Decentralization, Allocative Efficiency and Health Service Outcomes in the Philippines

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Decentralization, Allocative Efficiency and Health Service Outcomes in the Philippines[1]

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Decentralization, Allocative Efficiency and Health Service Outcomes in the Philippines

Abstract

Many developing countries have decentralized the public health care system in the last twenty years, but little empirical research has been conducted on the effects of these fiscal changes. Important policy questions are whether decentralization leads to more or less health care provision, whether more or less public good types of health care are provided, and whether local governments are effective in the provision of health care services. This paper systematically examines these questions using a unique data set on audited annual expenditures combined with secondary census and demographic survey data for nearly 1600 local governments before and after decentralization in the Philippines. Our statistical methods correct for the potentially endogenous allocation of funds to the provision of health care by local governments. The results show that although local health expenditures and the share of resources allocated to health increased after decentralization, local governments decreased the share of public good types of health care services. In addition, we find that city/municipality public health expenditures are endogenous and that simple methods that do not correct for this endogeneity can be seriously misleading. Finally, we find that local expenditures are found to increase the use of public health services and the impact of these expenditures on health related outcomes is substantial.

1. Introduction

A number of countries have decentralized some or all of public health care functions from the central government to lower levels of government in the last twenty years.[4] These reorganizations typically have involved the national government providing block grants to local governments, with the local governments then assuming the direct responsibility for the publicly provided health care goods and services and operation of health facilities in its jurisdiction. Often, the justification used for decentralization is to improve the well-being of the people by empowering local voters to change the kind, quantities and qualities of the public health services they receive from their local authorities. Societal welfare can be compromised, however, if the pattern of local government spending leads to allocatively inefficient and ineffective levels of public good types of health care.

Allocative efficiency is concerned with the types of health care goods and services provided by governments, and emphasizes provision of public good types of health services where at least some of the consumption benefits accrue to the community at large. Examples of these types of health services include immunizations, infectious disease control, health education, family planning, and maternal and child health. It is important to know if decentralization leads to the provision of more or less public good types of health care, or whether governments choose to allocate more or less to private, non-public good types of health care (e.g., curative hospital services) which only benefit the individual who consumes them. Equally important is whether or not local governments have the capacity to effectively organize and deliver public health goods.

Although many developing countries have either moved to some form of decentralized government health care system or have ongoing transitions, little empirical research has been conducted

[4] Examples include the Philippines, Nepal, Sri Lanka, Papua New Guinea, Indonesia, Ghana, Botswana, Senegal, Tanzania, Venezuela, Mexico, Brazil, Chile, Colombia, Argentina, Guatemala and Honduras.

on the effects of these structural changes. In general, studies have focused on the overall relationship between government decentralization and economic growth (Davoodi and Zou, 1998; Zhang and Zou, 1998), or on the equity implications of local government provision of health care (Collins and Green, 1994). Few studies have examined the consequences of decentralization of the public health sector in terms of economic efficiency and the effectiveness of local governments to provide health services. While West and Wong (1995) examined the effects of decentralization on the local provision of social services, we know of only one study (Strumpf, et al., 1999) that has systematically examined the allocative efficiency consequences of these changes.

A major constraint to research in this area is a lack of sufficient data on local government expenditures before and after decentralization in developing countries. The study by Strumpf, et al. (1999) on the decentralization of the health sector in Uganda, for example, relies on budget planning data rather than actual expenditures for a small sample of local districts and does not include pre-decentralization data for comparison with post-decentralization plans. The results of the study suggest that the decentralized system in Uganda decreased allocative efficiency by increasing health spending on private, non-public types of health goods at the expense of public goods. West and Wong (1995) examine the local provision of education and health services in China using cross-sectional aggregate data, and find regional differences in the provision of these goods without systematically controlling for differences in population characteristics.

In this paper, we build on this work by examining the allocation of health resources, changes in allocative efficiency, and the impact of these allocation decisions on health related outcomes in the Philippines. This research is made possible through the use of a unique large data set on local government expenditures before and after decentralization matched with population based data. The level of detail and completeness of local government expenditures before decentralization and for an extended six-year period following decentralization contained in our data has not been available any developing country to the best of our knowledge.

Audited line-item annual expenditure reports for nearly 1600 local governments for four pre- and post-devolution years (1992, 1993, 1995 and 1998) were collected for this study. These data are combined with secondary census and demographic survey data so that we can examine changes in the level and composition of local government health expenditures and the impact of these expenditures on the consumption of public health goods and services before and after decentralization.

Specifically, we examine four issues: i) changes in the level and composition of local government per capita health care expenditures; ii) changes in the share of total local government resources allocated to health; iii) changes in the share of local government health resources allocated to public good types of health care; and iv) the impact of local government health expenditures on the consumption of public good types of health services.

The paper is organized as follows. In Section 2 we provide background on the devolution process in the Philippines that began early in the 1990s. Section 3 lays out our estimation strategy for the analysis of the impact of government resource allocation decisions on individual outcomes (the decision to use family planning and decisions about child immunizations), where the estimation strategy controls for the potential endogeneity of the resource allocation decisions. Detailed information on the data used in the study is provided in Section 4 along with definitions for the variables used in the multivariate analysis. Section 5 presents results and we conclude in Section 6.

2. Background

Until the early 1990s the national government of the Philippines provided health care services through a centralized hierarchal system of national, provincial and district hospitals, and primary health care facilities (rural health units and barangay health stations). The Department of Health (DOH) was responsible for centralized planning, spending and decision-making. This centralized structure was radically changed in 1991, when the Philippines enacted the Local Government Code (LGC) which devolved major fiscal responsibilities to local government governments (Republic of the Philippines,

1992). The LGC went into effect beginning in 1992 to develop implementing rules and regulations. Actual fiscal reorganization began in 1993.

The LGC required a significant amount of public services and functions to be devolved to local governments from the DOH, as well as from five other national level agencies. National government transfers to local governments in the form of unconditional block grants, called Internal Revenue Allotments (IRAs), were significantly increased. Allocation among individual local governments within the same category of local governments (78 provinces, 65 cities, and nearly 1600 municipalities) is determined by a formula based on population (50 percent), land area (25 percent) and a portion divided equally among all local governments (25 percent).

The formula for allocating the IRA among categories of local governments and among individual local governments has no relationship to the actual costs of the devolved functions. In addition, the amount of the IRA does not take into account the capacity of local governments to carry out devolved functions or to raise their own resources. Also absent from the LGC are any conditions on local governments, such as provision of essential services or mobilization of local revenues, to receive their share of national government revenues.

