

# The Effects of Access to Health Insurance for Informally Employed Individuals in Peru

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# Health Insurance in Developing Countries

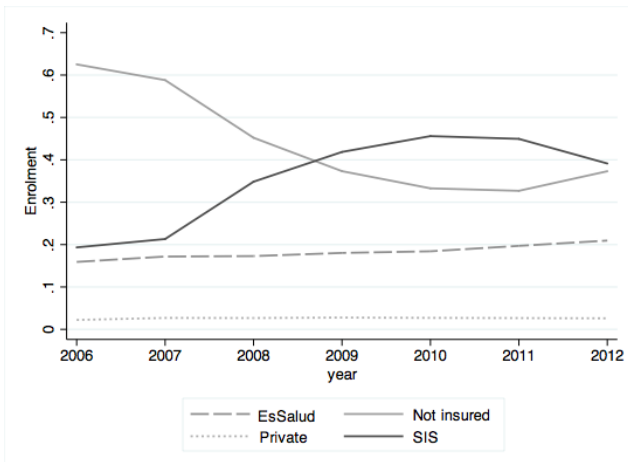
- Many individuals not covered by health insurance:
  - informal forms of risk sharing; not used to it
  - not seen as role of government.
- Does not reach poor even if there is health insurance. Reason: only for formal employees.
- Cause of concern because of insurance motive. Insurance also encourages individuals to see doctor.
- Many low and middle income countries have therefore introduced health insurance. But very recent, and not clear how to design it best.
- Key questions:
  - how can individuals be encouraged to seek medical attention from health care professional?
  - how can they be encouraged to invest in preventive care?

# Challenges

- Lack detailed data on health care utilization and health outcomes.
- Not easy to control for selection into insurance.
- This paper: Use rich survey data from National Household Survey of Peru for the year 2011 to evaluate the impact of access to the Peruvian Social Health Insurance called “Seguro Integral de Salud” (SIS) for individuals outside the formal labor market on a variety of measures for health care utilization and health indicators.
- Control for selection into insurance by exploiting a regression discontinuity design.

# Health Insurance in Peru

- Created in 2001, subsequently reformed. Successful. By now one of the highest enrollment rates among the SHI programs in low and middle income countries.
- SIS resembles European health care programs. Extensive coverage but no incentives to invest in preventive care. 65 percent of the total disease burden in the country
- Coverage for free.
- Aggregate data suggest that some health outcomes improved since the program has been implemented—between 2000 and 2010 total maternal and child mortality rates decreased from 185 to 93 per 100,000 mothers and 33 to 17 per 1,000 thousand children born alive.



Notes: Own calculations based on ENAHO survey for the years 2006-2012. See Section 4 for details on the data set and in particular our estimation sample for the year 2011. Here, we use the entire sample.

# Regression Discontinuity Design

- Reform 2009.
- Since end of 2010 household is eligible if household targeting index below a specific threshold.
- Other criteria: water and electricity consumption.
- Use data from 2011 and re-compute the index.
- Focus on Lima province because first area where targeting index was used. One third of population lives in Lima province and half of GDP generated there.

# Literature

- Many programs that did not achieve their goals. See Table 1.  
Reasons:
  - high premia and low quality led to low take-up, especially after subsidy expired (Nicaragua)
  - demand only shifts to providers that are part of the system, but no effects on utilization; however, reduction in health expenditure risk (Mexico)
  - administrative problems and individuals did not know they were covered (Georgia).
- Noteworthy exception: Colombia. Important differences in supply-side incentives. Providers receive capitation fee. Effect on preventive care.

# Conceptual Framework

- Grossman type world with health stock and health investment.
- Moral hazard and adverse selection.
- Health shocks.
- No prescription drugs. Individuals can simply buy any drug in pharmacy.
- May go to doctor/hospital. May lead to form of desirable supplier-induced demand. Revealed preference argument.
- Unclear how to interpret health report.



# Data

- Living Standards Measurement Survey (“Encuesta Nacional de Hogares”, ENAHO) for 2011.
- Information on demographics, health outcomes, enrollment to public insurance and the variables needed for construction of the IFH index.
- Individuals in Lima province.
- Only households with individuals working outside the formal labor market. 60 percent of sample.
- 4,161 individuals.
- Public insurance coverage is defined as being participant in SIS or EsSalud. Done at individual level.

