include the details of the findings from these alternative specifications.

MALE VS. FEMALE CHILDREN

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[76] When exploring the possibility of differential demand responses to changes in public health care and household characteristics, it is important that the sample NOT be split according a variable that is (a) the outcome of interest, or (b) is jointly determined with the outcome of interest. For example, stratifying the sample by those with low rates of utilization versus those with high rates would result in two artificially truncated subsamples, each of which would produce biased estimates.

The results from the baseline pooled model indicated that male children appear to be favored for health care investments. The likelihood ratio test of the hypothesis of no coefficient differences between the male and female subsamples was not significant.[77] We will still stratify the analysis by child sex, however, because it will allow us to explore whether demand for daughters' curative health care is more responsive than sons' to health care price, quality, or household influences.

Other health care demand studies for children in the Philippines have not found promale bias in health seeking behaviors.[78] Bouis et al. (1997) find that gender did not affect the probability of seeking any of the alternatives to traditional health care providers for adolescents with a reported illness in Bukidnon. Using country-wide data, Chin (1995) finds among sick children age fifteen or less that boys are less likely to be taken for formal health care services. In Bicol (Akin et al., 1985) child sex is not found to be an important determinant of health facility choice for children age 0-5.

Gender differentials in health care investments have been found in other countries, however. Alderman and Gertler (1997) estimate a conditional model of child health care utilization for rural Pakistan. They find that girls' demand for care from government clinics and high-quality private clinics is more price elastic than boys'; these effects diminished, however, with income. In rural Cote d'Ivoire, male sex was found to increase

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[77] Chi-square=136, d.f. 203, chiprob 0.995.

[78] For other important non-health care inputs into child health, gender differentials have been found for the Philippines (discussed in Haddad et al. 1996). Evenson et al. (1980) and Chula et al. (1980) find promale child bias in intrahousehold food distribution; however, Aligaen and Florencio (1980), Haddad, et al. (1993), and Bouis and Pena (1996) do not. (Haddad, et al (1993) adjust energy requirements for body weight; however, differences in body weight could themselves result from accumulated past patterns of intrahousehold discrimination in nutrient allocations.)

the likelihood of a visit to higher quality doctors for adults, but not for children (Dor and van der Gaag, 1987).[79] Gender was not an important determinant of health care choice for children in Bolivia (Ii, 1996), in rural Peru or rural Cote d'Ivoire (Gertler and van der Gaag, 1990), or in Indonesia (Gertler et al. 1995; Deolalikar, 1993)[80].

Each of the demand studies mentioned above (except that of Deolalikar) uses a sample which is conditioned on a current child illness being reported. If there exists bias in reporting of illness by child gender, say for instance against females, then only the very sickest females will even appear in a conditional sample. This would lead to biased estimates of the determinants of health care demand. For example, even if no sex differences were found in the conditional model, the fact that girls who may be just as sick are *less likely to even appear* in the sample of ill children implies that promale bias in seeking health care could still exist. Estimates which are not conditioned on illness status will not be tainted by this form of sample selection which could arise from the under reporting of illnesses for children of a particular gender.

The unconditional determinants of facility choice for curative health care for male and female children in our Cebu sample are presented in Table 7.1. Beginning with the facility-level determinants, we see that the negative effect of distance to a public provider on public demand is fifty percent larger in magnitude and more significant for girls than

[79] Using a conditional model, Dow (1995a) finds that adult demand for hospital care is higher for males, but in an unconditional specification male sex was found not have an impact on demand for hospital care, but to significantly reduce the demand for clinic care. In Kenya, facility choice for adult curative care was not affected by gender (Mwabu, et al., 1993).

[80] Deolalikar (1993) finds no effect of child gender in either his conditional or his unconditional demand results.

boys, indicating that girls' demand for public curative care is more price responsive than boys'.[81] Private distance, on the other hand, has a significant, although very small, influence only on sons' private demand.[82] Since sons appear to be preferred for use of private services to begin with, perhaps this causes male child demand to be more sensitive to price. Traditional demand was negatively affected by distance for both sexes; demand for daughters' care appears to be much more sensitive, however.

Responses to user fees for public and private health care were not significant for either sex. Daughters utilization of traditional services, however, was positively associated with traditional user fee. Perhaps this result arises from unmeasured quality aspects positively correlated with price which could be more important for girls than boys.[83]

The signs and significance of the quality characteristics of public facilities do not differ between boys and girls. The impact, however, of private quality on private demand differs more by sex.[84] Private provision of postnatal services has an important positive

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[81] Results from the conditional model of Alderman and Gertler (1997) for rural Pakistan also show that girls' demand for care from government clinics is more price elastic than boys', although the effect diminishes with income.

[82] Contrary to these findings, Alderman and Gertler's (1997) results, which condition on morbidity, indicate that demand for girls' high-quality health investments is more price elastic than boys'. They also find that the ratio of female to male elasticities is greater for high-quality care than for other types of care.

[83] Alderman and Gertler also find that demand for traditional care for female children is more price elastic and negative than for male children.

[84] To the knowledge of the author, this is the only study which includes detailed quality measures in examining the demand for health care investments for boys and girls separately.

impact on boys' visits only. Sons' demand is negatively affected by higher private doctor ratios. The chances of a private visit for a girl are enhanced by more personnel and the availability of intravenous diarrhea treatments at the facility, but are reduced by current ORT stocks, vaccines, and number of family planning methods. As discussed in the results from the pooled analysis, interpretation of the negative impacts of drug availability is not straightforward because current availability at any particular time reflects the interaction of both supply and demand factors. If supply of a particular drug is low it may be due to excess demand for it. For example, if private clinics with ORT supplies are in areas with high demand, their stocks may be diminished quickly, this would produce a negative correlation between demand for services and availability of drugs (Mwabu, et al., 1993). The significant negative effect of ORT and vaccines *may* indicate that they are in high demand for girls at private health facilities.

For traditional services, years of provider education had no impact. Formal training had large positive effects on demand for both sexes, with the magnitude being greater for girls.

Among the individual and household characteristics, the first linear segment of child age (months 0-6) has important positive effects on private and traditional visits for both sexes, but on public visits only for girls. The second linear segment (months greater than six) reduces the probability of a public or private visit approximately equally for both sexes.

The impact of the first linear section of maternal education (0-5 years) has no noticeable influence on demand for public care; its effect is positive and significant, however, for male, but not female, private demand. It also increases the probability of a traditional visit only among daughters. The second maternal education spline (years over five) has no effect on public or traditional care; however it raises the likelihood of a private visit for sons and daughters approximately equally, but the effect is slightly more statistically significant for girls than boys. It is possible that higher education of mothers has a more significant effect on the demand for daughters' high quality services than for sons'.[85]

Maternal age has a significant impact on male public visits only and reduces their likelihood. The first linear portion of the maternal height variable (up to 150 cm) increases the likelihood of private visits for both sexes, but not public visits as it did in the pooled model. The second height spline decreases demand for public services among girls only. Index child's mother being the senior woman in the household significantly increases private visits for sons, but reduces the likelihood of a daughter's traditional visit (perhaps the daughter effect is through a reduction in illness since this variable is negative for demand each type of care for girls).

The absence of the index child's father during every round of the survey reduces the probability of male, but not female, traditional visits. The second piecewise segment of paternal education (years over five) has a negative effect on the likelihood of public and traditional visits for sons, but does not affect any type of female care. It is conceivable that more highly educated fathers have a distaste for taking their sons to low-quality care.

[85] Thomas (1994) finds a greater impact of parents' education on the health of children of the same gender in the United States, Ghana, and Brazil. King and Lillard (1987) and King and Bellew (1988) find that mother's education has a stronger positive influence on daughter's education than on son's in the Philippines, Peru and Malaysia. (Quoted in Quisumbing, 1994).

The first piecewise segment of household assets (values in the first tercile) increase private demands for both sexes. The second asset spline (values in the upper two terciles of the distribution) has the effect of reducing daughters' demand for public and traditional visits. Perhaps richer households prefer their daughters not visit lower-quality health facilities.

Additional male children in the household younger than the index child now reduces *only girls'* demand for the more expensive service types, private and traditional. Younger female children also reduce the probability of an index daughter's visit to a private facility, but by less than do younger males. This lends evidence to the hypothesis of promale bias for more expensive health care investments.

Preschool girls in residence who are older than the index child have the effect of increasing the likelihood of boys' public and girls' traditional visits. Adult females age 14-20 raise the demand for son's private care, while females age 21-60 increase the probability of a daughter's private visit. It is conceivable that adult women have strong preferences for higher quality child curative investments, and the greater their numbers in the household, the more ability they may have to exert these preferences. Elderly men in the household decrease demand for private care for boys only. Although the effects is negative instead of positive, perhaps adult males in the household influence male children more than female children, such as in the findings of Thomas (1994).

LOW VS. HIGH MATERNAL EDUCATION

The next stratification we investigated was maternal education level. The findings from the baseline pooled model showed that years of maternal education below the elementary school level had demand effects which differed from those at or above the level of elementary school completion. We therefore wish to test the hypothesis that other factors influence care differently depending on the education level of the mother. The likelihood ratio test of the hypothesis of no coefficient differences between the group with less than elementary education and the group with elementary or more education could be rejected at the 16 percent level.[86] Even though this level of statistical significance is not high, will we still proceed with stratifying the analysis by maternal education to investigate whether mothers with varying education levels respond differently to health care price, quality, or other household influences.

Maternal education is hypothesized to raise the technical efficiency with which inputs are used and to increase the allocative efficiency of input use through better input choices for child health (T. W. Schultz, 1964). Often the latter effect is thought to be most important. For a health care demand model which is not conditioned on current reported illness, increased technical efficiency would imply that long-run demand for curative care would be reduced because mothers use their chosen health inputs more efficiently, for example, by providing appropriate nutritional and sanitation behaviors to complement health care investments. Allocative efficiency would imply that mothers make the better health input choices among the available alternatives. This could include using health services that are of higher quality when the child is ill. The long-run reduced-form estimates in this study and hence reflect the influence of both allocative and technical efficiency.

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[86] Chi-square=223, d.f. 203, chiprob 0.160.

Education has been hypothesized to affect human capital investments through increased income, better processing of information, or by changing preferences. Rosenzweig and Schultz (1982) and Schultz (1984) argue that the benefits of health infrastructure and the information provided will be greater for the least educated. Caldwell (1979), on the other hand, hypothesizes that more educated women benefit more because they are better able to understand information in the media and from health personnel. Stratifications by mother education level will enable us to compare whether health care demand for children of mothers with little education is more or less responsive to the availability and quality of health care than is demand for children of more highly educated mothers.

The effect of education through income will be controlled for in our analysis to a large degree by including the value of household assets and measures of the extent and quality of health and community infrastructure in the analysis. Controlling for each of these factors results in a more pure education effect. Without them, education could reflect household resources if more highly-educated parents also have higher incomes; it could also pick up more complete and higher quality community infrastructure if better educated parents live in areas with more and better services.

Other research on health care demand has found mixed results of the effect of maternal education. In Bicol Philippines, maternal education has no impact on facility choice for children age 0-5, but increases the demand for private services among the 0-13 age group (Akin et al. 1985). Ching (1995) finds that education of the household head, usually a male, reduces demand for modern services for rural and urban Philippine children age 0-15. Hotchkiss' (1993) results for the determinants of facility for child birth for Cebu mothers' show that drug availability was a significant determinant of choice only among well-educated women. Mother's education positively influences the demand for child clinic visits in rural Peru (Gertler and van der Gaag, 1990) and public and private care in urban Bolivia (Ii, 1996). It has no impact on demand in Pakistan (Alderman and Gertler, 1997) or Cote d'Ivoire (Dor and van der Gaag, 1987; Gertler and van der Gaag, 1990). For Indonesia Deolalikar (1993) finds no influence on choice (both conditional and unconditional on reported morbidity); Gertler et al. (1995) using a different Indonesian data set conclude that it increases demand for hospital care and reduces demand for lower quality nurse care.

Each of the demand studies mentioned above (except that of Deolalikar) uses a sample which is conditioned on a child illness being reported. Other studies have found that more highly educated mothers are more likely to report their children as ill (Sindelar and Thomas, 1991). In the Cebu data, child illness variables are constructed from 24-hour recall of very detailed morbidity symptoms. This may reduce the degree of reporting bias in the data. It may still be true, however, that mothers with more education may be better at recognizing symptoms and are thus more likely to report them. If reporting behavior is positively influenced by maternal education, children of more highly educated mothers may be over-represented in a conditional sample; such a non-randomly determined sample would result in biased demand estimates. Furthermore, if more highly-educated mothers also have a greater likelihood of using certain types of care, this will be an additional source of bias in the maternal education effects. Estimates which are not conditioned on illness status will not be subject these biases.

The results of the unconditional demand model for Cebu infants stratified by maternal primary school education are displayed in Table 7.2. We observe for public services that the effect of distance to that type of care does not vary by whether the mother has finished elementary school or not. Distance to private care, on the contrary, has negative and significant effects only for more highly educated mothers. This result could arise from fact that mothers with higher education are more likely to use private services in general, so they could be more sensitive to changes in access. Demand for children of low-education mothers was more responsive distance to traditional services than children of high-education mothers. Again, this could be because the low-education group is much more likely to use traditional care and hence to be affected by barriers to access to it.

The user fee results were notable in that the low-education group had *positive and significant* demand responses to own-user fees for public and traditional services. This was not expected; it is conceivable that mothers with little education respond positively to certain attributes of these lower quality services that remain unmeasured in this analysis, and these omitted variables are being picked up by the user fee effect. Private user fees did not influence the demand for private services for either high- or low-education mothers.

The high-education mothers had much greater demand responses to structural quality at facilities. For public care, the only significant influence for low-education mothers was a positive one for vaccine availability. High-education public demand was impacted significantly and positively by personnel levels, doctor ratios, and ORT availability, and negatively by the stock of intravenous ORT treatments on hand. It appears, therefore, that policy changes which could greatly benefit low education mothers would include increasing the availability of child vaccines and reducing distance and travel time to public clinics. Boosting personnel levels, doctor ratios, and ORT availability would benefit primarily those who are more highly educated.

Low-education demand for private care was not influenced at all by private quality; alternatively, high-education private demand was increased by the availability of intravenous diarrhea treatments, and decreased by a wider range of family planning methods offered at private facilities.

Responsiveness of traditional demand to attributes of these providers was stronger for those with less education. The positive effect on the formal training dummy is larger in magnitude for mothers who have not completed elementary school.

Individual and household characteristics also varied by maternal education level. While the male dummy increases private demand for both groups, the effect is much larger among moms who have not completed elementary school. Demand for traditional services among the low-educated was positively affected by the child being male.

The first piecewise segment of the child age variable (0-6 months) increased demand for each type of care among the high-education group, but only for private and traditional care among children of low-education mothers. The second piecewise segment of child age (7-24 months) decreased the probability of a public and private visit for both groups, but the lowered the probability of a traditional visit only among the least educated.

Maternal age had an impact only for post-elementary school mothers and it reduced their public demand. Height of mother also had influential effects only among the more highly-educated group; the first linear segment increased their public and private demand. Perhaps these mothers have other human capital or family background characteristics which boost their preferences for modern health care. The second height spline reduced high-education demand for public services.

Husband's non-residence for the duration of the two-year survey had negative influences on low-education demand for traditional services. The first paternal education spline (years below elementary) had impacts for children of sub-elementary school mothers, raising demand for public care at the expense of traditional services use. Advanced paternal schooling had the effect of reducing the likelihood of using traditional care among high-education group.

Among the low-educated, males younger than the index infant reduced utilization of traditional services; younger female infants reduced demand private care. For the post-elementary group, younger males reduced demand for private services, and younger children of both sexes reduced utilization of traditional care. Elderly men in the household decreased the demand for the two more expensive types of care, private and traditional, only for the high-education sample.

LOW VS HIGH ASSET HOUSEHOLDS

Results from the baseline pooled model revealed that asset levels in the first 33% of the distribution influenced demand differently from values above that level. It is of interest, therefore, to investigate the possibility that other factors influence care differently depending on the asset standing of the child's household. The likelihood ratio test of the hypothesis of no coefficient differences between the households with asset values only in the first tercile and those with values above that level was not significant at any reasonable level of significance.[87] We will still split the sample by owned asset value at the first tercile, however, to investigate whether children in households with different resource levels respond differently to health care price, quality, or other household influences.

Household resource levels have been shown to have important influences on health care choice for children. Moreover, price and quality responses differ by income-level in some studies. In Bicol, Philippines, Akin et al. (1985) find statistically significant but small effects of household assets on the probability of choosing public and self-care over traditional care for children. Household income (instrumented using household non-labor income) has no impact on choice for child health care in Indonesia (Deolalikar, 1993); it increases the probability of nurse and doctor care relative to self-care in Cote d'Ivoire (Dor and van der Gaag, 1987).

Higher negative price elasticities for lower-income households (often measured using household total or per capita consumption levels) are found in the Philippines (Ching, 1995), Pakistan (Alderman and Gertler, 1997), Indonesia (Gertler et al., 1996), Peru and Cote d'Ivoire (Gertler and van der Gaag, 1990), and urban Bolivia (Ii, 1996). A similar result is found for obstetric care choice by Cebu mothers (Hotchkiss, 1993).

Each of the demand studies above (except that of Deolalikar) uses a sample which is conditioned on a child illness being reported. In the Cebu data, child illness variables are constructed from 24-hour recall of very detailed morbidity symptoms. This careful approach collecting morbidity data may reduce the degree of reporting bias in the data. It

[87] Chi-square=183, d.f. 203, chiprob 0.840.

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may still be true, however, that household with more resources may be more likely to report an illness episode, for instance if they have had more contact with health providers in the past and are more familiar with symptoms, or simply because they are better able to afford treatment. Dow (1995a) estimates the probability of reporting sickness for adults in Côte d'Ivoire and finds *very large positive influences* for both income and wages. If reporting behavior is in fact influenced by household resource levels, higher-income children may be over represented in a conditional sample; this non-representativeness would lead to biased demand estimates. Furthermore, if higher-income children also have a greater likelihood of using certain types of care, this will be an additional source of bias in the asset effects. Estimates which are not conditioned on illness status will not be subject these biases.

