PREVENTING IMPOVERISHMENT, PROMOTING EQUITY AND PROTECTING HOUSEHOLDS FROM FINANCIAL CRISIS: UNIVERSAL HEALTH INSURANCE THROUGH INSTITUTIONAL REFORM IN MEXICO

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Abstract

Achieving fair financing poses a challenge for health systems. Effective, fair, and sustainable methods to finance complex health institutions are lacking and even the wealthiest countries have difficulty financing universal, comprehensive care.

In developing countries, financial protection for health is segmented and fragmented. Access to insurance coverage is regressive and impoverishing health spending common, particularly among the uninsured poor. Lack of financial protection means reliance on household out-of-pocket spending that both provokes impoverishment, and is inefficient and inequitable.

The Mexican health system was designed around a segmented model. As a result, out-of-pocket spending accounts for more than half of health finance and each year 2-4 million households -- most poor and uninsured -- suffer catastrophe or impoverishment. The health system reform of 2003 is designed to remedy this by offering publicly subsidized insurance to the more than 50% of families without social security.

This study analyzes the evolution and determinants of catastrophic and impoverishing health expenditure in Mexico between 1992 and 2004. This includes a period of economic crisis, and subsequently the initial phases of health reform. Indicators are developed to measure equity aspects and absolute impoverishment from health spending, and these are applied to document financial protection before and after reform. Econometric analysis measures the effect of the reform based on differential coverage across states and a methodology is developed for projecting potential, future impact.

Financial protection deteriorated during economic crisis. Post-crisis improvement is concentrated among the poorest and the uninsured and is likely to be due to both the health reform and poverty alleviation. The projections indicate the importance of insuring the poorest and including medications and ambulatory care in the package of covered services. Financial protection in health can prevent temporary shocks – to income and from illness – from generating permanent impoverishment.
I. Introducción

Achieving fair financing continues to be one of the most daunting challenges facing health systems. Complex and differentiated health care institutions were developed in the 20th century, yet effective, fair, and sustainable methods to finance these systems are still lacking. Some developed countries have met this challenge through universal social insurance, although even the wealthiest nations have found it difficult to develop a sustainable financial base for providing comprehensive health care to all citizens.

In most developing countries financial protection for health continues to be segmented and fragmented. As a result, access to insurance coverage through social security is regressive, there is an over-reliance on out-of-pocket spending to finance the health system, and impoverishing health spending is common, particularly among the poor and the uninsured. An important indicator of lack of financial protection is the proportion of the health sector that is financed directly from households through out-of-pocket spending. This provokes catastrophic and impoverishing health spending and is considered the least efficient and least equitable form of financing a health system (Frenk, Lozano, González Block, 1994; Hesketh and Zhu, 1997; WHO, 2000; Murray et al., 2000a; 2000b; Barraza-Llorenz, Bertozzi, Gónzalez-Pier, et al., 2002; Phelps, 2003).

Mexico, a middle-income country characterized by social inequalities and a complex epidemiological transition, has supported a fragmented health system since the 1940s. The inequity of this system is evidenced by large differences between the 32 states that make up the country both in terms of health needs and the contribution to health care, particularly for the uninsured. Further, pressures on the original model are becoming more intense as the health system battles the diseases of underdevelopment - concentrated in the poorest states - and simultaneously meets the challenges and upward pressure on health expenditure associated with chronic disease and ageing that affects all parts of the country (Knaul and Frenk, 2005; Frenk et al., 2003).
The need to improve the equity of health finance is one of the key challenges facing the Mexican health system. More than 50% of care is financed by out-of-pocket payments by families (Secretaria de Salud, 2005). Further, each year between two and four million Mexican households suffer catastrophic or impoverishing health expenditures and these incidents are concentrated among the poor and four times more common among the uninsured. This was reflected in the rank of Mexico in the World Health Organization (2000) analysis of health system performance. The overall position of Mexico was heavily affected by financial protection in which Mexico ranked 144 out of 191 countries as compared to 51 overall.

To address these challenges, the 2003 structural reform of the Mexican health system was designed to increase financial protection by offering subsidized, publicly provided health insurance to the 50 million Mexicans who are not covered by social security and are concentrated among the poor. The new System for Social Protection in Health (SSPH) operates through the Popular Health Insurance (PHI). The reconfiguration of the sources and allocation of funds via the reform seeks to increase the efficiency of financing, as well as equity and financial protection for households. One of the most important expected results is a reduction in out-of-pocket spending among previously uninsured families and hence in the incidence of catastrophic and impoverishing spending particularly among the poor. This is the hypothesis analyzed in this paper.

The study examines the determinants of catastrophic and impoverishing health spending events among Mexican households including the implementation of the health reform and the PHI, and the impact of the economic crisis of the mid-1990s and the subsequent recovery. In order to document the evolution of financial protection, this research develops and analyzes indicators of absolute and relative impoverishment from health spending and the equity of health system finance between 1992 and 2004. The econometric work focuses on analyzing the potential and observed impact of the reform, based on the differential expansion of coverage of the PHI across states, and on projections of more extensive coverage both of families and of health services.
The research uses seven rounds of the National Household Income and Expenditure Survey undertaken every two years between 1992 and 2004. The period spans the economic crisis of 1994, the economic recovery in the mid to late 1990s, the pre-reform pilot of the PHI in 2001-3 and the first year of the reform.

This paper contributes to the literature on a series of fronts. First, it is one of the first to analyze a major health policy change and economic shocks in the context of financial protection in health. Second, new indicators of impoverishing health spending and a methodology for simulating the potential impact of reform are developed. Further, the data set constitutes one of the few available time series from a developing country on health spending. The results generate both a series of recommendations for research and for policy in terms of extending financial protection.

This study builds on the framework for measuring health system performance put forward by the World Health Organization (WHO, 2000; Murray and Frenk, 2000a), as well as the data behind this work and more recent studies such as Xu, Evans et al. (2003) who find, using data from a cross-section of 59 countries, an important relationship between catastrophic health spending and the capacity of a health system to offer risk pooling mechanisms and insurance. This work also builds on studies of absolute impoverishment from health spending such as Wagstaff and Van Doorlaer (2003) for Vietnam and research on developed countries such as Himmelstein et al. (2005). The analysis draws on findings regarding health deterioration during economic crisis (Cutler et al., 2000).

This document has 10 sections. The second section discusses modes of health financing. Section three describes the Mexican health system prior to the reform. The following section provides an overview of the health sector reform of 2003 and the introduction of the PHI. The fourth part develops the indicators of catastrophic and impoverishing health expenditure and equity of health system finance. The next part presents the methodologies and data. Section six describes the basic characteristics of excessive health spending in Mexico. The following section gives the results of
simulation exercises of the potential impact of extending financial protection through the 2003 reform. Part eight analyzes the indicators from 1992 to 2004 differentiating between the pre economic crisis, economic crisis, recovery and health system reform period. The ninth section studies the impact to date of extending the reform and the PHI using econometric techniques and the evolution by state of the coverage of the program. The final section summarizes the main conclusions including suggestions for future research and policy recommendations.

II. Health Financing

The WHO model for measuring health system performance identifies three intrinsic goals: the health of the population, quality (responsiveness of the system) and financial protection. Based on this model, a health system that offers financial protection is one where no family faces impoverishment from health spending and each member of society contributes according to their financial capacity and independent of health status or health care requirements. Increasing spending on health is a means to achieve each of the intrinsic goals, but not a goal in and of itself. Rather, for a given level of health spending, each society should seek the maximum possible quantity of health, responsiveness and financial protection. In order to analyze this last component, it is necessary to study the sources of health finance and health system financial organization.

Health systems are financed through three main mechanisms: monies gathered by the state via specific and general taxes; contributions to social security via deductions or taxes; and private payments which can be either direct out-of-pocket or for private insurance (Wagstaff and Van Doorslaer, 1998; 1999) (Figure 1). It is important to recall that all of the funds used to finance a health system originate from households. As Fuchs (1988) writes:

"The most basic point, often obscured in public discussions, is that the public must pay for care under any system of finance. …the ultimate cost falls on families and individuals
even when the payment mechanism makes it appear that the bills are being sent elsewhere."