Variable	Dummy	(1) Total		(2) Participants		(3) Non-participants		(4) Eligibles		(5) Ineligibles	
		N = 4,161		N = 1,581		N = 2,580		N = 1,648		N = 2,375	
		Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
Participation											
Health Insurance	D	0.380	-	1.000	-	0.000	-	0.400	-	0.365	-
Demographics											
Woman	D	0.511	-	0.533	-	0.498	-	0.507	-	0.514	-
Age		33.014	22.250	34.366	24.737	32.185	20.540	28.292	20.695	36.564	22.718
Years of education		8.126	4.854	7.758	5.068	8.351	4.705	6.633	4.485	9.248	4.819
Members per household		4.607	2.101	4.491	1.992	4.678	2.163	4.661	1.917	4.566	2.229
Woman head of household	D	0.251	-	0.256	-	0.248	-	0.254	-	0.250	-
Annual household income (thousand Soles) 1/.		30.62	27.07	31.94	28.69	29.74	25.93	20.33	14.40	38.19	31.39
Utilization											
Any doctor visits	D	0.319	-	0.372	-	0.287	-	0.339	-	0.305	-
Medicines	D	0.456	-	0.507	-	0.426	-	0.465	-	0.450	-
Analysis	D	0.063	-	0.091	-	0.047	-	0.059	-	0.067	-
X-rays	D	0.037	-	0.054	-	0.028	-	0.033	-	0.041	-
Other tests	D	0.013	-	0.019	-	0.009	-	0.010	-	0.016	-
Dental care	D	0.118	-	0.125	-	0.113	-	0.096	-	0.134	-
Ophthalmological care	D	0.054	-	0.054	-	0.053	-	0.025	-	0.075	-
Glasses	D	0.041	-	0.040	-	0.041	-	0.019	-	0.058	-
Vaccines	D	0.109	-	0.133	-	0.094	-	0.138	-	0.087	-
Kids check 2/.	D	0.263	-	0.270	-	0.258	-	0.253	-	0.276	-
Birth control	D	0.060	-	0.063	-	0.058	-	0.065	-	0.056	-
Other treatments	D	0.234	-	0.255	-	0.222	-	0.201	-	0.259	-
Hospital	D	0.060	-	0.088	-	0.042	-	0.057	-	0.062	-
Intervention/Surgery	D	0.041	-	0.055	-	0.032	-	0.039	-	0.042	-
Pregnancy care 3/.	D	0.074	-	0.129	-	0.044	-	0.102	-	0.052	-
Child birth 3/.	D	0.033	-	0.067	-	0.014	-	0.045	-	0.023	-
Other medical attention	D	0.199	-	0.258	-	0.162	-	0.195	-	0.201	-

Notes: Data from the ENAHO 2011. See Table 12 for variable definitions. 1/. Question applied at household level: total  $N = 1,129$ ,  $N = 449$  participants,  $N = 680$  non-participants,  $N = 479$  eligible,  $N = 650$  ineligible. 2/. Question applied for kids under 10: total  $N = 649$ ,  $N = 289$  participants,  $N = 360$  non-participants,  $N = 363$  eligible,  $N = 286$  ineligible. 3/. Question applied for women in fertile age: total  $N = 1,182$  (total),  $N = 417$  participants,  $N = 765$  non-participants,  $N = 532$  eligible,  $N = 650$  ineligible.