As in the mother education stratifications, differences in the distance effects for these two groups were unexpected. Public demand was decreased much more by distance for high- rather than low-asset households; the effect is significant for both groups, but the magnitude and the level of significance is much higher for the richer stratum. For private demand, the magnitude of the distance effect was the same for the two income classes, but was statistically significant only for those in the better-off stratum. Traditional distance, on the other hand, is negative and significant for both groups, but the impact is much stronger for the low-income.

User fees were important only for low-asset demand at traditional facilities. Similar to low-education households, the impact was positive, possibly indicating that unmeasured desirable characteristics of this service type are correlated with and biasing the user fee result.

Responsiveness to quality at facilities varied by asset standing. Both groups reacted positively to public vaccine offerings and personnel levels. The current stock of intravenous diarrhea treatments at public clinics had negative demand impacts for both, but the magnitude of effect was greater for the poor. As discussed in earlier sections, because this variable is the result of both supply and demand for drugs, the negative sign could in fact indicate that this drug is in high demand in public facilities in poor areas which may be characterized by higher rates and more severe cases of diarrhea. Only high-income households responded positively to public doctor ratio and ORT availability.

Low-asset private demand was affected negatively by nurse ratio and positively by supply of intravenous diarrhea treatments at private facilities. The probability of a private visit for higher-asset children was reduced by current stock of ORT and a wider range of family planning methods at private facilities. Training of traditional practitioners had significant positive impacts on use of traditional care for both groups, the magnitude of the effect being greater for the low asset holders.

The impacts of individual and household characteristics also differed by household asset value. Male gender significantly increased the chances of a private visit for both groups, but the magnitude of the effect was twice as large for the poorer group. Traditional demand is significantly increased by male sex only for the higher stratum.

Mother education increased the likelihood of using private care *only* among higher-asset children; however public utilization was increased for the poor by post-elementary maternal education. Maternal age appears to reduce slightly the probability of public and traditional visits among higher-asset households. Mother's height has strong positive ir

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influences on demand for public and private care for the low-income, probably capturing aspects of her human capital or family background not being picked up by her education.

Paternal education reduces demand for traditional services only among high-resource households. Insurance coverage has positive and similar effects on the likelihood of a private visit for both asset classes, but the statistical significance of the impact of much greater for the better-off group.

The influences of household structure varied by household resource status as well. Males in residence who are younger than the index child and elderly men reduce demand for the two most expensive type of care, private and traditional, only among better-off households. It is conceivable that resources are distributed more equally within households who have low resource levels. Other evidence has indicated that discrimination against certain types of individuals (e.g., females) is greater at lower income levels; for example, Alderman and Gertler (1997) find that girls' demand for care is more price elastic than boys' at low income levels, but that the effect diminishes greatly with income. Perhaps high-income households discriminate more in favor of the very youngest and very oldest males for private health care than low-income households do.

Adult females in the household increase the likelihood of a private care visit only for high-asset children. It is possible that adult females have greater preferences for better-quality child care and those in higher-asset environments have the access to resources needed to act more upon these preferences.

CHILDREN 1-6 MONTHS VS. 7-24 MONTHS OF AGE

In the pooled sample, we saw that demand for services was strongly affected by child age. From birth to 6 months, age had a positive impact on the likelihood of using each type of service, whereas in the 7 to 24 month period, demand for modern services was decreased by child age. These disparate influences of child age were among the strongest predictors of health care utilization; furthermore, they arose despite the fact that illness levels did not fall after the child's sixth month. Given this major reversal in the effect of age on demand, we could expect to see other determinants of demand differ by age. One reason these could arise is that health production functions are likely to change with the stage of infant development. For example, the period between 7 and 24 months of age may differ from the 0-6 month period because it is when non-breastmilk liquid and solid nutrients are being introduced. This could make the child much more susceptible to water- and food-related illnesses such as those which cause diarrhea and anorexia. If health production technology does vary with age, demands for health inputs and the determinants of these demands may also. The likelihood ratio test of coefficient differences between children birth to 6 months and those age 7 to 24 months was not significant.[88] We will split the sample by child age at six months, however, because it will allow us to investigate how household and community factors influence demand for health care differently by child age.

Child age has been shown elsewhere to have important impacts on demand for curative health care services. Alderman and Gertler's results for Pakistan (1997) reveal that girls' demand for care from government clinics and doctors increases with a linearly specified age effect, but boys' does not. In Indonesia, age up to the fifth birthday has

[88] Chi-square=205, d.f. 203, chiprob 0.447.

negative impacts on child visits to doctors and health centers (Gertler et al., 1996); similar results are found in Bicol, Philippines (Akin et al., 1985) and urban Bolivia (Ii, 1996). Deolalikar (1993) also finds a negative effect of age on *unconditional* demand for traditional and modern care in Indonesia. For children age 0-15 in the Philippines, linear age effects are negative on demand of public and private services (Ching, 1995). In Côte d'Ivoire, age under five years has the effect of increasing the demand for lower-cost and quality nurse care, with the influence turning negative after five; age had no impact on demand for doctor care (Dor and van der Gaag, 1987). Gertler and van der Gaag (1990), using the same data as Dor and van der Gaag, find, on the other hand, that child age zero to three negatively impacts the demand for hospital and clinic care; age after three has no effect. The disparity in the findings on the child age effects using the same data set could be due to the difference in how the variable is divided into piecewise segments (in the former the break is at five years, in the second at three years), or to differences in how the choice alternatives were defined in each model. Finally, age under three was found to decrease the likelihood of a visit to a clinic; age over three decreased the probability of a visit to a private doctor, respectively, in rural Peru (Gertler and van der Gaag, 1990).

As discussed in previous sections, all but one of the health care demand studies above (Deolalikar) use samples which are conditioned on a current self-reported illness. If younger children are shown preference for health investments, so their illnesses are more likely to be reported by the mother than those of lower birth order children, this could lead to a selected sample for which estimated results would be biased. Models which are not conditioned on current reported morbidity will not be subject these possible sources of bias.

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Table 7.4 presents the health care demand equations stratified by child age. Beginning with the facility effects, distance has negative impacts for all types of care for both age groups. Distance to public facility decreases public demand for younger infants more than for their older counterparts. For private demand, private distance is a significant deterrent to utilization only for the youngest children. The effect of distance on demand for traditional services does not vary by child age.

Some user fee influences also varied by age. Private fees have influential negative impacts on private visits only for the youngest; user fees for traditional services were positive only for older children; public user fees were not important at either age.

A few facility quality results also differed by age. Doctor ratios at public facilities were positive and important only for older infants. Public supply of intravenous diarrhea treatments was negative and significant for both ages, but the effect was much stronger for children in the 7-24 month group who are more likely to be weaning.[89] Alternatively, ORT stocks at public facilities had important positive influences on public demand for both ages. Public personnel impacts were significant and positive, but not large, in both groups.

For private care, ORT availability had large negative impacts on the youngest children only, while intravenous diarrhea treatments had positive and important effects only for the older group. It was also found that the range of available family planning methods at private facilities significantly reduced only younger children's demand.

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[89] This again highlights the notion that if public facilities run low on supplies because children in the area have high rates diarrhea, low supply could be related to very high demand for the commodity.

The two measured aspects of traditional service quality, education and formal training, raised the probability of a traditional visit only among children older than six months of age.

Individual- and household-level characteristics also varied by child age. The effect of child being male had positive impacts on private and traditional services for all ages; however, the magnitude of this effect for newborns was double what is was for the older infants. Male gender raised public demand only for children younger than six months.

The first piecewise segment of maternal education (0-5 years) was positive and significant for pre-six month demand for pubic and traditional care, and for post-six month demand for private services. Maternal education beyond five years raised the likelihood of a private visit for post-six month olds; it reduced the chances of a traditional visit for those younger than six months of age. The first mother height spline had positive effects on using private services for all ages. Public demand for older infants was increased by height in the first spline, but decreased by height in the second spline. Child's mother being the senior woman in the household boosted the chances of a newborn visit to high-quality, high-priced private care.

Husband education up to the fifth year had the effect of increasing newborn demand for public care; the impact of his schooling after the fifth year was to raise the probability of a newborn's visit to a private facility reduce the probability of a newborn being taken to a lower-quality facility.

Also interesting were the insurance and asset effects. Insurance coverage increased the likelihood of a private visit for only older infants. Asset values in the lower

33 percent of the distribution had large and positive influences on private demand for both ages; values above the 33rd percentile, however, did not significantly affect demand for private care, but served to reduce the likelihood of a public visit and increase that of a traditional visit among 7-24 olds.

Household composition effects had varying influences depending on child age. Additional male children who are younger than the sample infant (these would not be siblings, but other infants in residence), reduced the chances of 7-24 month olds visiting private or traditional service providers, which are two higher-priced alternatives. In contrast, preschool girls older than the index child increased the likelihood of a traditional visit for non-newborns. Young adult females raised the demand for private care for all infants, while the presence of elderly men negatively affected private and traditional care only for 7-24 month olds.

CONCLUSION

Differential responses to health facility characteristics, household resources and composition were found when the demand analyses were stratified by demographic and socioeconomic subgroup. Starting with the care attributes, distance to public facilities had greater negative impacts on public visits for girls than boys, for higher-asset than lower-asset households, and for newborns than older infants. Distance to private facilities reduced the chances of a private visit more for males, for the high-asset and high-education groups, and for newborns. Traditional distance dampened traditional demand most among daughters, low-education mothers, and low-asset households. The finding that greater asset households responded more to distance to modern care was somewhat surprising since the other research has found that the poor are more sensitive to distance to facilities. However, past studies have not allowed differential responses to distance by type of care being sought. If these effects had been constrained to equality, it is very likely that the conclusion would have been that lower-income households are more responsive to distance; this is because the low-asset coefficient on traditional distance is much larger than any of the high-asset distance effects and it would have dominated the constrained effects.

Differences in user fee responses were less varied. Less-educated mothers had positive responses to public user fees. Newborn private care was inhibited by private user fees. Demand for traditional services among girls, less-educated mothers, low-asset households, and older infants were increased by traditional user fee. In general the positive price effects were not expected; however, because there is not much data available to control for the quality attributes which drive the demand for traditional services, it is possible that the positive influence is picking up unmeasured desirable aspects of the quality of this type of care. Furthermore, it is conceivable that poor mothers with little education are most attracted to traditional providers for reasons we are not aware of . Moreover, since girls and older infants appear to be discriminated against for the use of public services, their demand for traditional care may be more price inelastic than that of boys and newborns.

Results for the facility quality effects were not as straightforward. For public quality responses did not differ by child sex; mothers with more education responded more positively to public quality than did the less-educated.

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Private quality influences were stronger for girls, but the direction of the effects was not uniform. Mothers with more education had only slightly stronger to responses to private quality. The asset and age stratifications yielded not clear set of private quality impacts.

For traditional care, again girls, non-newborns, and mothers with little education had strong positive responses to provider characteristics.

Individual and household effects also varied with some of the stratifications. The positive influence of male gender on private demand was strongest among newborns, low-asset households, and mothers with less education. The male influence on traditional visits was paramount for newborns, high-asset households, and low-educated mothers.

The first linear segment of maternal education raised the chances of a public visit among the poor and newborns; it enhanced the chances of a private visit for boys, the less poor and non-newborns; and it strengthened traditional demand for girls and newborns. Maternal education over five years reduced private demand for girls but increased it for non-newborns. Maternal height raised the chances of a modern visit for children of more highly educated mothers and with low-asset holdings. Paternal education raised the demand for modern services for newborns.

The presence of children younger than the index infant reduced private and traditional demand for girls and children in high-asset households most. Elderly men, on the other hand, reduced the likelihood of private and traditional visits for boys, non-newborns, and infants of more highly educated mothers.

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Section 8

DISCUSSION AND CONCLUSIONS

This research seeks to add to the literature on child health care demand in developing countries in several ways. First, previous research has focused mainly on care for adults; this is one of the few studies to examine demand for services to treat young children. This is an important line of inquiry as the first three years of life is the most crucial period in terms of physical and mental development (Martorell, 1995). Illness during this period, much of which is due to treatable infectious disease, can have devastating effects on development because feeding, appetite, and absorption of nutrients can be severely reduced (Adair, et al., 1993).

Second, in addition to information collected from a broad, multi-wave survey of households, the study uses a unique set of data on quality of health facilities and characteristics of health personnel. This provides the opportunity to examine how specific aspects of services drive demand.

Third, the study uses BOTH distance and fees for service as measures of price. Most studies in this genre use only distance to estimate price responses; policy recommendations for user fees are often made based on these results. However, if households respond differently to changes in distance than to changes in fees, this could be important for predicting the effects of changing user fees versus building new facilities.

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Fourth, traditional health providers, which are used very frequently in developing countries but which are not always considered in demand studies, are included in the set of modeled health care alternatives.

Fifth, the empirical approach allows differential price and quality responses by type of health care. Most studies constrain price and quality coefficients to be equal across health care alternatives and assume that the same set of health care characteristics impact the probability of visiting different types of providers. This greatly limits the insights of what influences improving quality or raising fees at different types of facilities will have on demand.

Sixth, and finally, the model provides estimates of price and income responses that are not conditioned on self-reported morbidity status; this approach avoids the selection bias inherent in using a sample of only those who report themselves as ill. A strong argument can be made that self-reported health measures are endogenous in a model of health care demand because of unobserved attitudes that may affect both health reporting and utilization when an illness occurs, and should therefore, not be conditioned on.

RESULTS

Results from our baseline flexible MNL model indicate that when differential influences of price and quality on demand are allowed to vary by the type of care, there are indeed differential demand responses by service type. These results change dramatically when provider attribute effects from these diverse types of services are forced to have the same set of elements describing them, and each element is forced to have an identical impact on the demand for each type of care. Forcing different flavors of health care to be influenced by the same set of attributes, and imposing the restriction that each of these attributes has the same effect on every kind of service, is unrealistic at best and could be highly misleading.

We find that distance to facilities has consistently strong negative effects, and it appears from these estimates that distance is a more important determinant of demand than monetary user fees. In the context of health service reforms in developing countries, this demonstrates that location of facilities may largely determine not only whether health care is sought, but the type of care chosen.

User fee variables were very sensitive to whether non-facility community effects were controlled for. This was especially true for the public fee variable. Fees have strong negative impacts on demand for public care when other community attributes are either replaced by district-level dummies or omitted altogether; their impacts, however, are close to zero and insignificant when these influences ARE controlled for. This is an important finding since results from these types of studies may be used to set pricing policies for public health care in developing countries: without the detailed community controls we would conclude demand is price sensitive, whereas with them we would come to a very different conclusion. Past studies have controlled for few, if any, non-facility community variables. Because the presence and quality of health facilities is expected to be highly correlated with other community characteristics, facility price and quality results from models where community attributes are not specifically accounted for should be interpreted with caution.

Strong, though differential, quality effects were found on demand for all facilities. Availability of ORT, vaccines, family planning services, and personnel had large positive effects on the probability of using public services; more sophisticated (intravenous) diarrhea treatments increased visits to private facilities; demand for traditional providers was increased by the practitioner having had any formal health training. These particular quality effects were generally robust to the nesting specification.[90] However, similar to the public price variable, many of the quality variables were sensitive to whether other community characteristics were controlled for. Furthermore, a few of the quality variables, mainly current drug supplies at the facility, had consistently unexpected negative impacts on demand. This result could be driven however by the fact that the drug variables were defined as those *currently* in stock. The availability of a drug at any particular time reflects the interaction of both supply and demand factors; if a certain drug is out of supply it may be due to excess demand for it. For instance, if public clinics with intravenous drugs are in areas with high demand--poorer areas with high diarrhea levels--their stock may be diminished quickly; this would produce a negative correlation between demand for services and availability of drugs (Mwabu, et al., 1993). The significant negative effect of intravenous diarrhea treatments may, therefore, indicate that they are high demand at public health facilities in high-diarrhea areas.

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[90] Cross-effects between public and traditional services were also found in the nested models. Increasing barriers to access (distance or user fee) at one raises demand at the other type of facility. This signals that public facilities could in principle be major channels for the delivery of efficacious modern health services in developing countries if their access were expanded.

Another possiblity is that effect arises from non-random placement of facilities. While formal tests of the hypothesis cannot be performed because the complete set of facility quality data is not available at two different points in time (Pitt, Rosenzweig, Gibbons, 1995), an informal test was performed to get an indication of how facility quality was related to community illness rates. The complete set of regressors from the demand models was used to estimate a logit model of any reported illness using the 24 hour recall data. Several sets of facility quality variables had *positive effects* on reported illness. Facilities may therefore be purposefully located in sicker areas; this endogenous placement of quality of services makes their true effect on demand difficult to assess.[91]

For the individual- and household-level variables, we find that utilization of modern services is increased by household income and maternal human capital. Maternal education and height increases demand for both public and private, but especially private care. As incomes and health insurance coverage rise, households switch from public and traditional care into the private services. This income bifurcation in where people seek care could have equity considerations which are policy relevant: it implies that investing resources in public facilities may be a good method of targeting health care resources to

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[91] Mother age, household asset values, and to some extent mother education reduced the probability of reported illness.

Public distance and price increased as one would expect. Five of the seven public quality variables, however, had *positive* effects on reported illness: these were doctor ratio and nurse ratio, and ORT, other diarrhea drug, and vaccine availability. While none these was individually significant, their joint effect was. For private facilities, price was positive; however, distance had a negative effect, and number of personnel, doctor and nurse ratio each had *significant positive* effects on reported illness. These results may indicate that facilities may be placed in sicker areas.

the poor because they are the primary users of these services.[92] Similar results were found in Jamaica by Gertler and Sturm (1997).

Demand is greater among children who are male and less than 6 months of age; these groups are also more likely to be taken to expensive, higher quality private facilities. The presence of infant males younger than the index child reduces the likelihood of an index child's visit, especially for females. These individual and household effects were diminished somewhat in the nested model where correlation is allowed across facility types.

Differential responses to health facility characteristics, household resources and composition were found when the demand analyses were stratified by demographic and socioeconomic subgroup. Distance to public facilities had greater negative impacts on public visits for girls than boys, for higher-asset than lower-asset households, and for newborns than older infants. Distance to private facilities reduced the chances of a private visit more for males, for the high-asset and high-education groups, and for newborns. Traditional distance dampened traditional demand most among daughters, low-education mothers, and low-asset households. The finding that greater asset households responded more to distance to modern care was somewhat surprising since the other research has found that the poor are more sensitive to distance to facilities. However, past studies have not allowed differential responses to distance by type of care being sought. If these effects had been constrained to equality, it is very likely that the

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[92] This raises possible concerns about the development of a two-tiered system in the long-run. However, given the current organization of service delivery, this may have important welfare effects.

conclusion would have been that lower-income households are more responsive to distance; this is because the low-asset coefficient on traditional distance is much larger than any of the high-asset distance effects and it would have dominated the constrained effects.

