The Impact of Health Insurance on Health Care Utilization: Case Study For Armenia

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Abstract: Government of the Republic of Armenia is planning to legalize mandatory health insurance in 2014. The aim of this study is reveal the impact that such a law may have on the number of hospital visits and indirectly on the health status of the Armenian population. To measure the magnitude and the direction of the impact of the law on health care utilization I use the dataset from the online survey that I have conducted. The questionnaire was distributed between February 16, 2012 and March 7, 2012. 875 responses were obtained through the surveying process. Health insurance is assumed to be an endogenous variable so to avoid measurement errors I have used two stage least square estimation method where at the first stage health insurance is measured with both probit and linear probability methods. Instrumental variables for health insurance are family income, an indicator of whether spouse of the individual is in labor force and the size of the household. In addition, results of the ordinary least square estimation are also reported as baseline estimates. This case study for the Armenian population has showed that holding health insurance policy increased the number of hospital visits by more than one time. In addition, health care utilization has a positive and significant effect on the health status of the individual. These results imply that if health insurance is implemented in a mandatory form in Republic Armenia overall population will increase its' consumption of health care and thus will indirectly positively affect health status of the population.

Keywords: health insurance, health care utilization, Armenian population, online survey, instrumental variables.

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Introduction

During our everyday life, we make various choices, which affect our health. Among such choices are decisions on whether to visit a doctor, start smoking, to get a university degree or on whether to participate in the labor force. As Grossman (2000) states to maintain a good health status a person needs to invest in his/her health. Health on its own is an endogenous outcome, which depends on both financial, such as consuming one more unit of medical care, and non-financial, such as initial stock of health, investments.

Armenia is one of the three countries located in the South Caucasus region. According to the National Statistical Service of Republic of Armenia its population was estimated to be 3262.6 thousand people. According to the same source, 64% of the population lives in the urban area, and 36% lives in the rural parts of the country. In 2007, the Health Care Minister of the Republic of Armenia announced that adopting a mandatory health care insurance system would be among the main programs in his plan. However, in 2011 the government of Armenia adopted a new mandatory car insurance policy, which overshadowed the legislation of a mandatory health insurance. Nevertheless, government has not abandoned health insurance legislation. This is confirmed by the fact that during the time this study was conducted the Ministry of Finance in cooperation with the Ministry of Health of the Republic Armenia announced a social program for government workers. As it was announced on the official website of the Ministry of Health this social program, provides health insurance coverage to more than 20 thousand individuals and their families.

The aim of this work is to measure the magnitude of the effect of health insurance on health care consumption. This will allow to evaluate the effect of mandatory health insurance,

if implemented in the future, on health care consumption and thus indirectly on the health status of the population. This study proceeds as follows. Section II presents the literature review. Section III describes the dataset for the project. Section IV presents the methodology, which was used for the study. Section V offers the results. Section VI concludes.

II. Literature Review

Implementation of mandatory health insurance affects different aspects of the countries' economy. For example, Currie and Madrian (1999) reviews literature available until 1999 and state that health insurance have a significant effect on labor force participation. Other implementation on health insurance is on health care market. This issue is widely discussed in the literature. Main concern in this field is whether legislation of mandatory health insurance will improve the access to medical care utilization and whether those change will affect health status.

In his study, Pauly (2005) uses US data for the non-poor younger woman to address the concern whether government should extended health insurance policy to cover all the US population. As insured people may differ from uninsured in many ways that affect health outcomes, author argues that treating health insurance as an exogenous variable may cause a bias to the estimation of the impact of health insurance on medical care utilization. To address this issue Pauly (2005) uses instrumental variable (IV) technique alongside with ordinary least square estimation. Instrumental variables used in Pauli's (2005) study are the following: the size of the firm the individual is employed in, the number of the members of the household and the marital status of the individual. Author states that health insurance leads to more health care utilization among non-poor woman. In addition, woman without insurance policy go on without medical care and have worse health outcomes that woman with health care insurance. Furthermore, Pauly (2005) find no support for the hypothesis of adverse selection bias as woman with health insurance used less health care than they should have been.

