Health insurance and use of alternative medicine in Mexico

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ABSTRACT

Objectives: I analyze the effect of coverage by health insurance on the use of alternative medicine such as folk healers and homeopaths, in particular if it complements or substitutes conventional services.
Methods: Panel data from the Mexican Health and Aging Study (MHAS) is used to estimate bivariate probit models in order to explain the use of alternative medicine while allowing the determinant of interest, access to health insurance, to be an endogenous factor.
Results: The findings indicate that households with insurance coverage less often use alternative medicine, and that the effect is much stronger among poor than among rich households.
Conclusions: Poor households substitute away from traditional medicine towards conventional medicine.

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1. Introduction

Traditionally, health insurance in Mexico is a component of the social security package available for employees with a formal job and their close relatives. For people without social security (about half of the population), relatively simple issues such as visiting a doctor or using medication often are too expensive. In 2003, the nationwide rollout of a health insurance program providing universal coverage has started, improving the access to health care. One objective for the expansion of access to health insurance is the promotion of the use of conventional therapies while discouraging the use of alternative treatments. Conventional therapies are offered by formally acknowledged and certified institutions, and generally apply scientifically proven methods, while for alternative treatment the quality is generally unproven but based on belief. Here, 'alternative treatment' refers to non-conventional, 'complementary and alternative medicine (CAM)' such as homeopaths and acupuncturists, but also to traditional

therapies such as *curanderos* (folk healers), *yerberos* (cure with medicines extracted from plants) and *hueseros* (bonesetter, folk chiropractor).[1] Health insurance usually covers only the conventional services but not alternative treatment. The latter however are often cheaper, and may be the only services within reach of people without insurance.

Social security in Mexico is provided through two large institutes, the IMSS (*Instituto Mexicano del Seguro Social*, Mexican Institute for Social Security) for the private sector and the ISSSTE (*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*, Government Workers' Social Security and Services Institute) for the public sector employees, and a number of smaller institutes (*e.g.* for the state oil company Pemex, the army, the navy, federal states, municipalities). Apart from health insurance, the social security package includes retirement and disability pensions, job protection, childcare services, and a housing fund. Altogether they cover just over half of the population. The other half of the population, working in the informal sector, is not covered by a social security scheme

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[1] I refrain from the discussion on the quality and efficacy of CAM vs. conventional treatment (see *e.g.* [1]).

and, what is relevant for this paper, therefore has limited access to health services [2,3]. State-owned hospitals and clinics are available for uninsured people but charge a fee, and deliver services of a lower quality, in particular with longer waiting times [4]. The currently ongoing nationwide rollout of *Seguro Popular* (Popular Health Insurance) will provide health insurance to informal sector workers and others not covered by social security [5]. Thus, access to insurance and health care services is growing and universal coverage is within sight, however through different insurance schemes dependent on employment status, where informal workers will not obtain the other services of the social security package.

Recent publications show that access to health insurance in Mexico increases the use of conventional health care services, more specifically of doctor visits, hospitalization, and preventive exams [6,7]. A relevant question is if this new use of conventional services replaces other services, in particular alternative and traditional therapies, or is additional to them. In this paper I analyze if conventional services and alternative medicine can be considered as complements or substitutes. Does access to formally approved services through health insurance coverage reduce the use of alternative services?

2. Methods

2.1. Decision-making framework

An individual's demand for services provided by the social security (H^S) and for alternative medicine (H^A) can be described as a utility-maximization problem, $U(C, H^S, H^A)$, where C indicates consumption of all other goods and services. An individual maximizes utility subject to a budget constraint that guarantees that the total expenses are not higher than the available income (Y): $p^S H^S + p^A H^A + p^C C \leq Y$, where p^S, p^A, and p^C are the prices of formal health services, alternative treatment, and other consumption goods, respectively. Health services are found to behave as normal goods that react to prices, despite their rather specific nature related to health problems that create a 'need' for services. That is, a higher price generally reduces the use of health services [8].

For people similar in all characteristics except social security coverage, the price of conventional services p^S is higher for those without insurance than for the ones with coverage (and might tend to infinity if use is excluded without insurance). Alternative medicine is not covered by social security or other insurances, therefore the price of these services, p^A, does not change when insurance is obtained.