Differences in user fee responses were less varied. Less-educated mothers had positive responses to public user fees. Newborn private care was inhibited by private user fees. Demand for traditional services among girls, less-educated mothers, low-asset households, and older infants were increased by traditional user fee. In general the positive price effects were not expected; however, because there is not much data available to control for the quality attributes which drive the demand for traditional services, it is possible that the positive influence is picking up unmeasured desirable aspects of the quality of this type of care. Furthermore, it is conceivable that poor mothers with little education are most attracted to traditional providers for reasons we are not aware of . Moreover, since girls and older infants appear to be discriminated against for the use of public services, their demand for traditional care may be more price inelastic than that of boys and newborns.

Results for the facility quality effects were not as straightforward. For public quality responses did not differ by child sex; mothers with more education responded more positively to public quality than did the less-educated. Private quality influences were stronger for girls, but the direction of the effects was not uniform. Mothers with more education had only slightly stronger to responses to private quality. The asset and age stratifications yielded not clear set of private quality impacts. For traditional care, again girls, non-newborns, and mothers with little education had strong positive responses to provider characteristics.

Individual and household effects also varied with some of the stratifications. The positive influence of male gender on private demand was strongest among newborns, low-asset households, and mothers with less education. The male influence on traditional visits was paramount for newborns, high-asset households, and low-educated mothers.

The first linear segment of maternal education raised the chances of a public visit among the poor and newborns; it enhanced the chances of a private visit for boys, the less poor and non-newborns; and it strengthened traditional demand for girls and newborns. Maternal education over five years reduced private demand for girls but increased it for non-newborns. Maternal height raised the chances of a modern visit for children of more highly educated mothers and with low-asset holdings. Paternal education raised the demand for modern services for newborns.

The presence of children younger than the index infant reduced private and traditional demand for girls and children in high-asset households most. Elderly men, on the other hand, reduced the likelihood of private and traditional visits for boys, non-newborns, and infants of more highly educated mothers.

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APPENDICES

APPENDIX A

Main Tables

Table 4.1	Quality Attributes by Disaggregated Facility Type				
Variable	brgyhs	pubcln	pubhosp	prvcln	prvhosp	Total

Variable	brgyhs	pubcln	pubhosp	prvcln	prvhosp	Total
ChdOutpTrtd	1.00	1.00	1.00	0.86	1.00	0.86
ChdImmunAvl	1.00	0.96	0.75	0.57	0.67	0.87
PrenUserFee	0.00	0.00	0.00	2.88	3.59	0.97
ChOutpUsFee	0.00	0.00	0.00	7.76	9.84	2.55
# Personnel	10.52	25.19	148.71	6.75	96.55	41.01
Doctr Ratio	0.10	0.10	0.27	0.54	0.21	0.18
Nurs Ratio	0.69	0.48	0.55	0.31	0.57	0.54
ORT CurAvl	0.72	0.58	0.29	0.00	0.50	0.52
IntrvCurAvl	0.03	0.06	0.43	0.25	0.60	0.20
VaccinIndex	0.05	0.68	0.44	0.07	0.33	0.34
FamPlnIndex	0.24	0.43	0.46	0.32	0.27	0.33
#Facilities	21	23	4	7	12	67

Table 4.2 Health Care Characteristics by Final Facility Type			
	Public	Private	Traditional
Distance To Closest (km)	0.66	2.10	0.03
User Fee (1980 pesos)	0.54	4.83	1.06
Doctor Ratio	0.12	0.31	na
Nurse Ratio	0.50	0.54	na
# Personnel	39	49	1
ORT In Stock (0-1)	0.87	0.37	na
Intravenous Diar Trtmts In Stock (0-1)	0.15	0.74	na
Vacc Avl Index (% of 4 basic)	0.44	0.74	na
Fampln Index (% of 7 methods)	0.38	0.29	na
Educ Medn Tradl In Brgay (yrs)	na	na	5.09
Frmal Trng Medn Tradl Prvdr In Brgay (0-1)	na	na	0.78

Table 4.3 **Utilization by Demographic Group and Season**

Type of Health Facility Visited

	Public	Private	Tradl	No Visit	Obs
All	11.66	17.05	20.46	50.83	31030
Male	11.79	18.14	20.60	49.47	16425
Female	11.51	15.83	20.32	52.33	14541
Low Educ	10.02	11.95	22.99	55.05	9701
High Educ	12.40	19.37	19.31	48.92	21329
Low Asst	13.32	13.04	21.38	52.26	9545
High Asst	10.92	18.83	20.05	50.20	21485
Age 1-6 Mos	18.39	21.61	8.78	51.22	6492
Age 7-24 Mos	9.87	15.84	23.55	50.73	24538
Dry Season	11.67	17.81	20.52	50.00	10407
Wet Season	11.72	16.32	21.11	50.86	12973
Interim Season	11.54	17.25	19.28	51.92	7650

Table 4.4 **Reported Illness by Demographic Group and Season**

Child Illness — 24 Hour Recall by Mother

	Any	Diarrhea	FRI	Other
All	.61	.08	.08	.47
Male	.62	.09	.08	.47
Female	.61	.07	.07	.48
Low Educ	.63	.09	.09	.47
High Educ	.61	.08	.07	.47
Low Asst	.63	.10	.09	.47
High Asst	.60	.08	.07	.47
Age 1-6 Mos	.53	.05	.05	.43
Age 7-24 Mos	.63	.09	.08	.48
Dry Season	.63	.08	.08	.49
Wet Season	.60	.08	.07	.47
Interim Season	.62	.08	.09	.48

Table 4.5 **Exogenous Variables for Analysis of Health Care Demand—Cebu, Philippines 1983-1986**

Child Variables	
Child's Sex	1=Male, 0=Female
Child's Age	Days Since Birth
Household Variables	
Mother's Education	Highest Grade Completed
Mother's Age	Years
Mother's Height	Cm
Husband's Education	Highest Grade Completed
Husband's Age	Years
Mother Not in HHold	Mother never present in hhold during child's first 2 years.
Husband Not in HHold	Husband never present in hhold during child's first 2 years
Mother Senior Woman	Mother is Hhold Head, Spouse of Head, or Mother of Head
Grandmother Present	Sample Woman's Mother or Mother-in-law Present
# Younger Males	# Males Younger than Sample
# Younger Females	# Females Younger than Sample Child
# Older Males Under 6	# Males Older than Sample Child but Ynger than 6
# Older Females Under 6	# Females Older than Sample Child but Ynger than 6
Male Children Age 6-13	# Males Age 6-13
Female Children Age 6-13	# Females Age 6-13
Males Age 14-20	# Males Age 14-20
Females Age 14-20	# Females Age 14-20
Males Age 21-60	# Males Age 21-59
Females Age 21-60	# Females Age 21-59
Males Age 60 or Over	# Males Age 60 or Over
Females Age 60 or Over	# Females Age 60 or Over
Household Assets	Deflated value of total hhold asset holdings/1000 in 1980 pesos
Health Insurance	Child covered by health insurance
Health Facility Variables	
Distance to Public/Private	Km from Cluster Location of Household to Nearest Public or Private Facility
Distance to Traditional	Km to Nearest Traditional Facility from Barangay Center
Facility UserFees	Barangay Median Defltd HH Expenditure Per Visit by Facility Type in 1980 pesos
Postnatal Provided	Facility provides child postnatal services
Number Personnel	Total number personnel at facility
Doctor Ratio	Proportion of doctors to total staff
Nurse Ratio	Proportion of nurses to total staff
ORT Availability	Facility has ORT Supplies (0-1)
Other Diar Trtmt Avail	Facility has intraveneous diarrhea treatments (0-1)
Vaccin Availability Index	Percentage of four basic child vaccinations facility has on hand

Family Planning Avail Index	Percentage of seven possible family planning supplies/treatments facility provides
Yrs Educ Medn Trad Prvdr	Median years of education of traditional providers in the community
Formal Training Tradl	Median training of traditional providers in the community
Non-Facility Community Variables	
Piped/Pumped Water	% sample hholds in barangay w piped or pumped water into house or yard
Sanitary Garbage	% sample hholds in barangay w sanitary garbage disposal
Water Shortage	Frequent water shortages experienced in barangay
Improved Roads	Barangay has concrete or asphalt roads
Bank Dummy	Barangay has modern or "rural" bank
High Elevation	High Elevation Barangay
Island	Island Barangay
Corn Price	Deflated Bimonthly Barangay corn prices per kilogram in 1980 pesos
Vegetable Oil Price	Deflated Bimonthly Barangay Vegetable Oil prices per ml in 1980 pesos
Minimum Formula Price	Minim Deflated Bimonthly Barangay Infant Formula Price per ml in 1980 pesos
Rainfall	Monthly Levels for Region (mm)

Table 4.6	Summary Statistics	
Variable	Mean	Std. Dev.
Individual and Household		
Child is Male	0.53	0.50
Child Age in Months	12.73	6.92
Mother Absent All 2 Yrs of Survey	0.00	0.05
Mother Educ Years	7.36	3.71
Mother Age Years	27.43	6.19
Mother Ht cm	150.73	5.10
Husband Absent All 2Yrs of Survey	0.04	0.19
Husband Educ Years	7.43	4.10
Husband Age Years	29.18	8.78
Child Covered by Insurance	0.34	0.47
AssetValue-1980 Pesos/1000	8.19	28.36
Mother Is Senior Woman in Hhold	0.81	0.39
Grandmother Present in Hhold	0.21	0.41
# Younger Males In HH	0.04	0.21
# Younger Females in HH	0.04	0.20
# Older Under 6 Yr Male	1.06	0.85
# Older Under 6 Yr Feml	0.99	0.84
# Males 6-13	0.56	0.84
# Females 6-13	0.56	0.84
# Males 14-20	0.32	0.67
# Females 14-20	0.43	0.72
# Males 21-60	1.22	0.67
# Females 21-60	1.22	0.74
# Males Over 60	0.06	0.24
# Females Over 60	0.08	0.27
Community--Non-Facility		
High Elevation Brgy	0.06	0.24
Island Barangay	0.10	0.31
Comm Avg Piped/Pumped Wtr to House	0.13	0.08
Comm Avg Sanitry Garb Disposal Prac	0.79	0.10
Comm Has Freq Water Shortages	0.14	0.35
Comm Has Improved Roads	0.73	0.44
Community Has Bank	0.21	0.41
Comm Avg Fridge Owners	0.07	0.04
Comm Mdn Time To Water Source	2.04	2.24
Comm Avg Modern Toilet in House	0.39	0.20
Corn Price-Current Mth	198.51	33.05
Veg Oil Prc-Current Mth	1.02	0.33
Formula Prc-Current Mth	2.72	0.48
Rainfall mm Current Mth	145.56	99.22

Number of children: 2884

Number of child-round observations: 30919

Table 6.1. Any Child Curative Health Care Visit: Individual- and Household-Level Determinants

(Full Distance, User Fee, Facility Quality Specificaton)

	coef	z-stat
Child is Male	0.148	3.30
Child Age Mos 1-6	0.142	10.30
Child Age Mos 7-24	-0.040	11.22
Mother Absent All 2Yrs	-0.435	1.02
Mother Educ 0-5 Years	0.040	1.96
Mother Educ >= 6 Yrs	0.016	2.01
Mother Age (Years)	-0.012	2.47
Mother Ht to 150 cm	0.019	2.43
Mother Ht>=150 cm	-0.007	1.15
Husband Absent All 2Yrs	-0.126	0.72
Husband Educ 0-5 Years	-0.008	0.39
Husband Educ >= 6 Yrs	-0.011	1.52
Husband Age (Years)	0.002	0.39
Insurance	0.033	0.82
AssetValue-LowestThird	0.231	2.99
AssetValue-UpperTwoThrd	-0.001	1.05
Mother Is Senior Woman	0.019	0.25
Grandmother Present	0.033	0.46
# Younger Males In HH	-0.214	2.94
# Younger Females in HH	-0.113	1.42
# Older Under 6 Yr Male	-0.004	0.15
# Older Under 6 Yr Feml	0.035	1.42
# Males 6-13	0.003	0.12
# Females 6-13	-0.015	0.69
# Males 14-20	0.008	0.28
# Females 14-20	0.029	1.16
# Males 21-60	-0.014	0.48
# Females 21-60	0.033	1.19
# Males Over 60	-0.141	1.81
# Females Over 60	0.021	0.30
Constant Term	-5.407	3.09

Notes: 1. Outcome of no visit is the comparison group. 2. Regression standard errors adjusted for clustering on individual id. 3. Also included as regressors are current and lagged rainfall levels for the area, and the following community variables: deflated current and lagged food prices, high elevation indicator; island indicator; proportion of households in barangay with piped or pumped water into house or yard; proportion of households in barangay with sanitary garbage disposal; dummy for frequent water shortages; dummy for presence of improved (paved or concrete) roads; and dummy for presence of formal or rural banks.

Table 6.2. **Any Child Curative Health Care Visit: Health Provider Attributes, Included in Succesive Steps**

	Dist, Fee, Quality		Distance and Fee		Distance Only	
	coef	z-stat	coef	z-stat	coef	z-stat
Dist Nearest Public(km)	-0.068	1.33	-0.016	0.40	-0.097	2.68
Price Public Visit	0.543	1.85	0.579	4.16		
Number Personnel Public	-0.004	3.21				
Doctor Ratio Public	0.828	1.64				
Nurse Ratio Public	0.171	0.61				
ORT Available Public	0.358	2.02				
OthrDiarDrug Avl Public	0.363	1.12				
Vacc Avail Indx Public	0.448	3.30				
Famp Avail Indx Public	-0.188	0.76				
Dist Nearst Private(km)	-0.095	3.60	-0.060	3.70	-0.036	2.34
Price Private Visit	0.015	0.27	-0.036	1.69		
Prvt Provides PostNatal	-0.095	0.26				
Number Personnl Private	0.005	2.97				
Doctor Ratio Private	1.403	2.71				
Nurse Ratio Private	1.610	2.88				
ORT Available Private	-0.215	1.03				
OthrDiarDrug Avl Private	0.250	1.37				
Vacc Avail Indx Private	-0.419	0.82				
Famp Avail Indx Private	0.053	0.18				
Dist Nearst Traditl(km)	-0.732	1.10	-0.308	0.89	-0.722	3.75
Price Traditional Visit	0.074	0.54	0.190	1.93		
YrsEduc MedianTrdlPrvdr	0.013	1.22				
FormlTraing MedianTrdl	-0.182	0.89				
Constant Term	-5.407	3.09	-2.174	1.73	-1.335	1.08

Notes in Table 6.1 apply here.

Table 6.3. Any Child Curative Health Care Visit: Provider Attributes Included in Succesive Steps & Community Controls Excluded

	Dist, Fee, Quality		Dist and Fee		Distance Only	
	coef	z-stat	coef	z-stat	coef	z-stat
Dist Nearest Public(km)	-0.060	1.54	-0.009	0.30	-0.072	2.61
Price Public Visit	0.632	3.06	0.325	3.23		
Number Personnel Public	0.000	0.08				
Doctor Ratio Public	-0.022	0.06				
Nurse Ratio Public	-0.061	0.38				
ORT Available Public	0.338	2.23				
OthrDiarDrug Avl Public	0.041	0.28				
Vacc Avail Indx Public	0.069	0.81				
Famp Avail Indx Public	-0.295	1.47				
Dist Nearst Private(km)	-0.119	7.85	-0.081	7.21	-0.077	7.57
Price Private Visit	-0.059	2.27	-0.015	1.09		
Prvt Provides PostNatal	-0.491	3.65				
Number Personnl Private	0.004	2.82				
Doctor Ratio Private	0.622	1.55				
Nurse Ratio Private	1.054	2.49				
ORT Available Private	-0.188	1.00				
OthrDiarDrug Avl Private	0.112	0.87				
Vacc Avail Indx Private	-0.255	0.61				
Famp Avail Indx Private	-0.609	2.30				
Dist Nearst Traditl(km)	-0.127	0.34	-0.230	1.24	-0.338	2.91
Price Traditional Visit	0.274	3.01	0.224	3.78		
YrsEduc MedianTrdlPrvdr	0.005	0.71				
FormlTraing MedianTrdl	0.119	0.79				
Constant Term	-4.168	-3.44	-3.439	-2.94	-2.998	-2.58

Notes: 1. Outcome of no visit is the comparison group. 2. Regression standard errors adjusted for clustering on individual id.