The mix of financing between these three main categories – out-of-pocket, government-financed and social security—tends to vary substantially among countries (Wagstaff y Van Doorslaer, 1998; 1999). Most countries rely on a mix of taxes (value-added, income and excise and other) that reflects preferences for solidarity and progressivity, as well as the size and structure of the economy. Some countries rely heavily on general taxation as compared to a social insurance or social security scheme. Further, countries vary in their dependence on general versus payroll taxes to finance health, as well as on proportion of the population covered by social security which depends on the size of the formal labor market. Social security may be financed from general or payroll taxes, and there may be redistribution away from, or to, those individuals that are insured.

The first two types of finance (general taxation and payroll taxes) are pre-paid, involve a substantial degree of risk pooling and can protect both rich and poor from catastrophic and impoverishing health expenditures. Contributions are often a function of income, but they are not based on maximal capacity to pay. It is important to emphasize that these government-financed and social insurance schemes can, but do not necessarily, protect all citizens. Particular groups are often excluded such as informal sector workers, and these groups are concentrated among the poor.

Private payments are of two types: private insurance premiums and out-of-pocket payments. Private insurance can protect individuals from catastrophic expenditures, but access and hence risk pooling is often limited to the rich, the healthy and those that live in urban areas.

Out-of-pocket financing of health is considered the most inefficient and inequitable means of financing a health system, and the most likely to characterize unfair distributions of health financing and to generate risk of impoverishment (Frenk,
Lozano, González Block et al., 1994; Phelps, 2003; WHO, 2000; Xu, Evans et al., 2003; Knaul and Frenk, 2005). Out-of-pocket payments are typically made at point-of-service and the individual consumer chooses, as a function of income, how much they are willing and able to purchase. Some of the standard requirements for efficiency and competition -- that the consumer can choose among providers to achieve a fair price and that the consumer has the same knowledge as the service provider -- are violated as asymmetries of information, illness itself and the urgency of treatment limit the capacity of the patient to search among providers to minimize the price paid. Catastrophic, and potentially impoverishing, expenditures arise because the ceiling on cost is the individual's maximal capacity to pay at the time of purchase. The financing of out-of-pocket payments is limited by the individual or household access to credit and borrowing which is often severely constrained by poverty. Necessary care is forgone if the cost of care exceeds the ability to pay at the time of service. Further, out-of-pocket payments are the most fragmented across individual consumers with no possibility of pooling risk. These factors begin to explain why health systems financed by out-of-pocket spending tend to be associated with lower levels of economic development, increased poverty and reduced levels of productivity and competitiveness of a nation (Figure 2) (Arreola et al., 2003; Knaul et al., 2003; Huber, 1999; Huber and Orsoz, 2003).

A number of Latin American countries base the finance of their health systems on social payroll-based, security models. This health system model is described in Londoño and Frenk (1997) based on the degree of integration of the two basic actors in a health care system: populations and institutions. Typically, the formal sector of the labor market is covered by the public social security system, and the informal sector of the labor market, independent workers and those who are out of labor force, receive limited health benefits through a variety of public sector schemes that are often underfunded and do not include explicit rights to a health package. Out-of-pocket payments for health care are common for those families not covered by social security or lacking access to sufficient, quality health services. This has generated highly segmented systems in which the poor have less access to medical attention, are at
higher risk of suffering catastrophic and impoverishing health expenditures, and must often choose between satisfying other basic needs or foregoing necessary health care. This typified the Mexican health system prior to the reform of 2003 that created the System for Social Protection in Health.

III. Health Financing and the Organization of the Health Sector in Mexico Prior to the Reform

Many of the challenges currently being addressed by the reform are rooted in the original design of the health system. From its inception and through to the reform of 2003, this system was based on a segmented and vertically integrated model in which each institution was responsible for providing all functions (stewardship, financing and service provision) to a particular population group (Frenk et al., 2003).

The segmentation of the original model is based on the separation of health rights between the insured, formal, salaried employees and their families with access to social security, and the rest of the population (the self-employed, the unemployed, non-salaried and informal sector workers, and those who do not work). All citizens other than salaried workers were excluded from formal, social insurance schemes. The Ministry of Health was responsible for this so-called ‘open or residual population’ of uninsured, poor urban and rural families with an ill-defined funding source and benefit package. Private providers, many of whom lacked accreditation, served the families, both uninsured and with social security, who could afford to choose not to use public services.

In 1943, the Ministry of Health was established. The Mexican Social Security Institute (Instituto Mexicano del Seguro Social, IMSS) was created in the same year to attend to formal, private sector, salaried workers and their families. In 1959, the Institute of Social Services and Security for Civil Servants (Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, ISSSTE) began to cover government

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1 This section draws on a section of Frenk et al. (2004).
employees and their families. When the reform was passed in 2003, approximately 40% of the population was covered by IMSS, 7% by ISSSTE and no more than 2-3% by private health insurance. While some debate exists as to the exact proportion of the population covered by social security it is generally accepted that approximately 50% of the population was uninsured (Frenk et al., 2003).

The IMSS is financed by three sources: the worker’s contribution to their pension and health insurance which is an increasing function of the employees’ wage; the private-sector, employer contribution; and, the contribution by the federal government for each worker and their family. The ISSSTE is funded from the employee’s contribution which is also an increasing function of the wage, and the government contribution. From the outset and until the reform of 2003, the Ministry of Health was largely financed from federal funds, and to a lesser degree state-level contributions and user fees paid by families at the point of service.

Recent analysis of the Mexican health system, and particularly the work behind the reform and the National Health Program 2001-2006, identify several major financial imbalances: low overall spending on health, heavy reliance on out-of-pocket spending as a source of finance, inequity in allocation between the insured and the uninsured, inequitable distribution among states, and excessive current versus investment expenditure (Secretaria de Salud, 2001; Frenk et al., 2004). These imbalances promoted a high degree of inequality and financial fragmentation of the system as well as leaving Mexico ill-equipped to meet the challenges of a middle-income country transiting through epidemiological transition and facing an emergent ageing process.

In 2003, Mexico spent only 6.1% of GDP (approximately $360 USD per capita) on health care. This proportion was below the Latin American average and was too low to meet health needs and to operate an effective health system. Further, out-of-pocket spending accounted for more than 50% of total health spending and was above many Latin American countries including Brazil, Chile, Colombia and Costa Rica. The distribution of public funds between population groups and states was also inefficient.
and inequitable. Although the uninsured accounted for almost 50% of the population, they received only a third of the federal funding for health. Further, the difference in expenditure per capita across states was 5 to 1 in 2003, and the difference in state contributions was much more dramatic at more than 100 to 1 between the state with the highest and the lowest level of contribution (Frenk et al., 2004).²

Regressive insurance coverage worsened the situation. While more than 60% of the richest quintile of the population was insured, the figure was approximately 10% for the poorest quintile (Figure 3). Further, access to social security and overall public spending on health is lowest in the poorest states where health needs are greatest. For example, in Chiapas and Oaxaca only one-fifth of households were insured.

IV. The 2003 Reform of the General Health Law to create the System for Social Protection in Health³

The 2003 reform is designed to reduce the inefficiencies and inequities of the original health system. It offers financial protection in health through public, subsidized insurance coverage to the approximately 50 million Mexicans excluded from social security by virtue of not being salaried workers. The reform is structural and focused on the poor.

The reform was passed into law in April 2003, and the new insurance scheme called the System for Social Protection in Health (SSPH) went into operation on January 1st, 2004 with the goal of achieving universal health insurance coverage by 2010. The transition period runs for seven years so that by 2010 the new insurance program will be available to all Mexicans lacking access to social security. The goal is thus to affiliate 14.3% of the approximately 11 million families that make up the uninsured population

² These are based on the most conservative estimates. In some years, the differences have been much higher.
³ This section is draws from Knaul and Frenk (2005) and Frenk et al. (2004).
each year. The Popular Health Insurance (Seguro Popular de Salud, PHI) is the operating arm of the new system.

The guiding concept underlying the structural reform of 2003 is the “democratization of health”, meaning the effort to extend democracy to social as well as political and civil rights (Frenk et al., 2004). To achieve this, the reform aims at allowing all Mexicans, independent of their labor market or socio-economic status, to exercise their Constitutional right to health protection.

The allocation of federal funds in the new health system is divided into four main components: the stewardship role of the Ministry of Health; community health services; non-catastrophic, personal health services; and, catastrophic, high-cost, personal health services (Figure 4) (Frenk et al., 2004). The logic of the reform separates funding between personal and community health services by establishing a separate fund for the latter that is used exclusively to finance public health programs. This separation of funding is based on public goods theory and on the lessons learned from previous reform experiences that have neglected community health services (Restrepo, 2003).