Upon obtaining access to social security, the price of formal services is reduced while the price of alternative medicine is left unchanged. Given the health status and other circumstances, use of formal services is therefore likely to be higher among people with access to social security. As the absolute price of alternative medicine is unchanged, demand for it need not be affected by access to social security, or might even increase due to an income effect: since the costs of conventional formal health services are covered by the insurance, more income

is left for spending on other goods including alternative medicine.

On the other hand, if conventional and alternative medicine should be considered as substitutes, it is effectively the total demand for health services $H^T = H^S + H^A$ that is determined in the utility-maximization process. In that case, it is the relative price that is relevant instead of the absolute prices. Access to social security increases the relative price p^A/p^S, and is therefore likely to reallocate demand from alternative services towards services provided by the social security system.

As will be outlined below, the data does not contain precise information on the prices of neither conventional nor alternative medicine, but there is information on the access to health insurance, which is a major determinant of the price. In the empirical model I focus on the effect of this indicator of health insurance access on the usage of health services, while controlling for other differences between individuals that alter demand.

2.2. Material

I use the Mexican Health and Aging Study (MHAS), a panel survey with two waves.[2] The baseline survey from 2001 is constructed as a nationally representative sample of the about 13 million Mexicans aged 50 and over (about 13% of the population in 2001, a share that is growing [9]). The questionnaire contains questions about socio-demographic and health status, use of health services and other sources of support, current and past labor status, sources of income and possessions. Both the heads of the selected households as well as their partners were interviewed, resulting in a total sample size in 2001 of 15,186 individuals. In the follow-up survey of 2003 the same age-eligible persons and their household members were interviewed, even if the household had moved or split. Some could not be traced or refused to participate (5.8% of the targeted households) while others died in the two years between the interviews (3.8% of the interviewed individuals). As usual, attrition was somewhat higher among households in rural areas and among households that separated, while the number of households that left the sample due to death or migration was in line with the expectations. In general the attrition was low and not concentrated in specific groups [12]. An advantage of this data set is that the information is collected before the rollout of *Seguro Popular* set off; in 2003 only some small pilot projects were started. I construct a pooled data set that, after the elimination of observations with incomplete information on essential variables, contains 22,729 observations, of which 12,360 are from 2001 while 10,369 individuals are also observed in 2003.

2.3. Empirical model

I construct an empirical model explaining the use of alternative services by health insurance status and other

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[2] *Estudio Nacional sobre Salud y Envejecimiento en México* (ENASEM) [10,11].

determinants of health care use. The dependent variable in the model is whether the respondent has made use of alternative services, which is derived from two questions in the survey in 2001: "In the last year, about how many times (1) have you seen a folk healer? (2) have you consulted a homeopath?". In 2003, only one combined question is asked: "In the last year, about how many times have you seen a homeopath or folk healer?". I do not use the frequency of visit but focus on whether or not alternative services have been used. About 9.6% of the sample reports use in 2001, a number that drops to 7.4% in 2003.[3] Note that these questions are not exhaustive for the huge variety of alternative services available.

The main variable of interest in the explanation of the use of alternative therapies is the access to health insurance. I construct a dummy variable that takes the value 1 if someone has health insurance, either via a social security scheme (IMSS, ISSSTE, Pemex, other) due to his or her own job or through employed relatives, or has bought a private health insurance. The indicator takes the value 0 if one does not have health insurance. In 2001, 54.3% has health insurance, a proportion that grows to 56.9% in 2003.

Insurance coverage is not the only relevant factor in the decision to use medical services. Following the conceptual framework of Andersen [13] three categories of factors explaining the care utilization are distinguished: the need for services, the available resources (enabling factors), and the social conditions (predisposing variables). The primary determinant of the need for services is expected to be one's health. As health indicator I include the self-assessed health status as a set of three dummies (poor, fair, good health) with very good or excellent health as reference category. In addition, I include indicators if someone suffered, in the two years before the survey, from heart problems, a stroke, cancer, diabetes, arthritis, high blood pressure, or (at the moment of the survey) has severe limitations in performing instrumental activities of daily living (iadl) or regularly suffers from stomach pain. A heart attack, stroke, and cancer are important determinants of doctor visits and hospitalization [6]. The other diseases are chronic problems with recurrent expenses for which alternative treatment may be a viable option.