There were two major health policy concerns for the implementation of the LGC. First, with the exception of salaries to health care workers previously employed by DOH, no portion of the IRA allocation to local governments is earmarked specifically to the provision of health care services. While local governments are supposed to provide the health services that are devolved to them, the allocation of the IRA to expenditures by the local government has few restrictions. There were no assurances that central level public health care initiatives would be carried out by the local governments. Second, the IRA allocations to local governments are not based on their need or capacity to deliver health care services. This created winners and losers among local governments, with some better able to finance devolved health care services than others. It was feared that some local governments would fall well short of previous levels of support for public health care services.

Prior to fiscal devolution in 1993, each national government agency included in the LGC was required to develop rules and regulations for implementing the LGC. While some health policy issues were addressed in these regulations, the LGC prohibits the DOH from directly transferring funds from its budget to local governments to help offset health care service shortfalls. Instead, the DOH included a clause in its rules and regulations that allowed an agreement to be established with local governments "to cover technical, financial, and other forms of assistance, compliance of local governments to DOH guidelines, standards and criteria, augmentation of local health services and facilities, and such other concerns that pertain to the enhancement of local health services and facilities" (Republic of the Philippines, 1992). The DOH attempted through these agreements to assist local governments with the initial transition of health services from the central to the local levels and for continued support for its vertical programs. For example, to support the immunization program, the DOH provides vaccines and, in return, the local governments provide personnel, facilities, the cold chain, needles and syringes.

Of the five devolved national government agencies, the DOH had the largest amount of revenue transferred to the IRA. In 1993, the first year of fiscal devolution, the DOH budget was decreased by 50 percent (from about ₱10 billion to about ₱5 billion). Virtually all publicly provided health care functions below the regional level of the DOH, including provincial and district health offices, construction, operation and maintenance of provincial and district hospitals, purchase of drugs and medicines, operation of the primary health care system through rural health units and barangay health stations (primary health care facilities), operation of field health services, aid to puericulture, and operation of 5-bed health infirmaries were devolved to the local governments. Provinces, in general, fared much worse than cities and municipalities in the devolution of health care functions because all provincial hospitals (the largest expenditure category of devolved health services) were assigned to them. Cities, because of their large population bases, received a disproportionately large share of the IRA, but had few health care services devolved. Municipalities, with few exceptions, had the fiscal ability to cover devolved services that consist mainly of the delivery of primary health care goods and services. Overall, however, there

was no assurance that services previously provided by the central system under DOH would actually be delivered under the devolved system.

In the sections that follow, we will see that there was wide variability in how provinces and municipalities allocated their expenditures to competing needs. The next section explains how we use regression methods to examine the determinants of differing allocations to public and private heath expenditures and how these differences impact two very important public health related outcomes: use of family planning and child immunizations.

3. Estimation Methods

Our estimation strategy must take into account the fact that local governments are now making expenditure allocation decisions and, obviously, these can be influenced by local conditions. If some of the factors that affect the allocation process also affect health outcomes and they are not observed to the researcher, then simple methods that attempt to measure the impact of the expenditures on health outcomes could lead to biased results. For example, suppose a local government recognizes a strong reluctance on the part of its citizens to use family planning and allocates a disproportionate share of its budget to family planning services in an attempt to change local attitudes. Simple estimation methods may understate the impact of expenditures on the use of family planning in this instance.

It has been shown in several studies that simple methods that do not correct for potentially endogenous allocation decision can lead to biased results. In a study in the Philippines, Rosenzweig and Wolpin (1986) demonstrate that the impact of public programs could be seriously biased if unobserved characteristics of the program distribution mechanism are correlated with outcome variables such as health and fertility. Pitt, Rosenzweig, and Gibbons (1993) and Gertler and Molyneaux (1994) describe the implementation of the Indonesian family planning program and show that ignoring the non-random nature of its implementation produce seriously biased results. All three papers use fixed effects methods to obtain statistically valid measures of program impact. Angeles, Guilkey, and Mroz (1998) in a study

of Tanzania also show that naive methods yield biased results, and demonstrate that a random effects estimator which jointly estimates discrete time "hazard" models for program placement at the community level with a fertility equation estimated at the individual level yields much more precise parameter estimates than fixed effects methods.

The estimation strategy that we use in this paper is similar to the one used by Angeles, Guilkey and Mroz (1998), except that we use instrumental variables methods rather than full information maximum likelihood. We demonstrate the methodology by laying out the statistical specification for current use of family planning. The estimation strategy used for childhood immunization is identical.

We consider four health expenditure variables: per capita public health expenditures separately by city/municipality and province, and per capita private health expenditures separately by city/municipality and province. All expenditures were adjusted to constant 1992 prices. We then examine the impact of these expenditures on the dichotomous choice to use a family planning method.

For the sake of exposition of the statistical model, we do not write down separate public and private expenditure equations and so we have the following three equation system:

$$E_i^P = Z_i^P \beta^P + \lambda_i^P$$

where the dependent variable is one of the province level expenditure variables (i=1,2,...N, where N is the number of provinces), the Z^P's are a set of exogenous explanatory variables described below, β^P are unknown regression coefficients, and λ^P is an unknown disturbance term that is assumed to be iid normal with mean zero and standard deviation $\sigma_{\lambda p}$.

The second equation is for expenditures at the municipality/city level:

$$E_{ij}^M = Z_{ij}^M \beta^M + \lambda_i^M + \mu_{ij}^M$$

where the dependent variable is expenditures by municipality j (j=1,2,...,M_i) in province i and the Z, β and λ are defined as above, and μ^M is an unknown disturbance term that is assumed to be iid normal with mean zero and standard deviation $\sigma_{\lambda M}$.

The final equation in the system is at the individual level and explains the discrete choice to use some method of family planning:

$$FP_{ijk}^{*} = \alpha E_j^P + \gamma E_{ij}^M + X_{ijk}\beta^{FP} + \lambda_i^{FP} + \mu_{ij}^{FP} + \varepsilon_{ijk}$$

where the dependent variable is a latent variable which measures the strength of respondent k's (k=1,2,...K_{ij}) motivation to use a family planning method. The observed dependent variable is a dichotomous indicator for whether the respondent is practicing some type of family planning. The X's represent exogenous household and individual level variables that may affect use of family planning and include such measures as age, education, and assets. We do not include variables such as the number of children the respondent currently has because these variables are potentially endogenous. The exclusion of these types of variables make the coefficients of the X's difficult to interpret since the model is in reduced form. However, the affect of these variable is not of interest in this paper where we are focused on the impact of expenditures on health related outcomes and X's are included simply as controls.

