Health Insurance Eligibility and Child Health in Peru: An Analysis of the "Seguro Materno-Infantil" Program.

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Abstract

In this paper I estimate the impact of Peru's Seguro Materno-Infantil on mothers' and children's health care utilization and subsequent health outcomes, using a Difference-in-Differences (DiD) design. I exploit the program's eligibility rule, based on region of residence of the beneficiary and age of the child or prenatal or puerperium stage of the mother. I estimate the effect of the intention to treat using data from the Demographic and Health Surveys (DHS). Results show that the effects of the program on health system utilization are generally positive, although no significant effects are found on the rates of immunization for children enrolled. Moreover, I find that the Seguro Materno-Infantil had positive and significant effects on child health, measured by anthropometric variables like weight-for-height, and weight-for-age.

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I. Introduction

It has been argued that during the last 150 years, health has improved more on the grounds of advances in the standard of living and public health measures than because of improvements in personal health care (Preston, 1977). Moreover, a fundamental part of the welfare state is universal eligibility for health care. Currie (2009) suggests that child health inequalities may be partially explained by disparities in the access to health care services. And the use of health care for children is of particular interest, given its relation with adult health and mortality (Barker and Osmond, 1986; Forsdahl 1977; Wadsworth, 1986). Moreover, if poor health early in life hinders the accumulation of human capital, health may play a key role in the intergenerational transmission of socioeconomic inequalities (Currie, 2009; Almond and Currie, 2010)

The literature has documented the existence of a link between child health insurance and their access and use of the health network (Currie and Gruber, 1996). For example, Newacheck et al. (1998) show that insured children have a more regular entry into the health care system, identification with a regular clinician, satisfaction with care, less delayed or missing care, and more physician's services received. At the same time, there are several papers documenting the disadvantages that uninsured children suffer: lower utilization levels, less efficient distribution of utilization across sites of care, and worse health outcomes (Kasper 1986; Short and Lefkowitz, 1992; Mullahy, 1994).

There is also evidence of a link between child health insurance and their health status. Researchers have analyzed the case of the expansion of the Medicaid insurance to find that it not only raised the beneficiaries' medical care, but also significantly reduced child mortality (Currie and Gruber, 1994). Another study by Hanratty (1992) has similar findings for Canada: he shows that the introduction of health insurance in that country was associated with a decrease in infant mortality rate. Although not many studies have been conducted for developing countries, it may make sense from a policy point of view to design interventions aiming at covering as much of the population with some kind of health insurance.

However, the mere fact of being eligible for some health insurance does not guarantee better health outcomes, for a number of reasons. First, not all those eligible for insurance will take up the public assistance benefit (Blank and Card, 1991; Blank and Ruggles, 1993). This may be related to the fact that the typical target population of these programs has less access to information about the programs they may use. Second, the health care delivered by these programs may be of uneven quality among different groups (Pui et al., 1995). Moreover, physicians may choose not to treat publicly insured patients, as in some countries these programs typically refund at rates far below private levels. At the same time, generally, the target population is concentrated in areas with low density of physicians, resulting again in inefficient service provision (Fossett and Peterson, 1989; Fossett et al., 1992; Long, Settle, and Stuart, 1986). And finally, an increase in the use of the health system not necessarily improves the health outcomes of kids. The type of care received may not be adequate: for example, some hospitalizations may not be necessary (Kemper, 1998).

Unfortunately, most of the studies in this area have focused on developed countries. The Latin-American case presents some further complications in terms of the health status of its population. The latest MDG progress report documents the stark disparities in under-five mortality rate among urban and rural regions, and among income levels. The ratio of rural to urban under-five mortality rate for the region (2000/2008) stands at 1.7, well above the

ratios for the rest of the developing regions. Also, the mortality risk for the poorest households is nearly three times as high as children in the richest 20 per cent of households; measured by the ratio of under-five mortality rate for children from the poorest quintile households to that of children from the richest quintile households, 2000/2008 (MDG Report 2011). Moreover, there are several cultural factors at play in this region that complicate the relationship between the traditional (public) health services and its use by the (indigenous) population.