The incidence of a health problem is not sufficient to observe the use of medical services; required is their availability and accessibility. Enabling factors in the model, in addition to health insurance, are the household income (from labor, pensions, transfers, businesses, rental properties, and financial assets), and the (business, real estate, financial, and transport) assets owned by the household. Information about the distance to a clinic, probably a relevant measure, is unavailable. I include a dummy indicating if someone is living in a rural or urban area (with more than 100,000 inhabitants). Having indigenous roots may be an important indicator both for the access to services (enabling factor) – because indigenous people often live in remote areas with fewer resources – as well as a predisposing variable measuring cultural factors that guide the

decision for conventional or alternative medicine. Other predisposing variables included in the model are gender, age, whether one is married or co-habiting, and the number of years of schooling.

A complication in the construction of the empirical model is that the use of services refers to the two years before the survey, while insurance is reported at the moment of the survey. Hence it is possible that people change insurance status after the use of services, and also it can be that the loss of the insurance (e.g. due to job loss) is caused by the health incidences that led to the use of health services. Insurance status thus is suspect to be an endogenous variable in the econometric model. I account for endogeneity by applying an instrumental variable method.[4] As instruments I use a salaried job, a job in the agricultural sector, having a job at the moment of the survey, and owning a business or farm. The latter two instruments vary over time while the first two refer to the main job during the career. They qualify as instruments because insurance is closely linked to formal employment, which is less common among self-employed and in agriculture, while salaried jobs are more common in the formal sector; furthermore, a prior there is no reason to expect that the job type affects the use of (alternative) services (see also the next section).

Due to the discrete nature of both the outcome (use of alternative services, S_{it}) and the endogenous explanatory (health insurance, HI_{it}), the model boils down to a bivariate probit model:

$$S_{it}^* = \lambda HI_{it} + \beta_S' x_{it} + u_{it}, \tag{1}$$

$$HI_{it}^* = \beta_I' x_{it} + \gamma' z_{it} + v_{it}, \tag{2}$$

where S_{it}^* and HI_{it}^* are unobserved. Observed is the use of alternative medicine S_{it}, equal to 1 if $S_{it}^* > 0$, and zero otherwise, and the endogenous health insurance, $HI_{it} = 1$ if $HI_{it}^* > 0$ and zero otherwise. The model equations are jointly estimated, allowing a correlation (ρ) between the error terms u_{it} and v_{it}. The vector of exogenous variables is x_{it}, while the vector z_{it} contains the instrumental variables that correct for the endogeneity of health insurance. The parameter λ measures the (causal) effect of health insurance on the use of alternative medicine.

3. Results

3.1. Average effect

Table 1 presents the results of the estimations of the weighted pooled bivariate probit model. If I do not account for the endogeneity of health insurance, the effect of access to health insurance on the use of alternative medicine is found to be negative but small and insignificant (column 1). Poor health in general, and stomach aches and problems with daily activities specifically, increase the use

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[3] Table A1 in Appendix A gives the descriptive statistics of the variables used in the empirical model.

[4] A difference-in-differences approach, comparing elderly who obtain access to health services in 2003 with those who remain without insurance, is not possible because the event of obtaining access cannot be considered as a randomized event, and even assuming that it is random after controlling for observable characteristics would be a doubtful.

Table 1
Use of alternative medicine[a].