Funding for personal health services is based on an insurance logic to deal with uncertainty and the PHI is the financial instrument. Personal health services are divided between an essential package of primary and secondary-level interventions in ambulatory settings and general hospitals, and a package of high-cost tertiary-level care financed through the Fund for Protection against Catastrophic Expenditures. The number of covered interventions will be gradually expanded as funding increases (Secretaria de Salud, 2005a).

The package of catastrophic interventions is financed in a fund that aggregates risk at the national level because of low-probability, high cost and the degree of specialization of services. In contrast, the package of essential services is covered by funds administered at the state level as these services are associated with low risk, high probability health events.
The services in the Fund for Protection against Catastrophic Expenditures are updated annually using an explicit priority-setting mechanisms based on burden of disease, cost-effectiveness, and resource availability. The Fund currently covers: cancers, cardiovascular problems, cerebro-vascular diseases, severe injury, long-term rehabilitation, HIV-AIDS, neo-natal intensive-care, organ transplants, and dialysis.

The PHI was designed so its financial structure would be similar to the tripartite logic of the other major social insurers (Figure 5) (Frenk et al., 2004). Thus, there is a similar funding mechanism for each of the three major population groups (previously uninsured families-PHI; private sector workers and their families – IMSS; public sector workers and their families-ISSSTE). Each group has a contribution (the social quota) from the federal government that is equal for all families and guarantees some solidarity among the three population groups. In January of 2004, the federal social quota for the PHI was set at 15% of the mandatory minimum wage (approximately $230USD per family per year).

The second source of funding is from the co-responsible contributor and guarantees solidarity within each population group and redistribution between states. For IMSS, this is the private employer and for ISSSTE it is the public employer. In the case of the PHI, since there is no employer, co-responsibility is established between the federal and the state governments in a solidarity scheme that recognizes the differences in level of development among states. The federal solidarity contribution is on average 1.5 times the social quota, but is increased for poorer states at the expense of those that are wealthier. The state solidarity quota is the same in all of the states, set at half of the federal social quota and the source of funding is state-level revenue.

The third contribution is a prepayment from beneficiaries that is progressive and redistributes family income. In the case of the IMSS and ISSSTE, the employee contribution is set as a progressive proportion of the wage and deducted from the payroll. The family contribution to the PHI is progressive and designed to promote
fairness in finance. The upper limit on the family contribution is 5% of disposable
income, which is defined as total spending less spending on basic needs. Families in
the lowest two income deciles do not contribute in monetary terms, but are required to
adhere to participation rules associated with health promotion. One contribution level is
defined for each of the other income deciles.

The assignment of funds by state is based on a formula that takes into account
health needs and level of socio-economic development. The formula is designed to
make up for historical imbalances and inequities, to respond to differential needs across
population groups, to provide incentives for performance and affiliation, and to promote
solidarity, universality and financial equity.

This funding model implies an important change in incentives for state
governments and providers. Funding for the states will be largely determined by
affiliation to the PHI. Thus, the reform provides a legal framework to break out of
discretionary allocations and move toward a demand-driven funding model that enables
the effective use of an expanded health budget. In the past, federally-allocated state
budgets in health were largely determined by historical inertia and the size of the health
sector payroll.

Affiliation is voluntary, although states have the budgetary incentive to achieve
universal coverage. Families who choose not to affiliate by 2010 will continue to receive
health care through public providers, but will have to continue to pay fees for services
received at point of delivery. The voluntary nature of the affiliation process is an
essential feature of the reform that facilitates the process of replacing supply-side with
demand-side subsidies so that money follows people. This process includes incentives
for states to convince families to enroll by improving the quality of health service
delivery. Although the financial trigger is a demand-side subsidy, the additional funding
mobilized by the reform is channeled to strengthen the supply side in line with the
expansion in affiliation to cover drugs, equipment, and enhancing or building facilities.
This, combined with the focus during the first years on the poorest families, will help to prevent problems of market failure such as adverse selection.

Affiliation is progressing. Between 2001 y 2003, prior to the reform, the PHI operated as a pilot program and 614,000 families were affiliated (Secretaria de Salud, 2004). The expansion of coverage has proceeded according to schedule and by the end of 2004, 1,722,000 families had been affiliated, including re-affiliation and newly incorporated families (Secretaria de Salud, 2005).

The new system is also fully operational and gradually expanding coverage in all of the states. In 2004, the state of Colima affiliated all families without social security and has maintained universal coverage in 2005. Aguascalientes and Tabasco covered more than two-thirds of uninsured families in 2004, and four other states covered more than one-third. Aguascalientes declared universal coverage in 2005, and it is expected that four more states will achieve this target in 2005 and another ten in 2006 (Secretaria de Salud, 2005).

As stipulated by law, the affiliation process has focused on the poor who do not contribute financially. Over 90% of beneficiaries are in the poorest quintile of the income distribution (Secretaria de Salud, 2005). Further, an indicator of satisfaction is the willingness of families to renew their yearly enrollment and vast majority of families that participated in the 2003 pilot phase decided to re-affiliate in 2004. A challenge for the future is to maintain high rates of affiliation as the reform proceeds to cover families that will be contributing financially.

Additional public funding is required for the reform to proceed. Initial estimates suggest that total public investment in health should increase by about 1% of Gross Domestic Product (GDP) to complete the reform (OECD, 2005). To date, affiliation has been accompanied by increases in budgetary allocations for the uninsured through the Ministry of Health and the states. The authorized, 2005 budget of the Ministry of Health increased by 55% in real terms over the pre-reform level of 2002, and 37% over 2004.
V. Indicators, Methodologies and Data

i) Indicators of Fairness in Financing and Catastrophic and Impoverishing Health Spending

The study makes use of four indicators to document and measure the effects on households of increasing financial protection in health through the reform:

1) the Index of Fairness in Financial Contributions - IFFC (WHO, 2000; Murray et al., 2000b);
2) the proportion of households with catastrophic health expenditures, measured as spending 30% or more of disposable income (total income less spending on basic needs approximated by food expenditure) (Murray et al., 2000b);
3) the proportion of households with impoverishing health expenditures, defined as falling below the absolute poverty line due to health spending or significantly deepening their level of poverty for those that are below the poverty line (Arreola et al., 2004; Wagstaff and Van Doorslaer, 2003); and,
4) the proportion of families with either catastrophic or impoverishing health spending which is termed ‘excessive health expenditure’.

This paper applies the WHO (2000) framework for measuring the fairness of health financing (Murray et al., 2000b). The Household Financial Contribution (HFC) of household $h$ is:

$$HFC_h = \frac{HE_h}{DI_h}$$

where $HE_h$ is the per capita expenditure on health of household $h$ and $DI_h$ is per capita permanent income minus subsistence expenditure of household $h$. The numerator includes all financial contributions to the health system attributable to the household through taxes, social security contributions, private insurance, and direct, out-of-pocket
payments. For taxes and social security contributions that are not earmarked for health, total household payments must be multiplied by the share of these revenues that ultimately goes to finance the health system using National Health Accounts. DI is approximated by total, household, per capita expenditure net of household, per capita food expenditure.

The distribution of HFC identifies how the burden of health system financing affects households and this is incorporated into the Index of Fairness in Financial Contribution (IFFC):

\[
IFFC = 1 - 4 \left( \sum_{i=1}^{n} \left| HFC_{h} - \overline{HFC} \right|^3 \right) \frac{0.125n}{125.04113}
\]

Values of IFFC closest to one (1) indicate systems that offer more financial protection in health. The cube of the absolute difference places strong emphasis on health expenditures that are a very high proportion of income. Further, by using disposable income the indicator places substantial weight on the poorest households with that are likely to have low nominal expenditure on health.

The index has the advantage of being a continuous measure, but interpretation generates some difficulties. Three complementary indicators are presented. The first, following Murray et al. (2000b) is a relative measure of health expenditure as a proportion of disposable income that emphasizes equity aspects and `what is too much spending for a household`. Catastrophic expenditures are defined as those where a household spends more than 30% of their effective non-subsistence income on health. The level of 30% is subjective, and this is one of the reasons to use alternate measures.