In contrast to Pauly(2005), Anderson et al. (2012) use the discontinuity effect of health insurance on health care utilization of individuals around the age of 19 to estimate the effect of health insurance on medical care usage. Authors use the data about the number of visits to the hospital for United States for six states. Anderson et al. claim that individual make choices about the number of hospital visits and the amount of health insurance based on the same set of variables. This will lead to a biased estimate of the casual effect of health insurance on the medical care utilization. To overcome this issue, Anderson et al. use the fact that 19 years old individuals can no longer claim to be a dependent member of a family, and thus lose their parents coverage and do not buy insurance in the near future. Author uses this discontinuity effect to cancel out the differences among the insured and uninsured individuals. The main result of the study is that losing an insurance policy decreases visits to the emergency department. In addition, Anderson et al. found that loss of health insurance coverage increases the share of public hospital visits; however, this is due to only the tradeoff between private and public medical care and the overall usage of medical care does not increase.

Machnes (2006) analyses the effect of the law, which provided health insurance package to all of its residence in Jerusalem, on health care utilization. Authors use probit and logit models to estimate the effect of health insurance on the number of hospital visits. Main finding of the author was that self-employed people visit hospital less than wage earners were, because self-employed were not compensated for ill days. In addition, Machnes(2006) state that size of the family significantly affects the probability of holding health insurance policy, because most probably for large families holding health insurance policy is a luxury, which not everybody can afford. In contrast the effect of the family size is insignificant on the number of hospital visits.

Other findings are as follows. First, marital status leads to a higher number of hospital visits, this can be due to pregnancy and birth. Second, schooling has negative effect on the number of hospital visits and this result coincide with the Grossman (1972) model. Third, if the head of the family is married, he will buy more health insurance. Finally, white-collar workers demand more health insurance than blue-collar does.

Zheng and Zimmer(2008) estimate the effect of health insurance on the US farmers' health care utilization and health care spending. As is done by Andersen et al., they also treat health insurance as an endogenous variable. The authors suggest three instrumental variables for health insurance. The first instrumental variable under consideration is whether the individual has an off-farm job. The second instrument is whether the individual has a spouse in the labor force and the third instrument is an indicator of whether the firm individual works in has multiple locations. They estimate the effect of health insurance, demographic variables, health status and income on health care utilization using a two-part model with endogeneity. The main findings of the article are the following. First, females and Hispanics use less medical care as compared to males and non-Hispanics. Second, health status variables affect health care utilization. Third, insurance increases the number of visits to the hospital by one.

All of the articles discussed in the literature suggest that health insurance should be treated as endogenous outcome and other than OLS estimation method should be used to address this question. Mostly instrumental variable technique is used. Authors differ when describing the set of IV to use. This study will combine the set of instrumental variables used in the above-discussed articles according to the data set available for the Republic of Armenia.

Data description

As there is no available data set, which links health insurance to health care utilization in Armenia, I will use the dataset from the online survey that I have conducted. To construct a survey I have used the methodology proposed by Saris and Gallhofer (2007). For the purposes of this study, I have conducted a survey via the Internet.

Tourneau (1996) compares three methods of conducting a survey: computer-assisted personal interviewing (CAPI), computer-assisted self-administered interviewing (CASI), and audio computer-assisted self-administered interviewing (ACASI). Tourangeau states that the three groups, which responded to one type of the three methods each, did not differ in response rates, however, they did differ in the level of reporting sensitive behavior. According to Tourangeau's study respondents of my questionnaire will report their income level more precisely, when the survey is conducted via the Internet, which will ensure confidentiality than if it would have been conducted face-to-face.