	Probit model	Bivariate probit
Health insurance	−0.035 (0.053)	−0.614[***] (0.168)
Needs		
Self-assessed health: good	0.061 (0.104)	0.071 (0.103)
Self-assessed health: fair	0.150 (0.104)	0.143 (0.103)
Self-assessed health: poor	0.270[**] (0.115)	0.225[**] (0.114)
Disease: heart attack	0.047 (0.142)	0.097 (0.131)
Disease: stroke	0.116 (0.145)	0.114 (0.141)
Disease: cancer/malignant tumor	0.341[*] (0.188)	0.302[*] (0.179)
Disease: hypertension/high blood pressure	−0.003 (0.050)	0.032 (0.050)
Disease: arthritis/rheumatism	0.073 (0.057)	0.080[*] (0.055)
Disease: diabetes/high blood sugar level	−0.054 (0.062)	0.014 (0.063)
Severe problems with (i)adl	0.187[***] (0.053)	0.206[***] (0.051)
Symptoms: stomach pain, indigestion	0.208[***] (0.055)	0.193[***] (0.053)
Enabling factors		
Household income ($1000×)	−0.000 (0.000)	0.000 (0.000)
Household assets ($1000×)	0.003 (0.002)	0.002 (0.002)
Locality size: >100,000	−0.003 (0.050)	0.142[**] (0.062)
Predisposing factors		
Gender: female	−0.028 (0.051)	0.007 (0.052)
Age: 60–69	−0.051 (0.059)	0.004 (0.058)
Age: 70 or more	−0.177[***] (0.061)	−0.119[*] (0.063)
Married/living together	−0.089 (0.065)	−0.047 (0.067)
Number of years of education	−0.002 (0.006)	0.010 (0.006)
Speaks indigenous language	0.220[***] (0.076)	0.114 (0.082)
Other variables		
Observation from 2003	−0.118[**] (0.050)	−0.103[**] (0.048)
Constant	−1.468[***] (0.129)	−1.317[***] (0.137)
ρ (correlation of insurance and alternative services)		0.359[***] (0.099)
Test of excluded instruments ($\chi^2(4)$)		163.98[***] ($p = 0.000$)
Wald test of constant-only model ($\chi^2(22)$)	94.83[***] ($p = 0.000$)	120.08[***] ($p = 0.000$)
#Observations	22,729	22,714

[a] Weighted pooled bivariate probit regression, 2001 and 2003. Heterogeneity-corrected standard errors, clustered by household.
[*] Significant at 10%.
[**] Significant at 5%
[***] Significant at 1%.

of alternative therapists, as does a (previous) period of cancer.

Column 2 shows the results of the (preferred) model that accounts for endogeneity of health insurance. Before discussing the results, first some words about the quality of the instruments and the relevance of the endogeneity correction. Testing the instruments in a bivariate probit set-up is not straightforward. Preliminary tests (see Appendix A, Table A2) show that the instruments contribute to the identification of the health insurance access: underidentification is rejected (which is confirmed in the bivariate probit (Table 1, $\chi^2(4) = 164.0$)). An overidentification test indicates that it is valid to exclude the instruments from the main equation; they have no direct effect on the use of alternative medicine but only through the access to health insurance. The correlation between the insurance status and the use of alternative services (ρ) is significant, suggesting that exogeneity of insurance coverage is rejected and that the model that corrects for endogeneity is preferred.

The effect of health in the model that accounts for endogeneity (column 2) remains unchanged after correction, but the corrected effect of insurance on the use of alternative medicine is much larger than suggested by the uncorrected estimates. The strongly significant negative

effect of health insurance on the use of alternative therapists implies that the improved opportunities to use conventional health services due to the price reduction inherited from health insurance coverage, strongly reduces the use of alternative services.[5] This suggests that the second interpretation of the theoretical framework, which hypothesizes that consumers decide on the total amount of health care used and that a price reduction due to health insurance implies that conventional services substitute for alternative medicine, is the correct interpretation. This is in line with the positive effect on the occurrence of doctor visits and hospitalization found by Wong and Díaz [6].

3.2. Poor vs. rich households

The model in Table 1 estimates an average effect of health insurance for the population aged 50 and over. This hides the fact that various subgroups may experience different effects. In particular, obtaining access to health care

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[5] Separate analyses for rural and urban areas give the same effect for both subsamples (to be precise, −0.663 in rural areas and −0.623 in the urban sample).

Table 2

Characteristics of users of traditional and other non-conventional medicine, weighted, 2001.

Variable	Traditional medicine		Homeopaths, etc.	
	Mean	S.D.	Mean	S.D.
Number of observations (users of the service)	653		667	
Number of people	783,959		567,174	
Household income ($1000×)	4.071	69.156	7.609	114.633
Household assets ($1000×)	3.022	4.517	3.955	5.729
Gender: female	0.509	0.500	0.694	0.461
Number of years of education	2.620	3.193	4.449	4.409
Locality size: >100,000	0.349	0.477	0.605	0.489
Speaks indigenous language	0.228	0.420	0.065	0.247

Table 3

Use of alternative medicine by poor and rich households[a].