The error term has three components: province and city/municipality level errors as defined above plus an individual level error that is assumed to be iid normal with mean zero and standard deviation one (since the error variance is not identified). If the province and city/municipality level errors were not correlated across the three equations, simple probit would yield consistent estimates of the model's parameters and the Huber-White sandwich estimator could be used to obtain asymptotically valid standard errors. However, we assume that the λ's and μ's are correlated across the three equations which means that simple probit would result in inconsistent parameter estimates. Our solution is a two-stage procedure in which we first estimate the province and city/municipality expenditure equations by

OLS, determine predicted values for expenditures, and then replace actual expenditures with predicted expenditures in the third equation. This procedure serves two purposes: it corrects for the endogeneity of expenditures (see Maddala, 1983 and Rivers and Vuong, 1988), and it fills missing expenditure values which occurred mainly at the province level.

While the point estimates from our two-step probit procedure are consistent, the standard errors may be understated since we use predicted values for the right-hand-side expenditure variables. In order to obtain unconditional standard errors, we use a bootstrap procedure where we sample with replacement at the province level and then estimate the two expenditure equations and the probit equation on the bootstrap sample. We then draw 10,000 bootstrap samples to obtain unconditional standard errors. It should be noted that our bootstrap standard errors were almost the same as the conditional standard errors obtained by using the Huber-White sandwich estimator with a correction for clustering at the province level.

A standard Hausman test of the endogeneity of expenditures can be performed by including actual expenditures and predicted expenditures in the use of family planning equation, and then performing a t test on the estimated coefficient of predicted expenditures (an equivalent procedure is to use residuals in place of predicted expenditures). The results of this test are discussed below.

4. Data and Variable Definitions

Dependent Variables

Local Government Expenditures. Health care expenditure data for nearly 1,600 local governments were collected from the national level audit agency, the Commission on Audit (COA), which tracks and monitors local government expenditures for all provinces, cities, and municipalities. Expenditures are monitored by the local provincial and municipal budget and accounting offices, and are reported to the COA in an end-of-year report, the Status of Allotment, Appropriations and Obligations (SAAO). Detailed line-item data were obtained for each province, city and municipality on all

"obligations incurred" which represent all goods and services, health and non-health, actually purchased by the local government for each local government for 1992 (the year prior to devolution), and for three years following devolution – 1993, 1995, and 1998.[5]

Each line item expenditure from the SAAO for each local government was initially classified as either a health or non-health expenditure and, for health expenditures, a further classification was made for public and private good types of health care and family planning.[6] The definitions used for the classification of public and private types of health care expenditure at the local government level are the same as those used in the annual Philippines National Health Accounts.[7] Local government expenditure data are given in current (nominal) prices for each year. Nominal peso values (current prices) are converted to constant prices using the GDP Implicit Price Index with 1992 defined as the base year to allow for comparisons of health expenditures over time in real terms.[8] To calculate per capita measures of expenditures, the population of each local government is taken directly from the original 1990 and 1995 census data files and interpolated for 1992, 1993 and 1998.

Table 1 gives local government average annual per capita expenditures for health and family planning for 1992 (pre-devolution), 1993, 1995 and 1998, by type of local government, and type of

[5] A detailed description of the SAAO data can be found in Schwartz, et al., 2000.
[6] Family planning in the Philippines is a separate line item in expenditure reports, and not included in overall health expenditures. In this paper we consider family planning expenditures separately, and also combine these expenditures with public health expenditures.
[7] For a detailed description of the Philippines National Health Accounts, see National Statistical Coordination Board, 1999a.
[8] The Implicit Price Index for GDP was taken from selected issues of *The National Accounts of the Philippines, CY1990 – CY 1998,* National Statistical Coordination Board.

health care expenditure (public health, family planning, private health).[9]

[Table 1 about here]

Per capita expenditures are seen to increase significantly from 1992 to 1993 immediately following devolution. Cities and municipalities, which assumed much of the responsibility for primary health care appear to have followed this mandate with a large portion of increased revenue being devoted to public health care, and less to private health care. Provincial governments, which assumed responsibility for hospitals, are seen to have substantially increased both public and private per capita health care expenditures. On a per capita basis in 1998, provinces allocated more than one and a half times private health expenditures to public health expenditures. Family planning, by contrast, received little increase in funding from either city/municipalities or provinces. This is largely attributable to DOH implementing rules and regulations that retained support for vertical programs at the central level, including family planning. By 1998, overall per capita expenditures for public health including family planning outstripped per capita private health expenditures by more than 3 to 1.

Table 1 also presents expenditure quartiles for city/municipality expenditures, provincial expenditures, and the combination of the two. For every quartile, we see increases in expenditures through time for all three categories. However, it is interesting to note that the quartiles indicate that there is wide dispersion in per capita expenditures across city/municipalities and provinces.

The percentage of total local government expenditures devoted to health and family planning also is seen to have substantially increased following devolution (Table 2). Pre-devolution, local governments allocated less than 5 percent of expenditures to the health sector. In the first year of devolution, 22 percent of all expenditures went to health. By 1998, this share increased to nearly 24 percent. Increases at the provincial level were largely responsible for this large re-allocation of

[9] Historically, family planning in the Philippines has been a separate line item in the budget and accounting system.

government expenditures. The proportion of total provincial resources allocated to health grew from about 5 percent to more than 25 percent. Of the 25 percent health allocation in 1998, 14 percent was allocated to public health and 11 percent to private health. Cities and municipalities spent less than one percent pre-devolution, which grew to about 11 percent by 1998. The large majority of this re-allocation was to public health and family planning (10.7 percent), and only 0.1 percent to private health. The results by quartiles again indicate that there is wide dispersion across municipalities and provinces with some local governments allocating less than 20percent of their total budgets to health care while others allocate in excess of 50 percent.

[Table 2 about here]

The percent public/private composition of local government health expenditures is given in Table 3. Pre-devolution, more than 95 percent of local health expenditures were allocated to public health goods and services. By 1998, the share devoted to public health had dropped to about 60 percent, and expenditures on private health goods and services had grown to 40 percent. This large increase in the share of private health expenditures is attributable to provincial governments which changed their pre-devolution allocation of 95 percent public, 5 percent private to about 58 percent public, 42 percent private by 1998. The primary reason for this shift in allocation toward private health expenditures is the devolution of hospitals to the provincial governments, a private health care responsibility that was previously supported by central DOH. Cities and municipalities, on the other hand, continued to maintain a 99 percent public to 1 percent private health care allocation. The responsibility for primary health care (largely public health care) was devolved to cities and municipalities, and it appears that these types of local governments have continued to support public health much in the same proportion as pre-devolution.