Wagstaff and Van Doorslaer (2003) propose indicators of absolute impoverishment. In this paper their methodology is adapted and absolute
impoverishment is measured as falling below, or falling further below, the poverty line of $1 dollar a day per person due to health expenditure. The definition of what constitutes ‘falling further below’ the poverty line is somewhat difficult as for all families below a poverty line any nominal expenditure on health, irrespective of how small it is, increases impoverishment in an empirical sense. Still, very marginal expenditures in health do not necessarily significantly deepen impoverishment. In this paper, a solution is adopted based on available data and with the caveat that more research is required. In the ENAGS survey (described below) families are asked if they had to modify their expenditure on food, education or housing because of health spending. The level at which this occurred was approximately 6-7% of disposable income. Thus, this level was chosen as the cutoff for including an expenditure by a family below the poverty line as impoverishing.

This approach of combining the absolute and relative aspects of health spending provides a composite indicator of impoverishment – excessive health spending. The total is less than the sum of the parts as there are families with catastrophic spending (more than 30% of disposable income) that is not impoverishing (fall below the poverty line), families with impoverishing expenditures that are not catastrophic and families whose health spending is both catastrophic and impoverishing in the absolute sense. Considering both categories, catastrophic and impoverishing, guarantees the inclusion of families with very large, and perhaps unfair, nominal expenditures although they do not become impoverished and families with low nominal expenditures that do become impoverished. It also covers families whose spending on health is very high even if it is not sufficient to push them into poverty. The five sub-categories of catastrophic and impoverishment health expenditures that make up total excessive events are shown using a tree diagram (Figure 6).

**ii) Methodologies**

**a) Projecting the Potential Impact of Extending Financial Protection in Health through the PHI**
The potential impact of extending the PHI is measured by projecting possible scenarios for the expansion of insurance coverage and reductions in out-of-pocket expenditures on the indicators mentioned above taking into account initial conditions in 2000. These exercises provide insight into the transition phase of the reform, as well as benchmarks of possible outcomes.

The simulation exercise involves imposing the new financial structure of the reform on the spending patterns observed in 2000. Based on the parameters established by the reform, a level of 3.5% of disposable income is assumed as the family contribution for deciles two through 10 and the mandated level of zero contribution for the poorest two deciles (details in Knaul et al. 2003, 2005).

The first step of the simulation exercise consists of hypothetically covering uninsured families. The second stage is to reduce progressively their out-of-pocket spending on health. This assumes that families will reduce health expenditures once they are insured.

In the first set of simulations, for every newly covered family, out-of-pocket spending is reduced from 1% to 100% to examine the impact on the indicators. In another exercise out-of-pocket spending is reduced in patterns similar to those of families that have social security, using Tobit regressions to control for family background variables such as number of children in the family.

The affiliation process is also modeled using logit regressions to analyze if the family contribution is above the household’s level of willingness to affiliate (WTAi):

\[ \text{A household } i \text{ affiliates to PHI } \iff \text{WTA}_i \geq (3.5\% \text{ DI}_i, \text{ si ID}_i \geq 3 \text{ ó } 0\% \text{ si ID}_i \leq 2) \]

where:
- \( \text{DI}_i \): disponible income of household \( i \)
- \( \text{ID}_i \): income decile of household \( i \)
The results make it possible to group households, controlling for household income and health characteristics, risk aversion and place of residence.

The scenarios of partial coverage that are presented in this analysis are:

S 1: 100% of families in quintile 1 affiliate, 80% of quintile 2, 60% of quintile 3, 40% of quintile 4 and only 20% of the richest quintile.
S 2: 75% of families are affiliated in each quintile.
S 3: covering only the 20% of families that are most likely to affiliate based on WTA.
S 4: covering the 40% of families that are most likely to affiliate based on WTA.
S 5: All households with positive WTA affiliate.

The analysis also considers the implications of covering different areas of the country based on population density to estimate the marginal impact on impoverishment. The last scenario is to reduce particular categories of out-of-pocket spending in a non-cumulative fashion using the categories: medicines, maternity, ambulatory care, hospitalizations, orthopedics and other. This exercise establishes the importance of different aspects of a package of covered services in terms of reducing the possibility of catastrophic or impoverishing health expenditures.

b) Econometric Methods for Analyzing Changes in Catastrophic and Impoverishing Health Expenditure associated with the Expansion of the PHI

The regression analysis investigates the effect of the initial stages of health reform and extension of PHI on catastrophic and impoverishing expenditure. The basic descriptive data for the variables are presented in Figure 7.

Five dependent variables are analyzed: 1) the probability that a household has a catastrophic expenditure, 2) the probability that a household suffers an impoverishing expenditure, 3) the probability that a household suffers excessive health spending
(categories 1 and 2), 4) total health spending as a proportion of disposable income (HFC), and 5) out-of-pocket spending per capita. The regressions presented correspond to logit models for the first three dependent variables and tobit (censored on zero) for the last two.

The interventions that are analyzed are coverage and expanding coverage of PHI, under the assumption that this indicates ‘willingness to treat’ or financially protect, on the part of the state and the federal health sector, households experiencing catastrophic and impoverishing expenditure and to decrease the HFC. This intervention includes an increase in funding, as described above, and with it an expansion in quantity and quality of health services available to the population with PHI. The analysis exploits the variation in state-level coverage in the initial stages of implementing the reform (Knaul and Frenk, 2005; Secretaría de Salud, 2005).

Each of the regressions is undertaken for: the whole population; families with access to social security; families with no access to social security and with or without PHI; and, families without access to social security and with or without PHI for each one of the income quintiles. A selection of the regressions is presented in this document.

Coverage variables for PHI come from annual reports of the Mexican Ministry of Health (Secretaría de Salud, 2003, 2004, 2005) and from the 2004 coverage data reported by the National Comission for Social Protection in Health. All of the other variables come from the ENIGH.

In order to measure the effect of the PHI, two kinds of variables are incorporated, with and without lags:

- Proportion of the population (0-100%) covered by the PHI in each state before the application of the 2004 ENIGH,
- The number of years that each state has been incorporated into the PHI (four dichotomous variables - 2001, 2002, 2003, 2004).
The household-level regressions include as independent variables:

- Presence of a family member over 65 years or less than 5 years old to measure the risk of faced by the household to suffer high health expenditure.

- Gender and education of the household head, if the family includes a person with social security access or private medical insurance and the level of urbanization of the location where the households resides, which are applied to measure the capacity of the household to cover health needs and access health services.

- In order to identify the needs of the state, prior to the PHI, in terms of protecting the population from excessive health expenditure, a two-year lagged variable is included for the percentage of the population with social security access; the percentage of the population with catastrophic or impoverishing health expenditures and, the percentage of households under the poverty line.

- A complete group of state-level indicator variables.

c) Data

The data base is a time series of the Mexican Survey of Household Income and Expenditure (Encuesta Nacional de Ingresos y Gastos de los Hogares-ENIGH), undertaken by the National Institute of Statistics, Geography and Informatics (INEGI) every two years since 1992. For the over-time analysis the full time series is used. For the projections, the ENIGH 2000 data base is used as this predates the PHI. The regressions are based on the ENIGH 2004 data with lagged variables taken from the earlier surveys. The sample size is presented in Figure 8.

The ENIGH is a cross-sectional survey that includes a representative sample at the national and sub-national level. Household-level information is provided on all sources of income and expenditure. Individual information is included on labour force
participation and social security rights, and basic sociodemographic characteristics. The survey is applied between August and November of each year and data on health are based on the expenditures incurred during the three months prior to the survey. The base questionnaire has remained relatively intact since 1992.

In order to apply the time series indicators, payments for social security and taxes were calculated based on the laws in place for each year. All the monetary variables were deflated using the National Consumer Prices Index to constant prices for 2000 (Banco de México, 2005). Further, a household is defined as lacking access to social security if there is no member with a right to insurance coverage of any type, public or private, other than PHI. This assumes that a single insurance or social security payment covers an entire family.

In order to differentiate between economic cycles and the health reform period, the analysis assumes that: the 1992 and 1994 ENIGH reflect the pre-crisis period (the 1994 ENIGH was undertaken before the crisis); the economic crisis period that goes from the end of 1994 to 1996 is measured with the 1996 and 1998 ENIGH; the post crisis, recovery period is reflected in the 1998 and 2000 ENIGH; and, the implantation of the PHI and the reform, covering the years 2001 – 2004, is included in the ENIGH 2002 and 2004.

Another data base that is used is the National Insurance and Health Spending Survey (ENGAS) of 2001. The ENAGS is a national survey of almost 2000 households undertaken to determine the target population of the PHI. It includes specific questions on the willingness to pay for subscription to a health insurance similar to the PHI.