	Poor households	Rich households
Health insurance	−0.984*** (0.295)	−0.216 (0.308)
Needs		
Self-assessed health: good	0.153 (0.205)	0.027 (0.133)
Self-assessed health: fair	0.085 (0.202)	0.213 (0.146)
Self-assessed health: poor	0.056 (0.217)	0.271 (0.176)
Disease: heart attack	0.382** (0.185)	−0.273 (0.223)
Disease: stroke	−0.028 (0.207)	0.151 (0.247)
Disease: cancer/malignant tumor	0.184 (0.287)	0.159 (0.252)
Disease: hypertension/high blood pressure	0.132* (0.073)	−0.090 (0.091)
Disease: arthritis/rheumatism	0.051 (0.089)	0.168* (0.102)
Disease: diabetes/high blood sugar level	0.137 (0.094)	−0.131 (0.124)
Severe problems with (i)adl	0.348*** (0.075)	0.137 (0.096)
Symptoms: stomach pain, indigestion	0.196** (0.089)	0.213** (0.096)
Enabling factors		
Household income ($1000×)	0.002 (0.002)	−0.000 (0.000)
Household assets ($1000×)	0.008 (0.008)	−0.002 (0.003)
Locality size: >100,000	0.145 (0.113)	−0.040 (0.108)
Predisposing factors		
Gender: female	−0.002 (0.073)	0.034 (0.101)
Age: 60–69	0.113 (0.085)	0.051 (0.104)
Age: 70 or more	0.093 (0.100)	−0.260** (0.130)
Married/living together	0.044 (0.084)	−0.127 (0.143)
Number of years of education	0.026** (0.013)	−0.009 (0.010)
Speaks indigenous language	0.073 (0.125)	0.162 (0.171)
Other variables		
Observation from 2003	−0.107 (0.076)	−0.079 (0.082)
Constant	−1.439*** (0.257)	−1.144*** (0.249)
ρ (correlation of insurance and alternative services)	0.656*** (0.161)	0.049 (0.190)
Test of excluded instruments ($\chi^2(4)$)	46.64*** ($p = 0.000$)	86.09*** ($p = 0.000$)
Wald test of constant-only model ($\chi^2(22)$)	117.87*** ($p = 0.000$)	68.19*** ($p = 0.000$)
#Observations	7203	7688

[a] Weighted pooled bivariate probit regression, 2001 and 2003. Heterogeneity-corrected standard errors, clustered by household.

* Significant at 10%.

** Significant at 5%

*** Significant at 1%.

may have different impacts for poor and rich households. For the latter, lack of insurance is not necessarily a binding restriction on the use of health care due to the availability of resources, while for poor households it is likely to be a serious constraint. Another difference between poor and rich households is the kind of alternative services that is used. The survey of 2001 allows the identification of users of traditional therapies (folk healers) and of other non-conventional services (homeopaths). Women, people with longer schooling, higher income or more assets, and persons living in cities are found less among users of traditional medicine than among users of services as homeopaths

(Table 2). Indigenous people on the other hand report higher use of traditional medicine. Several of these factors relate to poverty, suggesting that poor households use different therapies and might have a different behavior than richer people.

In Table 3 I repeat the endogeneity-corrected analysis of Table 1 (column 2) separately for samples of poor and rich households. Column 1 presents results for households with incomes below the poverty line to cover basic needs (health, education, clothing, housing and public transportation), which equals a monthly income of about 1050 pesos per person [7]. The sample of rich households (column 2)

consists of households that earn at least three times that poverty line.[6]

For the poor households I find a strong negative effect of insurance on the use of alternative therapies while in the rich sample I find a much smaller and insignificant effect. The results indicate that especially among the poor the use of alternative medicine (which, in their case, includes a larger fraction of traditional therapies) is a substitute for the use of conventional services. For richer households conventional and alternative services (in their case, home-opaths) are complements: health insurance does not affect the use of alternative therapists.[7] Further, the health status has different effects among the poor and the rich. Stomach ache and digestive problems form a strong predictor in both groups, but apart from that there are few health effects among the rich. In case of a life-threatening disease like a heart attack a negative (though insignificant) effect on the use of alternative services among the rich is found, while among the poor a rather strong positive effect on usage is observed. Something similar holds for severe problems with the instrumental activities of daily living. Note that only among the poor, endogeneity appears to be a problem; the correlation between the insurance status and the use of alternative services (ρ), is insignificantly different from zero among the rich.