The online questionnaire was send via an online social network and, afterwards, re-sent again by the respondents via their social networks. I collected data for Armenian individuals. The outcome variables of the survey are:

- ✓ Health status
- ✓ Health insurance
- ✓ Labor force participation
- ✓ Basic demographic questions

Health status was measured using the self-assed measure[1] of individuals' health. Smith (2008) in his paper examines different ways of measuring health status. He uses the data from a national representative survey of older adults in the Taiwan population. Smith (2008) compares three estimates of health status: one is measured by the respondent, the second one is measured by the interviewer and the third one is measured by the physician. He finds a significant difference in the distributions of health ratings of these three groups. On average, respondents, compared to physicians and interviewers, underestimate their health conditions . However, Smith summarizes that the variable resulting from the self-assessed health status is a good predictor for health outcome. Additional two questions, about the health conditions of the individual, were designed to get a more precise estimate of health status.

The survey included questions about persons' participation in the labor force, the income level and the number of hours worked as well as the nature of the occupation and the level of satisfaction with work. If an individual is married and his/her spouse is in the labor force, additional questions about the wage of the spouse and the number of hours of the spouse's participation in the labor force were asked.

Moreover, the questionnaire also asked questions about whether the individual smokes or drinks. The questionnaire also included questions about health insurance coverage of individuals. Furthermore, it also included basic demographic questions (gender, age, place of residence), and questions about a person's background (education, marital status, number of children at home, etc.).The questionnaire was available both in Armenian and in English. The full version of the questionnaire in English is available in Appendix A of this study.

[1] Respondent evaluate their health status on a five point scale that runs from poor to excellent.

The majority of the data set was collected via the Internet. The questionnaire was distributed between February 16, 2012 and March 7, 2012. A typical interview lasted on average 11 minutes. Overall, the questionnaire was viewed 1,133 times online. To measure the response rate I have used the method proposed in Duffy (2004). I have defined the initial sample as the number of individuals who has at least viewed the survey. The response rate was approximately 68% of the initial sample. Out of the initial sample, 755 (66.64%) people completed the survey, 120 (10.59%) people partially completed the survey and 258 (22.77%) people dropped out from the survey, that is, they answered less than five questions.

Table 1 presents the basic descriptive statistics of the sample population. Column 1 presents the main outcome variables of the survey. Column 2 presents the definition of each variable. Columns 3,4 and 5 include the number of observations, the mean values and standard deviations of each variable for the individuals who reported themselves as those who never visited a hospital during the last year. Columns 6,7 and 8 present the same observations, but for the group of individuals who visited a hospital from one to six times during the last year. Finally, columns 9,10 and 11 record the same observations, but for the group of individual who visited a hospital more than seven times during the last year.