VI. Overview of Catastrophic and Impoverishing Health Spending

In 2000, based on data from the ENIGH, 3.4% of families suffered catastrophic health expenditures and 3.8% impoverishing health expenditures per trimester. Overall,
6.3% of families had an incidence of excessive health spending and the IFFC was .915. These estimates are similar to the average over the period 1992-2004.

The rates are substantially higher among the poor and the uninsured. More than 20% of households in the poorest quintile suffered a catastrophic or impoverishing health expenditure as compared to less than 5% in the wealthier quintiles (Figure 9). The rates are more than four times higher among the uninsured as compared to the insured at 9.6% and 2.2%, respectively.

There are important differences by quintile in the nature of excessive health spending (Figure 9). In the poorest quintile, more than half of households with excessive expenditures live below the poverty line and spent less than 30% of disposable income on health. A substantial number spend less than 30% of disposable income and cross the poverty line. Further, the vast majority of families that cross the poverty line due to health spending are from the poorest quintile. By contrast, the families with catastrophic health spending are distributed throughout the income distribution. These results demonstrate the usefulness of applying an indicator that differentiates between the absolute and relative aspects of health spending.

Another important observation about catastrophic and impoverishing health spending is that the type of expenditures vary by income quintile. Among the poor, these events are concentrated in spending on ambulatory care and medications, while by contrast among the poorer households hospitalization is the more common cause (Figure 10).

There is descriptive evidence to suggest that these health expenditure events detract from a family’s ability to finance basic needs and generate systemic inefficiencies by detracting from other public investments such as education. More than a third of uninsured families report that their health expenditures forced them to reduce their investment in food, education or housing (Figure 11). Among the poorest quintile, the figure is 45% of households.
VII. The Potential Impact of Extending Financial Protection Through the PHI

The work presented in this section provides estimates of the potential impact of the expansion of the financial protection in health through the PHI under the scenarios described in above. These results complement the findings presented in the following sections based on the first two years of data.

As is to be expected, the greatest impact is achieved with universal coverage and large reductions in out-of-pocket spending. For example, with a reduction of 60%, the IFFC improves to 0.985, with accompanying levels of catastrophic, impoverishing and excessive spending of 0.6%, 3.0% and 2.9% respectively (Figure 12). Continuous reductions (0% to 100%) in out-of-pocket spending with universal coverage are presented in Figure 13. With a relatively small reduction in out-of-pocket spending of 5-10%, an improvement in the indicators begins to be evident.⁴

The results of regression analysis of the WTA show that affiliation is more likely if the household is female-headed, in quintiles I or II, had a recent medical examination, is more risk averse, is subject to a lower PHI contribution, had higher out-of-pocket health spending, lives outside of the rural areas and does not include a person aged 60 or more. Based on this, 93% of households in the first quintile of the income distribution as compared to 5% in the highest are willing to affiliate at the given contribution level. Of the 20% of families with the highest likelihood of affiliation, almost 50% are in the first quintile. Overall, 58% of households are willing to affiliate at their established contribution level.⁵

The results of the exercise with partial affiliation indicate that even under pessimistic scenarios there is an important potential improvement in the indicators of financial protection (Figure 14). With affiliation of only the 20% of the population most likely to affiliate (scenario 3, a level that will likely be surpassed in 2005) and a reduction

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⁴ Note that this does not occur at 0, because of the introduction of the family contribution in quintiles II to V.
⁵ See Knaul et al. (2005) for more detail on the methodology.
in out-of-pocket spending of only 20%, the IFFC improves to 0.925, and the rates of catastrophic, impoverishing and excessive spending to 3.1%, 4.2% and 6.6%, respectively. With the projected affiliation rate of 58% (scenario 5) and a reduction in out-of-pocket spending by the uninsured similar to the actual rate of those with access to social security (tobit), the expected levels in the indicators are 0.939, 2.7%, 4.1% and 6.2%. Each of the scenarios can be compared to the best case scenario of universal coverage in Figure 14.

The results of simulations using place of residence as the determining factor show the largest impact from covering the rural areas (Figure 15). Further, covering particular categories of out-of-pocket health and reducing out-of-pocket expenditure (Figure 16) shows that the greatest gains are achieved by covering the low-cost categories of ambulatory care and medications.

VIII. Evolution of Catastrophic and Impoverishing Health Spending and Financial Equity in Mexico between 1992 and 2004

All of the indicators of financial protection show a deterioration during the period of economic crisis and an improvement post-crisis that continues after 2000 (Figure 17). In general, the recuperation has exceeded the crisis and there is an overall improvement between 1992 and 2004.

The tendencies in each of indicators are consistent, but there are some important variations. The largest changes occur in the proportion of households with impoverishing health expenditures with an increase from 5.2% in 1992 to 9.9% in 1996 and a continual decline after that to 1.8% in 2004. There is less variation in the proportion with catastrophic expenditures from 3.4% in 1996 to 4.2% in 1998 and 2.6% in 2004. By contrast the IFFC worsened considerably between 1996 and 1998 which is a result that is difficult to explain. Since 2000, the index has improved continually indicating substantial improvement in the overall equity of health financing.
These figures correspond to an important reduction in the number of families affected by catastrophic or impoverishing health expenditure. One way to consider this is that if the rates of catastrophic and impoverishing health expenditure that prevailed among the uninsured population in 2000 had continued in 2004, there would have been 600,000 more cases reported among this population group.

The deterioration during the crisis period affected both families with, and those without, access to social security (Figure 18). By contrast, the improvements between 2000 and 2004 have been focused among households that lack access to social security and are either uninsured or have PHI. The rates of excessive health spending fell from 9.6% in 2000, to 6.5% in 2002 and 5.3% in 2004. Among households with social security, the rates are 2.2%, 1.9% and 2.5% respectively. The improvements are concentrated in the poorest quintile which correspond to the population targeted in the first years of the PHI (Figure 19). Among these households the rates are 19.6% in 2000 and 9.7% in 2004. For the second quintile, the rates are 4.2% and 2.5% over the same period and for the rest of the population there is no clear tendency.

The differences in the evolution of the sub-categories of catastrophic and impoverishing health expenditures provide information on the underlying factors (Figure 20). There has been an improvement in each of the five sub-categories since the economic crisis, yet the increase during the crisis period and the subsequent reductions have been concentrated among families below the poverty line, including those whose health spending is less than, and those where it is more than, 30% of disposable income. There has been an important reduction in the proportion of families that cross the poverty line, although both the size of the group of the changes, is smaller. It is among households above the poverty line with spending over 30% the reductions have been smaller.

These changes in each of the sub-categories are associated with a change in the overall composition of households with excessive health spending over the period (Figure 21). Although before and during the period of economic crisis the majority were
households below the poverty line whose health spending was less than 30% of disposable income, in 2004 it is the group of households above the poverty line with catastrophic expenditures in health that predominate. This group has increased its participation from 26% to 56% of the total, while the group below the poverty line has fallen from 59% to 34%. This phenomenon is evident for households with and without social security.

These figures are consistent with at least two possible explanations: reductions in poverty and the expansion of financial protection in health through the PHI. In a recent study, the World Bank (2005) documents a continual reduction since 1998 in the proportion of households living on less than $2 per day from more than 25% to almost 15%. The analysis of the factors that explain this decline is a subject for ongoing research, but are likely to include economic policies, poverty reduction programas such as Oportunidades⁴ and other social programs such as the PHI and the reform. The evidence suggests that both factors – poverty reduction and the expansion of financial protection in health -- have played a role in the decline in the incidence of catastrophic and impoverishing health spending. Further, poverty alleviation measures and the PHI are likely to have complemented each other, although in the absence of longitudinal data and a formal evaluation it is impossible to determine the relative role of each factor.

IX. The Expansion of the PHI at the State Level and Changes in Catastrophic and Impoverishing Health Spending Among Households: econometric analysis.

There has been substantial variation across states since 2001 in the take up rate for the PHI and hence in funding increases that are tied to affiliation (Knaul and Frenk, 2005; Secretaría de Salud, 2005) (Figure 22). The changes in the distribution of excessive health spending across states show a certain degree of association with the expansion of the PHI. Overall, there is weak inverse relationship between the two variables, yet analysis of the states by groups provides stronger evidence. There is a

⁴ Oportunidades is an integrated social development and poverty alleviation program that includes health, nutrition, micro-finance and education components and covers the majority of households living in poverty in Mexico (Secretaría de Desarrollo Social, 2005).
group of states where PHI coverage has advanced slowly and the percent change in catastrophic and impoverishing health spending among households has also been low. For another group reductions in excessive spending have been high despite slower progress in the extension of the PHI. These could be the states with changes in the impoverishing health spending are associated with reductions in poverty levels. On the other hand, Aguascalientes, Campeche, Colima, Nayarit, Tabasco, Tamaulipas and Sinaloa are the states where both PHI coverage and reductions in excessive health pending incidents have advanced substantially. An important point is that there are no states with high levels of PHI coverage and little advance in the reduction of excessive health spending.