In Peru, the last two decades have been marked by both an economic recovery in general but also by a steady or even increasing poverty level in the rural areas, which led to an increasing inequality. This was reflected in a lower access to health services and a higher effect of transmissible diseases of the poorest quintile of the population (generally located in the rural areas of the country) (IDB, 2007).

This paper describes and assesses the impact of a specific infant-maternal health insurance program, Peru's Seguro Materno-Infantil (SMI) from 1998. This coverage extension program was aimed at eliminating the economic barrier of access to health services by mothers and children. It was targeted to the departments with highest maternal mortality rates and progressively expanded. As of 2000, the average percentage of enrolled individuals of the target population was of 32.8%. The coverage rate was very unequal among the targeted regions, ranging from more than 75% in Tacna to around 8% in Puno (Jaramillo and Parodi, 2004). These differences may be due to the timing in implementation across regions (Tacna and San Martin were in the program since 1998, and other regions were included later on).

In this paper, I address two questions. First, I study whether those insured actually increased their use of the health services offered. Perhaps people that enrolled in the program never made use of the package, preventing the achievement of its ultimate goal: to improve the health status of the population through the expansion of access to some basic health services. Second, I analyze if the program had any impact on any infant-maternal health outcomes. That is to say, if the project's outputs or deliverables achieve the desired initial targets. As discussed before, maybe the target population enrolled and used the health services provided, but they were not effective or efficient or of the necessary quality. This could point to faults in the supply side of the intervention.

I exploit the particular characteristics of SMI's eligibility rules to identify the causal effects of the program on mother's and children's outcomes. A mother is eligible if she lives in the targeted regions and is in the pregnancy or puerperium stage; and a child is eligible if he/she lives in the targeted regions and is younger than 4 years old. The health status of children who were young enough to be eligible should be higher than that of older children in all regions and than that of children of the same age in non-treated regions. This rule allows me to implement a Difference-in-Differences (DiD) design, which produces an estimator that controls for (additive) systematic variation of health status both across regions and age groups of children.

I use data from the Demographic and Health Survey (DHS), which provides information on health system use, health outcomes, and wealth of mothers and their children up to 5 years old.

The results indicate that the SMI improves mother's use of the health system in two ways. First, it increases maternal access to preventive health care, both when they are pregnant and for their children when they are young. Second, it promotes the practice of breastfeeding. Moreover, results show that children affiliated to the SMI receive

micronutrient support and are more likely to be treated when they suffer infectious diseases. Furthermore, I find that affiliation to SMI has a positive impact on child health as indicated by their nutritional status. However, the results are not conclusive for immunization measures.

In the last few years, there have been a number of evaluations of this program, mainly as a component of the broader Seguro Integral de Salud. Jaramillo and Parodi (2004) focus on the targeting and maternal use of health services (measured by prenatal checkups). They find that the coverage of SMI may be progressive or regressive according to the type of socioeconomic status measure used. On the other hand, they propose that being enrolled in the SMI has a positive impact on attending the first prenatal checkup. Also, Bitran, Muñoz and Parodi (2011) find that being insured with the SMI is positively associated with some measures of use of the health system like being fully immunized, receiving pap smear exams, growth monitoring visits, being formally treated for diarrhea and respiratory infections. Their analysis is restricted to the lowest wealth quintiles, but previous studies have shown that the targeting of this program may have benefitted people in better positions. In principle, this study doesn't limit the sample to the poorest population.

This paper contributes to the literature at least in two ways. First, I estimate the impact of the SMI with a methodology that is focused on the effect of the *intention to treat* of the program, which is the relevant issue for policy makers, rather than the effect on the treated. Second, I assess the impact of SMI not only on the access and use of the health system, but also on health outcomes for children, who are pinpointed as the main beneficiaries of the program (along with mothers).