Table 1 Discriptive statistics by the number of hospital visits

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
			did not visit hospital			from 1 to 6 hospital visits			more than seven visits	
Variable	Definition	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
insured	=1 if has insurance policy	205	0.0927	0.2907	509	0.2043	0.4036	68	0.2059	0.4074
age	age of the individual	183	28.863	12.287	443	27.584	10.506	59	33.831	16.350
capital	=1 if lives in capital city Yerevan	181	0.8122	0.3917	437	0.8650	0.3421	59	0.8644	0.3453
female	1 if is a female	184	0.5652	0.4971	443	0.6637	0.4730	59	0.7119	0.4568
married	=1 if is married	205	0.1854	0.3895	510	0.2196	0.4144	68	0.3235	0.4713
lwage	log of the wage	124	11.558	0.7091	284	11.488	0.7288	35	11.598	0.6163
Lfp	=1 if participates in labor force	197	0.6599	0.4750	482	0.6432	0.4796	66	0.6061	0.4924
child	=1 if has a child	173	0.1908	0.3940	427	0.2037	0.4033	57	0.4035	0.4950
degree_none	=1 if does not have degree	205	0.0000	0.0000	510	0.0020	0.0443	68	0.0000	0.0000
degree_school	=1 if highest degree is school	205	0.1463	0.3543	510	0.2078	0.4062	68	0.1765	0.3841
degree_BA	=1 if highest degree is BA	205	0.2634	0.4416	510	0.2804	0.4496	68	0.3235	0.4713
degree_MA	=1 if highest degree is MA	205	0.5463	0.4991	510	0.4667	0.4994	68	0.4559	0.5018
degree_PhD	=1 if highest degree is PhD	205	0.0439	0.2054	510	0.0431	0.2034	68	0.0441	0.2069
smoker1	=1 if smokes	205	0.2098	0.4081	510	0.1333	0.3403	68	0.2059	0.4074
heavy_drinker	=1 if is a heavy drinker	205	0.1171	0.3223	510	0.1020	0.3029	67	0.1940	0.3984
blue_collar	=1 if laborer/transport worker/tradesperson	191	0.3298	0.4714	462	0.3312	0.4711	63	0.2857	0.4554
white_collar1	=1 if manager, administrator	191	0.2042	0.4042	462	0.1818	0.3861	63	0.1905	0.3958
white_collar2	=1 if clerk/sales worker/service	191	0.1152	0.3201	462	0.1147	0.3190	63	0.1111	0.3168
spouse_lfp	=1 if spouse is in labor force	203	0.1379	0.3457	507	0.1755	0.3808	68	0.1765	0.3841
poor	=1 if poor health	205	0.0049	0.0698	505	0.0059	0.0769	68	0.0294	0.1702
below_average	=1 if below average health	205	0.0049	0.0698	505	0.0059	0.0769	68	0.0294	0.1702
average	=1 if average health	205	0.1756	0.3814	505	0.2158	0.4118	68	0.4559	0.5018
good	=1 if good health	205	0.5463	0.4991	505	0.5960	0.4912	68	0.4118	0.4958
excellent	=1 if excellent health	205	0.2634	0.4416	505	0.1584	0.3655	68	0.0588	0.2370
firm	=1 if works in private/international firm	125	0.7920	0.4075	291	0.7526	0.4323	37	0.8649	0.3466

Source: the online survey conducted for this study.

The survey was available in different regions of Armenia. According to the National Statistical Service of the Republic of Armenia, the current population of the capital city Yerevan is 34.4 percent of the total population of the country (Armenian Statistical Service 2011). From the sample population, however, 85 percent reside in Yerevan, which may lead to an oversampling bias. The distribution of the cities and villages of the respondents residence is provided in Table B1 in Appendix B.

The age distribution of the sample population can be seen in the Table 2. The average age for the sample population is 29 years. As we can see, mostly, people older than 18 years answered the survey. The average age for the Armenian population,as reported by the Armenian Statistical Service, is 33 years. The average age of the sample is obviously pulled downwards which is due to the fact that the survey was conducted via the internet.

Table 2 Age distribution of the sample

age groups	Freq.	Percent
age less than 18	8	0.92
age from 18 to 25	459	52.64
age from 26 to 33	123	14.11
age from 34 to 41	49	5.62
age from42 to 49	40	4.59
age from 50 to 57	41	4.7
age from 58 to 65	19	2.18
age above 66	133	15.25
Total	872	100

Source: the online survey conducted for this study.

According to the National Statistical Service of the Republic of Armenia 47.5% of the Armenian population is male and 52.5% is females (Armenian Statistical Service 2011). The sample distribution is provided in the first row of table 3.

Table 3 Percentage distribution of males and females

	Male	Female	Total Number of Observations
distribution over the sample	34.62	65.38	751
Individual does not smoke	26.77	73.23	635
smokes at least one cigarette a day	77.59	22.41	116
Individual does not have insurance	34.87	65.13	628
has health insurance	33.88	66.12	121
Participate in labor force	30.74	69.26	270
participates in labor force	36.76	63.24	476
health status			
Excellent	33.82	66.18	136
Good	35.61	64.39	410
Average	32.39	67.61	176
below average	27.78	72.22	18
Poor	50	50	6

Source: the online survey conducted for this study. Column 2 and 3 present the percentage distribution of the variables in column 1 among males and females. Last column presents the total number of observations for each variable in column 1.