The econometric analysis suggests a consistent relation across all of the regressions, between the extension of PHI coverage between 2002 and 2004 at the state level and the probability that a household has an impoverishing and/or catastrophic expenditure, the HFC per capita and the level of out-of-pocket health spending (Figures 23 and 24). This relation is robust in almost all cases to changing the specification of the PHI coverage variable and to the inclusion of the full set of control variables and the complete group of dummy indicators for the states. In addition, there is some evidence of a gradient between the effect of the coverage in the early stages of the program in 2001 and 2002 in comparison with 2003 and 2004, and a more concentrated effect among the families with no access to social security and those that belong to the first quintile. Although these results using cross-sectional information do not substitute for a rigorous evaluation analysis with longitudinal data, they do provide suggestive evidence of the impact, independent of reductions in poverty, of the extension of financial protection through the PHI. The findings are encouraging, particularly given that they are based on the initial implementation phase.

Another important result of the econometric analysis is that families that include an older person are more inclined to suffer a catastrophic or impoverishing expenditure and to have a higher levels out-of-pocket spending relative to their income level. This suggests the importance of meeting the challenge of the more expensive care
associated with chronic and degenerative diseases as the PHI expands and the ageing process continues.

X. Conclusions

1) Summary of Results

This study documents the evolution of catastrophic and impoverishing spending among Mexican households between 1992 and 2004. A large proportion of these households are below the poverty line or cross the poverty line due to health spending. At the same time, impoverishing health spending is much more common among the poorest deciles. Catastrophic health spending, which places more weight on equity issues and a relative definition of impoverishment, occurs among both rich and poor households.

This study documents an overall improvement in financial protection between 1992 and 2004. Between 1994 and 1998, however, there was significant deterioration associated with the years of economic crisis. Since 1998, there has been continual improvement. This coincides with the period of economic recovery and the introduction of the PHI and the health reform.

The reduction in the number of households with catastrophic and impoverishing health spending has been accompanied by an important change over time in composition. This change is related to economic progress, poverty alleviation and recovery from financial crisis. During the period of economic crisis, impoverishing health spending was much more common and constituted a larger proportion of households with excessive health spending. Economic recovery and the decrease in the number of households below the poverty line, has generated a reduction in impoverishing health spending while the prevalence of catastrophic health spending has experienced less change. Thus, it is now the relative type of impoverishing health expenditure that dominates the overall distribution.
The descriptive and projection analysis suggests that excessive health spending is focussed among the poor, in the rural areas and on low-nominal cost items such as ambulatory care and medications. The econometric work shows that there is a statistically significant association between the extension of the PHI at the state level and the probability that a household suffers a catastrophic or impoverishing health expenditure. This effect is more evident among the poorest and the uninsured where the PHI is targeted. While these results are suggestive, they cannot be taken as causal as they are not based on a longitudinal evaluation.

2. Methodology and Future Research

The time series data used in this analysis provide new insights that were not available from individual cross-sections or cross-country data. The results suggest the importance considering absolute as well as relative and equity-related definitions of impoverishment from health spending. The results for Mexico demonstrate important differences in each of these indicators over time and in relation to progress with overall poverty alleviation.

This paper develops and applies a variety of indicators, although a number of issues remain unresolved. First, it is necessary to refine the indicators in terms of the time period over which they are defined. The existing analysis does not consider the periodicity of the expenditures. Further, the time period over which impoverishing health expenditure is defined may be endogenous to the level of income of the family. For a wealthy family, the appropriate period may be very long based on the ability to borrow against lifetime income. For a family living in absolute poverty and very close to the margin of survival, it may be as short as a week.

Another area requiring further research is the analysis of the cutoff points for defining the indicators in terms of the proportion of income at which health expenditure is catastrophic, the poverty line and the amount of health spending that causes a deepening of poverty. Sensitivity analysis is one route currently under study, but this
should be complemented with more behavioural analysis of the impact on household decisions and consumption. Another issue is the definition of income loss from health incidents.

In terms of the projections and simulation exercises, both the results for expansion at the subnational level and by category of expenditure lend themselves to future work on developing cost-benefit or effectiveness measures for financial protection. The costs of coverage are likely to vary substantially and this makes it possible to produce estimates for the policy maker of the tradeoffs of covering areas of the country and components of the package of services.

The results of the econometric analysis suggest various avenues for future research as the implementation phase continues. In the absence of longitudinal data it is impossible to separate the effects of health reform from poverty, or to definitively evaluate the impact of policy changes such as the PHI. Future analysis with the ENIGH data will focus on developing pseudo-panels at the municipality and household level.

Despite the unique quality of the data used for the analysis of the Mexican case, it is important to highlight the need for longitudinal, program evaluation work in order to effectively analyze the impact of health reform and track health spending in relation to permanent income. Very few longitudinal data bases on health spending exist, and collecting this type of data should be a priority to be built into the design of the formal evaluation of the reform in Mexico, as well as for strengthening health policy analysis at the international level.

3. Policy-oriented Conclusions

The Mexican experience with the use of evidence on financial protection for policy making can provide insight for other countries. This type of analysis has been heavily used in all phases including policy design, advocacy, budgeting, monitoring and evaluation. Prior to the reform, the international information demonstrated the
importance of focussing on financial protection and this constitutes an example of the synergies that can be developed between national policy making and international evidence (Frenk et al., 2004).

The results of the simulation exercises can be translated into policy recommendations in the context of the transition to universal coverage. First, it is particularly important to cover the rural areas where the poor are concentrated and this corresponds to what has been done with the PHI that has focussed on the poorest income deciles in the first years of operation.

Second, the essential package of services should include ambulatory care and medications. Although these tend to be low cost services and not the cause of high nominal expenditures, for the poor it is these items that drive catastrophic and impoverishing health expenditures. Doctor visits, antibiotics and other small purchases that are associated with minor medical incidents such as childhood infections, represent large proportions of the income of families living in poverty. This logic is different from many theories of insurance that stress the need to cover major medical incidents that involve large nominal expenditures. These recommendations are likely to be costly for the health system, but will produce the greatest results in terms of extending financial protection.

The change in the composition of households with excessive health expenditures indicates that in the future the PHI will have to focus on households with higher income and catastrophic rather than impoverishing health expenditure. It will be increasingly important to isolate the nature and causes of these expenditures and to affiliate particular population groups such as families that include older adults. Key factors in progressive affiliation are likely to include promotion, increasing the awareness of importance of insurance against health shocks, improving the quality of services and responsiveness of the system and introducing more choice of providers.
The results also suggest an important role for the organization and financing of the health system in reducing impoverishing, promoting equity and protecting household during periods of individual and collective financial crisis. Both the descriptive and econometric evidence suggest that an important part of the reduction in catastrophic and impoverishing health spending is associated with the reform.

The Mexican experience shows that there is an important relationship between financial protection in health and economic performance. Periods of economic downturn tend to be associated with loss of formal sector jobs, and this in turn means loss of social security and hence financial protection in health. In addition, there is typically an increase in the number of families living in poverty and hence less able to pay for health.