The rest of the paper is structured as follows: Section 2 describes the SMI program in more detail; Section 3 presents the empirical strategy; Section 4 describes the data; Section 5 presents the results; and Section 6 concludes.

II. Program Description

The Seguro Materno-Infantil (SMI) program was introduced in Peru in 1998 as a health insurance program targeted to mothers and children. In this country, before the introduction of these insurance schemes, the cost of medical attention was a deterrent for the poor. People with few resources depended on exonerations by hospitals and pharmacies to finance most of their health expenditures (Cotlear 2000). The assignment to the exonerations was unclear and resulted in an unequal provision of health care and services, because most of the beneficiaries of the exceptions were not poor. The main objective of the reforms was to guarantee basic health services to everyone via medium-term reforms, thus reducing gaps in attention to the poor and rural population.

The focus was on the reduction of the maternal and peri-natal mortality through the supply of a package of interventions well studied by the literature: professional attention during delivery by competent health personnel; oxitocin supply during delivery to prevent hemorrhage; Caesarean section according to protocols when necessary; availability of supply networks capable of providing timely obstetric and neonatal functions via referral systems for the high-risk cases; and insure the affiliation to the insurance of vulnerable women and children from the bottom two wealth quintiles.

The program also supported community education campaigns aimed at increasing the use of available services and promoting preventive practices, such as the adequate handling of

water and food, breastfeeding, etc. Another important part of the program was the financing of the coordination of networks to ensure the provision of drugs and other supplies (such as immunizations).

The program was available to women in the stages of pregnancy or puerperium and to children of up to 4 years old. Only specific regions were chosen to be targeted, based on their maternal mortality rates. Even though the program was called an "insurance", it did not have the elements that define such a scheme, such as a precisely calculated prime or an explicit contract.

The SMI took the form of a reimbursement mechanism that paid to selected providers for the attention of mothers and children younger than 3 years old. The program was basically a subsidy to the demand: it eliminated or decreased tariffs charged to users for access to the aforementioned package of interventions. The health services' providers requested a reimbursement for each encounter. The program resulted in a reorganization of the financing of the services, of the management of providers, and of the medical attention itself, with the implementation of service protocols.

III. Empirical Methodology

I would like to estimate the causal effect of the SMI on infant-maternal health care access and use, and health outcomes.

$$H_{ij} = c + \theta SMI_{ij} + \varepsilon_{ij} \quad (1)$$

where H_{ijk} is the health access or outcome measure of an individual i, born in region j; c is a constant, and SMI_{ij} is an indicator of individual i, born in region j being enrolled in the program. However, a simple OLS regression of equation (1) would give us biased estimators, since enrollment to SMI is an endogenous variable: it may be related to some of the user's characteristics, such as income, access to information; or even other unobservable variables that are correlated with the outcomes.

In effect, an analysis of the profile of SMI's effective beneficiaries (Table 1) shows that SMI beneficiaries have some particular characteristics: they are mainly less educated, have less access to piped water, and have worse sanitation facilities than those who did not take the insurance. Mothers that enroll in the SMI are typically younger, live in households with a higher proportion of children under 5 years old, start having children when they are younger, have less access to television, watch TV and read the newspapers with less frequency. Notably, beneficiaries of this program are less wealthy and reside more in rural areas. It seems that the program served primarily mothers and children of poorer backgrounds, more isolated geographically (because of the regions targeted) and technological/informationally.