Table 6.4. Baseline Specification of Facility Choice for Child Curative Visit

Multinomial Logit Regression						
	Public v None		Private v None		Traditional v None	
Variable	Coef.	z	Coef.	z	Coef.	z
Public Facility Characteristics						
Nearest Public (km)	-0.360	4.46	.	.	.	.
Price Public Visit	0.092	0.31	.	.	.	.
Number Personnel Public	0.006	4.55	.	.	.	.
Doctor Ratio Public	1.544	3.41	.	.	.	.
Nurse Ratio Public	0.116	0.38	.	.	.	.
ORT Avail Indx Public	1.042	4.72	.	.	.	.
OthrDiarDrugIndx Public	-1.221	4.16	.	.	.	.
Vacc Avail Indx Public	0.615	4.37	.	.	.	.
Famp Avail Indx Public	0.335	1.13	.	.	.	.
Private Facility Characteristics						
Nearest Private (km)	.	.	-0.069	2.42	.	.
Price Private Visit	.	.	-0.017	0.81	.	.
Prvt Provides PostNatal	.	.	0.439	1.11	.	.
Number Personnl Private	.	.	0.002	1.25	.	.
Doctor Ratio Private	.	.	-0.400	1.05	.	.
Nurse Ratio Private	.	.	-0.230	0.52	.	.
ORT Avail Indx Private	.	.	-0.403	2.00	.	.
OthrDiarDrugIndx Privat	.	.	0.305	2.12	.	.
Vacc Avail Indx Private	.	.	-0.757	1.92	.	.
Famp Avail Indx Private	.	.	-0.601	2.09	.	.
Traditional Provider Characteristics						
Nearest Traditional(km)	.	.	.	.	-1.990	5.41
Price Traditional Visit	.	.	.	.	0.241	2.10
YrsEduc MedianTrdlPrvdr	.	.	.	.	0.010	1.31
FormlTraing MedianTrdl	.	.	.	.	0.466	6.42
Individual and Household Characteristics						
Child is Male	0.098	1.34	0.200	3.08	0.122	2.20
Child Age Mos 1-6	0.042	2.15	0.121	6.72	0.372	15.15
Child Age Mos 7-24	-0.082	12.66	-0.063	12.52	-0.002	0.33
Mother Absent All 2Yrs	-0.227	0.43	-0.206	0.36	-0.924	1.57
Mother Educ 0-5 Years	0.039	1.17	0.083	2.41	0.039	1.55
Mother Ecuc >= 6 Yrs	0.020	1.48	0.028	2.70	-0.002	0.20
Mother Age (Years)	-0.021	2.51	-0.009	1.28	-0.009	1.42
Mother Ht to 150 cm	0.023	1.82	0.030	2.71	0.004	0.46
Mother Ht>=150 cm	-0.021	2.04	-0.004	0.46	-0.004	0.62
Husband Absent All 2Yrs	0.194	0.68	0.251	0.99	-0.575	2.55
Husband Educ 0-5 Years	0.054	1.56	0.006	0.17	-0.032	1.35
Husband Educ >= 6 Yrs	-0.029	2.22	0.012	1.23	-0.025	2.74
Husband Age (Years)	0.008	1.19	0.005	0.69	-0.005	1.0

Table 6.4 (cont'd)

Variable	Public v None Coef.	z	Private v None Coef.	z	Traditional v None Coef.	z
Insurance	-0.087	1.27	0.192	3.42	-0.016	0.30
AssetValue-LowestThird	0.018	0.14	0.667	5.89	0.034	0.36
AssetValue-UpperTwoThrd	-0.005	2.38	0.001	1.04	-0.002	1.99
Mother Is Senior Woman	-0.121	0.96	0.119	1.15	-0.060	0.65
Grandmother Present	0.045	0.37	0.067	0.69	-0.019	0.20
# Younger Males In HH	-0.063	0.47	-0.365	3.04	-0.195	2.32
# Younger Females in HH	0.092	0.62	-0.184	1.44	-0.120	1.29
# Older Under 6 Yr Male	0.026	0.66	-0.045	1.28	0.029	0.95
# Older Under 6 Yr Feml	0.066	1.66	-0.012	0.34	0.067	2.16
# Males 6-13	0.043	1.13	-0.019	0.57	0.006	0.20
# Females 6-13	0.011	0.29	-0.014	0.44	-0.020	0.70
# Males 14-20	0.022	0.50	-0.034	0.94	0.036	1.03
# Females 14-20	-0.078	1.74	0.091	2.76	0.019	0.59
# Males 21-60	-0.012	0.24	0.019	0.47	-0.046	1.29
# Females 21-60	0.012	0.26	0.071	2.02	0.000	0.01
# Males Over 60	-0.077	0.61	-0.189	1.82	-0.168	1.66
# Females Over 60	0.018	0.14	0.036	0.38	0.044	0.50
Constant Term	-4.514	2.15	-5.482	2.93	-2.836	1.82
Chi-Square Test Statistics for Joint Significance of Variable Groups						
Facility	132.49	0.00	23.97	0.00	58.37	0.00
Fee and Distance	21.17	0.00	6.04	0.05	29.86	0.00
Personnel	47.76	0.00	2.61	0.46	44.72	0.00
Drug Availability	107.79	0.00	11.02	0.03	na	na
Individual and Household						
Child Age	164.62	0.00	164.04	0.00	256.16	0.00
Mother Educ	4.75	0.09	18.18	0.00	2.47	0.29
Mother Height	5.30	0.07	7.98	0.02	0.43	0.81
Husband Educ	5.80	0.05	1.74	0.42	12.45	0.00
Value Assets	5.68	0.06	36.26	0.00	3.97	0.14
Hhold Composition	13.38	0.50	31.36	0.00	17.01	0.26
Community	146.28	0.00	124.55	0.00	193.27	0.00
Infrastructure	93.94	0.00	26.20	0.00	83.75	0.00
Food Prices	10.05	0.35	21.78	0.01	39.32	0.00
Rainfall	15.91	0.26	61.14	0.00	39.75	0.00

Number of obs = 30919
Pseudo R2 = 0.0636
Log Likelihood = -35349.89

Notes in Table 6.1 apply here.

Table 6.5. Facility Choice for Child Curative Care: Individual and Household-Level Determinants with Barangay-Year Interaction Control Dummies

	All Hhold- & Indiv-Level		Insurance Excluded		Hhold Comp Excluded		Hhold Comp & Insur Excluded	
	coef	z	coef	z	coef	z	coef	z
Public Visit vs No Visit								
Child is Male	0.080	1.09	0.081	1.10	0.047	0.80	0.048	0.81
Child Age Mos 1-6	0.001	2.20	0.001	2.21	0.001	2.12	0.001	2.13
Child Age Mos 7-24	-0.003	11.77	-0.003	11.77	-0.003	12.26	-0.003	12.26
Mother Absent All 2 Yrs	-0.158	0.30	-0.189	0.37	0.036	0.07	0.010	0.02
Mother Educ 0-5 Years	0.044	1.29	0.044	1.27	0.045	1.31	0.044	1.29
Mother Educ >= 6 Yrs	0.021	1.58	0.020	1.48	0.018	1.36	0.016	1.24
Mother Age (Years)	-0.021	2.46	-0.021	2.48	-0.018	2.42	-0.018	2.44
Mother Ht to 150 cm	0.025	1.95	0.024	1.93	0.025	2.00	0.025	1.97
Mother Ht>=150 cm	-0.020	1.91	-0.020	1.92	-0.020	1.93	-0.020	1.95
Husband Absent All 2Yrs	0.134	0.47	0.116	0.40	0.188	0.66	0.168	0.59
Husband Educ 0-5 Years	0.035	1.05	0.034	1.02	0.036	1.08	0.035	1.04
Husband Educ >= 6 Yrs	-0.022	-1.71	-0.024	1.92	-0.023	1.80	-0.025	2.05
Husband Age (Years)	0.008	1.21	0.008	1.15	0.008	1.20	0.008	1.13
AssetValue-LowestThird	0.018	0.14	0.008	0.06	0.059	0.47	0.048	0.39
AssetValue-UpperTwoThrd	-0.005	2.19	-0.005	2.16	-0.004	2.19	-0.004	2.16
Insurance	-0.062	0.89			-0.073	1.04		
Mother Is Senior Woman	-0.074	0.60	-0.080	0.64				
Grandmother Present	0.075	0.63	0.073	0.62				
# Younger Males In HH	-0.020	0.15	-0.017	0.12				
# Younger Females in HH	0.063	0.43	0.062	0.42				
# Older Under 6 Yr Male	0.029	0.73	0.030	0.75				
# Older Under 6 Yr Feml	0.067	1.70	0.068	1.70				
# Males 6-13	0.044	1.16	0.046	1.20				
# Females 6-13	-0.003	0.07	-0.001	0.03				
# Males 14-20	0.031	0.70	0.032	0.73				
# Females 14-20	-0.063	1.43	-0.064	1.46				
# Males 21-60	-0.014	0.29	-0.013	0.28				
# Females 21-60	0.003	0.07	0.002	0.04				
# Males Over 60	-0.055	0.43	-0.057	0.45				
# Females Over 60	-0.026	0.20	-0.023	0.18				
Constant Term	-4.816	2.50	-4.745	2.47	-4.913	2.55	-4.841	2.53

Table 6.5 (continued)

	All Hhold- & Indiv-Level		Insurance Excluded		Hhold Comp Excluded		Hhold Comp & Insur Excluded	
	coef	z	coef	z	coef	z	coef	z
Private vs. No Visit								
Child is Male	0.217	3.33	0.214	3.28	0.170	3.48	0.168	3.44
Child Age Mos 1-6	0.003	6.19	0.003	6.18	0.003	6.44	0.003	6.44
Child Age Mos 7-24	-0.003	13.43	-0.002	3.40	-0.003	14.26	-0.003	14.24
Mother Absent All 2 Yrs	-0.028	0.05	0.053	0.10	-0.122	0.21	-0.053	0.10
Mother Educ 0-5 Years	0.087	2.47	0.089	2.54	0.081	2.32	0.084	2.40
Mother Educ >= 6 Yrs	0.028	2.68	0.032	3.05	0.033	3.12	0.038	3.54
Mother Age (Years)	-0.010	1.36	-0.009	1.29	-0.011	1.53	-0.010	1.44
Mother Ht to 150 cm	0.030	2.71	0.030	2.75	0.031	2.81	0.031	2.85
Mother Ht>=150 cm	-0.003	0.36	-0.002	0.23	-0.003	0.37	-0.002	0.23
Husband Absent All 2Yrs	0.251	1.00	0.316	1.26	0.283	1.13	0.341	1.37
Husband Educ 0-5 Years	0.004	0.11	0.008	0.22	0.004	0.11	0.008	0.24
Husband Educ >= 6 Yrs	0.011	1.07	0.017	1.76	0.012	1.20	0.019	1.94
Husband Age (Years)	0.005	0.80	0.006	0.98	0.005	0.80	0.006	0.96
AssetValue-LowestThird	0.678	5.95	0.709	6.23	0.699	6.22	0.723	6.45
AssetValue-UpperTwoThrd	0.001	1.36	0.001	1.28	0.001	1.90	0.001	1.79
Insurance	0.198	3.50			0.207	3.69		
Mother Is Senior Woman	0.128	1.23	0.147	1.42				
Grandmother Present	0.076	0.77	0.079	0.80				
# Younger Males In HH	-0.383	3.23	-0.397	3.36				
# Younger Females in HH	-0.201	1.56	-0.205	1.60				
# Older Under 6 Yr Male	-0.051	1.43	-0.051	1.42				
# Older Under 6 Yr Feml	-0.002	0.06	-0.004	0.11				
# Males 6-13	-0.018	0.53	-0.022	0.67				
# Females 6-13	-0.009	0.29	-0.013	0.42				
# Males 14-20	-0.046	1.25	-0.051	1.39				
# Females 14-20	0.101	3.06	0.104	3.15				
# Males 21-60	0.014	0.35	0.012	0.30				
# Females 21-60	0.074	2.12	0.079	2.27				
# Males Over 60	-0.166	1.61	-0.156	1.54				
# Females Over 60	0.042	0.44	0.034	0.35				
Constant Term	-6.798	4.10	-6.929	4.17	-6.753	4.09	-6.883	-4.16

Table 6.5 (continued)

	All Hhold- & Indiv-Level		Insurance Excluded		Hhold Comp Excluded		Hhold Comp & Insur Excluded	
	coef	z	coef	z	coef	z	coef	z
Traditional vs No Visit								
Child is Male	0.124	2.24	0.124	2.25	0.088	2.04	0.089	2.05
Child Age Mos 1-6	0.014	19.70	0.014	19.70	0.014	19.78	0.014	19.78
Child Age Mos 7-24	0.000	2.17	0.000	2.17	0.000	3.07	0.000	3.07
Mother Absent All 2 Yrs	-0.914	1.50	-0.916	1.50	-0.831	1.38	-0.832	1.38
Mother Educ 0-5 Years	0.025	0.99	0.024	0.99	0.021	0.86	0.021	0.86
Mother Educ >= 6 Yrs	-0.006	0.66	-0.007	0.68	-0.008	0.81	-0.008	0.83
Mother Age (Years)	-0.009	1.43	-0.009	1.43	-0.007	1.27	-0.007	1.27
Mother Ht to 150 cm	0.007	0.76	0.007	0.76	0.008	0.83	0.008	0.83
Mother Ht>=150 cm	-0.003	0.40	-0.003	0.41	-0.003	0.41	-0.003	0.42
Husband Absent All 2Yrs	-0.657	2.93	-0.658	2.94	-0.633	2.88	-0.634	2.88
Husband Educ 0-5 Years	-0.037	1.52	-0.037	1.52	-0.035	1.45	-0.035	1.46
Husband Educ >= 6 Yrs	-0.024	2.61	-0.024	2.68	-0.025	2.68	-0.025	2.75
Husband Age (Years)	-0.007	1.36	-0.007	1.37	-0.007	1.41	-0.007	1.42
AssetValue-LowestThird	0.123	1.29	0.122	1.28	0.127	1.36	0.126	1.35
AssetValue-UpperTwoThrd	-0.002	1.90	-0.002	1.88	-0.002	2.04	-0.002	2.02
Insurance	-0.007	0.13			-0.006	0.11		
Mother Is Senior Woman	-0.064	0.68	-0.064	0.68				
Grandmother Present	-0.041	0.45	-0.041	0.45				
# Younger Males In HH	-0.206	2.48	-0.206	2.48				
# Younger Females in HH	-0.152	1.65	-0.152	1.66				
# Older Under 6 Yr Male	0.018	0.56	0.018	0.56				
# Older Under 6 Yr Feml	0.057	1.84	0.057	1.84				
# Males 6-13	0.005	0.16	0.005	0.16				
# Females 6-13	-0.023	0.81	-0.022	0.81				
# Males 14-20	0.034	0.95	0.034	0.95				
# Females 14-20	0.013	0.40	0.013	0.40				
# Males 21-60	-0.046	1.29	-0.046	1.29				
# Females 21-60	0.002	0.05	0.002	0.05				
# Males Over 60	-0.154	1.53	-0.154	1.52				
# Females Over 60	0.039	0.44	0.040	0.45				
Constant Term	-3.773	2.65	-3.774	2.66	-3.912	2.76	-3.914	-2.76

LR Test vs. Full Set Indiv and HHold Vars	Stat	Prob	Stat	Prob	Stat	Prob
	111.31	0.00	36.46	0.00	153.03	0.00

Notes: 1. Outcome of no visit is the comparison group. 2. Standard errors adjusted for clustering on id.

Table 6.6. Facility Choice for Child Curative Care Visit: Provider Attributes Included in Succesive Steps w Full Set of Community Controls

	Dist, Fee, Quality		Dist and Fee		Distance Only	
	coef	z-stat	coef	z-stat	coef	z-stat
Public Visit vs No Visit						
Dist Nearest Public (km)	-0.360	4.46	-0.352	4.51	-0.363	4.71
Price Public Visit	0.092	0.31	0.130	0.70		
Number Personnel Public	0.006	4.55				
Doctor Ratio Public	1.544	3.41				
Nurse Ratio Public	0.116	0.38				
ORT Available Public	1.042	4.72				
OthrDiarDrug Avl Public	-1.221	4.16				
Vacc Avail Indx Public	0.615	4.37				
Famp Avail Indx Public	0.335	1.14				
Constant Term	-4.514	2.15	-3.222	1.62	-3.159	1.59
Private Visit vs No Visit						
Dist Nearst Private (km)	-0.069	2.43	-0.102	4.29	-0.099	4.22
Price Private Visit	-0.017	0.82	-0.020	1.23		
Prvt Provides PostNatal	0.439	1.11				
Number Personnl Private	0.002	1.25				
Doctor Ratio Private	-0.400	1.05				
Nurse Ratio Private	-0.230	0.52				
ORT Available Private	-0.403	2.00				
OthrDiarDrug Avl Privat	0.305	2.13				
Vacc Avail Indx Private	-0.757	1.92				
Famp Avail Indx Private	-0.601	2.09				
Constant Term	-5.482	2.93	-5.073	2.87	-5.358	3.05
Traditional Visit vs No Visit						
Dist Nearst Traditl (km)	-1.990	5.41	-1.369	4.59	-1.298	4.67
Price Traditional Visit	0.241	2.10	0.035	0.32		
YrsEduc MedianTrdlPrvdr	0.010	1.31				
FormlTraing MedianTrdl	0.466	6.42				
Constant Term	-2.836	1.82	-2.761	1.78	-2.725	1.75

Notes in Table 6.1 apply here.

Table 6.7.1 Facility Choice for Child Curative Care Visit: Provider Attributes Included in Succesive Steps & Community Controls Excluded

	Dist, Fee, Quality		Dist and Fee		Distance Only	
	coef	z-stat	coef	z-stat	coef	z-stat
Public Visit vs No Visit						
Dist Nearest Public (km)	-0.465	8.28	-0.522	9.26	-0.527	9.03
Price Public Visit	-0.386	1.81	-0.888	6.28		
Number Personnel Public	0.006	7.16				
Doctor Ratio Public	1.238	3.20				
Nurse Ratio Public	0.248	1.55				
ORT Available Public	0.989	5.27				
OthrDiarDrug Avl Public	-1.069	6.62				
Vacc Avail Indx Public	0.146	1.32				
Famp Avail Indx Public	1.026	4.25				
Constant Term	-6.256	3.28	-3.531	1.88	-4.235	2.23
Private Visit vs No Visit						
Dist Nearst Private (km)	-0.134	7.48	-0.130	8.40	-0.125	8.44
Price Private Visit	0.006	0.35	0.008	0.72		
Prvt Provides PostNatal	0.056	0.40				
Number Personnl Private	0.001	0.60				
Doctor Ratio Private	-0.722	3.07				
Nurse Ratio Private	-0.683	2.18				
ORT Available Private	-0.162	0.84				
OthrDiarDrug Avl Private	0.031	0.32				
Vacc Avail Indx Private	-0.360	1.00				
Famp Avail Indx Private	-0.460	1.74				
Constant Term	-5.788	3.44	-6.395	3.83	-6.378	3.81
Traditional Visit vs No Visit						
Dist Nearst Traditl (km)	-0.248	1.54	-0.045	0.29	-0.085	0.55
Price Traditional Visit	0.029	0.45	-0.018	0.31		
YrsEduc MedianTrdlPrvdr	0.009	1.63				
FormlTraing MedianTrdl	0.245	4.30				
Constant Term	-4.066	2.83	-3.923	2.75	-3.947	2.78

Notes: 1. Outcome of no visit is the comparison group. 2. Regression standard errors adjusted for clustering on individual id.