Overall, 16.28 percent of the individuals reported themseves as smokers among which 77.59 percet of males and only 22.41 percent of females reported themselves as smokers. Morover, this distribution of smokers vs non smokers in the sample population coinsides with the distribution of tobacco usage among Armenians as reported by the World Health Organization (2011).

Priory studies identify the following main issues of the surveys conducted via the Internet

- Unrestricted population
- Multiple response
- Internet access is not available for many individuals
- Validity

I have defined the group under the study Armenian population, that is any Armenian residence could answer the survey. To avoid the pitfall of unintended group, questionnaire asked a question about the residence of the respondent, and those observations for the respondents who reside outside of Armenia were dropped out of the sample.

To overcome the issue of multiple responses by the same respondent, the program I have used to conduct the survey[2] generated a variable that was specifying the IP address of the respondent. None of the IP addresses were used multiple times thus eliminating the possibility of multiple responses.

Only 52 percent of the population has an access to the internet and this may affect the external validity of this study. To make sure that people who did not have access to Internet could answer the survey I have conducted 42 face-to-face interviews.

Overall, Braithwaite et. al. (2003) argues that the representativeness of the data and thus the external validity of the data obtained via the internet are under question. In contrast, Fortson et al. (2006) showed that internet base survey provide an internal validity comparable to the other traditional surveys methods.

[2] To conduct the survey I have used QuestionPro online research tool. http://www.questionpro.com/

III. Methodology

According to Anderson et al. (2012) the basic model which describes the effect of health insurance on health care utilization has the following form

$$Y_i = \gamma_0 + \gamma_1 D_i + \varepsilon_i$$

Where Y_i is the number of hospital visits for individual i and D_i is a dummy variable which equals one if the individual has a health insurance policy. This model can be extended by adding exogenous variables, which probably affect health care utilization. For instance, according to Grossman(2000) education increases health related knowledge so a completed degree should affect health care utilization. The second variable related to health care utilization is marital status (Wilson & Oswald 2005). As living in the capital means better access to medical care, so the effect of living in a capital city is also included in the health utilization equation (Cai & Kalb 2006). Since people decide about the number of their visits to the doctor conditional on their health status, thus, self-assessed measure of health is also included in the equation (Zheng and Zimmer 2008). In addition, variables such as age, occupation and gender are included in the equation. Finally, the equation also includes the log of wage as a measure of income of the individual.

The model under consideration becomes

$$hosp\_visit_i = \gamma_0 + \gamma_1 insured_i + \gamma_2 age_i + \gamma_3 age_i^2 + \gamma_4 good_i + \gamma_5 average_i + \gamma_6 below\_average_i + \gamma_6 poor_i + \gamma_7 degree\_none_i + \gamma_7 degree\_school_i + \gamma_8 degree\_BA_i + \gamma_9 degree\_MA_i + \gamma_{10} degree\_PhD_i + \gamma_{11} capital_i + \gamma_{12} female_i + \gamma_{13} married_i + \gamma_{14} blue\_collar_i + \gamma_{15} white\_collar1_i + +\gamma_{16} white\_collar2_i + \varepsilon_i$$

The definition of each variable is available in Column 2, Table1.

However, according to Anderson et al. (2012) health insurance is correlated with the unobserved factors in the above-described equation. An individual typically choose whether to purchase health insurance or whether to visit the hospital, based on the same set of characteristics. To deal with this issue, I will use an instrumental variables method. I use the following three instruments for that purpose: family income, spouse's participation in the labor force and the size of the household. First, I will use family income as an instrument, because after controlling for health insurance family income will most likely affect health insurance status and not the number of visits to the hospital. Second, spouse's participation in the labor force may be an important source of health insurance for the females who claim to be dependent members of the family. On the other hand after controlling for health insurance status, spouse's participation in the labor force, most probably, will not affect health care utilization. Finally, for large families health insurance is a luxury, which household does not consider as a necessity. In addition, Pauly(2005) claims that the size of the household affects the insurance status, but health care utilization is not affected. This makes the size of the household a good candidate for instrument for health insurance. First of all I have used OLS estimation as a baseline estimation of the effect of health insurance on the number of hospital

visits. However, in order to get a consistent estimate for γ_1, I will use a two-stage least square (2SLS) method. At the first-stage, health insurance is the dependent variable in the regression against all the exogenous variables and the instrument proposed. The obstacle here is that health insurance is a binary variable, so at the first stage I use a probit regression[3]. In the second stage, I use the predicted value of health insurance obtained from the first stage to estimate the equation described above.