Table 1. Beneficiaries' profile

Variable	Control	Treated	difference	
No education	0.017443	0.039193	0.02175	
	(0.1609)	(0.1805)	(0.0133)	
Primary education	0.187625	0.376668	0.189043	
	(0.4177)	(0.4750)	(0.0314)	***
Secondary education	0.510489	0.430442	-0.08005	
	(0.4992)	(0.4983)	(0.0320)	**
total children ever born	2.361817	2.609704	0.247887	
	(1.8802)	(2.1314)	(0.1572)	
Access to piped water	0.788415	0.639105	-0.14931	
	(0.4347)	(0.4700)	(0.0312)	***
Optimal sanitation	0.626042	0.35505	-0.27099	
	(0.4995)	(0.4913)	(0.0303)	***
Intermediate sanitation	0.216294	0.352822	0.136528	
	(0.4473)	(0.4647)	(0.0312)	***
No sanitation facility	0.12512	0.250393	0.125273	
	(0.3700)	(0.4282)	(0.0281)	***
Employed mother	0.615263	0.629214	0.01395	
	(0.4855)	(0.4826)	(0.0317)	
Mother's current age	29.37513	26.86446	-2.51067	
	(6.8829)	(7.0007)	(0.4635)	***
female	0.485346	0.482008	-0.00334	
	(0.4997)	(0.5007)	(0.0324)	
Female household head	0.16434	0.130016	-0.03432	
	(0.3648)	(0.3694)	(0.0192)	*
Number of household members	5.917199	5.664526	-0.25267	
	(2.4874)	(2.1435)	(0.1330)	*
Proportion of children in hous	0.244856	0.271734	0.026877	
	(0.1177)	(0.1265)	(0.0078)	***
wealth index from factor score	0.635213	-0.13209	-0.76731	
	(0.9074)	(0.9456)	(0.0554)	***
Rural residence	0.15785	0.545551	0.387701	
	(0.4281)	(0.4977)	(0.0308)	***
age of respondent at 1st birth	21.82222	20.18808	-1.63414	
	(4.5731)	(3.9409)	(0.2718)	***
Has radio	0.88753	0.859736	-0.02779	
	(0.3328)	(0.3385)	(0.0225)	
Has television	0.869006	0.583301	-0.28571	
	(0.3934)	(0.4806)	(0.0324)	***
Frequency of listening to radi	2.220047	2.26818	0.048133	
	(1.0285)	(1.0062)	(0.0641)	
Frequency of watching televisi	2.432193	1.79178	-0.64041	
	(1.0616)	(1.1640)	(0.0760)	***
Frequency of reading newspaper	1.387895	0.949849	-0.43805	
	(0.8650)	(0.8765)	(0.0510)	***

The effect I am interested in, from a public policy perspective, is not the effect of the program on the treated, but the effect of the *intention to treat*, since enrollment to the program is not mandatory. To identify this, I take advantage of the rule of assignment to the program to implement a Difference-in-Differences design. The resulting estimator controls for (additive) systematic variation of health system use both across regions and across cohorts. Only the combination of the two variations is treated as exogenous.

The identification strategy in this paper uses the fact that exposure to the SMI varied by region of birth and date of birth. Substantial variations existed in program intensity across regions, due to the government's efforts to allocate the SMI to regions where infant and maternal mortality was higher. The program was available to women in the stages of pregnancy or puerperium and to children of up to 4 years old; only in specific regions of high maternal mortality rates. From an original sample of roughly 13,500 observations in 24 regions, 12 of them were marked as "treated", keeping a sample of around 7,100 observations.

I would like to estimate the following equation:

$$H_{ijk} = c + \alpha_j + \beta_k + (P_j * A_i)\theta + \varepsilon_{ij} \quad (2)$$

where H_{ijk} is the health access or outcome measure of an individual i, born in region j, in cohort k; c is a constant, α_j is a treated region fixed effect, β_k is a treated cohort of birth fixed effect, P_j is an indicator of treated region, A_i is an indicator of child's age less than 4 years old.