Table 6.7.2 **Facility Choice for Child Curative Care Visit: Provider Attributes Included in Succesive Steps w Community Controls Replaced by Municipality Dummies**

	Dist, Fee, Quality		Dist and Fee		Distance Only	
	coef	z-stat	coef	z-stat	coef	z-stat
Public Visit vs No Visit						
Dist Nearest Public (km)	-0.627	-8.08	-0.504	-7.81	-0.483	-7.43
Price Public Visit	-0.432	-1.44	-0.789	-5.17		
NumberPersonnel Public	0.005	3.70				
Doctor Ratio Public	1.885	3.01				
Nurse Ratio Public	1.006	4.33				
ORT Available Public	1.175	4.13				
OthrDiarDrug Avl Public	-0.646	-2.51				
Vacc Avail Indx Public	0.234	1.84				
Famp Avail Indx Public	0.878	3.13				
Constant Term	-6.376	-3.34	-3.684	-1.97	-4.179	-2.22
Private Visit vs No Visit						
Dist Nearst Private (km)	-0.128	-6.88	-0.115	-6.96	-0.110	-6.95
Price Private Visit	-0.006	-0.32	0.004	0.29		
Prvt Provides PostNatal	1.487	3.92				
Number Personnl Private	0.000	0.06				
Doctor Ratio Private	-0.963	-2.37				
Nurse Ratio Private	-0.897	-2.17				
ORT Available Private	-0.063	-0.31				
OthrDiarDrug Avl Privat	-0.329	-1.46				
Vacc Avail Indx Private	0.104	0.20				
Famp Avail Indx Private	-0.500	-1.64				
Constant Term	-6.886	-4.02	-6.207	-3.72	-6.178	-3.71
Traditional Visit vs No Visit						
Dist Nearst Traditl (km)	-0.237	-1.32	-0.173	-0.99		
Price Traditional Visit	0.009	0.12	-0.041	-0.55		
YrsEduc MedianTrdlPrvdr	-0.005	-0.82				
FormlTraing MedianTrdl	0.061	0.96				
Constant Term	-3.888	-2.72	-3.808	-2.68	-0.182	-1.06

Notes: 1. Outcome of no visit is the comparison group. 2. Regression standard errors adjusted for clustering on individual id.

Table 6.8 Effect of Facility Price and Quality on Choice—Facility Effects Constrained to Equality

Conditional Logit Regression		
Variable	Coef.	z
Distance	-0.167	-14.76
User Fee	-0.026	-2.51
Postnatal Services	-0.021	-0.31
Number Personnel	0.000	0.98
Doctor Ratio	0.498	5.34
Nurse Ratio	0.537	6.05
ORT Available	-0.190	-5.23
Othr Diar Avail	0.005	0.11
Vaccn Avail Indx	0.525	10.63
Fampl Avail Indx	-0.339	-4.69
Yrs Educ Tradl	0.001	0.53
Formal Training Tradl	0.235	5.95
Public Intercept	-5.043	-4.13
Private Intercept	-7.378	-6.49
Traditl Intercept	-3.912	-4.07

Number of obs = 30920
Log Likelihood = -35938.261
Pseudo R2 = 0.1616

Notes: 1. Standard errors NOT adjusted for clustering on id. 2. Results of household effects not reported in this table because they are nearly identical to those in "unconstrained" specification.

TABLE 6.9 UNCONDITIONAL MARGINAL FACILITY EFFECTS--POOLED SAMPLE
MULTINOMIAL VS NESTED MULTINOMIAL LOGIT MODELS

Var	PUBLIC v NONE		PRIVATE V NONE		TRADITIONAL V NONE	
	Mnl	Nmnl	Mnl	Nmnl	Mnl	Nmnl
Inclusive Value for Nested Specification: coef=.359 t=3.46						
Dist Nearest Public(km)	-0.032	-0.025	0.006	0.004	0.007	0.016
Price Public Visit	0.008	0.025	-0.001	-0.004	-0.002	-0.016
Number Personnel Public	0.001	0.001	0.000	0.000	0.000	0.000
Doctor Ratio Public	0.139	0.115	-0.025	-0.020	-0.030	-0.072
Nurse Ratio Public	0.010	-0.046	-0.002	0.008	-0.002	0.029
ORT Available Public	0.094	0.103	-0.017	-0.018	-0.020	-0.064
OthrDiarDrug Avl Public	-0.110	-0.179	0.020	0.032	0.024	0.112
Vacc Avail Indx Public	0.055	0.047	-0.010	-0.008	-0.012	-0.029
Famp Avail Indx Public	0.030	0.041	-0.005	-0.007	-0.006	-0.026
Dist Nearst Private(km)	0.001	0.000	-0.009	-0.001	0.002	0.001
Price Private Visit	0.000	0.000	-0.002	0.001	0.001	0.000
Prvt Provides PostNatal	-0.007	-0.015	0.059	0.068	-0.014	-0.040
Number Personnl Private	0.000	0.000	0.000	0.000	0.000	0.000
Doctor Ratio Private	0.006	0.007	-0.054	-0.033	0.012	0.020
Nurse Ratio Private	0.004	0.003	-0.031	-0.011	0.007	0.007
ORT Available Private	0.006	0.010	-0.054	-0.044	0.013	0.026
OthrDiarDrug Avl Privat	-0.005	-0.008	0.041	0.038	-0.009	-0.022
Vacc Avail Indx Private	0.012	0.015	-0.102	-0.066	0.024	0.039
Famp Avail Indx Private	0.010	0.005	-0.081	-0.020	0.019	0.012
Dist Nearst Traditl(km)	0.038	0.119	0.062	0.090	-0.310	-0.310
Price Traditional Visit	-0.005	-0.004	-0.007	-0.003	0.038	0.011
YrsEduc MedianTrdlPrvdr	0.000	0.000	0.000	0.000	0.002	-0.001
FormlTraing MedianTrdl	-0.009	-0.047	-0.014	-0.035	0.073	0.121
Child is Male	0.003	0.000	0.022	0.010	0.011	.
Child Age Mos 1-6	-0.005	-0.020	0.004	-0.011	0.053	.

TABLE 6.9 (continued)

Var	PUBLIC v NONE		PRIVATE V NONE		TRADITIONAL V NONE	
	Mnl	Nmnl	Mnl	Nmnl	Mnl	Nmnl
Child Age Mos 7-24	-0.006	-0.010	-0.007	-0.006	0.003	.
Mother Absent All 2Yrs	0.001	0.041	0.005	0.036	-0.133	.
Mother Educ 0-5 Years	0.001	0.002	0.009	0.005	0.003	.
Mother Educ >= 6 Yrs	0.001	0.003	0.004	0.003	-0.002	.
Mother Age (Years)	-0.002	-0.002	-0.001	-0.001	-0.001	.
Mother Ht to 150 cm	0.002	0.003	0.004	0.003	-0.001	.
Mother Ht>=150 cm	-0.002	-0.002	0.000	0.000	0.000	.
Husband Absent All 2Yrs	0.025	0.065	0.049	0.061	-0.101	.
Husband Educ 0-5 Years	0.005	0.009	0.001	0.003	-0.006	.
Husband Educ >= 6 Yrs	-0.002	-0.001	0.003	0.002	-0.004	.
Husband Age (Years)	0.001	0.001	0.001	0.001	-0.001	.
Insurance	-0.011	-0.002	0.028	0.020	-0.007	.
AssetValue-LowestThird	-0.010	0.005	0.089	0.059	-0.016	.
AssetValue-UpperTwoThrd	0.000	0.000	0.000	0.000	0.000	.
Mother Is Senior Woman	-0.012	-0.012	0.020	0.012	-0.011	.
Grandmother Present	0.003	0.007	0.009	0.008	-0.006	.
# Younger Males In HH	0.004	-0.002	-0.042	-0.028	-0.018	.
# Younger Females in HH	0.014	0.012	-0.023	-0.014	-0.015	.
# Older Under 6 Yr Male	0.003	0.003	-0.007	-0.005	0.005	.
# Older Under 6 Yr Feml	0.005	0.003	-0.005	-0.004	0.009	.
# Males 6-13	0.004	0.004	-0.003	-0.002	0.001	.
# Females 6-13	0.002	0.002	-0.001	0.000	-0.003	.
# Males 14-20	0.002	-0.002	-0.006	-0.006	0.006	.
# Females 14-20	-0.009	-0.009	0.013	0.007	0.002	.
# Males 21-60	0.000	0.002	0.004	0.004	-0.008	.
# Females 21-60	0.000	0.003	0.009	0.008	-0.003	.
# Males Over 60	-0.001	-0.001	-0.019	-0.008	-0.019	.
# Females Over 60	0.000	0.001	0.003	0.003	0.005	.

Table 6.10 **Mean Simulated Probabilities of Facility Choice by Household Asset Level**

	PUBLIC			PRIVATE			TRADITIONAL			NO VISIT		
	All	Low	High	All	Low	High	All	Low	High	All	Low	High
Actual Utilization	11.7	13.3	10.9	17.1	13.0	18.8	20.5	21.4	20.1	50.8	52.3	50.2
Baseline Predicted Probabilities	11.7	13.3	10.9	17.1	13.1	18.8	20.5	21.4	20.1	50.8	52.2	50.2
Make ORT Available at Public	13.7	14.3	13.5	16.6	12.9	18.2	20.1	21.2	19.6	49.6	51.6	48.7
ORT Not Available at Public	5.8	9.0	5.0	18.4	13.8	20.3	21.7	22.3	21.3	54.2	54.8	53.7
Make Full Range Vaccs Avail at Public	15.1	16.6	14.3	16.4	12.6	18.1	19.7	20.6	19.3	48.8	50.2	48.3
Full Range Fam Plan Avail at Public	13.8	11.8	14.8	16.6	13.3	17.9	20.0	21.7	19.3	49.6	53.1	48.0
ORT, Vacc, & Fam Plan at Public	20.3	15.8	22.5	15.3	12.7	16.2	18.6	20.8	17.6	45.9	50.7	43.7
Reduce Pub Dist for Most Remote HHs	12.3	13.6	11.8	17.0	13.0	18.7	20.3	21.3	19.9	50.4	52.0	49.7
Increase Mom Edu by 1 sd (3.7 yrs)	12.2	15.0	11.0	18.6	12.7	20.8	20.1	22.5	19.3	49.2	49.8	48.9
Increase Assets by 1 sd (2836 pesos)	10.3	00.0	9.9	18.9	100.0	19.5	19.5	00.0	19.4	51.3	00.0	51.2

Table 7.1 **Determinants of Facility Choice for Child Curative Health Care For Male vs. Female Children**

	Public				Private				Tradl			
	Male		Female		Male		Female		Male		Female	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
Public Facility Characteristics												
Nearest Public (km)	-0.31	2.81	-0.45	3.80	0.00	0.00			0.00	0.00		
Price Public Visit	-0.07	0.18	0.29	0.68	0.00	0.00			0.00	0.00		
Number Personnel Public	0.01	3.70	0.01	2.83	0.00	0.00			0.00	0.00		
Doctor Ratio Public	1.52	2.38	1.36	2.08	0.00	0.00			0.00	0.00		
Nurse Ratio Public	-0.02	0.05	0.31	0.71	0.00	0.00			0.00	0.00		
ORT Avail Indx Public	1.10	3.60	1.01	3.07	0.00	0.00			0.00	0.00		
OthrDiarDrugIndx Public	-1.36	3.34	-1.11	2.57	0.00	0.00			0.00	0.00		
Vacc Avail Indx Public	0.64	3.22	0.57	2.78	0.00	0.00			0.00	0.00		
Famp Avail Indx Public	0.34	0.83	0.40	0.91	0.00	0.00			0.00	0.00		
Private Facility Characteristics												
Nearest Private (km)	.	0.00			-0.09	2.36	-0.06	1.24	0.00	0.00		
Price Private Visit	.	0.00			-0.04	1.28	0.01	0.16	0.00	0.00		
Prvt Provides PostNatal	.	0.00			0.99	2.45	-0.02	0.02	0.00	0.00		
Number Personnl Private	.	0.00			0.00	0.11	0.01	2.01	0.00	0.00		
Doctor Ratio Private	.	0.00			-0.96	1.84	0.18	0.30	0.00	0.00		
Nurse Ratio Private	.	0.00			-0.99	1.58	0.59	0.88	0.00	0.00		
ORT Avail Indx Private	.	0.00			-0.10	0.32	-0.75	2.73	0.00	0.00		
OthrDiarDrugIndx Privat	.	0.00			0.13	0.66	0.52	2.31	0.00	0.00		
Vacc Avail Indx Private	.	0.00			-0.31	0.54	-1.27	2.25	0.00	0.00		
Famp Avail Indx Private	.	0.00			-0.22	0.56	-1.02	2.34	0.00	0.00		
Traditional Provider Characteristics												
Nearest Traditional(km)	.	0.00			0.00	0.00			-1.73	3.24	-2.42	5.39
Price Traditional Visit	.	0.00			0.00	0.00			0.19	1.21	0.34	2.10
YrsEduc MedianTrdlPrvdr	.	0.00			0.00	0.00			0.01	1.01	0.01	0.58
FormlTraing MedianTrdl	.	0.00			0.00	0.00			0.38	3.78	0.58	5.60

Table 7.1 (continued)

	Public				Private				Tradl			
	Male		Female		Male		Female		Male		Female	
Individual and Household Characteristics												
Child Age Mos 1-6	0.03	1.00	0.06	2.02	0.12	4.90	0.13	4.57	0.37	10.84	0.38	10.71
Child Age Mos 7-24	-0.08	9.34	-0.08	8.72	-0.07	10.64	-0.05	6.81	0.00	0.23	0.00	0.40
Mother Educ 0-5 Years	0.03	0.69	0.07	1.25	0.09	2.11	0.07	1.22	0.01	0.39	0.08	2.25
Mother Educ >= 6 Yrs	0.02	1.08	0.02	1.02	0.03	1.83	0.03	2.25	-0.01	0.71	0.01	0.34
Mother Age (Years)	-0.02	2.09	-0.01	1.09	-0.01	0.51	-0.02	1.65	-0.01	0.70	-0.01	1.08
Mother Ht to 150 cm	0.02	1.29	0.02	0.95	0.03	2.10	0.03	1.75	0.01	0.45	0.00	0.17
Mother Ht>=150 cm	-0.01	0.56	-0.04	2.43	0.00	0.10	-0.01	0.73	0.00	0.09	-0.01	1.03
Husband Absent All 2Yrs	0.07	0.19	0.28	0.64	0.07	0.20	0.42	1.16	-0.64	2.02	-0.50	1.57
Husband Educ 0-5 Years	0.03	0.63	0.09	1.69	-0.03	0.54	0.05	1.06	-0.02	0.49	-0.05	1.51
Husband Educ >= 6 Yrs	-0.05	2.53	-0.01	0.39	0.01	0.34	0.02	1.22	-0.03	2.66	-0.02	1.05
Husband Age (Years)	0.01	0.89	0.01	0.75	0.01	0.67	0.00	0.31	-0.01	0.70	-0.01	0.75
Insurance	-0.02	0.17	-0.18	1.77	0.18	2.33	0.22	2.62	0.00	0.01	-0.03	0.43
AssetValue-LowestThird	-0.06	0.35	0.13	0.73	0.66	4.35	0.68	4.08	0.10	0.76	-0.04	0.28
AssetValueUpperTwoThrd	0.00	1.15	-0.01	2.53	0.00	1.11	0.00	0.11	0.00	0.47	-0.01	3.61
Mother Is Senior Woman	-0.04	0.24	-0.24	1.40	0.26	1.86	-0.08	0.51	0.13	1.06	-0.27	1.99
Grandmother Present	0.16	0.91	-0.11	0.67	0.21	1.61	-0.11	0.74	0.10	0.80	-0.17	1.20
# Younger Males In HH	-0.02	0.10	-0.11	0.56	-0.26	1.64	-0.51	2.77	-0.16	1.42	-0.24	1.91
# Younger Females in HH	-0.15	0.64	0.33	1.74	-0.05	0.29	-0.36	2.11	-0.16	1.21	-0.08	0.59
# Older Under 6 Yr Male	0.06	1.12	-0.03	0.49	-0.03	0.72	-0.06	1.13	0.04	1.01	0.00	0.09
# Older Under 6 Yr Feml	0.12	2.11	0.01	0.20	-0.01	0.16	-0.01	0.22	0.04	1.00	0.10	2.12
# Males 6-13	0.12	2.17	-0.05	0.80	0.03	0.66	-0.08	1.51	0.00	0.05	0.00	0.00
# Females 6-13	0.03	0.65	0.00	0.07	-0.01	0.31	0.00	0.06	-0.07	1.70	0.03	0.75
# Males 14-20	-0.02	0.36	0.07	1.01	-0.05	0.96	-0.03	0.48	-0.01	0.19	0.09	1.76
# Females 14-20	-0.07	1.21	-0.09	1.36	0.09	2.16	0.07	1.49	0.00	0.11	0.05	0.89
# Males 21-60	0.02	0.28	-0.05	0.81	0.01	0.22	0.04	0.61	-0.07	1.38	0.00	0.03
# Females 21-60	0.00	0.04	0.01	0.19	0.03	0.70	0.13	2.27	0.02	0.38	-0.02	0.28
# Males Over 60	-0.15	0.84	-0.01	0.08	-0.27	1.99	-0.14	0.82	-0.23	1.53	-0.08	0.60
# Females Over 60	-0.18	1.02	0.24	1.35	0.02	0.18	0.02	0.11	0.07	0.58	-0.02	0.12

Table 7.1 (continued)

	Public				Private				Tradl			
	Male		Female		Male		Female		Male		Female	
Constant Term	-4.37	1.44	-4.05	1.37	-5.76	2.21	-5.36	1.98	-3.34	1.48	-2.30	1.07
Chi-Square Test Statistics for Joint Significance of Variable Groups												
Facility	71.79	0.00	66.64	0.00	18.57	0.03	22.10	0.01	21.26	0.00	48.47	0.00
Fee and Distance	7.92	0.02	17.39	0.00	7.03	0.03	1.91	0.39	10.66	0.01	29.36	0.00
Personnel	26.19	0.00	20.79	0.00	3.38	0.34	4.37	0.22	15.94	0.00	32.68	0.00
Drug Availability	62.09	0.00	46.82	0.00	1.71	0.79	13.18	0.01	na	na	na	na
Individual & Household												
Child Age	92.93	0.00	76.52	0.00	115.39	0.00	51.98	0.00	132.46	0.00	125.36	0.00
Mother Educ	2.12	0.35	3.56	0.17	10.69	0.00	8.45	0.01	0.55	0.76	5.92	0.05
Mother Height	1.65	0.44	5.92	0.05	5.25	0.07	3.08	0.21	0.32	0.85	1.14	0.57
Husband Educ	6.41	0.04	2.88	0.24	0.33	0.85	3.25	0.20	8.80	0.01	4.63	0.10
Value Assets	1.56	0.46	6.50	0.04	20.43	0.00	16.66	0.00	0.75	0.69	13.35	0.00
Hhold Composition	18.09	0.20	13.37	0.50	20.18	0.13	26.09	0.03	18.55	0.18	21.69	0.09
Community	92.55	0.00	82.61	0.00	77.98	0.00	78.82	0.00	108.43	0.00	118.23	0.00
Infrastructure	46.31	0.00	56.39	0.00	24.55	0.01	11.86	0.29	42.48	0.00	53.70	0.00
Food Prices	9.82	0.37	4.84	0.85	11.27	0.26	12.91	0.17	24.51	0.00	23.71	0.01
Rainfall	17.00	0.20	11.34	0.58	35.45	0.00	37.51	0.00	17.49	0.18	33.79	0.00

Number of obs	Boys:	16403	Girls:	14516
Pseudo R2		0.0678		0.0655
Log Likelihood		-18889.671		-16323.709

Notes on Table 6.1 apply here.