It is important to bear in mind that in Mexico, economic crisis preceeded the PHI and the reform. Families that lost access to social security and were driven into poverty did not enjoy the financial protection in health that is now becoming available. In the future, PHI is likely to serve as a safety net for families in the face of economic shocks. In other words, health insurance can have the dual function of protecting families against health shocks that increase health care needs and against economic shocks that reduce their capacity to finance health care. Financial protection in health helps guaranty that illness does not force families to choose between economic ruin and health, and that temporary health shocks are not converted into permanent impoverishment.
References


Figure 1: The Structure of Health Financing By Country, 2002

Figure 2: The relationship between GDP per capita and the proportion of the health system financed from out-of-pocket spending, 2003

Source: Author estimates with data from World Health Report, 2004. WHO.
Figure 3: Insurance coverage in Mexico is inequitable, 2000

Epidemiological backlog

Insurance coverage (% of population)

Figure 4: Correspondence between types of health goods and funds

**Health goods**

- **Public health goods**
  - Stewardship function
  - Information, research and human resource development
  - Community health services

- **Personal health services**
  - Essential health interventions
  - Catastrophic interventions

**Health funds**

- **Budget of the Federal Ministry of Health**
  - Allocation to states using need-based formula

- **Fund for Community Health Services**
  - Stewardship function
  - Information, research and human resource development

- **Fund for Personal Health Services**
  - 8% of contributions
  - Package based on cost-effectiveness
  - Tripartite funding
  - Essential package of primary and secondary-level interventions
  - Large part of allocation to state by formula based on affiliation, health backlog and performance

- **Fund for Protection against Catastrophic Expenditures**
  - 8% of contributions
  - Package based on cost-effectiveness
  - Tertiary interventions

**Allocation rules**

- Allocation to states using need-based formula

- Tripartite funding
- Essential package of primary and secondary-level interventions
- Large part of allocation to state by formula based on affiliation, health backlog and performance

- 8% of contributions
- Package based on cost-effectiveness
- Tertiary interventions
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<th>Co-responsible contributor</th>
<th>Private employer</th>
<th>Public employer</th>
<th>Family</th>
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<td>Social contribution</td>
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<tr>
<td>ISSSTE (public-sector salaried employees)</td>
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<tr>
<td>Popular Health Insurance (informal sector, self-employed, and families outside of the labor force)</td>
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</tr>
</tbody>
</table>

Source: Secretaría de Salud 2003
Families in Absolute poverty
(< 1 USD per capita per day)

No

< 30% of disposable income

Yes

>= 30% of disposable income

Above poverty line

Fall below poverty line

Above poverty line

Fall below Poverty line

>= 30% of disposable income

potential of h.c. and b.n.
$ (6-29%)

< 6% of disposable income

Catastrophic

Impoverishing

Source: adapted from Wagstaff and VanDoorslaer, 2003; Arreola et al., 2004.
### Figure 7: Sample descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non insured</th>
<th>Insured</th>
<th>Per capita spending quintiles</th>
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<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
<td>Std. Dev.</td>
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<td>% of the population covered by the Popular Health Insurance</td>
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<td>% of incorporated families</td>
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<td>10.7</td>
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<td>One year (2004)</td>
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<td>0.3</td>
<td>12.5</td>
<td>0.3</td>
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<td>0.4</td>
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<td>Four years (2001)</td>
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<td>64.3</td>
<td>0.5</td>
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<td>Residence in areas from 15,000 to 99,999 inhabs. (0=No, 1=Yes)</td>
<td>13.8</td>
<td>0.3</td>
<td>13.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Residence in areas from 2,500 to 14,999 inhabs. (0=No, 1=Yes)</td>
<td>13.7</td>
<td>0.3</td>
<td>12.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Residence in areas with less than 2,500 inhabs. (0=No, 1=Yes)</td>
<td>23.2</td>
<td>0.4</td>
<td>48.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Family Head gender (0=Female, 1=Male)</td>
<td>23.7</td>
<td>0.4</td>
<td>19.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Family Head scholarship</td>
<td>7.3</td>
<td>5.0</td>
<td>9.2</td>
<td>4.9</td>
</tr>
<tr>
<td>State characteristics where the household is located</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households in the state with excessive spending in the former period</td>
<td>3.6</td>
<td>3.3</td>
<td>3.0</td>
<td>3.4</td>
</tr>
<tr>
<td>% of households in the state under the poverty line in the former period</td>
<td>16.6</td>
<td>16.6</td>
<td>13.0</td>
<td>14.9</td>
</tr>
<tr>
<td>% of households in the state with social security in the former period</td>
<td>42.0</td>
<td>13.1</td>
<td>45.3</td>
<td>12.7</td>
</tr>
<tr>
<td>No. of households in the sample</td>
<td>23,033</td>
<td>12,681</td>
<td>10,352</td>
<td>4,596</td>
</tr>
<tr>
<td>No. of households with expansion factor</td>
<td>26,190,037</td>
<td>14,972,288</td>
<td>11,217,749</td>
<td>5,195,105</td>
</tr>
</tbody>
</table>

Source: Estimations made by the author with data from the ENIGH 2004.
Figure 8: Mexican Household Income and Expenditure Surveys (ENIGH), 1992/2004

<table>
<thead>
<tr>
<th>Year</th>
<th>Households in the sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>10,503</td>
</tr>
<tr>
<td>1994</td>
<td>12,815</td>
</tr>
<tr>
<td>1996</td>
<td>14,042</td>
</tr>
<tr>
<td>1998</td>
<td>10,952</td>
</tr>
<tr>
<td>2000</td>
<td>10,108</td>
</tr>
<tr>
<td>2002</td>
<td>17,167</td>
</tr>
<tr>
<td>2004</td>
<td>22,595</td>
</tr>
</tbody>
</table>
Figure 9: Catastrophic and impoverishing expenditure
By quintile and type of impoverishment, (2000)

% of households with respect to the quintile

Quintile by per capital spending

Source: Author calculations based on ENIGH, 2000.
Figure 10: Households with catastrophic and impoverishing health expenditures by distribution of spending on health

Source: Author calculations based on ENIGH, 2000.
Figure 11: How do families finance health events?: Catastrophic spending on health affects family investment on other basic needs, 2001
Figure 12: Projected impact of extending financial protection through PHI with universal coverage and partial reduction in out of pocket spending

<table>
<thead>
<tr>
<th></th>
<th>WHO (2000), ENIGH 1996¹</th>
<th>Initial Value, ENIGH, 2000²</th>
<th>Reduction scenario out of pocket spending with 2003 reform, ENIGH</th>
<th>TOBIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of Fairness in financial contribution</td>
<td>0.903</td>
<td>0.915</td>
<td>0.952</td>
<td>.985</td>
</tr>
<tr>
<td>Households with catastrophic spending (%&gt;30%)</td>
<td>3.8</td>
<td>3.4</td>
<td>2.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Households with absolut impoverishment (&gt;30%)</td>
<td>3.8</td>
<td>3.4</td>
<td>2.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Households with absolut and/or relative impoverishment</td>
<td>6.3</td>
<td>5.5</td>
<td>2.9</td>
<td>5.3</td>
</tr>
<tr>
<td>World ranking according to the WHO (2000) among 191 countries</td>
<td>144</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 13: Projected impact of extending financial protection through PHI with universal coverage and progressive reduction in out of pocket spending to 100%

Initial values (ENIGH, 2000): 0.915, 3.4%, 3.8%, 6.3%

Source: Authors’ calculations using ENIGH 2000.
Figure 14. Projected Impact of extending financial protection through PHI with partial coverage and progressive reduction in out of pocket spending

Source: Authors’ calculations using ENIGH 2000
**Figure 15: Projected Impact of extending financial protection through PHI with coverage at the subnational level**

<table>
<thead>
<tr>
<th>Initial values</th>
<th>Insurance coverage by geographic area (Non-cumulative)</th>
<th>reduction in out of pocket spending</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Areas with &gt; 100,000 inhabitants</td>
<td>IFFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATASTROPIC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IMPOVERISHING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td></td>
<td>15,000 to 99,999 inhabitants</td>
<td>IFFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATASTROPIC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IMPOVERISHING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td></td>
<td>2,500 to 14,999 inhabitants</td>
<td>IFFC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATASTROPIC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IMPOVERISHING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
</tr>
<tr>
<td>Areas with &lt; 2,500 inhabitants</td>
<td>IFFC</td>
<td>.9350</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CATASTROPIC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IMPOVERISHING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations using ENIGH 2000
Figure 16: Projected impact of universal coverage of the SPSS and Popular Insurance and reduction of out of pocket spending by type of expenditure