Variable	Dummy	(1)		(2)		(3)		(4)		(5)	
		Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.	Mean	Std.
<b>Health report</b>											
Any symptom	D	0.396	-	0.394	-	0.397	-	0.444	-	0.356	-
Illness	D	0.144	-	0.156	-	0.136	-	0.147	-	0.141	-
Chronic illness	D	0.415	-	0.457	-	0.390	-	0.351	-	0.464	-
Relapse	D	0.097	-	0.123	-	0.080	-	0.086	-	0.104	-
Accident	D	0.023	-	0.025	-	0.022	-	0.026	-	0.020	-
num. days with symptom		0.134	1.122	0.159	1.299	0.118	0.998	0.162	1.263	0.112	1.003
num. days with illness		0.144	1.099	0.154	1.126	0.137	1.083	0.151	1.069	0.138	1.122
num. days with relapse		0.250	2.295	0.345	2.701	0.191	2.004	0.208	1.987	0.281	2.501
num. days with accident		0.069	1.123	0.124	1.567	0.035	0.727	0.079	1.111	0.061	1.133
<b>Health expenditures</b>											
Any health expenditures	D	0.571	-	0.547	-	0.586	-	0.548	-	0.588	-
Health expenditures		401.133	1154.340	0.547	1294.957	394.735	1059.202	248.033	710.470	516.265	1387.277
Var expenditures		539.212	1020.595	568.610	1163.354	521.197	922.040	429.187	586.629	621.951	1245.203
Abs expenditures		530.172	1007.187	559.612	1144.685	512.132	912.521	324.440	629.826	684.883	1193.124
Sqre expenditures		1295264	1.16e+07	1622640	1.52e+07	1094651	8778272	501719	5000706	1892010	1.47e+07
Expenditures 50	D	0.495	-	0.488	-	0.499	-	0.448	-	0.530	-
Expenditures 75	D	0.250	-	0.250	-	0.249	-	0.196	-	0.290	-
Share expenditures		0.057	0.187	0.057	0.191	0.057	0.184	0.056	0.187	0.058	.187
Var share		0.076	0.170	0.077	0.174	0.075	0.168	0.076	0.171	0.076	.170
Abs share		0.076	0.170	0.077	0.174	0.075	0.168	0.073	0.172	0.078	.170
Sqre share		0.035	0.478	0.036	0.488	0.034	0.472	0.035	0.483	0.035	.475
Share 50	D	0.500	-	0.500	-	0.500	-	0.485	-	0.511	-
Share 75	D	0.250	-	0.250	-	0.250	-	0.246	-	0.253	-
Catastrophic 5%	D	0.231	-	0.223	-	0.235	-	0.227	-	0.233	-
Catastrophic 10%	D	0.136	-	0.131	-	0.140	-	0.135	-	0.137	-
Catastrophic 15%	D	0.096	-	0.094	-	0.098	-	0.092	-	0.100	-
Catastrophic 20%	D	0.069	-	0.067	-	0.071	-	0.065	-	0.072	-
Catastrophic 25%	D	0.051	-	0.051	-	0.051	-	0.046	-	0.055	-

Notes: Data from the ENAHO 2011. See Table 13 and Section 6.3.2 for variable definitions.

# Econometric Approach

- 2SLS.
- First-stage: probability of having health insurance

$$d_i = \beta_0^d + \beta_1^d z_i^c + \beta_2^d \text{elig}_i + \beta_3^d z_i^c \text{elig}_i + \varepsilon_i^d,$$

where  $z_i^c$  is the IFH index centered at its threshold and  $\text{elig}_i$  is an indicator for eligibility.

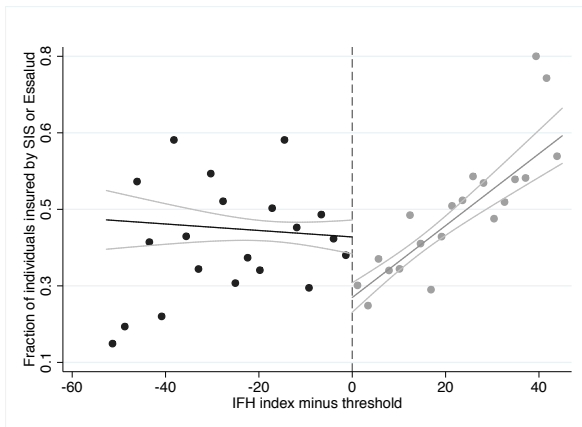
- The second-stage equation for outcome variables  $y_i$  is, accordingly,

$$y_i = \beta_0^y + \beta_1^y z_i^c + \beta_2^y d_i + \beta_3^y z_i^c \text{elig}_i + \varepsilon_i^y.$$

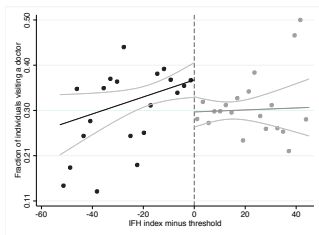
- Use  $\text{elig}_i$  as the instrument for  $d_i$  and control for the index  $z_i^c$  and its interaction  $z_i^c \text{elig}_i$  with eligibility.
- Estimate ratio  $\beta_2^y / \beta_2^d$ . Has interpretation of local average treatment effect.