Table 7.2 **Determinants of Facility Choice for Child Curative Health Care by Maternal Education Level**

	Public				Private				Tradl			
	Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
Public Facility Characteristics												
Nearest Public (km)	-0.31	3.05	-0.35	2.93	0.00	0.00			0.00	0.00		
Price Public Visit	0.99	1.99	-0.48	1.29	0.00	0.00			0.00	0.00		
Number Personnel Public	0.00	0.44	0.01	5.31	0.00	0.00			0.00	0.00		
Doctor Ratio Public	1.03	1.19	1.54	2.79	0.00	0.00			0.00	0.00		
Nurse Ratio Public	0.25	0.45	-0.06	0.15	0.00	0.00			0.00	0.00		
ORT Avail Indx Public	0.39	1.01	1.35	4.84	0.00	0.00			0.00	0.00		
OthrDiarDrugIndx Public	-0.52	1.01	-1.72	4.48	0.00	0.00			0.00	0.00		
Vacc Avail Indx Public	0.58	2.15	0.60	3.49	0.00	0.00			0.00	0.00		
Famp Avail Indx Public	0.61	1.07	0.14	0.39	0.00	0.00			0.00	0.00		
Private Facility Characteristics												
Nearest Private (km)	0.00	0.00			-0.06	1.10	-0.08	2.21	0.00	0.00		
Price Private Visit	0.00	0.00			0.06	1.18	-0.03	1.33	0.00	0.00		
Prvt Provides PostNatal	0.00	0.00			0.76	0.98	0.39	0.81	0.00	0.00		
Number Personnl Private	0.00	0.00			0.01	1.60	0.00	0.55	0.00	0.00		
Doctor Ratio Private	0.00	0.00			-0.32	0.41	-0.54	1.21	0.00	0.00		
Nurse Ratio Private	0.00	0.00			-0.31	0.35	-0.31	0.57	0.00	0.00		
ORT Avail Indx Private	0.00	0.00			-0.35	1.13	-0.44	1.50	0.00	0.00		
OthrDiarDrugIndx Privat	0.00	0.00			0.13	0.44	0.34	1.98	0.00	0.00		
Vacc Avail Indx Private	0.00	0.00			-1.11	1.59	-0.70	1.32	0.00	0.00		
Famp Avail Indx Private	0.00	0.00			-0.42	0.94	-0.70	1.74	0.00	0.00		
Traditional Provider Characteristics												
Nearest Traditional(km)	0.00	0.00			0.00	0.00			-2.37	4.47	-1.86	3.68
Price Traditional Visit	0.00	0.00			0.00	0.00			0.37	2.25	0.08	0.48
YrsEduc MedianTrdlPrvdr	0.00	0.00			0.00	0.00			0.01	0.95	0.01	0.52
FormlTraing MedianTrdl	0.00	0.00			0.00	0.00			0.52	4.13	0.44	4.64

Table 7.2 (continued)

	Public				Private				Tradl			
	Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs	
Individual and Household Characteristics												
Child is Male	0.22	1.50	0.06	0.67	0.27	2.06	0.18	2.34	0.11	1.10	0.13	1.95
Child Age Mos 1-6	0.03	0.93	0.04	1.91	0.14	3.98	0.11	5.45	0.36	9.06	0.38	12.09
Child Age Mos 7-24	-0.09	7.14	-0.08	10.26	-0.06	6.36	-0.06	10.82	-0.02	1.96	0.01	0.99
Mother Educ 0-5 Years	0.05	1.17			0.05	1.32			0.03	1.03		
Mother Educ >= 6 Yrs			0.03	1.70			0.03	2.38			0.00	0.06
Mother Age (Years)	0.00	0.27	-0.03	2.50	-0.02	1.26	0.00	0.48	-0.01	0.73	-0.01	1.13
Mother Ht to 150 cm	0.01	0.26	0.04	2.34	0.01	0.44	0.04	2.93	0.02	1.31	0.00	0.22
Mother Ht>=150 cm	-0.01	0.27	-0.03	2.20	0.02	0.90	-0.01	1.01	-0.02	1.20	0.00	0.05
Husband Absent All 2Yrs	0.33	0.70	0.02	0.05	-0.49	1.03	0.40	1.07	-1.22	3.33	-0.08	0.25
Husband Educ 0-5 Years	0.11	2.17	-0.01	0.17	-0.01	0.15	-0.01	0.16	-0.05	1.75	0.01	0.22
Husband Educ >= 6 Yrs	-0.02	0.56	-0.02	1.51	0.02	0.90	0.02	1.45	-0.03	1.07	-0.02	2.27
Husband Age (Years)	0.01	0.79	0.01	0.79	0.00	0.34	0.00	0.59	-0.02	1.77	0.00	0.00
Insurance	-0.01	0.07	-0.11	1.42	0.37	2.79	0.14	2.36	0.10	0.90	-0.05	0.90
AssetValue-LowestThird	0.26	1.11	-0.03	0.19	0.73	3.37	0.65	4.75	0.26	1.63	-0.09	0.74
AssetValueUpperTwoThrd	-0.03	2.60	-0.01	2.26	0.01	0.88	0.00	0.68	-0.02	2.12	0.00	1.70
Mother Is Senior Woman	0.00	0.01	-0.15	1.04	0.08	0.35	0.12	0.98	-0.02	0.13	-0.09	0.83
Grandmother Present	-0.24	0.76	0.14	1.08	-0.05	0.20	0.10	0.95	-0.19	1.14	0.04	0.37
# Younger Males In HH	-0.43	1.22	0.01	0.10	-0.17	0.68	-0.41	3.00	-0.35	2.13	-0.16	1.67
# Younger Females in HH	0.30	1.00	0.05	0.29	-0.55	1.88	-0.13	0.93	0.02	0.11	-0.18	1.65
# Older Under 6 Yr Male	0.03	0.40	0.04	0.77	0.00	0.04	-0.06	1.43	-0.01	0.27	0.05	1.27
# Older Under 6 Yr Feml	0.06	0.83	0.07	1.60	0.15	2.05	-0.06	1.46	0.02	0.44	0.09	2.26
# Males 6-13	0.03	0.41	0.04	0.89	-0.02	0.28	-0.03	0.77	0.06	1.34	-0.04	1.05
# Females 6-13	-0.03	0.46	0.03	0.71	-0.02	0.35	-0.01	0.26	0.06	1.38	-0.07	1.96
# Males 14-20	-0.13	1.52	0.06	1.26	-0.13	1.95	0.00	0.04	0.02	0.36	0.03	0.76
# Females 14-20	-0.05	0.48	-0.10	1.89	0.13	1.86	0.09	2.36	-0.02	0.34	0.06	1.46

Table 7.2 (continued)

	Public				Private				Tradl			
	Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs		Educ<6 Yrs		Educ>=6 Yrs	
# Males 21-60	0.10	0.92	-0.05	0.85	-0.10	0.87	0.03	0.79	-0.02	0.26	-0.07	1.62
# Females 21-60	-0.05	0.45	0.01	0.22	0.09	0.88	0.07	1.83	0.10	1.09	-0.02	0.48
# Males Over 60	0.22	0.76	-0.20	1.45	-0.12	0.40	-0.25	2.30	0.15	0.72	-0.25	2.20
# Females Over 60	0.04	0.13	0.05	0.34	-0.02	0.07	0.06	0.53	0.00	0.02	0.07	0.64
Constant Term	-3.60	0.94	-5.15	1.97	-1.85	0.57	-6.84	3.03	-4.74	1.98	-2.20	1.04
Chi-Square Test Statistics for Joint Significance of Variable Groups												
Facility	41.82	0.00	107.31	0.00	8.57	0.48	19.88	0.02	31.87	0.00	33.24	0.00
Fee and Distance	15.97	0.00	9.42	0.01	3.28	0.20	6.02	0.05	20.47	0.00	17.93	0.00
Personnel	2.45	0.49	50.66	0.00	3.31	0.35	1.87	0.60	18.31	0.00	22.26	0.00
Drug Availability	19.02	0.00	97.17	0.00	3.04	0.55	9.47	0.00	na	na	na	na
Individual & Household												
Child Age	55.16	0.00	106.69	0.00	44.59	0.00	121.02	0.00	83.45	0.00	175.95	0.00
Mother Educ	na	na	na	na	na	na	na	na	na	na	na	na
Mother Height	0.10	0.95	7.36	0.03	1.67	0.43	8.71	0.01	2.16	0.34	0.05	0.97
Husband Educ	4.80	0.09	2.77	0.25	0.85	0.66	2.22	0.33	6.46	0.04	5.49	0.06
Value Assets	7.23	0.03	5.36	0.07	13.75	0.00	23.15	0.00	6.16	0.05	3.78	0.15
Hhold Composition	12.85	0.54	21.82	0.08	19.01	0.17	33.45	0.00	11.35	0.66	24.10	0.04
Community	89.46	0.00	90.93	0.00	47.34	0.04	102.08	0.00	101.36	0.00	117.03	0.00
Infrastructure	54.91	0.00	56.86	0.00	7.92	0.64	23.73	0.01	49.76	0.00	46.32	0.00
Food Prices	12.50	0.19	5.96	0.74	14.06	0.12	13.67	0.14	24.49	0.00	22.76	0.01
Rainfall	8.27	0.83	13.33	0.42	19.55	0.11	49.32	0.00	21.37	0.07	27.70	0.01
Number of obs	Low:	9663.00		High:	21256.00							
Pseudo R2		0.07			0.06							
Log Likelihood		-10311.91			-24815.86							

Table 7.3 **Determinants of Facility Choice for Child Curative Health Care by Value of Household Asset Holdings**

	Public				Private				Tradl			
	1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
Public Facility Characteristics												
Nearest Public (km)	-0.19	1.70	-0.46	4.54	0.00	0.00			0.00	0.00		
Price Public Visit	0.29	0.50	-0.03	0.09	0.00	0.00			0.00	0.00		
Number Personnel Public	0.01	3.00	0.01	3.34	0.00	0.00			0.00	0.00		
Doctor Ratio Public	0.65	0.78	2.00	3.63	0.00	0.00			0.00	0.00		
Nurse Ratio Public	-0.47	0.89	0.37	0.98	0.00	0.00			0.00	0.00		
ORT Avail Indx Public	0.56	1.25	1.27	4.90	0.00	0.00			0.00	0.00		
OthrDiarDrugIndx Public	-1.66	3.12	-1.04	2.98	0.00	0.00			0.00	0.00		
Vacc Avail Indx Public	0.61	2.30	0.60	3.57	0.00	0.00			0.00	0.00		
Famp Avail Indx Public	-0.25	0.49	0.61	1.65	0.00	0.00			0.00	0.00		
Private Facility Characteristics												
Nearest Private (km)	.	0.00			-0.08	1.38	-0.07	2.07	0.00	0.00		
Price Private Visit	.	0.00			0.01	0.13	-0.03	1.17	0.00	0.00		
Prvt Provides PostNatal	.	0.00			0.02	0.03	0.38	0.70	0.00	0.00		
Number Personnl Private	.	0.00			0.00	0.17	0.00	1.30	0.00	0.00		
Doctor Ratio Private	.	0.00			-1.02	1.25	-0.23	0.53	0.00	0.00		
Nurse Ratio Private	.	0.00			-1.63	1.73	0.15	0.30	0.00	0.00		
ORT Avail Indx Private	.	0.00			-0.16	0.40	-0.47	2.05	0.00	0.00		
OthrDiarDrugIndx Privat	.	0.00			0.93	2.77	0.13	0.81	0.00	0.00		
Vacc Avail Indx Private	.	0.00			-0.62	0.77	-0.71	1.59	0.00	0.00		
Famp Avail Indx Private	.	0.00			-0.25	0.43	-0.69	2.13	0.00	0.00		
Traditional Provider Characteristics												
Nearest Traditional(km)	.	0.00			0.00	0.00			-2.78	5.11	-1.70	3.66
Price Traditional Visit	.	0.00			0.00	0.00			0.39	2.02	0.19	1.36
YrsEduc MedianTrdlPrvdr	.	0.00			0.00	0.00			0.00	0.31	0.01	1.28
FormlTraing MedianTrdl	.	0.00			0.00	0.00			0.67	5.62	0.42	4.69

Table 7.3 (continued)

	Public				Private				Tradl			
	1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles	
Individual and Household Characteristics												
Child is Male	0.13	0.98	0.08	0.89	0.30	2.29	0.16	2.16	0.07	0.69	0.15	2.17
Child Age Mos 1-6	0.03	1.00	0.05	1.92	0.14	3.94	0.11	5.41	0.38	9.12	0.37	12.19
Child Age Mos 7-24	-0.08	6.63	-0.09	10.98	-0.07	6.92	-0.06	10.48	0.00	0.42	0.00	0.60
Mother Absent All 2Yrs	1.44	2.79	-0.94	1.43	0.82	1.27	-0.66	1.23	1.23	1.78	-1.92	3.29
Mother Educ 0-5 Years	0.05	0.87	0.02	0.54	0.03	0.56	0.10	2.31	0.05	1.28	0.03	0.97
Mother Ecuc >= 6 Yrs	0.05	2.09	0.01	0.60	0.00	0.10	0.03	2.64	0.02	1.16	-0.01	0.89
Mother Age (Years)	-0.02	1.29	-0.02	2.07	-0.01	0.81	-0.01	1.28	0.01	1.27	-0.02	2.50
Mother Ht to 150 cm	0.05	2.48	0.01	0.65	0.05	2.49	0.02	1.78	0.01	0.86	0.00	0.23
Mother Ht>=150 cm	-0.01	0.46	-0.03	2.22	-0.02	0.95	0.00	0.20	-0.04	2.87	0.01	0.90
Husband Absent All 2Yrs	0.17	0.34	0.16	0.45	-0.57	1.13	0.55	1.84	-0.75	1.88	-0.55	1.95
Husband Educ 0-5 Years	0.05	0.81	0.06	1.32	-0.07	1.18	0.04	1.06	0.02	0.60	-0.07	2.11
Husband Educ >= 6 Yrs	-0.04	1.52	-0.03	1.61	0.00	0.12	0.01	1.31	-0.03	1.59	-0.02	1.87
Husband Age (Years)	0.01	1.29	0.00	0.51	0.00	0.08	0.01	0.98	-0.01	1.26	0.00	0.21
Insurance	-0.06	0.50	-0.07	0.78	0.20	1.67	0.19	2.90	-0.06	0.64	0.00	0.05
AssetValue-1stTercile	0.13	0.57			0.66	3.00			0.04	0.24		
AssetValue-UpperTerciles			0.00	2.28			0.00	1.05			0.00	1.75
Mother Is Senior Woman	-0.42	1.70	0.00	0.00	-0.15	0.67	0.17	1.45	-0.20	1.14	0.01	0.08
Grandmother Present	-0.26	1.11	0.15	1.11	0.06	0.31	0.08	0.74	-0.20	1.05	0.05	0.49
# Younger Males In HH	-0.12	0.46	-0.05	0.33	-0.11	0.54	-0.47	3.17	-0.24	1.59	-0.17	1.72
# Younger Females in HH	-0.11	0.38	0.18	1.10	-0.35	1.26	-0.13	0.88	-0.29	1.55	-0.04	0.39
# Older Under 6 Yr Male	0.06	0.84	0.02	0.32	-0.07	0.95	-0.04	0.84	0.06	1.04	0.02	0.60
# Older Under 6 Yr Feml	0.02	0.30	0.09	1.84	0.06	0.83	-0.02	0.58	0.09	1.52	0.07	1.81
# Males 6-13	-0.03	0.39	0.08	1.72	-0.16	2.07	0.01	0.31	-0.04	0.72	0.02	0.60
# Females 6-13	0.06	0.83	0.00	0.00	-0.01	0.18	-0.02	0.47	-0.11	1.77	0.01	0.23
# Males 14-20	-0.03	0.24	0.04	0.78	-0.11	1.23	-0.02	0.54	0.14	1.87	0.02	0.40
# Females 14-20	-0.06	0.54	-0.08	1.60	0.11	1.25	0.08	2.10	0.03	0.37	0.01	0.30

Table 7.3 (continued)

	Public				Private				Tradl			
	1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles		1st Tercile		2nd, 3rd Terciles	
# Males 21-60	0.00	0.04	-0.01	0.25	0.13	1.39	0.00	0.08	0.08	0.98	-0.08	2.00
# Females 21-60	0.09	0.87	0.00	0.08	0.06	0.62	0.07	1.91	-0.10	1.06	0.02	0.47
# Males Over 60	-0.13	0.50	-0.06	0.43	0.11	0.42	-0.24	2.10	-0.09	0.44	-0.17	1.42
# Females Over 60	0.24	0.94	-0.02	0.16	0.01	0.02	0.05	0.44	0.01	0.05	0.05	0.45
Constant Term	-6.28	1.87	-3.60	1.33	-9.72	2.82	-3.36	1.51	-4.74	1.74	-2.32	1.23
Chi-Square Test Statistics for Joint Significance of Variable Groups												
Facility	33.49	0.00	100.85	0.00	23.36	0.01	12.11	0.21	44.32	0.00	31.86	0.00
Fee and Distance	3.56	0.17	21.27	0.00	2.05	0.36	5.01	0.08	26.19	0.00	13.68	0.00
Personnel	12.20	0.01	37.31	0.00	4.26	0.23	2.48	0.48	31.75	0.00	25.49	0.00
Drug Availability	23.26	0.00	92.46	0.00	12.28	0.02	5.94	0.20	na		na	na
Individual & Household												
Child Age	44.87	0.00	124.50	0.00	50.62	0.00	113.93	0.00	94.91	0.00	165.01	0.00
Mother Educ	6.92	0.03	0.85	0.65	0.40	0.82	16.62	0.00	4.16	0.13	1.36	0.51
Mother Height	6.57	0.04	5.05	0.08	6.23	0.04	4.31	0.12	8.46	0.01	1.30	0.52
Husband Educ	2.41	0.30	3.42	0.18	1.44	0.49	3.71	0.16	2.52	0.28	10.71	0.00
Value Assets	na	na	na	na	na	na	na	na	na	na	na	na
Hhold Composition	8.41	0.87	13.54	0.48	20.74	0.11	29.79	0.01	19.27	0.16	13.06	0.52
Community	53.44	0.01	138.70	0.00	46.95	0.02	102.34	0.00	103.05	0.00	126.69	0.00
Infrastructure	18.83	0.04	87.78	0.00	14.64	0.15	18.78	0.04	47.98	0.00	51.67	0.00
Food Prices	6.95	0.64	8.30	0.50	15.35	0.08	15.81	0.07	16.41	0.06	27.61	0.00
Rainfall	16.84	0.21	22.20	0.05	20.68	0.08	52.97	0.00	27.37	0.01	25.76	0.02
Number of obs	1st Tercile		9470.00		2nd,3rd Tercile		21449.00					
Pseudo R2			**0.07**				**0.06**					
Log Likelihood			**-10560.54**				**-24606.51**					

Notes on Table 6.1 apply here.