[Table 3 about here]

Health Service Outcomes. Two health care services, family planning and immunization, are chosen to examine the effectiveness of local government expenditures to provide public health goods. Individual observations were taken from the 1993 Philippines National Demographic Survey (NDS) and the 1998 Philippines National Demographic and Health Survey (DHS) for all women of reproductive age (15-49), and all children under five years of age. These individual observations are matched with province and city/municipality per capita local government health expenditures to test the impact of health expenditures on the likelihood of women using modern family planning and children being fully immunized. Effective local health expenditures are expected lead to increases in the consumption of these goods.

Table 4 shows that there has been a slight increase in the use of family planning between 1993 and 1998. The table also shows that the use of modern family planning is relatively low in the Philippines. In 1993, only 35 percent of women of reproductive age used modern family planning methods and, by 1998, only about 39 percent of women were using modern methods. Thus, modern use only accounts for a little more that half of family planning use. There has also been a slight increase in the number of fully immunized children – from 68% to 71%.

[Table 4 about here]

Independent Variables

Expenditure Estimations. Secondary data sources are used to develop a set of multivariate control variables for local government expenditures, including i) the 1990 Philippines Census and 1995 Philippines Inter-Censual data sets; ii) the 1993 Philippines National Demographic Survey (NDS); iii) the 1998 Philippines National Demographic and Health Survey (DHS); and iv) Philippines Statistical Yearbooks. Names and definitions of independent variables are given in Table 5.

[Table 5 about here]

Independent variables are chosen to represent city, municipality and provincial population characteristics under the assumption that responsive local governments allocate health resources toward groups most in need. Primary health care expenditures, for example, are expected to be higher in local governments with a higher proportion of infants and children under 5 years of age. Similarly, local governments with a wealthier population may choose to provide less government provided health services if income and wealth translate into higher demand for privately provided health services.

Original census data sets are used to calculate population characteristics for each province, city and municipality including the percentage of infants, children under 5 years of age, elderly (65+ years), women of child bearing age (WCBA), disabled, workers, overseas workers, highest level of education attained (no formal education, primary, high school, and college +), and the local government population.

The 1993 NDS and 1998 DHS are used to calculate an average asset index for each local government as a proxy index for wealth.[10] The asset index is based on household assets where the coding for each asset is 1 if the household had the asset, and 0 if not. Assets include: i) own flush toilet, ii) electricity; iii) television; iv) refrigerator; v) bicycle; vi) motorcycle; vii) car; and viii) house floor made of vinyl, polished wood, ceramic, or marble. For each of these eight factors, the household is assigned the value of the natural log of the inverse of the proportion of households that have a value of one. This transformation weights the factor so that the scarcer the factor is, the higher its value. The sums of the eight factors form the asset index which ranges from 0.14 (low) to 5.36 (high), depending on how many of the factors each household scored. See Bollen, Glanville and Stecklov (2001) for a discussion of the construction of these types of indices. The index we use was found to work well in their study.

Other data for each local government is obtained from the Philippines Statistical Yearbooks, including land mass (square kilometers), whether a city is designated as a Chartered City, and whether a city or municipality is home to the provincial capital. Land mass is used with census data to calculate

[10] Documentation of the 1993 NDS and 1998 DHS is given in NSO, 1994, 1999.

population density per kilometer for each province and major city for each year (1992, 1993, 1995, 1998), which forms a continuous urban/rural control variable.

Table 6 lists the means and standard deviations of independent variables used for the estimation of expenditures. The means of the independent variables are in line with what would be expected in a developing country that experienced stable economic growth over the period from 1992 to 1998.

[Table 6 about here]

Average province and major city population density nearly doubled from 298 people per square kilometer in 1992 to 559 people per square kilometer in 1998 as a marked urbanization trend continued to occur. It is important to note that Chartered Cities are not necessarily large or have a high population density in the Philippines. Virtually all of the large cities are chartered, but this political designation for 65 cities also is granted to "cities" with populations under 20,000 people. Under the DOH implementing rules and regulations for devolution, chartered cities are responsible for primary health care, similar to the municipalities. Unlike municipalities, however, chartered cities do not have rural health units to support, and many of the larger cities funded their own primary health care services and city hospitals prior to the devolution. Because population partially determines the amount of the IRA, cities generally faired well under devolution because fewer new services were assumed, yet their IRA disproportionately increased. The purpose of chartered cities as an independent variable is to control for these differences. Similarly, if the city or municipality is the home of the provincial capital, it is likely that some provincial health expenditures spill over to the city or municipality, thus relieving the responsibility for these services, and the provincial capital variable is included to control for these differences.

The average provincial asset index is seen to increase over the four annual time periods, from 2.0 in 1992 to 2.2 in 1998, as expected during a period of economic growth. The average percent of the population 15+ years of age that is working also is seen to increase, as well as the average percent of the population 15+ years of age working overseas. The average highest level of education attained is also seen to increase between 1992 and 1998. These variables serve as proxies for wealth and income of the

local government. It is a common practice for families in the Philippines to send at least one member overseas to work for higher wages than available locally, and send funds home to support the family. A higher percentage of overseas workers likely increases the income level of the local government. It is expected that local governments with higher asset indices, larger percentages of workers, larger percentages of overseas workers, and larger percentages of higher education levels would elect to provide less health care services as privately provided health services likely would be substituted for publicly provided services, usually available except in the most remote areas.

Local governments with higher percentages of infants, children under 5, elderly (65+ years), women of childbearing age (15-49), and disabled are expected to provide higher levels of health care services, because these groups typically are targeted for publicly provided health care especially maternal and child care including pre-natal and neo-natal care, immunizations, control of diarrheal disease, acute respiratory infections, and family planning.

Three dummy variables also are included in the expenditure estimations to indicate observations for 1993, 1995, and 1998, with 1992 omitted as the base year for expenditure and health service outcome comparisons over time. Note that dummy variables for provincial capital and charter city obviously must be omitted from the province level expenditure equations.

Family Planning and Immunization Estimations. Table 7 lists the means and standard deviations in 1993 and 1998 for the independent variables in the use of family planning and immunization regressions. Remember that we are estimating a reduced form regression and so variables such as whether or not the woman is currently married and her number of children, which are potentially endogenous are excluded. In the regressions, we allow for non-linear effects of age and education by breaking up the variables into categories displayed in the table. The mean values for the four expenditure variables are listed in Table 1.

[Table 7 about here]

5. Results

Local Per Capita Health Expenditures

Tables 8 and 9 present the results of four regressions that explain per capita public and private health expenditures at the city/municipality and province levels. In these regressions we use all four years of expenditure data even though we only have individual level data for the health outcomes for 1993 and 1998. Predicted health expenditures for 1993 and 1998 were calculated using the estimated coefficients and then used for endogeneity corrections in the health outcome equations. Regressions that only use the 1993 and 1998 data sets yielded similar results.