[3] Wooldridge (2002,pp623-625) states that " there are no special considerations in estimating equation by 2SLS when the endogenous explanatory variable is binary." Under the assumption that stochastic part of the dependent variable is linear in exogenous variables and is independent of the instruments the procedure of estimation is as follows:
Stage1: estimate instrumented variable against all the exogenous and instrumented variables by maximum likelihood method and find fitted probabilities.
Stage2: Estimate the dependent variable against all the explanatory variables by IV using probabilities obtained in the first stage.
Wooldridge (2002,pp623-625) argues that 2SLS standard errors and test statistics obtained from this procedure are asymptotically valid and IV estimator from stage 2 is asymptotically efficient among the estimators .

IV. Results

Health status describes the physical condition of the individual. Table1 provide the Ordinary Least Square estimates of the effect of the number of hospital visits on the health status. As Table 4 implies the effect is positive and significant. According to this result, if health insurance is proved to have an effect on the number of hospital visits it will indirectly affect the health status of the population. This will lead to a healthier human capital of the economy, which, on its turn is among the main drivers of the the growth of the country.

Table 4 Linear probability regression. Dependent variable: health status

Variable	Definition	OLS estimates	Std. Err.
hosp_visit	number of hospital visits	0.0132***	(0.0013)
age	age	-0.0243*	(0.0116)
age2	square of the age	0.00048**	(0.0002)
married	1 if married	0.119***	(0.0258)
degree_none	1 if no degree	0.413***	(0.0546)
degree_school	1 if degree is school	-0.157**	(0.0522)
degree_BA	1 if degree is BA	0.105***	(0.0271)
degree_PhD	1 if degree is PhD	0.134*	(0.0628)
capital	1 if lives in capital	-0.0439	(0.0519)
heavy_drinker	1 if is heavy drinker	0.0516	(0.0522)
blue_collar	1 if blue collar	-0.0580*	(0.0238)
white_coll~2	1 if white collar	-0.0662**	(0.0209)
_cons	constant	1.694***	(0.1977)
N	number of observations	665	
Standard errors in parentheses			

Source: Online survey conducted for this study. Method of estimation: linear probability regressions. Table presents the marginal effect of health care utilization on the health status, with clustered standard errors by city. Base group are individuals with excellent health status and MA degree. Significance levels: * p<0.05, ** p<0.01, *** p<0.001

To identify the effect of health insurance on health care utilization I have defined health care utilization as a discreet variable, which identifies the number of times an individual has visited a doctor in the last year. Health insurance is the main factor of interest. Most of the priory researches state that health insurance is an endogenous variable in the equation of the

number of hospital visit (e.g. Anderson 2012, Zheng et al. 2008, Pauly 2005, etc.). Table 6 provides first stage of the two-stage least square estimation of health insurance on the number of hospital visits. Column 3 and 4 provides estimates and standard errors of the probit regression for health insurance usage. Three instrumental variables stand in the first three rows. Table 5 implies that all of the instrumental variables are statistically significant and have expected signs. To eliminate the possibility of weak instruments I have used F-test. Null hypothesis is that all three instruments are insignificant at the same time. The null hypothesis was rejected for all the significance levels.