Table 7.4 Determinants of Facility Choice for Child Curative Health Care by Child Age in Months

	Public				Private				Tradl			
	1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
Public Facility Characteristics												
Nearest Public (km)	-0.46	3.63	-0.32	3.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Price Public Visit	0.02	0.04	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Number Personnel Public	0.01	2.54	0.01	4.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Doctor Ratio Public	1.01	1.56	1.80	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nurse Ratio Public	0.03	0.06	0.14	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORT Avail Indx Public	1.05	3.26	1.07	4.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OthrDiarDrugIndx Public	-1.01	2.30	-1.43	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vacc Avail Indx Public	0.77	3.82	0.58	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Famp Avail Indx Public	0.39	0.93	0.26	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Facility Characteristics												
Nearest Private (km)	0.00	0.00	0.00	0.00	-0.13	2.67	-0.05	1.60	0.00	0.00	0.00	0.00
Price Private Visit	0.00	0.00	0.00	0.00	-0.08	2.29	0.00	0.06	0.00	0.00	0.00	0.00
Prvt Provides PostNatal	0.00	0.00	0.00	0.00	0.31	0.50	0.51	0.97	0.00	0.00	0.00	0.00
Number Personnl Private	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.67	0.00	0.00	0.00	0.00
Doctor Ratio Private	0.00	0.00	0.00	0.00	-0.41	0.66	-0.26	0.62	0.00	0.00	0.00	0.00
Nurse Ratio Private	0.00	0.00	0.00	0.00	0.30	0.41	-0.27	0.55	0.00	0.00	0.00	0.00
ORT Avail Indx Private	0.00	0.00	0.00	0.00	-0.84	2.43	-0.26	1.20	0.00	0.00	0.00	0.00
OthrDiarDrugIndx Privat	0.00	0.00	0.00	0.00	-0.01	0.04	0.39	2.43	0.00	0.00	0.00	0.00
Vacc Avail Indx Private	0.00	0.00	0.00	0.00	-0.95	1.45	-0.64	1.47	0.00	0.00	0.00	0.00
Famp Avail Indx Private	0.00	0.00	0.00	0.00	-1.37	2.74	-0.37	1.20	0.00	0.00	0.00	0.00
Traditional Provider Characteristics												
Nearest Traditional(km)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-2.15	2.65	-2.04	5.29
Price Traditional Visit	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.04	0.16	0.25	2.06
YrsEduc MedianTrdlPrvdr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.03	1.41	0.02	2.03
FormlTraing MedianTrdl	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	2.83	0.46	6.03

Table 7.4 (continued)

	Public				Private				Tradl			
	1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
Individual and Household Characteristics												
Child is Male	0.28	2.74	0.03	0.35	0.32	3.33	0.16	2.23	0.20	1.57	0.11	1.85
Child Age Mos 1-6	0.05	1.85			0.09	3.35			0.33	8.95		
Child Age Mos 7-24			-0.08	10.44			-0.06	9.88			-0.01	0.92
Mother Absent All 2Yrs			-0.13	0.22			-1.38	1.75			-0.79	1.31
Mother Educ 0-5 Years	0.09	2.03	0.02	0.58	0.08	1.58	0.08	2.14	0.10	1.84	0.03	1.29
Mother Educ >= 6 Yrs	0.01	0.63	0.02	1.42	0.01	0.90	0.03	2.66	-0.04	1.85	0.00	0.21
Mother Age (Years)	-0.02	2.04	-0.02	2.05	-0.01	1.14	-0.01	1.18	-0.02	1.44	-0.01	0.99
Mother Ht to 150 cm	0.00	0.21	0.03	2.30	0.03	1.84	0.03	2.41	0.01	0.67	0.00	0.43
Mother Ht>=150 cm	-0.01	0.93	-0.03	2.22	-0.02	1.31	0.00	0.11	-0.02	0.97	0.00	0.43
Husband Absent All 2Yrs	0.36	0.94	0.12	0.35	0.50	1.32	0.20	0.72	-0.30	0.62	-0.63	2.63
Husband Educ 0-5 Years	0.13	2.63	0.02	0.56	0.07	1.32	-0.01	0.25	0.01	0.30	-0.04	1.63
Husband Educ >= 6 Yrs	-0.05	2.64	-0.02	1.35	0.04	2.58	0.00	0.28	-0.04	1.87	-0.03	2.50
Husband Age (Years)	0.01	0.87	0.01	0.84	0.00	0.19	0.01	0.93	0.00	0.18	-0.01	1.05
Insurance	-0.14	1.60	-0.07	0.83	0.09	1.10	0.23	3.61	-0.09	0.74	0.00	0.03
AssetValue-LowestThird	0.13	0.78	-0.01	0.08	0.87	5.17	0.61	4.85	-0.01	0.06	0.03	0.28
AssetValue-UpperTwoThrd	0.00	1.16	-0.01	2.39	0.00	1.02	0.00	1.51	-0.01	1.40	0.00	1.74
Mother Is Senior Woman	-0.22	1.18	-0.07	0.45	0.30	1.79	0.05	0.46	-0.40	1.62	-0.03	0.34
Grandmother Present	0.05	0.29	0.03	0.20	0.02	0.14	0.07	0.70	-0.13	0.50	-0.01	0.10
# Younger Males In HH	0.24	0.33	-0.05	0.35	0.18	0.28	-0.37	3.01	0.54	0.73	-0.19	2.31
# Younger Females in HH	0.16	0.25	0.10	0.68	-0.57	0.79	-0.16	1.24	-0.75	0.69	-0.11	1.19
# Older Under 6 Yr Male	-0.09	1.74	0.08	1.69	-0.09	1.73	-0.03	0.65	-0.08	1.17	0.05	1.46
# Older Under 6 Yr Feml	0.03	0.58	0.08	1.77	-0.04	0.70	0.00	0.01	0.01	0.18	0.08	2.38
# Males 6-13	-0.02	0.31	0.07	1.52	0.00	0.01	-0.02	0.61	0.09	1.28	-0.01	0.17
# Females 6-13	-0.01	0.11	0.02	0.56	0.02	0.49	-0.03	0.81	-0.08	1.16	-0.02	0.52
# Males 14-20	0.01	0.18	0.02	0.47	-0.01	0.14	-0.05	1.10	0.00	0.00	0.04	1.04

Table 7.4 (continued)

	Public				Private				Tradl			
	1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.		1-6 Mos.		7-24 Mos.	
	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z	coef.	z
# Females 14-20	-0.05	0.78	-0.09	1.77	0.16	2.89	0.07	1.84	-0.01	0.10	0.02	0.41
# Males 21-60	-0.01	0.09	-0.01	0.12	0.03	0.49	0.02	0.35	0.01	0.06	-0.05	1.38
# Females 21-60	-0.08	1.13	0.05	0.89	0.06	1.04	0.07	1.74	-0.15	1.39	0.02	0.43
# Males Over 60	-0.11	0.59	-0.07	0.45	-0.09	0.54	-0.23	1.99	-0.03	0.14	-0.18	1.71
# Females Over 60	-0.07	0.37	0.06	0.43	0.09	0.64	0.02	0.22	-0.25	1.03	0.07	0.70
Constant Term	-1.39	0.44	-5.95	2.43	-5.30	1.74	-5.72	2.60	-2.49	0.66	0.59	0.34
Chi-Square Test Statistics for Joint Significance of Variable Groups												
Facility	76.84	0.00	101.37	0.00	21.69	0.01	20.85	0.01	16.38	0.00	58.07	0.00
Fee and Distance	13.58	0.00	13.11	0.00	9.73	0.01	2.58	0.28	9.26	0.01	28.40	0.00
Personnel	13.74	0.00	43.46	0.00	3.80	0.28	1.27	0.74	10.17	0.01	43.14	0.00
Drug Availability	64.75	0.00	77.37	0.00	9.16	0.06	10.61	0.03	na	na	na	na
Individual & Household												
Child Age	na	na	na	na	na	na	na	na	na	na	na	na
Mother Educ	5.28	0.07	3.04	0.22	4.31	0.12	16.33	0.00	5.26	0.07	1.99	0.37
Mother Height	0.90	0.64	7.35	0.03	3.69	0.16	7.48	0.02	1.00	0.61	0.26	0.88
Husband Educ	11.04	0.00	1.86	0.40	10.89	0.00	0.12	0.94	3.56	0.17	12.16	0.00
Value Assets	1.79	0.41	5.92	0.05	27.39	0.00	26.61	0.00	2.02	0.37	3.04	0.22
Hhold Composition	7.71	0.90	17.85	0.21	17.04	0.25	25.55	0.03	11.49	0.65	18.94	0.17
Community	95.93	0.00	142.20	0.00	109.08	0.00	116.71	0.00	74.81	0.00	194.81	0.00
Infrastructure	40.98	0.00	80.31	0.00	14.62	0.15	40.05	0.00	24.13	0.01	82.94	0.00
Food Prices	11.90	0.22	8.65	0.47	6.45	0.69	27.57	0.00	5.70	0.77	19.76	0.02
Rainfall	30.20	0.00	18.02	0.16	70.73	0.00	38.83	0.00	29.91	0.00	44.12	0.00
Number of obs	1-6 Mo:	6483		7-24:	24436							
Pseudo R2		0.0759			0.0508							
Log Likelihood		-7185.795			-27958.931							

Notes on Table 6.1 apply here.

APPENDIX B

Derivation of the Estimated Probabilities and the Unconditional Marginal Effects for Nested Multinomial Logit Model

APPENDIX B

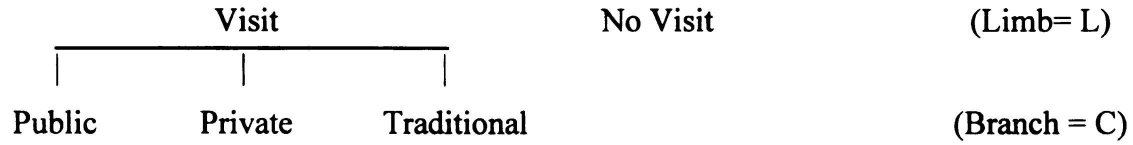
Derivation of Nested Multinomial Logit Probabilities and Unconditional Marginal Effects of Regressors

PROBABILITIES

To derive the choice probabilities for the nested multinomial logit model, first write the single-level multinomial logit model in nested form. The single level model in its simple form is written as

$$P_j = \exp(V_j)/\sum [\exp(V_k)] \quad \text{for } k = 1 \text{ to } J$$

If we now assume that the tree has the following two-level structure,



we can rewrite the probability as a function of these two levels of the decision, L and C

$$P_{c\ell} = \exp(V_{c|\ell} + V_\ell)/\sum_\ell \sum_c \exp(V_{c|\ell} + V_\ell)$$

$$P_{c\ell} \quad = \quad (P_{c|\ell}) \quad * \quad (P_\ell)$$

$$P_{c\ell} = P_{c|\ell} * P_\ell = [\exp(V_{c|\ell})/\sum_c \exp(V_{c|\ell})] * [\exp(V_\ell)/\sum_\ell \exp(V_\ell)] * \frac{[\sum_c \exp(V_{c|\ell})][\sum_\ell \exp(V_\ell)]}{[\sum_\ell \sum_c \exp(V_{c|\ell} + V_\ell)]}$$

Define the inclusive value parameter as the log of the denominator of the conditional choice

$$I_\ell = \ln \sum_c \exp(V_{c|\ell})$$

so

$$P_{c|\ell} = [\exp(V_{c|\ell})/\sum_c \exp(V_{c|\ell})]$$

and

$P_\ell = [\exp(V_\ell + \tau I)/\sum_\ell \exp(V_\ell + \tau I)]$

and

$P_{c\ell} = [\exp(V_{c|\ell})/\sum_c \exp(V_{c|\ell})] * [\exp(V_\ell + \tau I)/\sum_\ell \exp(V_\ell + \tau I)]$

If, however, the parameter of the inclusive value, τ, equals one, then

$P_{c\ell} = \exp(V_{c|\ell} + V_\ell)/\sum_\ell \sum_c \exp(V_{c|\ell} + V_\ell)$

which simplifies to our original multinomial model with k choices

$P_j = \exp(V_j)/\sum [\exp(V_k)]$ for $k = 1$ to J

MARGINAL EFFECTS

In a two-level model, starting with the facility choice limb, we defined the probability of each choice as

$P_{c|\ell} = [\exp(V_{c|\ell})/\sum_c \exp(V_{c|\ell})]$

There are three alternatives at this level, public facility, private facility, and traditional facility. If we refer to each indirect utility function using the notation $\beta^{(c)}$ for the set of estimated coefficients and X as the set of regressors, we can write the probabilities as

$P(1) = \exp(\beta^{(1)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) = \exp(\beta^{(1)} X)/\sum\exp(\beta^{(c)}X)$
$P(2) = \exp(\beta^{(2)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) = \exp(\beta^{(2)} X)/\sum\exp(\beta^{(c)}X)$
$P(3) = \exp(\beta^{(3)} X) / \exp(\beta^{(1)} X) + \exp(\beta^{(2)}X) + \exp(\beta^{(3)}X) = \exp(\beta^{(3)} X)/\sum\exp(\beta^{(c)}X)$

Let alternative three be the alternative we normalize to zero.

To derive the marginal effects for this conditional choice, we differentiate each equation using the quotient rule

$$\frac{d}{dx}\frac{u}{v} = [v*u' - u*v']/v^2$$

Therefore, for the conditional choices, the own-marginal effect of a change in one of the facility characteristic, say of alternative (1), equals

$$\frac{d(P_1)}{dx_{1i}} = \frac{\sum \exp(\beta^{(c)}X)*b_{1i}\exp(\beta^{(1)}X) - \exp(\beta^{(1)}X)*b_{1i}\exp(\beta^{(1)}X)}{[\sum \exp(\beta^{(c)}X)]^2}$$

$$= \frac{b_{1i}\exp(\beta^{(1)}X)\,[\sum \exp(\beta^{(c)}X) - \exp(\beta^{(1)}X)]}{[\sum \exp(\beta^{(c)}X)]^2}$$

$$= b_{1i}\,P_{1|\ell}\,(1-P_{1|\ell})$$

For the marginal choice between the limbs of whether to have a health care visit or not, the probability is given as

$$P_\ell = [\exp(V_\ell + \tau I)/\textstyle\sum_\ell \exp(V_\ell + \tau I)]$$

Using $\alpha^{(\ell)}$ to refer to the set of estimated coefficients and X as the set of regressors, we can write the probability of having a health care visit as

$$P_\ell = [\exp(\alpha^{(\ell)}X + \tau I)/\textstyle\sum_\ell \exp(\alpha^{(\ell)}X + \tau I)] \qquad \text{where } I = \log\,[\textstyle\sum_c \exp(\beta^{(c)}X)]$$

Because the facility characteristics do not enter into this level of the tree, they have no estimated parameters in this level. However, each own facility characteristic enters P_ℓ via I, so we must still differentiate this equation.

$$\frac{dP_\ell}{dI} = \tau\,P_\ell\,(1 - P_\ell)$$

and

$$\frac{dI}{dx_{1i}} = \frac{b_{1i}\exp(\beta^{(1)}X)}{\sum_c \exp(\beta^{(c)}X)} = b_{1i}\,P_{c|\ell}$$

so $P_\ell' = b_{1i}\,P_{1|\ell}\,\tau\,P_\ell\,(1 - P_\ell)$

With this and with the marginal effects on the conditional probabilities we can obtain the total own-unconditional marginal effect for a change in a facility characteristic

$$\frac{dP_{c|l}}{dx_{ci}} = P_{c|l}{}' P_l + P_{c|l} P_l{}'$$

$$= b_{ci} P_{c|l} (1-P_{c|l})P_l + P_{c|l} b_{1i} P_{c|l} \tau P_l (1 - P_l)$$

$$= b_{ci} P_{c|l} P_l [(1-P_{c|l}) + P_{c|l} \tau(1 - P_l)]$$

Tracing through a similar process as outlined above, one can obtain the unconditional cross-marginal effects for changes in the characteristics of other health care alternatives

$$\frac{dP_{n|l}}{dx_{ci}} = b_{ci} P_{c|l} P_l P_{n|l} [\tau(1 - P_l) - 1]$$

and the unconditional marginal effects for changes in non-health facility characteristics, such as individual, household, or community attributes

$$\frac{dP_{c}}{dx_{i}} = P_{c|l} P_l [b_{ci} (1-P_{c|l}) + (\alpha_l + \tau P_{c|l} b_{ci} (1 - P_l)]$$

APPENDIX C

Supplementary Tables

Table C1. Community Influences for Any Child Curative Care Visit

	coef.	z-stat
High Elevation (0-1)	-0.22	-2.16
Island (0-1)	0.06	0.92
CommAvgPiped/PumpWtr	-0.62	-0.76
CommAvgSanitGarbDsposl	-0.54	-1.91
CommFreqWaterShortages	-0.12	-1.65
CommHasImprovedRoads	-0.15	-2.39
CommunityHasBank	0.01	0.15
CommAvgFridgeOwners	3.09	1.90
CommMdnTimeToWaterSource	-0.05	-3.26
CommAvgModernToilet	-0.58	-2.53
CornPrice-Current	0.00	-0.51
CornPrice-Lag 2 Mos.	0.00	-1.16
CornPrice-Lag 4 Mos.	0.00	1.30
VegOilPrice-Current	-0.07	-1.22
VegOilPrice-Lag 2 Mos.	0.11	2.01
VegOilPrice-Lag 4 Mos.	0.14	2.30
InfFormulaPrice-Current	-0.04	-1.27
InfFormulaPrice-Lag 2 Mos.	-0.11	-3.83
InfFormulaPrice-Lag 4 Mos.	-0.09	-3.31
Rainfall-Current	0.00	-0.98
Rainfall-Lag 2 Mos.	0.00	0.35
Rainfall-Lag 4 Mos.	0.00	1.08
Rainfall-Lag 6 Mos.	0.00	-1.45
Rainfall-Lag 8 Mos.	0.00	-3.12
Rainfall-Lag 10 Mos.	0.00	-1.55
Rainfall-Lag 12 Mos.	0.00	0.44
Rainfall-Lag 14 Mos.	0.00	-0.17
Rainfall-Lag 16 Mos.	0.00	-2.79
Rainfall-Lag 18 Mos.	0.00	1.58
Rainfall-Lag 20 Mos.	0.00	-1.19
Rainfall-Lag 22 Mos.	0.00	-2.37
Rainfall-Lag 24 Mos.	0.00	-0.65
Constant	-5.41	3.09

Notes: 1. Main results from this regression, the facility and indvidual- and household-level effects, are presented in Table 6.1. 2. Outcome of no visit is the comparison group. 3. Regression standard errors adjusted for clustering on individual id.