The parameter of interest would be $\hat{\theta}$, the estimation of the difference in outcomes of individuals with no exposure to the program (aged 4 or more in 2000) to those of individuals exposed (aged 3 or less), in both treated and non-treated regions. The difference in these differences can be interpreted as the causal effect of the program, under the assumption that, in the absence of the program, the improvement in health outcomes would not have been systematically different in treated and non-treated regions.

To test this assumption, I replicate the same calculations for the immediately previous survey, from 1996. Results are presented later on in Section 5. In sum, they show that before the SMI was introduced, the differences across regions (later divided in treated and non-treated by the SMI) between children younger and older than the threshold defined for treatment are not significant and very close to zero.

IV. Data

The data used to evaluate this program comes from the 2000 Peru Demographic and Health Surveys (DHS) with information on health system use, health outcomes, and wealth. The DHS is meant to be representative of all women of reproductive age, which is usually defined as women aged 15 to 49. Each woman, who already had children, is also requested to answer a questionnaire regarding their sons and daughters under the age of 5.

Unfortunately, the large majority of the Demographic and Health Surveys do not provide information on household income. Therefore, I use the wealth index provided in each survey as a proxy of income. Filmer and Prichett (2001) suggest that a wealth index can be used to assess welfare, as households ranked according to their expenditure level closely resemble the ranking according to asset indexes. For further discussion on this see Filmer and Scott (2008) and Alderman (2010). The wealth index provided by the DHS is based on

questions regarding household assets (such as such as televisions and bicycles, materials used for housing construction, and types of water access and sanitation facilities).

To avoid including in the estimation special cases, I drop observations (57) that report to be enrolled in the program even though they are not supposed to (either living outside the treated areas or being older than 4 years old). The issue of targeting of the program has been documented extensively in the literature (see for example, Jaramillo and Parodi, 2004).

I assign the SMI eligibility status of the child according to his/her age and region of residence. We know that the program was offered to children that complied with two criteria: being younger than 4, and living in vulnerable regions (defined by maternal mortality rates). Table 2 lists the treated regions.

Table 2. SMI Implementation Schedule by Region

1998	1999	2000
Tacna	San Martin**	Amazonas
San Martin*	Ayacucho	Cusco
	Huancavelica	Huanuco
	Puno	Junin
	Cajamarca	Lambayeque
	Apurimac	

*Moyobamba province
**Other provinces

Source: Health Ministry, 1999

The interest is on the effect of this program on variables that measure the *use* of the health system and the *health status* of infants and mothers covered. As measures of the use of the health system I use the number of prenatal examinations, weight at birth, growing controls, vaccination as part of a campaign in the past, having received the complete schedule of vaccination, individual immunization coverage (BCG, DPT, polio, and measles), breastfeeding practices, and provision of vitamin A supplement in two months after delivery.

To measure the health status of covered infants, I consider anthropometric measures that describe their nutritional status, which is highly correlated with health: weight-for-height, weight-for-age, and height-for-age. Each one of these measures describes a different stage of the health accumulation process. Height-for-age gives a sense of accumulated nutritional condition of a child, reflecting all health shocks experienced as well as the mother's condition during pregnancy. On the other extreme, weight-for-height is a very sensitive measure of current intake of calories, and is consequently a very short run assessment of the child's health status. I also include variables that measure the incidence of infectious diseases, like anemia, and variables that describe the use of the health system after an episode of another one of these diseases, diarrhea.

V. Results

Table 3 reports the effect of SMI on health use and health outcomes, equation (2). The intention to treat estimates show that making a child eligible for the SMI improves his/her access to health services. The program seems to be effective in implementing some preventive health practices, like regular growing controls for children and antenatal visits for pregnant mothers. The treated regions are somewhat isolated geographically and therefore it is much more convenient to invest in preventive than remedial health.

However, the SMI also provides treatment services to those that still get sick: the results in Table 3 show that someone eligible for enrollment to the program has higher chances of being treated for diarrhea. The results for anemia treatment are not conclusive. One possible explanation for this difference is that mothers may notice an episode of diarrhea more easily than one of anemia, and therefore they are more likely to seek for help and treat their children in the presence of the former disease.