In this discussion that follows, we say that an estimated coefficient is significantly different from zero if the absolute value of the z statistic is at least 1.65 indicating significance at least the 10% level.

The left side of Table 8 presents the results for per capita public expenditures and we see that the model fits the data quite well with an R^2 of almost 60%. We see that the percent elderly, the percent disabled, and the percent working all have positive effects on expenditures as do two of the education categories and the dummy for chartered city. Negative effects are found for the percent of women of child bearing age and population density. We also see that the point estimates of the coefficients are quite large as might be expected given the large variation in expenditures that we noted in the descriptive tables. Finally, we see that even after controlling for this set of variables, the year dummies are still strongly significant and indicate an upward trend in per capita public health expenditures at the city/municipality level between 1991 and 1998 when the other variables are controlled.

The results are not nearly as strong for private expenditures at the city/municipality level and the R^2 is only 13%. However, this is to be expected since private health expenditures are very low at this most local level (see Table 1). Positive significant determinants of private expenditures are percent of the residents with a college degree, population density and the chartered city dummy while the percent working overseas has a negative effect. The year dummies are also significant predictors but there is no upward trend through time.

The results for province level expenditures are reported in Table 9. At the province level, the descriptive statistics in Table 1 indicate substantial expenditures at both the public and private level and we see from the R^2 statistics that the regression equations explain the two types of expenditures equally well. However, there are no significant explanatory variables that have a positive impact on public expenditures while percent women of child bearing age, percent working, percent with only a primary education and the asset index all have negative effects. The year dummies are all positive and significant indicating increasing public expenditures relative to 1991 but the upward trend is broken in 1995 where the positive coefficient is substantially smaller than the coefficients for 1993 and 1998.

For private province level health expenditures, we see that percent infants and percent disabled have positive effects while population density has a negative effect. The year dummies again show substantial increases in expenditures relative to 1991 with the 1995 and 1998 coefficients almost double the coefficient for 1993. Note also that the coefficients for year dummies for private expenditures in 1995 and 1998 are substantially larger than the corresponding coefficients for public expenditures, which is consistent with the data in Table 3 which shows private expenditures increasing relative to public health expenditures at the province level.

Altogether, the results for the four regressions demonstrate that the wide variance in expenditures across local government units is at least partly explained by the demographic make-up of the units. This relatively high explanatory power for cross sectional regressions plus the large numbers of significant coefficients means that it is reasonable to expect that the proposed two-stage estimation procedure described above will be an effective method to control for unobservable variables that affect both expenditures and health outcomes (see Bollen, Guilkey, and Mroz, 1995).

Health Service Outcomes

The first topic that must be addressed in this section is the potential endogeneity of local government expenditures. If local governments are responsive to the needs of their citizens, then it is highly likely that simple methods may seriously understate the importance of local government health

expenditures. This is exactly the result that we find for the *public* per capita expenditures at the city/municipality level for both use of family planning and whether or not a child is fully immunized. Since the probit results are scale sensitive, we will determine the size of understatement in simulations described below.

A Hausman test was done which involved including both actual and predicted expenditures in each equation. A significant t statistic for predicted expenditures is then evidence of endogeneity. The t statistic for predicted city/municipality level public expenditures in the use of family planning and immunization equations were 2.07 and 1.83 respectively. There was no evidence of endogeneity for private expenditures at the city/municipality level and none of the province level expenditures were found to be endogenous. It is interesting that strong evidence of endogeneity is found at this more local level of government and only for the public expenditure component. A possible interpretation of this result is that city/municipalities are more in tune with the needs of their communities and target their expenditures appropriately.

In the results discussed below, we use predicted values for all the expenditure variables even though only public expenditures are found to be endogenous to fill in missing values that occurred mainly at the province level.

The results of the two-stage probit regressions for the use of family planning are presented in Table 10. We see that two of the four expenditure variables are significantly different from zero – private per capita expenditures at the province level and public expenditures at the city/municipality level. Although, the province level variable is highly significant, its coefficient is half the size of the municipality level variable. In an attempt to quantify the size of the impact of health expenditures on the use of family planning we performed the following simulation. We first predicted the use of family planning by each individual in the sample using the actual values of the explanatory variables for each individual. If you average predicted use across individuals, the result is a predicted 66 percent use regardless of whether or not you correct for endogenous expenditures. We then increased public per

capita city/municipality expenditures by one standard deviation for each individual, predicted use, and averaged over all individuals. Using the probit regression with no correction for endogeneity, predicted use increased to 70percent. However, in the two-stage probit regressions, predicted use increased to 78 percent. Thus we see that simple methods seriously understate the impact of public city/municipality level expenditures on a very important public good. This result has obvious policy implications.

[Table 10 about here]

As stated earlier, the primary focus of this paper is to examine the impact of health expenditures and our reduced form model makes the other estimated coefficients difficult to interpret. However, many are significantly different from zero. The omitted category for age is women older than 44 and we see that all the age dummies are significant and positive. However, there is little difference in the coefficients for the 20 to 39 age range. The excluded category for both the woman's and her partner's years of education is 11 or more years of education. We see that women with 0 to 5 years of education are significantly less likely to use family planning than the most highly educated group but the other two education groups have insignificant estimated effects. The effect of the years of education of the woman's partner shows high predicted use for lower levels of education. This may be due to an income effect. No other variable including the year dummy is significantly different from zero.

The t statistic for public per capita health expenditures at the city/municipality level is only 1.39 in the two-stage probit estimation for child immunization (Table 11). However, the t statistic in the uncorrected probits is 0.04 and the point estimate of the coefficient is zero to four decimal places. A quick perusal of Table 11 shows that very few variables significantly affect whether or not a child is fully immunized and so we take our results as weak evidence of a positive impact of public city/municipality level expenditures on immunization. When we perform the same simulation exercise outlined above, we find that the predicted average for full immunization is 67 percent regardless of whether or not you correct for the endogeneity of expenditures and that a one standard deviation increase in expenditures

results in no increase in the uncorrected probits but the percentage increases to 75 percent using the two-stage probit regressions. Again, these results have obvious policy implications.

[Table 11 about here]

There are few other significant coefficients in Table 11. We see that the youngest age group is less likely to fully immunize their child relative to the oldest age group while assets and the dummy for Catholic are significant and positive.