4. Discussion

The increase in the use of conventional services in Mexico due to health insurance access, as is found by Wong and Díaz [6] and Pagán et al. [7], is in line with the decision-making framework outlined above: with health insurance the (absolute and relative) price for services is lower, and, given the health and socio-economic status, an increase in the demand for conventional services is likely. However that observation does not imply that it is accompanied by a reduction of the use of alternative services. Sensitivity of the use of conventional services for its price is a general empirical finding [8], but findings regarding the effect of insurance on the use of CAM are less conclusive. In a representative sample for the USA it is found that uninsured adults use more CAM [14], which matches the results in a sample of elderly [15]. Also insignificant effects of insurance on the use of CAM are found [16], while it is observed that adults with an insurance plan that covers CAM use more of it [17].

The situation in Mexico may differ from the USA, because availability of conventional services is less equally distributed and the use of traditional medicine may be more widespread. Analysis of the decision to use non-conventional medicine in Mexico is scarce. In a qualitative

research Berenzon-Gorn et al. [18] conclude that traditional healers in Mexico City are mainly consulted for problems caused by stress and tension, not for diseases in the strict sense; the role of economic factors is not analyzed. However, costs may be relevant; in rural India, the average costs of conventional treatment are two to three times higher than the costs of alternative treatment while the (self-reported) recovery rates are similar, which leads to the conclusion that for certain diseases alternative medicine is a cost-effective substitution for conventional treatment for certain diseases [19].

The results in this paper show that access to formal services through health insurance reduces the use of complementary and alternative therapies among Mexicans aged 50 years and older, giving evidence of a substitution away from alternatives medicine towards the use of formally acknowledged, conventional medicine. The effect is more prominent among poor households, for whom the use of alternative medicine mainly consists of traditional services such as folk healers. For richer households no significant reduction of the use of alternative medicine is found; there is hardly any effect on the use of alternative medicine (in their case, mainly homeopaths) if access to health insurance is increased.

A limitation of the analysis, apart from the need to solve the endogeneity issue with the health insurance and the fact that the data are representative only for people aged 50 and more, is that the survey explicitly asks about consults with folk healers and homeopaths. Consults with other types of traditional and alternative practitioners may therefore not be registered, depending on the precise interpretation of the questions and the services by the respondents. Further, the use of alternative medication without consultation of a practitioner is excluded from the response. It is known that self-medication in Mexico is widespread, also conventional medication is often bought and used without prescription.

The rollout of *Seguro Popular*, a health insurance for about half of the Mexican population working in the informal sector without any social security, which essentially establishes universal health insurance coverage, will change the access to conventional health care services. Hence it can be expected to have a huge impact on the demand for conventional services. Expansion of health insurance coverage to the poorest households, who currently have hardly any access to medical services, might have a large impact on their health, due to the substitution of unproven treatments with services using acknowledged methods. However, an improvement of health status is not assured. International research finds mixed and inconclusive results of insurance on health status [20]. For Mexico, in early analyses it is concluded that the introduction of *Seguro Popular* has positive but small effects on health status [21] while others do not find effects on the probability of having a low birth weight baby [22]. A challenge that must be dealt with is that not only access to the services but also their quality must be guaranteed. A threat is the persistent division between social security schemes for formal sector workers and the new insurance for the informal sector workers. The separate systems of providers will not necessarily offer the same quality levels.

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[6] For people living together I multiply the individual poverty line by 1.5 because various expenses are shared. I use the actual household incomes in 2001 and 2003, thus people leave and enter the respective samples.

[7] With lower bounds for the income in the definition of a poor household, stronger negative effects are found. In an analysis with only the sample of 2001, for the poor I find an especially strong effect on use of folk healers and an insignificant effect on homeopaths. For the rich on the other hand I find insignificant effects both on homeopaths and folk healers.