Results suggest that the SMI provides beneficiaries with nutritional supplements like Vitamin A in a timely manner. Also, the program's component directed to improve healthy behaviors among their users seems to be successful in increasing the breastfeeding practices of nursing mothers.

Perhaps more importantly, the results also point to an improvement in child health outcome measures. The program seems to have a positive effect on the accumulation of better health by kids, reflected in anthropometric measures like weight and height for age, and weight for height. Some lessons can be learned about the program's impact from these indicators.

Even though the coefficients are relatively similar between the different anthropometric measures, the results seem to point to a more significant impact of the SMI on those relevant for the shorter-term. That is, the coefficient for weight for height, which is closely related to the child's current caloric intake, is positive and significant. On the other hand, although the coefficient for height for age, an indicator of the accumulated health of the child during his/her life, is positive, it is not significant.

The natural explanation for the fact that the program has a more significant impact on short-term measures of children health, is that at the time the survey was collected (2000), the program (started in 1998) hadn't been in place long enough to have an impact on long-term indicators of health, such as height.

Results in Table 3 show that the SMI does not seem to have a positive effect on immunization rates or birth weight. The project's completion report mentions that only in 2002 was the immunization coverage rate added as an indicator of impact. This may mean that the original intervention didn't make such a big emphasis on vaccination. Therefore, this study, that covers only up to the year 2000, would not show this renewed interest in the vaccination progress. Also, some previous studies of this program have found that the program had a positive impact on vaccination for the lowest wealth quintile, but that this effect was much bigger and significant in 2004 (Bitran, Muñoz, and Prieto, 2011).

Table 3. Results

Outcome	Reg*Age	Obs	R2
Number of prenatal examinations	1.510***	4,083	0.208
	(0.360)		
Birth weight	66.38	4,192	0.033
	(67.34)		
Any growing control bet jan-jun/00	0.189***	4,491	0.117
	(0.0495)		
Currently breastfeeding	0.240***	4,582	0.178
	(0.0366)		
ht/a standard deviations (according to who)	231.5	4,067	0.014
	(141.5)		
wt/a standard deviations (according to who)	239.5*	4,067	0.014
	(139.9)		
wt/ht standard deviations (according to who)	229.3*	4,067	0.012
	(138.9)		
Vitamin A in 2 months after delivery	0.117***	4,102	0.021
	(0.0363)		
Received any diarrhea treatment	0.289**	650	0.082
	(0.114)		
Given no diarrhea treatment	-0.282**	652	0.089
	(0.138)		
Mother's anemia level	-0.0583	1,035	0.037
	(0.156)		
Child's anemia level	-0.168	893	0.083
	(0.194)		
Any vacc in last 2 yrs from campaign	0.0182	2,855	0.033
	(0.0594)		
all_vacc	0.0102	3,200	0.033
	(0.0660)		
no_vacc	-0.00591	3,200	0.019
	(0.0273)		
has_bcg	-0.000436	3,135	0.031
	(0.0307)		
has_dpt	0.0530	3,200	0.042
	(0.0490)		
has_polio	0.0250	3,200	0.032
	(0.0627)		
has_measles	0.00313	3,133	0.023
	(0.0463)		

Notes: all regressions are linear probability models of the listed dependent variables on the interaction between dummies for treated region and age group. They include as controls dummies for treated age, treated region,mother's age and its square, mother's education, gender of household head, wealth quintiles, rural area, access to water, sanitation facilities, household size, proportion of children under 5 in the household, interactions of mother's education and age and mother's education and child's gender, and access and frequency of use to TV, radio, and newspapers. Number in parentheses correspond to robust standard errors.

To check the assumption that in the absence of the program, the improvement in health outcomes would not have been systematically different in treated and non-treated regions, I estimate equation (2) but using the previous DHS survey, from 1996. The results are in Table 4.