6. Conclusions

This paper examines four questions regarding government expenditures for health in the Philippines before and after decentralization and the effectiveness of these expenditures in the provision of public health goods. On the first health expenditure question, the results suggest that per capita expenditures increased immediately following devolution and continued to increase in 1995 and 1998 compared with per capita expenditure levels prior to devolution. Per capita increases appear to be more pronounced for provincial expenditures than for city/municipality expenditures, probably because more costly responsibility for hospitals was devolved to provincial governments. The results suggest that local governments, at least in times of increasing budget allocations from the central government, increase the amount of per capita resources devoted to health care goods and services.

On the second health expenditure question, changes in the share of total local government resources allocated to health by level of local government, the results are similar to those found for changes in per capita expenditures and suggest that the percent of revenue allocated to health by both city/municipalities and provinces increased following devolution and continued to increase in 1995 and 1998 compared with the share allocated to health prior to devolution. The results suggest that local governments, which have discretionary authority over the IRA, allocated increasing shares of total resources to health at the expense of other locally provided government services following devolution. Given the low level of total national health expenditures in the Philippines prior to devolution compared

with other developing countries, these results combined with those found for per capita expenditures suggest local governments are committed to expenditures for health.

On the allocative efficiency question, changes in the share of local government health resources allocated to public good types of health by level of local government, the results suggest the percent of revenue allocated to public health decreased immediately following devolution and stayed below the pre-devolution level in 1995 and 1998. The result is consistent with Strumpf, et al. (1999) for Uganda, and suggests that local governments may be more inclined to spend on private health types of goods rather than public health goods. The result found here for the Philippines is not surprising given that provincial governments, in particular, were forced to change their pre-devolution allocation of high public health allocations to private health allocations due to the devolution of the operation of hospitals to the provincial governments. This new responsibility transferred a large private health responsibility that was previously funded by central DOH. In addition, even though cities and municipalities have continued to maintain a high percent public share of total health and family expenditures, the results suggest that cities and municipalities initially slightly decreased the allocation of total health resources devoted to public health, but by 1998 maintained the distribution of public and private expenditures relative to pre-devolution allocation levels.

Finally, we find strong evidence that public health expenditures at both the province and city/municipality level have a positive impact on the use family planning and weaker evidence of a positive impact of public health expenditures at the city/municipality level on child immunizations. A most interesting result is that we find clear evidence that public city/municipality health expenditures are endogenous in both the family planning and immunization equations and that naive methods that do not take this endogeneity into account seriously understate the impact of expenditures on these two public health outcomes. Thus, the post-devolution increase in per capita public health expenditures at this most local governmental unit level appear to have been spent wisely.

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Table 1. Average Annual Per Capita Expenditures for Health and Family Planning by Type of Local Government (constant 1992 pesos)

Expenditure Category	1992 (₱)	1993 (₱)	1995 (₱)	1998 (₱)
City/Municipality Expenditures				
Public Health	2.3	30.3	42.6	53.3
Family Planning	0.2	0.4	0.4	0.4
Public Health and Family Planning	2.5	30.7	43.0	53.7
Private Health	0.2	1.8	1.9	1.1
Public Health, Family Planning and Private Health	2.7	32.5	45.0	54.8
Quartiles				
25	0.0	20.2	28.9	37.2
50	0.0	27.3	37.4	48.7
75	1.3	32.5	50.3	63.7
100	105.3	533.8	756.5	558.4
Provincial Expenditures				
Public Health	3.4	21.7	23.8	51.1
Family Planning	0.7	0.5	0.6	0.7
Public Health and Family Planning	4.1	22.2	24.4	51.8
Private Health	0.3	18.5	36.2	30.8
Public Health, Family Planning and Private Health	4.4	40.8	60.5	82.5
Quartiles				
25	1.9	21.2	35.9	39.7
50	4.1	32.5	48.2	62.7
75	5.7	44.1	73.0	95.8
100	20.3	639.8	976.2	1359.6
Combined City/Municipality and Provincial Expenditures				
Public Health	5.7	52.0	66.4	104.4
Family Planning	0.9	0.9	1.0	1.1
Public Health and Family Planning	6.6	52.9	67.4	105.2
Private Health	0.5	20.3	38.1	31.9
Public Health, Family Planning and Private Health	7.1	73.3	105.5	137.3
Quartiles				
25	2.7	46.9	71.8	83.8
50	4.9	60.8	91.1	115.5
75	8.1	79.4	118.6	155.9
100	106.5	782.7	1222.5	1685.1

Table 2. Average Annual Percentage Allocation of Total Local Government Expenditures to Health and Family Planning

Expenditure Category	1992 (%)	1993 (%)	1995 (%)	1998 (%)
Total City/Municipality Expenditures				
Public Health	0.8	9.3	9.8	10.6
Family Planning	0.1	0.1	0.1	0.1
Public Health and Family Planning	0.9	9.4	9.9	10.7
Private Health	0.0	0.3	0.3	0.1
Public Health, Family Planning and Private Health	0.9	9.7	10.2	10.8
Quartiles				
25	0.0	7.4	7.6	8.5
50	0.0	9.3	9.9	10.8
75	0.7	11.4	12.3	13.3
100	20.8	59.8	63.2	38.1
Total Provincial Expenditures				
Public Health	3.6	11.0	8.8	14.0
Family Planning	0.9	0.4	0.3	0.2
Public Health and Family Planning	4.5	11.4	9.1	14.2
Private Health	0.4	11.8	15.5	11.0
Public Health, Family Planning and Private Health	4.9	23.3	24.6	25.2
Quartiles				
25	1.9	17.8	17.8	16.7
50	3.9	24.3	26.9	25.6
75	6.6	30.8	32.3	30.8
100	15.6	63.8	52.8	58.3
Combined Total City/Municipality and Provincial Expenditures				
Public Health	3.5	10.8	9.0	13.8
Family Planning	0.8	0.3	0.2	0.2
Public Health and Family Planning	4.3	11.1	9.2	14.0
Private Health	0.3	10.9	14.3	9.9
Public Health, Family Planning and Private Health	4.7	22.1	23.5	23.9
Quartiles				
25	1.8	17.1	17.1	16.7
50	3.8	22.6	23.6	24.6
75	6.4	29.2	30.9	30.0
100	15.2	61.5	51.1	54.5

Table 3. Average Annual Percentage Allocation of Total Local Government Health Expenditures to Public Health, Family Planning and Private Health