<table>
<thead>
<tr>
<th></th>
<th>Maternity</th>
<th>Medications</th>
<th>Ambulatory care</th>
<th>Hospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFFC</td>
<td>0.921</td>
<td>0.944</td>
<td>0.934</td>
<td>0.927</td>
</tr>
<tr>
<td>IMPOVERISHMENT</td>
<td>3.3</td>
<td>2.6</td>
<td>2.9</td>
<td>3.4</td>
</tr>
<tr>
<td>RELATIVE</td>
<td>4.0</td>
<td>3.1</td>
<td>3.4</td>
<td>4.0</td>
</tr>
<tr>
<td>ABSOLUTE</td>
<td>6.5</td>
<td>5.3</td>
<td>5.7</td>
<td>6.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Initial values (ENIGH, 2000): .915, 3.4%, 3.8%, 6.3% | | |     | Source: Authors’ calculations using ENIGH 2000.
Figure 17: Evolution over time of catastrophic and impoverishing health expenditure (1992-2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>IFFC</th>
<th>Catastrophic</th>
<th>Impoverishing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>0.9214</td>
<td>2.8</td>
<td>5.17</td>
<td>6.98</td>
</tr>
<tr>
<td>1994</td>
<td>0.9131</td>
<td>3.42</td>
<td>5.53</td>
<td>7.85</td>
</tr>
<tr>
<td>1996</td>
<td>0.9164</td>
<td>3.45</td>
<td>9.93</td>
<td>11.77</td>
</tr>
<tr>
<td>1998</td>
<td>0.8915</td>
<td>4.22</td>
<td>7.40</td>
<td>9.95</td>
</tr>
<tr>
<td>2000</td>
<td>0.9146</td>
<td>3.37</td>
<td>3.84</td>
<td>6.33</td>
</tr>
<tr>
<td>2002</td>
<td>0.9199</td>
<td>2.77</td>
<td>2.37</td>
<td>4.59</td>
</tr>
<tr>
<td>2004</td>
<td>0.9264</td>
<td>2.64</td>
<td>1.79</td>
<td>4.07</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations using ENIGH.
Figure 18: Evolution of household health spending by insurance coverage (1992-2004)

Source: Author calculations using ENIGH 2000
Figure 19: Evolution of the distribution of excessive health spending by income quintile (1992-2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>+ Poorer</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>- Poorer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>24.2</td>
<td>3.2</td>
<td>2.7</td>
<td>2.3</td>
<td>3.4</td>
</tr>
<tr>
<td>1994</td>
<td>26.4</td>
<td>4.1</td>
<td>2.8</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>1996</td>
<td>35.3</td>
<td>14.0</td>
<td>2.9</td>
<td>3.0</td>
<td>3.5</td>
</tr>
<tr>
<td>1998</td>
<td>27.1</td>
<td>11.3</td>
<td>5.0</td>
<td>4.1</td>
<td>2.6</td>
</tr>
<tr>
<td>2000</td>
<td>19.6</td>
<td>4.2</td>
<td>2.4</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>2002</td>
<td>12.6</td>
<td>3.0</td>
<td>2.0</td>
<td>2.6</td>
<td>2.8</td>
</tr>
<tr>
<td>2004</td>
<td>9.7</td>
<td>2.5</td>
<td>2.1</td>
<td>3.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: Author calculations using ENIGH 2000
Figure 20: Evolution of Catastrophic and Impoverishing Health Spending by sub-type

Source: Author calculations using ENIGH 2000
Figure 21: Composition of Catastrophic and Impoverishing Health Spending by sub-type

- Below the poverty line and health spending b/w 6 y 29% of disposable income
- Below the poverty line and health spending > 30% of disposable income
- Cross the poverty line health spending >0 but <30% of disposable income
- Cross the poverty line b/c health spending > 30% of disposable income
- Above the poverty line and health spending > 30% of disposable income

Source: Author calculations using ENIGH 2000
Figure 22: Progress in coverage of the Popular Health Insurance and reduction in the percentage of households with total impoverishment, 2000-2004

Source: Author estimates with data from ENIGH, 2002 and 2004; and SSa, 2005.
### Figure 23. Logit estimations that a household suffers excessive, catastrophic or impoverishing expenditure

#### % of the population covered by the Popular Health Insurance (x 100)

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef.</td>
<td>0.53</td>
<td>-0.58</td>
<td>-0.53</td>
<td>-0.46</td>
<td>-0.79</td>
<td>-0.41</td>
<td>-0.42</td>
<td>-0.79</td>
<td>-0.41</td>
<td>-0.45</td>
<td>-0.48</td>
<td>-0.05</td>
</tr>
<tr>
<td>z</td>
<td>2.14</td>
<td>-1.54</td>
<td>-1.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Number of years since the state incorporated to the Popular Health Insurance

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
</tr>
</thead>
<tbody>
<tr>
<td>One year (2004)</td>
<td></td>
<td></td>
<td></td>
<td>-0.23</td>
<td>-0.40</td>
<td>1.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>11.79</td>
<td>9.64</td>
<td>5.02</td>
<td>11.41</td>
<td>9.36</td>
<td>5.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two years (2003)</td>
<td></td>
<td></td>
<td></td>
<td>-0.78</td>
<td>-0.93</td>
<td>1.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>2.44</td>
<td>-1.80</td>
<td>-1.24</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three years (2002)</td>
<td></td>
<td></td>
<td></td>
<td>-0.91</td>
<td>-0.42</td>
<td>1.68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>-1.81</td>
<td>-1.41</td>
<td>-1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four years (2001)</td>
<td></td>
<td></td>
<td></td>
<td>-0.62</td>
<td>-0.96</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>1.82</td>
<td>0.47</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Household characteristics

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef.</td>
<td>0.48</td>
<td>0.47</td>
<td>0.34</td>
<td>0.43</td>
<td>0.47</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>0.08</td>
<td>0.07</td>
<td>0.06</td>
<td>0.06</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence of children in the household (0=No, 1=Yes)</td>
<td></td>
<td></td>
<td></td>
<td>-0.41</td>
<td>0.07</td>
<td>1.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence of older people (65 or plus) in the households (0=No, 1=Yes)</td>
<td></td>
<td></td>
<td></td>
<td>0.46</td>
<td>0.47</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>0.45</td>
<td>0.19</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence in areas from 15,000 to 99,999 inhabs. (0=No, 1=Yes)</td>
<td></td>
<td></td>
<td></td>
<td>-0.58</td>
<td>-0.54</td>
<td>0.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z</td>
<td>-1.81</td>
<td>-1.41</td>
<td>-1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### State characteristics where (x 100)

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
<th>All</th>
<th>Non insured</th>
<th>Quintile I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef.</td>
<td>0.16</td>
<td>0.07</td>
<td>0.36</td>
<td>0.71</td>
<td>0.59</td>
<td>0.36</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>z</td>
<td>0.46</td>
<td>0.18</td>
<td>0.72</td>
<td>1.22</td>
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<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Log likelihood

|                     | -3399.33| -2431.02| -1399.24| -1079.92| -3382.16| -2402.63| -1382.05| -1675.68| -1199.52| -1306.59| -1168.38| -1281.49| -2508.58| -1828.29| -572.35| -1803.89| -562.21|
|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|

**Note:** The underline values are significatives unless 10%
Figure 24: TOBIT regressions on financial contribution of households and per capita out of pocket spending

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Coef</th>
<th>t</th>
<th>Coef</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of the population covered by the Popular Health Insurance (x 1,000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Non insured Quintile I</td>
<td>-0.02</td>
<td>-0.45</td>
<td>-0.27</td>
<td>-2.74</td>
</tr>
<tr>
<td>Non insured Quintile I</td>
<td>-0.29</td>
<td>-3.12</td>
<td>-0.41</td>
<td>-3.12</td>
</tr>
<tr>
<td>Non insured of quintile I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of years since the state incorporated to the Popular Health Insurance (x 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One year (2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>0.04</td>
<td>1.47</td>
<td>-0.04</td>
<td></td>
</tr>
<tr>
<td>One year (2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>1.85</td>
<td>3.24</td>
<td>0.87</td>
<td>0.80</td>
</tr>
<tr>
<td>One year (2004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>0.48</td>
<td>0.80</td>
<td>0.48</td>
<td>0.76</td>
</tr>
<tr>
<td>Family Head gender (0=Female, 1=Male)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>0.40</td>
<td>0.34</td>
<td>0.21</td>
<td>0.18</td>
</tr>
<tr>
<td>State characteristics where households are located (x 100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households in the state with excessive spending in the former period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>-0.03</td>
<td>-0.31</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>% of households in the state under the poverty line in the former period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>-0.04</td>
<td>-0.80</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>% of households in the state with social security in the former period</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coef</td>
<td>0.01</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Constant</td>
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</tr>
<tr>
<td>Coef</td>
<td>1.47</td>
<td>3.24</td>
<td>0.51</td>
<td>0.83</td>
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<tr>
<td>Residual standard error</td>
<td>0.05</td>
<td>0.06</td>
<td>0.04</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Note: The underline values are significatives unless 10%