Unfortunately, the 1996 survey does not include information on all the outcomes of interest: the number of growing controls and the timely provision of Vitamin A are absent in this database. For the outcomes that are registered, almost all (except for polio vaccination) coefficients are very close to zero and in most cases, non-significant. This means that before the introduction of the PSM, there were no systematic differences between regions for kids younger and older than 4 years old.

Table 4. Robustness check

Outcome	Reg*Age	Obs	R2
Number of prenatal examinations	0.0178	15,373	0.339
	(0.167)		
Birth weight	-4.500	10,081	0.019
	(43.98)		
Currently breastfeeding	-0.0181	15,472	0.152
	(0.0214)		
ht/a standard deviations (according to who)	-10.89	13,497	0.009
	(78.44)		
wt/a standard deviations (according to who)	-21.95	13,497	0.008
	(77.53)		
wt/ht standard deviations (according to who)	-29.07	13,497	0.009
	(76.65)		
Received any diarrhea treatment	-0.0292	2,879	0.035
	(0.0500)		
Given no diarrhea treatment	-0.0459	2,884	0.015
	(0.0939)		
all_vacc	-0.0510*	10,879	0.028
	(0.0263)		
no_vacc	0.00649	10,879	0.015
	(0.00643)		
has_bcg	-0.0186*	10,098	0.032
	(0.0105)		
has_dpt	-0.0185	10,879	0.060
	(0.0220)		
has_polio	-0.0546**	10,879	0.027
	(0.0253)		
has_measles	-0.00811	10,087	0.025
	(0.0129)		

Notes: all regressions are linear probability models of the listed dependent variables on the interaction between dummies for treated region and age group. They include as controls dummies for treated age, treated region,mother's age and its square, mother's education, gender of household head, wealth quintiles, rural area, access to water, sanitation facilities, household size, proportion of children under 5 in the household, interactions of mother's education and age and mother's education and child's gender, and access and frequency of use to TV, radio, and newspapers. Number in parentheses correspond to robust standard errors.

VI. Conclusions

In this paper I analyze the effects of a health insurance scheme introduced in 1998, the SMI, on Peruvian mothers' and child health care utilization and health outcomes. I estimate the effects of *eligibility* to the program and, contrasting the results to a previous survey, I attribute these effects to the SMI.

The results indicate that the SMI has positive and significant effects in the use of the health system, measured by the number of growing controls and micronutrient provision, like Vitamin A. This marks the (partial) achievement of an explicit target of the government: to increase the productivity of the health system by subsidizing the demand. As reported by Cotlear (2000), before the introduction of these insurance schemes, 70% of the health posts outside Lima had 3 or less daily consultations per health professional, compared to around 40 in Lima. The program was successful in diminishing the socioeconomic barriers of access to health care of the very poor in Peru.

Also, my findings indicate that the program is associated with better health behaviors, such as breastfeeding. The promotion of healthy practices is an important part of the development of an effective strategy of preventive care. A society that is well educated on preventive practices will save many resources otherwise destined to remedial health care.

Finally, results highlight that SMI-insured children are healthier, which shows that the SMI program accomplished its ultimate goal of improving the health status of the most vulnerable population. After the great collapse in health services in the early 90s caused by hyperinflation and terrorism, the government increased largely the amount of budgetary resources dedicated to the health sector, which were used to build capacity and staff health centers. The introduction of the health insurance systems described in this paper was motivated by the low utilization of the installed capacity in the health sector. This paper shows that the government's measures of demand strengthening were appropriate to increase the use of the health services by poor people and those living in rural areas, and to ultimately improve their health outcomes.

Future research may want to look into the specific relationship between insurance and vaccination in Peru with more detail. Furthermore, it would be useful to make a follow-up study with the 2004 DHS survey to assess whether the program had a lasting impact on child health status and was sustainable in time.

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