Table C2. Pooled Sample — Complete Results for Baseline Flexible Specification of Determinants of Facility Choice for Child Curative Care Visit

	Public vs None		Private vs None		Tradl vs None	
	coef.	z-stat	coef.	z-stat	coef.	z-stat
Dist Nearest Public(km)	-0.360	-4.46	.	.	.	.
Price Public Visit	0.092	0.31	.	.	.	.
Number Personnel Public	0.006	4.55	.	.	.	.
Doctor Ratio Public	1.544	3.41	.	.	.	.
Nurse Ratio Public	0.116	0.38	.	.	.	.
ORT Available Public	1.042	4.72	.	.	.	.
OthrDiarDrug Avl Public	-1.221	-4.16	.	.	.	.
Vacc Avail Indx Public	0.615	4.37	.	.	.	.
Famp Avail Indx Public	0.335	1.13	.	.	.	.
Dist Nearst Private(km)	.	.	-0.069	-2.42	.	.
Price Private Visit	.	.	-0.017	-0.81	.	.
Prvt Provides PostNatal	.	.	0.439	1.11	.	.
Number Personnl Private	.	.	0.002	1.25	.	.
Doctor Ratio Private	.	.	-0.400	-1.05	.	.
Nurse Ratio Private	.	.	-0.230	-0.52	.	.
ORT Available Private	.	.	-0.403	-2.00	.	.
OthrDiarDrug Avl Privat	.	.	0.305	2.12	.	.
Vacc Avail Indx Private	.	.	-0.757	-1.92	.	.
Famp Avail Indx Private	.	.	-0.601	-2.09	.	.
Dist Nearst Traditl(km)	.	.	.	.	-1.990	-5.41
Price Traditional Visit	.	.	.	.	0.241	2.10
YrsEduc MedianTrdlPrvdr	.	.	.	.	0.010	1.31
FormlTraing MedianTrdl	.	.	.	.	0.466	6.42
Child is Male	0.098	1.34	0.200	3.08	0.122	2.20
Child Age Mos 1-6	0.042	2.15	0.121	6.72	0.372	15.15
Child Age Mos 7-24	-0.082	-12.66	-0.063	-12.52	-0.002	-0.33
Mother Absent All 2Yrs	-0.227	-0.43	-0.206	-0.36	-0.924	-1.57
Mother Educ 0-5 Years	0.039	1.17	0.083	2.41	0.039	1.55
Mother Educ >= 6 Yrs	0.020	1.48	0.028	2.70	-0.002	-0.20
Mother Age (Years)	-0.021	-2.51	-0.009	-1.28	-0.009	-1.42
Mother Ht to 150 cm	0.023	1.82	0.030	2.71	0.004	0.46
Mother Ht>=150 cm	-0.021	-2.04	-0.004	-0.46	-0.004	-0.62
Husband AbsentAll2Yrs	0.194	0.68	0.251	0.99	-0.575	-2.55
Husband Educ 0-5 Years	0.054	1.56	0.006	0.17	-0.032	-1.35
Husband Educ >= 6 Yrs	-0.029	-2.22	0.012	1.23	-0.025	-2.74
Husband Age (Years)	0.008	1.19	0.005	0.69	-0.005	-1.04
Insurance	-0.087	-1.27	0.192	3.42	-0.016	-0.30
AssetValue-LowestThird	0.018	0.14	0.667	5.89	0.034	0.36
AssetValue-UpperTwoThrd	-0.005	-2.38	0.001	1.04	-0.002	-1.99
Mother Is Senior Woman	-0.121	-0.96	0.119	1.15	-0.060	-0.65
Grandmother Present	0.045	0.37	0.067	0.69	-0.019	-0.20
# Younger Males	-0.063	-0.47	-0.365	-3.04	-0.195	-2.32
# Younger Females	0.092	0.62	-0.184	-1.44	-0.120	-1.29

Table C2. (continued)

	Public vs None		Private vs None		Tradl vs None	
	coef.	z-stat	coef.	z-stat	coef.	z-stat
# Older Under 6 Yr Male	0.026	0.66	-0.045	-1.28	0.029	0.95
# Older Under 6 Yr Feml	0.066	1.66	-0.012	-0.34	0.067	2.16
# Males 6-13	0.043	1.13	-0.019	-0.57	0.006	0.20
# Females 6-13	0.011	0.29	-0.014	-0.44	-0.020	-0.70
# Males 14-20	0.022	0.50	-0.034	-0.94	0.036	1.03
# Females 14-20	-0.078	-1.74	0.091	2.76	0.019	0.59
# Males 21-60	-0.012	-0.24	0.019	0.47	-0.046	-1.29
# Females 21-60	0.012	0.26	0.071	2.02	0.000	-0.01
# Males Over 60	-0.077	-0.61	-0.189	-1.82	-0.168	-1.66
# Females Over 60	0.018	0.14	0.036	0.38	0.044	0.50
High Elevation	-0.946	-4.83	-0.241	-1.31	0.012	0.08
Island	0.673	3.88	0.284	0.75	0.236	2.15
ComAvPiped/PumpWtrHous	-2.117	-1.30	1.321	1.02	-0.849	-0.75
CommAvSantGarbDisposal	-1.089	-1.96	0.250	0.61	-1.900	-5.32
CommFreqWaterShortages	0.395	2.53	0.022	0.15	-0.428	-4.52
CommHasImprovedRoads	-0.777	-4.94	-0.048	-0.41	-0.023	-0.31
CommunityHasBank	-0.285	-2.08	0.081	0.52	0.277	2.70
CommAvgFridgeOwners	6.714	1.92	-1.016	-0.38	6.186	2.65
CommMdnTimeToWtrSorce	-0.124	-3.49	-0.085	-3.41	-0.057	-3.12
CommAvgModernToilet	-0.165	-0.33	-0.567	-1.79	-1.704	-4.59
CornPrice-Present	0.001	1.27	0.000	-0.21	0.000	0.25
CornPrice-Lag 2 Mos.	-0.001	-0.58	-0.001	-1.63	0.001	1.51
CornPrice-Lag 4 Mos.	0.001	0.92	-0.001	-1.30	0.003	3.76
VegOilPrc-Present	-0.075	-0.79	-0.119	-1.45	-0.143	-1.91
VegOilPrc-Lag 2 Mos.	-0.026	-0.29	0.160	2.07	0.094	1.32
VegOilPrc-Lag 4 Mos.	-0.031	-0.32	0.206	2.45	0.131	1.72
InfFormulaPr-Present	-0.020	-0.36	0.020	0.43	0.003	0.08
InfFormulaPr-Lag 2 Mos.	-0.104	-2.04	-0.063	-1.42	-0.057	-1.40
InfFormulaPr-Lag 4 Mos.	-0.080	-1.70	-0.050	-1.23	-0.061	-1.65
Rainfall-Present	0.000	0.68	0.000	-0.25	0.000	-1.12
Rainfall-Lag 2 Mos.	0.000	1.35	0.000	0.69	0.000	-0.44
Rainfall-Lag 4 Mos.	0.000	1.64	0.000	1.11	0.000	1.60
Rainfall-Lag 6 Mos.	0.000	0.50	0.000	-1.09	0.000	0.72
Rainfall-Lag 8 Mos.	0.000	-0.27	-0.001	-3.78	0.000	0.02
Rainfall-Lag 10 Mos.	0.000	-0.36	-0.001	-2.26	0.000	1.12
Rainfall-Lag 12 Mos.	0.000	1.04	0.000	-0.99	0.000	2.03
Rainfall-Lag 14 Mos.	0.000	0.66	0.000	-1.26	0.000	1.20
Rainfall-Lag 16 Mos.	0.000	-0.02	0.000	-1.70	0.000	-1.83
Rainfall-Lag 18 Mos.	0.001	2.14	0.000	-0.28	0.000	2.17
Rainfall-Lag 20 Mos.	0.000	0.64	-0.001	-2.55	0.000	0.89
Rainfall-Lag 22 Mos.	0.000	-0.94	-0.001	-2.25	0.000	-0.33
Rainfall-Lag 24 Mos.	0.000	0.50	-0.001	-2.77	0.001	2.81
Constant	-4.514	-2.15	-5.482	-2.93	-2.836	-1.82

Number of Obs: 30919 Log Likelihood: -35349.89 Pseudo R2: 0.0636

Table C3. *Nested* Multinomial Logit — Facility Choice for Child Curative Care

Variable	Public v Tradl		Private v Tradl		Visit v None	
	Coef.	z	Coef.	z	Coef.	z
InclusiveValue	.	.	.	.	0.359	3.46
DistNearestPublic(km)	-0.252	2.79	.	.	.	.
PricePublicVisit	0.248	0.77	.	.	.	.
NumberPersonnelPublic	0.008	5.08	.	.	.	.
DoctorRatioPublic	1.144	2.19	.	.	.	.
NurseRatioPublic	-0.461	1.30	.	.	.	.
ORTAvailablePublic	1.019	4.18	.	.	.	.
OthrDiarDrugAvlPublic	-1.780	5.37	.	.	.	.
VaccAvailIndxPublic	0.463	2.86	.	.	.	.
FampAvailIndxPublic	0.407	1.22	.	.	.	.
DistNearstPrivate(km)	.	.	-0.011	0.31	.	.
PricePrivateVisit	.	.	0.008	0.24	.	.
PrvtProvidesPostNatal	.	.	0.849	2.00	.	.
NumberPersonnlPrivate	.	.	0.001	0.63	.	.
DoctorRatioPrivate	.	.	-0.413	0.85	.	.
NurseRatioPrivate	.	.	-0.142	0.24	.	.
ORTAvailablePrivate	.	.	-0.548	2.30	.	.
OthrDiarDrugAvlPrivat	.	.	0.474	2.59	.	.
VaccAvailIndxPrivate	.	.	-0.824	1.68	.	.
FampAvailIndxPrivate	.	.	-0.255	0.75	.	.
DistNearstTraditl(km)	1.895	3.72	1.895	3.72	.	.
PriceTraditionalVisit	-0.065	0.41	-0.065	0.41	.	.
YrsEducMedianTrdlPrvdr	0.008	0.69	0.008	0.69	.	.
FormlTraingMedianTrdl	-0.742	5.09	-0.742	5.09	.	.
ChildisMale	-0.077	0.93	0.048	0.63	0.145	3.30
ChildAgeMos1-6	-0.317	10.94	-0.242	8.53	0.217	6.78
ChildAgeMos7-24	-0.084	11.46	-0.065	10.66	-0.024	4.00
MotherAbsentAll2Yrs	0.739	1.11	0.737	1.80	-0.598	0.30
MotherEduc0-5Years	-0.003	0.08	0.032	0.85	0.046	1.92
MotherEduc>=6Yrs	0.024	1.67	0.037	3.14	0.007	0.88
MotherAge(Years)	-0.012	1.34	-0.002	0.24	-0.010	2.00
MotherHtto150cm	0.022	1.63	0.027	2.14	0.010	1.11
MotherHt>=150cm	-0.012	1.02	0.004	0.46	-0.007	1.17

Table C3. (continued)

Variable	Public v Tradl		Private v Tradl		Visit v None	
	Coef.	z	Coef.	z	Coef.	z
HusbandAbsentAll2Yrs	0.818	2.50	0.897	3.12	-0.316	1.75
HusbandEduc0-5Years	0.096	2.52	0.051	1.35	-0.020	0.87
HusbandEduc>=6Yrs	-0.001	0.10	0.038	3.29	-0.016	2.00
HusbandAge(Years)	0.015	2.21	0.013	1.83	-0.002	0.50
Insurance	-0.026	0.34	0.234	3.64	0.015	0.37
AssetValue-LowestThird	-0.031	0.23	0.632	5.03	0.153	1.82
AssetValue-UpperTwoThrd	-0.002	0.96	0.003	1.97	-0.001	0.00
MotherIsSeniorWoman	-0.106	0.75	0.162	1.41	-0.025	0.33
GrandmotherPresent	0.065	0.45	0.089	0.81	0.005	0.06
#YoungerMalesInHH	0.096	0.68	-0.231	1.83	-0.212	3.12
#YoungerFemalesinHH	0.182	1.18	-0.105	0.78	-0.118	1.57
#OlderUnder6YrMale	0.021	0.45	-0.064	1.51	0.008	0.33
#OlderUnder6YrFeml	0.009	0.20	-0.072	1.71	0.046	1.77
#Males6-13	0.042	0.97	-0.024	0.66	0.004	0.16
#Females6-13	0.029	0.69	0.002	0.07	-0.013	0.62
#Males14-20	-0.026	0.53	-0.081	1.88	0.018	0.64
#Females14-20	-0.100	1.90	0.070	1.79	0.021	0.88
#Males21-60	0.033	0.60	0.060	1.27	-0.025	0.83
#Females21-60	0.013	0.25	0.088	1.93	0.021	0.72
#MalesOver60	0.068	0.47	-0.016	0.14	-0.147	2.07
#FemalesOver60	0.000	0.00	0.021	0.19	0.021	0.30
ConstantTerm	-0.644	0.26	-3.384	1.52	-2.207	1.62
Number of obs =	15207		15207		30919	
Pseudo R2 =	0.1177		0.1177		0.0209	
Log Likelihood =	-14402.588		-14402.588		-20980.033	

Notes: 1. Standard errors in marginal visit choice column are cluster bootstrapped on 500 replications. 2. Standard errors in conditional facility choice columns are adjusted for clustering on id. Note 3 on Table 6.1 also applies.

Table C4. **Pooled Sample — Facility Price and Quality Results for Full Cross-EffectS Specification**

	Public vs None		Private vs None		Tradl vs None	
	coef	z-stat	coef	z-stat	coef	z-stat
Public Characteristics						
Dist Nearest Public(km)	-0.291	-3.39	-0.188	-2.08	0.051	0.83
Price Public Visit	1.083	2.08	-1.269	-2.89	1.542	4.38
Number Personnel Public	0.000	0.11	-0.005	-2.21	-0.004	-2.59
Doctor Ratio Public	2.320	2.74	0.213	0.28	0.813	1.34
Nurse Ratio Public	-0.198	-0.45	-0.093	-0.21	0.595	1.79
ORT Available Public	1.137	3.76	0.228	0.85	0.253	1.17
OthrDiarDrug Avl Public	-0.923	-1.70	0.188	0.36	0.787	2.09
Vacc Avail Indx Public	0.464	1.90	0.462	2.16	0.444	2.74
Famp Avail Indx Public	0.940	2.16	-0.503	-1.37	-0.610	-2.01
Private Characteristics						
Dist Nearst Private(km)	-0.170	-3.11	-0.089	-2.24	-0.091	-2.94
Price Private Visit	0.010	0.10	0.053	0.66	0.009	0.15
Prvt Provides PostNatal	-2.774	-4.07	-0.676	-1.17	1.043	2.51
Number Personnl Private	-0.003	-0.90	0.006	2.13	0.008	3.56
Doctor Ratio Private	1.228	1.31	1.778	2.25	0.897	1.46
Nurse Ratio Private	0.449	0.44	1.329	1.57	1.825	2.77
ORT Available Private	0.596	1.46	-0.393	-1.27	-0.232	-0.93
OthrDiarDrug Avl Privat	0.232	0.80	0.742	3.00	-0.140	-0.61
Vacc Avail Indx Private	1.693	1.74	-0.924	-1.24	-1.004	-1.65
Famp Avail Indx Private	1.213	2.00	0.027	0.06	-0.378	-1.05
Traditional Characteristics						
Dist Nearst Traditl(km)	0.558	0.45	-1.943	-1.97	-0.403	-0.51
Price Traditional Visit	-0.390	-1.54	0.177	0.82	0.166	0.99
YrsEduc MedianTrdlPrvdr	0.057	2.94	-0.055	-3.41	0.029	2.22
FormlTraing MedianTrdl	-0.742	-2.49	-0.125	-0.45	0.175	0.69
Constant	-4.136	-1.45	-5.851	-2.18	-9.923	-4.68

Notes on Table 6.1 apply here.