5. Conclusions

Existing research for Mexico has shown that access to health insurance increases the use of health care services, in particular doctor visits, hospitalization, and preventive exams [6,7]. In this paper I have analyzed the effect of coverage by health insurance in the population aged 50 years and older on the use of alternative medicine, which includes traditional treatment provided by *e.g.* folk healers and other non-conventional services such as homeopaths.

The findings suggest that economic motives play a role in the use of alternative medicine. Households with insurance coverage less often use alternative therapies, an effect that is much stronger among poorer households than among the richer ones; poor households substitute away from traditional medicine towards the use of conventional services.

Therefore potentially large positive effects on public health can be achieved by increased health insurance coverage. The Mexican approach, with a division of the insurance schemes and care providers accessible for formal and informal sector workers, implies that a necessary condition is that investments in the quality of the (newly available) services for the informal sector workers are made such that the services that become available for poor households are indeed of high quality.

Appendix A.

Tables A1 and A2.

Table A1
Descriptive statistics.

Variable	2001		2003	
	Mean	S.D.	Mean	S.D.
Number of observations	12,360		10,369	
Number of people	13,175,123		11,716,225	
Main variables of interest				
Use of alternative medical services	0.096	0.295	0.074	0.262
Health insurance	0.543	0.498	0.569	0.495
Needs				
Self-assessed health: good	0.306	0.461	0.268	0.443
Self-assessed health: fair	0.468	0.499	0.500	0.500
Self-assessed health: poor	0.166	0.372	0.188	0.390
Disease: heart attack	0.028	0.164	0.024	0.152
Disease: stroke	0.022	0.148	0.009	0.094
Disease: cancer/malignant tumor	0.018	0.134	0.007	0.086
Disease: hypertension/high blood pressure	0.358	0.479	0.346	0.476
Disease: arthritis/rheumatism	0.202	0.401	0.178	0.382
Disease: diabetes/high blood sugar level	0.152	0.359	0.161	0.368
Severe problems with (i)adl	0.382	0.486	0.351	0.477
Symptoms: stomach pain, indigestion	0.205	0.404	0.188	0.390
Enabling factors				
Household income ($1000×)	6.908	79.617	6.555	26.936
Household assets ($1000×)	3.523	7.165	4.036	7.229
Locality size: >100,000	0.473	0.499	0.482	0.500
Predisposing factors				
Gender: female	0.539	0.498	0.559	0.497
Age: 60–69	0.307	0.461	0.342	0.474
Age: 70 or more	0.231	0.422	0.264	0.441
Married/living together	0.679	0.467	0.670	0.470
Number of years of education	3.964	4.254	3.999	4.227
Speaks indigenous language	0.097	0.296	0.087	0.281
Instrumental variables				
Salaried job (mainly, over lifetime)	0.448	0.497	0.452	0.498
Job in the agricultural sector (mainly)	0.225	0.418	0.213	0.409
Employed	0.303	0.460	0.189	0.391
Owner of business or farm	0.347	0.476	0.344	0.475

Table A2

Indicative tests of the validity of the instrumental variables[a].

Test of excluded instruments	41.288
H_0: Excluded instruments do not explain endogenous variable	$F(4, 9070)$: $p = 0.000$
Overidentification test (Hansen J statistic)	3.226
H_0: Exclusion restrictions of instruments are valid	$\chi^2(3)$: $p = 0.358$
Underidentification test (Kleibergen–Paap LM statistic)	143.336
H_0: Model is underidentified, instruments are not good	$\chi^2(4)$: $p = 0.000$
Endogeneity test of endogenous regressors	8.996
H_0: Variable can be considered as exogenous	$\chi^2(1)$: $p = 0.003$
Weak identification test (Kleibergen–Paap rk Wald F statistic)	41.288
H_0: Weakly identified system; Stock–Yogo critical value for 5% maximal IV relative bias	16.85
Weak instrument-robust inference (Anderson–Rubin Wald test)	13.37
H_0: endog. regr. = 0 and overident. restr. are valid	$\chi^2(4)$: $p = 0.010$

[a] Tests performed in the linear probability instrumental variable model, where more tests are available than in the dichotomous models for instrumental variables.

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