# Assumptions

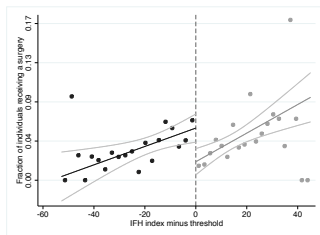
- Individuals close to insurance threshold comparable.
- Monotonicity.
- Value of index independent of outcomes.



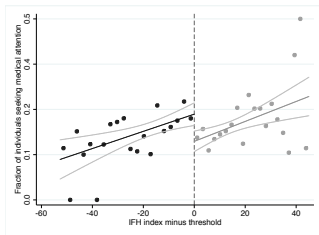
Notes: Based on ENAHO data for the year 2011, See Appendix C for details on how the IFH index is computed.



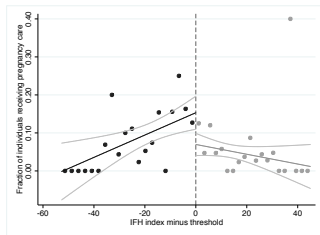
(a) Doctor visits



(b) Surgery



(c) Medical attention



(d) Pregnancy care

	Estimates	Ste.
Participation (first stage)		
0 Health Insurance	0.1403***	(0.0257)
		$F = 29.8023$
Utilization		
1 Any doctor visit	0.5149***	(0.1954)
2 Medicines	0.5271***	(0.2045)
3 Analysis	0.2056**	(0.0921)
4 X-rays	0.1297*	(0.0712)
5 Other tests	0.0508	(0.0413)
6 Dental care	0.0660	(0.1231)
7 Ophthalmological care	0.0356	(0.0841)
8 Glasses 1/.	-0.0305	(0.0693)
9 Vaccines	0.2884**	(0.1317)
10 Kids check 2/.	0.0678	(0.2610)
11 Birth control	-0.1443	(0.0934)
12 Other treatments	0.1763	(0.1616)
13 Hospital	0.1484	(0.0931)
14 Surgery	0.2567***	(0.0881)
15 Pregnancy care 3/.	0.6504**	(0.2931)
16 Child birth 3/.	0.1900	(0.1593)
1-16 Any of the above	0.4377**	(0.1860)

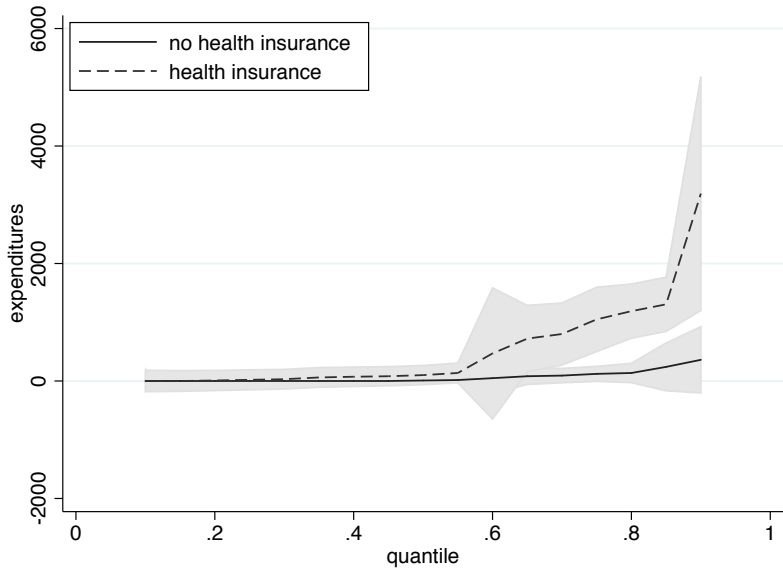
Notes: Except for kids check, pregnancy care and child birth  $N = 4, 161$ . 1/. Not covered by SIS. 2/. Question applied for kids under 10,  $N = 649$ . 3/. Question applied for women in fertile age,  $N = 1, 182$ . \*  $p < 0.10$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ .



		Estimates	Ste.
<b>A. Curative</b>			
0'	Medical attention	0.5635***	(0.1741)
1'	Doctor visits	0.5554***	(0.1729)
2'	Medicines	0.5135***	(0.1676)
3'	Analysis	0.1788**	(0.0863)
4'	X-rays	0.0926	(0.0667)
5'	Other tests	0.0382	(0.0319)
13	Hospital	0.1484	(0.0931)
14	Surgery	0.2567***	(0.0881)
16	Child birth	0.1900	(0.1593)
1'-5',13,14,16	Any of the above	0.7402***	(0.1981)
<b>B. Preventive</b>			
9	Vaccines	0.2884**	(0.1317)
10	Kids check	0.0678	(0.2610)
11	Birth control	-0.1443	(0.0934)
15	Pregnancy care	0.6504**	(0.2931)
6'	Planning 1/.	-0.0412	(0.2447)
7'	Iron 2/.	0.6127	(0.4954)
8'	Preventive campaign 3/.	0.0344	(0.0696)
6'-8', 9-11,15	Preventive use	0.2743*	(0.1626)

Notes: Total:  $N = 4,161$ , kids check:  $N = 649$ , pregnancy care:  $N = 1,182$ , planning:  $N = 1,181$ , iron:  $N = 343$ . Standard errors in parentheses. \*  $p < 0.10$  \*\*  $p < 0.05$  \*\*\*  $p < 0.01$ . 1/. Family planning for women at fertile age. 2/. Reception of iron supplements for pregnant women and children less than three years old. 3/. Information on prevention of sickness.

		Estimates	Ste.
1	Any health expenditures	0.2916	(0.1955)
2	Health expenditures	1018.8250**	(440.8071)
3	Var expenditures	809.5140**	(385.2883)
4	Abs expenditures	608.7793*	(369.3996)
5	Sqre expenditures	8.555e+06*	(4.77E+06)
6	Expenses 50	0.2862	(0.1958)
7	Expenses 75	0.2716	(0.1655)
8	Share expenditures	0.1107	(0.0799)
9	Var share	0.0702	(0.0730)
10	Abs share	0.0698	(0.0730)
11	Sqre share	0.1422	(0.2277)
12	Share 50	0.5308**	(0.2107)
13	Share 75	0.3474**	(0.1760)
14	Catastrophic 5%	0.4059**	(0.1777)
15	Catastrophic 10%	0.2907**	(0.1407)
16	Catastrophic 15%	0.1750	(0.1148)
17	Catastrophic 20%	0.1448	(0.0998)
18	Catastrophic 25%	0.0485	(0.0856)



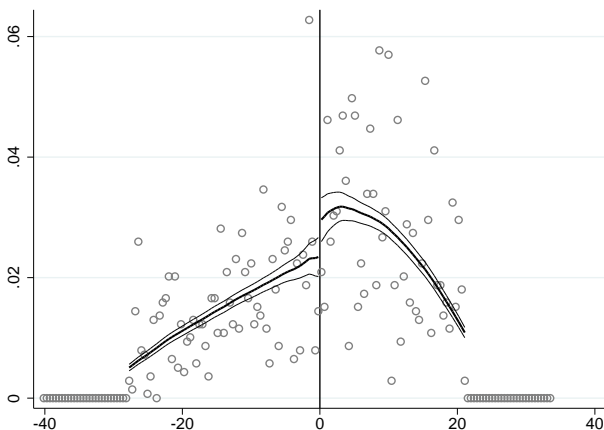
## Effects on Health

		Estimates	Ste.
1	Symptom	0.2655	(0.1942)
2	Illness	0.3158**	(0.1465)
3	Chronic illness	0.0754	(0.1736)
4	Relapse	0.0601	(0.1113)
5	Accident	0.0714	(0.0591)
6	Num. days with symptom	0.4004	(0.4898)
7	Num. days with illness	0.6078*	(0.3607)
8	Num. days with relapse	0.8262	(0.9162)
9	Num. days with accident	0.5295	(0.4494)

## Differences by Gender

- Conduct analysis by gender. Tables 17-19.
- Estimates less precise.
- Likely driven by women: medicines, surgery, pregnancy care.
- Likely driven by men: vaccines.
- Both: visiting a doctor.