Expenditure Category	1992 (%)	1993 (%)	1995 (%)	1998 (%)
City/Municipality Expenditures				
Public Health	89.2	97.5	97.8	98.4
Percent Family Planning	9.6	0.6	0.5	0.6
Public Health and Family Planning	98.8	98.1	98.3	99.0
Quartiles				
25	100.0	100.0	100.0	100.0
50	100.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0
100	100.0	100.0	100.0	100.0
Private Health	1.2	1.9	1.5	1.0
Provincial Expenditures				
Public Health	77.0	51.5	41.2	56.9
Family Planning	18.1	1.6	1.6	1.1
Public Health and Family Planning	95.2	52.1	42.8	58.1
Quartiles				
25	100.0	11.9	6.3	19.1
50	100.0	40.9	28.1	61.5
75	100.0	100.0	99.9	100.0
100	100.0	100.0	100.0	100.0
Private Health	4.8	47.9	57.2	41.9
Combined City/Municipality and Provincial Expenditures				
Public Health	77.6	53.0	43.3	60.0
Family Planning	17.7	1.7	1.7	1.3
Public Health and Family Planning	95.3	54.7	45.0	61.3
Quartiles				
25	100.0	14.5	10.1	24.7
50	100.0	43.0	29.6	64.5
75	100.0	100.0	99.9	100.0
100	100.0	100.0	100.0	100.0
Private Health	4.7	46.2	55.0	39.0

Table 4. Family Planning and Immunization

	1993 (%)	1998 (%)
Use modern family planning	35.3	38.9
Use Family Planning	63.7	67.9
Fully immunized child	68.1	70.6

Table 5. Independent Variable Names and Definitions Used in Expenditure Estimations

Variable	Definition
% infant	percent of population under 1 year of age by city, municipality and province for 1992, 1993, 1995 and 1998
% children	percent of population under 5 years of age by city, municipality and province for 1992, 1993, 1995 and 1998
% elderly	percent of population over 65 years of age by city, municipality and province for 1992, 1993, 1995 and 1998
% wcba	percent of population who are women of child bearing age (15 – 49 years old) by city, municipality and province for 1992, 1993, 1995 and 1998.
% disabled	percent of population with a disability (totally or partially blind, low vision, totally or partially deaf, mute, speech defect, missing or paralyzed limbs, quadriplegic, retarded, insane, other) by city, municipality and province for 1992, 1993, 1995 and 1998
% overseas	percent of working age population (15 and older) who are working overseas by city, municipality and province for 1992, 1993, 1995 and 1998.
% working	percent of working age population (15 and older) who are working by city, municipality and province for 1992, 1993, 1995 and 1998
% no education	percent of population age 21 and older with no formal years of education by city, municipality and province for 1992, 1993, 1995 and 1998
% primary educ	percent of population age 21 and older with 6 years of primary education (highest grade attained) by city, municipality and province for 1992, 1993, 1995 and 1998
% hs education	percent of population age 21 and older with high school diploma (highest grade attained) by city, municipality and province for 1992, 1993, 1995 and 1998
% college +	percent of population age 21 and older with college degree or higher by city, municipality and province for 1992, 1993, 1995 and 1998
asset index	average index of household assets for each city, municipality and province
pop density	population density per square kilometer by province and major city for 1992, 1993, 1995 and 1998
chartered city	city is designated as a Chartered City, yes=1, no=0
province capital	city or municipality is the provincial capital, yes=1, no=0
1992	year is 1992 (omitted)
1993	year is 1993, yes=1, no=0
1995	year is 1995, yes=1, no=0
1998	year is 1998, yes=1, no=0

Table 6. Independent Variable Means and Standard Deviations for Cities, Municipalities and Provinces by Year for Expenditure Estimations

Variable	1992		1993		1995		1998	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
City/Municipality Population	34,809	44,538	36,546	52,100	39,418	58,258	39,881	53,863
Province Population	932,442	578,976	962,038	591,695	985,498	616,647	1,028,432	664,263
Province and Major City Population Density (per sq kilometer)	298	558	301	2,358	539	1,984	559	1,972
Percent Chartered Cities	3.6	18.6	3.8	19.2	4.3	20.2	4.1	19.1
Percent Provincial Capitals	4.5	20.7	4.3	19.9	4.5	20.6	4.1	19.5
Province Asset Index	2.0	0.9	2.0	1.0	2.2	1.0	2.2	1.0
Percent Infant	3.1	0.6	3.1	0.6	2.7	0.5	2.7	0.5
Percent Children under 5	14.4	2.2	14.4	2.2	14.0	1.9	14.0	1.9
Percent elderly (65+ yrs old)	3.6	1.7	3.7	1.7	3.6	1.6	3.6	1.6
Percent WCBA	23.2	1.8	23.1	1.9	22.0	2.0	22.0	1.9
Percent Disabled	1.5	0.8	1.5	0.7	1.5	1.2	1.5	1.2
Percent Working (15+ yrs old)	50.8	9.4	50.9	9.4	61.2	14.8	61.3	14.9
Percent Working Overseas (15+ yrs old)	1.1	1.2	1.1	1.3	1.6	1.5	1.6	1.5
Percent No Formal Education (21+ yrs old)	15.9	16.1	15.7	15.7	11.4	14.3	11.5	14.5
Percent 6 yrs Highest Education Level Attained (21+ yrs old)	46.7	13.0	47.0	13.2	44.0	13.0	44.1	13.2
Percent HS Diploma Highest Education Level Attained (21+ yrs old)	21.7	10.0	21.6	10.0	28.1	12.3	28.0	12.3
Percent College Degree+ Highest Education Level Attained (21+ yrs old)	15.7	7.7	15.7	7.9	16.5	9.2	16.4	8.8

Table 7. Independent Variable Means and Standard Deviations by Year for Family Planning and Immunization Estimations

Variable	1993		1998	
	Mean	**SD**	**Mean**	**SD**
Family Planning				
Age 15 to 19	0.02	0.12	0.01	0.11
Age 20 to 24	0.15	0.36	0.14	0.35
Age 20 to 29	0.25	0.43	0.27	0.44
Age 30 to 34	0.26	0.44	0.25	0.43
Age 35 to 39	0.16	0.37	0.19	0.39
Age 40 to 44	0.10	0.30	0.08	0.28
Education 0 to 5	0.15	0.36	0.14	0.34
Education 6	0.24	0.43	0.18	0.39
Education 7 to 10	0.35	0.48	0.35	0.48
Partner's Education 0 to 5	0.19	0.39	0.17	0.38
Partner's Education 6	0.23	0.23	0.17	0.37
Partner's Education 7 to 10	0.34	0.47	0.35	0.48
Catholic	0.84	0.36	0.78	0.42
Lives in urban area	0.49	0.50	0.48	0.50
Household asset index	2.04	2.43	2.31	2.42

Table 8. City and Municipality Public and Private Health and Family Planning Expenditures Per Capita (Standard Errors Corrected for Clustering on Province)

Variable	City and Municipality Per Capita Public Expenditures			City and Municipality Per Capita Private Expenditures		
	Coefficient	Standard Error	t Statistic	Coefficient	Standard Error	t Statistic
% infant`	489.44	128.48	3.81	9.21	8.34	1.10
% children	-57.52	64.60	-0.89	-1.92	3.29	-0.58
% elderly	177.53	62.88	2.82	-3.84	4.20	-0.92
% wcba	-85.60	49.56	-1.73	3.26	4.00	0.82
% disabled	93.73	40.88	2.29	-2.37	2.90	-0.82
% overseas	-14.40	51.98	-0.28	-11.08	4.21	-2.63
% working	23.07	5.56	4.15	0.20	0.27	0.75
% primary educ	14.19	7.94	1.79	0.40	0.41	0.98
% hs education	16.17	9.65	1.68	-0.10	0.92	-0.11
% college +	-1.59	11.89	-0.13	3.27	1.51	2.17
Asset Index	0.06	0.88	0.07	0.03	0.06	0.43
pop density	-0.12	0.04	-2.69	0.98	0.02	4.04
chartered city	30.44	3.36	9.05	1.95	1.09	1.80
province capital	1.82	1.82	1.00	0.73	0.62	1.19
1993	27.29	1.27	21.46	0.39	0.10	3.38
1995	34.68	1.54	22.53	0.37	0.15	2.56
1998	45.33	1.84	24.61	0.25	0.12	2.12
constant	-14.84	22.31	-0.67	-1.55	1.48	-1.05
Observations	5641			5669		
F	104.22			6.78		
prob > F	.0000			.0000		
R-squared	0.5865			0.1337		
Interpretations						
1993	+₱27 per capita			+₱.4per capita		
1995	+₱35 per capita			+₱.4 per capita		
1998	+₱45 per capita			+₱.2 per capita		

Table 9. Provincial Public and Private Health and Family Planning Expenditures Per Capita

Variable	Provincial Per Capita Public Expenditures			Provincial Per Capita Private Expenditures		
	Coefficient	Standard Error	t Statistic	Coefficient	Standard Error	t Statistic
% infant`	-322.036	1518.15	-0.21	2214.84	11.4371	1.94
% children	541.88	541.49	1.00	-616.00	407.86	-1.51
% elderly	576.24	526.81	1.09	-626.74	397.33	-1.58
% wcba	-934.22	433.26	-2.16	168.78	329.36	0.51
% disabled	-216.03	559.53	-0.39	861.38	437.71	1.97
% overseas	415.76	359.31	1.16	-263.98	271.05	-0.97
% working	-65.87	31.67	-2.08	-14.18	24.32	-0.58
% primary educ	-70.89	37.85	-1.87	33.61	29.00	1.16
% hs education	71.03	52.69	1.35	16.73	39.43	0.42
% college +	81.71	89.54	0.91	61.62	67.85	0.91
Asset Index	-6.55	3.17	-2.06	0.76	2.45	0.31
pop density	-0.92	1.16	-0.80	-1.82	0.87	-2.09
1993	23.48	6.31	3.72	21.21	4.71	4.50
1995	9.82	11.37	0.86	43.52	8.69	5.01
1998	34.90	11.58	3.01	40.48	8.82	4.59
constant	183.55	159.35	1.15	-24.43	119.91	-0.20
Observations	228			222		
F	6.16			5.85		
prob > F	.0000			.100		
R-squared	0.303			0.299		
Interpretations						
1993	+₱23 per capita			+₱21per capita		
1995	+₱9 per capita			+₱43per capita		
1998	+₱35 per capita			+₱40per capita		

Table 10. Probit Estimates Use of Family Planning with Corrections for the Endogeneity of Per Capita Public and Private Health Expenditures at the Province and Municipality Level and Bootstrap Standard Errors

	Coefficient	Standard Error	z - statistic
Age 15 to 19	0.720	0.221	3.26
Age 20 to 24	1.245	0.107	11.64
Age 25 to 29	1.284	0.098	13.14
Age 30 to 34	1.248	0.092	13.52
Age 35 to 39	1.116	0.124	8.95
Age 40 to 44	0.604	0.128	4.74
Education 0 to 5	-0.363	0.117	-3.10
Education 6	-0.131	0.106	-1.24
Education 7 to 10	0.069	0.088	0.79
Partner's Education 0 to 5	0.208	0.113	1.84
Partner's Education 6	0.312	0.100	3.13
Partner's Education 7 to 10	0.284	0.069	4.13
Assets	0.011	0.015	0.71
Catholic	0.039	0.077	0.50
Urban	-0.021	0.057	-0.37
Private Per Capita Health Expenditures – Province Level	0.007	0.002	3.22
Public Per Capita Health Expenditures – Province Level	-0.004	0.003	-1.43
Private Per Capita Health Expenditures – Municipality Level	0.018	0.028	0.65
Public Per Capita Health Expenditures – Municipality Level	0.014	0.005	2.73
Year is 1993	0.161	0.111	1.45
Intercept	-1.531	0.271	-5.64
Observations	14165		
Log – Likelihood	-8258		
Wald chi2 (18 df)	366		

Table 11. Probit Estimates Fully Immunized Child with Corrections for the Endogeneity of Per Capita Public and Private Health Expenditures at the Province and Municipality Level and Bootstrap Standard Errors

	Coefficient	Standard Error	z - statistic
Age 15 to 19	-0.607	0.269	-2.26
Age 20 to 24	-0.046	0.201	-0.23
Age 25 to 29	0.102	0.202	0.50
Age 30 to 34	0.115	0.190	0.61
Age 35 to 39	0.175	0.192	0.91
Age 40 to 44	0.082	0.195	0.42
Education 0 to 5	-0.117	0.120	-0.98
Education 6	-0.026	0.110	-0.24
Education 7 to 10	0.080	0.084	0.95
Partner's Education 0 to 5	-0.184	0.123	-1.49
Partner's Education 6	-0.132	0.114	-1.16
Partner's Education 7 to 10	0.038	0.094	0.41
Assets	0.028	0.016	1.75
Catholic	0.157	0.094	1.66
Urban	-0.041	0.076	-0.53
Private Per Capita Health Expenditures – Province Level	0.002	0.003	0.91
Public Per Capita Health Expenditures – Province Level	-0.003	0.003	-0.81
Private Per Capita Health Expenditures – Municipality Level	0.010	0.035	0.29
Public Per Capita Health Expenditures – Municipality Level	0.009	0.006	1.39
Year is 1993	-0.23	0.147	-0.16
Intercept	-0.068	0.362	-0.19
Observations	11508		
Log – Likelihood	-7103		
Wald chi2 (18 df)	65		