## Sensitivity 1: Manipulation of the Index?



Notes: The figure show estimates of the density of the IFH index around the threshold and uses the sample in which we keep the 75 percent of the observations that are closest to the threshold in terms of the IFH index, separately to the right and to the left.

## Sensitivity 2: Discontinuities at other Points?

- Follow Imbens and Lemieux (2008).
- Divide sample in two parts, to the left and to the right of discontinuity.
- Then re-run analysis specifying discontinuity at median, respectively.
- Table 25 and 26. No significant effects.

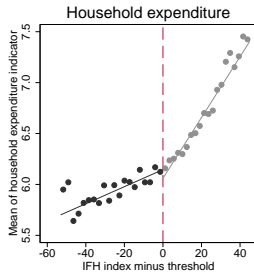
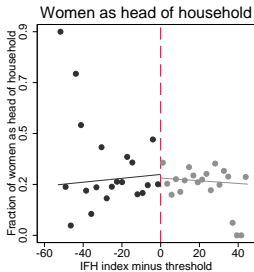
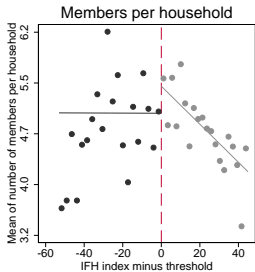
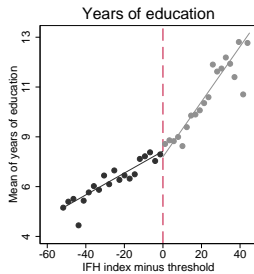
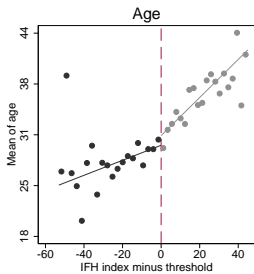
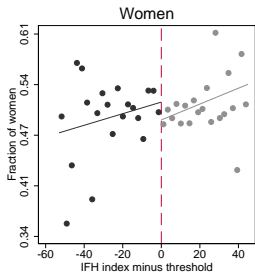
## Sensitivity 3: Linearity too strong?

- Drop observations, 25 and 50 percent furthest away to the left and to the right of the discontinuity, respectively.
- Re-run analysis.
- Table 22-24. Less precise estimates, but similar values.



## Sensitivity 4: Control for Covariates?

- Have controlled for gender, age, years of education, number household members.
- Table 8. Test for discontinuities in expectation of covariates. Not the case, except for number of household members. Negative effect.
- Re-run regressions without controlling for covariates.
- Table 22-24. Less precise estimates, but similar values.



## Sensitivity 5: Local Linear Regressions

- Analysis without covariates.
- Table 9.

## Sensitivity 6: Juntos and Food Aid Program

- Juntos is a conditional cash transfer program. Also uses IFH index for targeting. But program for rural areas. Confirmed by data: no individual participates in our sample.
- Food Aid Program. 29 percent of uncovered and 51 percent of covered individuals in our sample receive some food aid. But not currently under the SISFOH's targeting rules. Unlikely that discontinuity at SIS threshold.

## Sensitivity 7: Self-Employed and Microfirm Employees

- Other SIS plans.
- But SIS targeted to the poor reaches 99.75 percent of the entire SIS population.

# Conclusions

- Use rich survey data from Peru to study effect of “Seguro Integral de Salud” (SIS) program targeted to the poor working in the informal labor market.
- Find strong effects on health care utilization, more pronounced for curative services.
- Our interpretation: coverage encourages individuals to seek medical attention when facing health problems. Receive curative care.
- Also positive, but weaker effect on preventive care (pregnancy care, vaccines). In line with the stark decrease in maternal and child mortality.
- Positive on health care expenditures at the top end of the distribution. Idea: seeing a doctor makes individuals spend more on their health when it is needed.
- Overall, program notable exception in developing countries. Reaches its goal of increasing access to health care. No measurable effects on health yet.