Table 5 Probit and linear probability regression. Dependent variable: health insurance status

(1)	(2)	(3)	(4)	(5)	(6)
	Definition	Probit estimates	Std. Err.	LPM estimates	Std. Err
lincome	Log income of the household	0.473***	(0.0349)	0.0841***	(0.0065)
hh_members	number of members	-0.113***	(0.0097)	-0.0250***	(0.0025)
spouse_lfp	=1 if spouse is in labor force	-0.203***	(0.0574)	-0.0134	(0.0146)
age	age of the individual	0.0608***	(0.0157)	0.0069*	(0.0027)
age2	square of the age	-0.0007***	(0.0002)	-0.0001*	0.0000
good	=1 if good health	-0.0091	(0.0678)	-0.0012	(0.0128)
average	=1 if average health	-0.368***	(0.0502)	-0.0737***	(0.0108)
below_average	=1 if below average health	-0.425***	(0.1020)	-0.0589**	(0.0209)
degree_school	=1 if highest degree is school	-0.1840	(0.4114)	-0.0363	(0.0633)
degree_BA	=1 if highest degree is BA	-0.121*	(0.0487)	-0.0239*	(0.0089)
degree_PhD	=1 if highest degree is PhD	0.1980	(0.1076)	0.0582*	(0.0251)
capital	=1 if lives in capital city	0.3490	(0.2363)	0.0545	(0.0309)
married	=1 if is married	0.218**	(0.0821)	0.0207	(0.0238)
female	=1 if is a female	0.0645	(0.0418)	0.0124	(0.0088)
blue_collar	=1 if laborer/transport worker/tradesperson	0.178***	(0.0538)	0.0361**	(0.0121)
white_collar2	=1 if clerk/sales worker/service	0.256**	(0.0905)	0.0533*	(0.0237)
poor	=1 if poor health			-0.151***	(0.0363)
degree_none	=1 if does not have degree			-0.116	(0.0964)

_cons	Constant	-7.853***	(0.6798)	-0.959***	(0.1038)
N	number of observations	654		661	

Source: Online survey conducted for this study. Method of estimation: probit and linear probability regressions. Table presents the first stage of the two stage least square estimation, with clustered standard errors by city. Instrumented variable: health insurance status. Instrumental variables: income of the household, the number of members of the household and participation of the spouse of the individual in the labor force. Base group are individuals with excellent health status and MA degree. Significance levels: * p<0.05, ** p<0.01, *** p<0.001

Column 5 and 6 provide the estimation results and standard errors of the linear probability model. Income of the household and the number of household members has statistically significant effect on the health insurance. In contrast to probit estimation, spouse labor force participation is not significance in this case. However, the joint F-test implies the joint significance of all three instruments, and thus again the possibility of weak instruments is eliminated.

Overall, standard errors are higher for the probit regression than for the linear probability model and for that reason we may choose linear probability model on the efficiency grounds.

To check for the appropriateness of IV estimation I have used Hausman test. First, I have used an over identification test to exclude the possibility of exactly identified equation. The null hypothesis of exactly identified equations is rejected at all the statistically significance levels. Second, I have used Hausman test to check whether the estimate obtained using the IV technique are consistent. The null hypothesis is that health insurance is an exogenous explanatory variable and OLS estimates are consistent. Again, null hypothesis was rejected implying that health insurance is indeed an endogenous variable.

Table 7 provides the second stage of the two-stage estimation. Column 3 and 4 provides the one-step ordinary least square estimates and standard errors of the effect of health insurance on health care utilization respectively. Column 5 and 6 presents the 2SLS estimation results and standard errors when in the first stage we use probit regression. And, finally, 7 and 8 Column present the 2SLS estimation results and standard errors when the in the first stage we use LPM regression .

I have rejected the null hypothesis of the Hausman test which implies that OLS estimates are not consistent. However, standard errors for OLS estimation are less than the standard errors of 2SLS with LPM in the first stage. In addition, mainly the standard errors of the variables in the OLS regression are less than standard errors in the 2SLS with probit regression in the first stage. Moreover, Table 6 shows that the OLS estimates are significant compared to 2SLS estimates with probit and LPM in the first stage. This implies that OLS estimates are more efficient in comparison with the other two models.

Table 6 Second stage of 2SLS estimation. Dependent variable: number of hospital visits

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	Definition	OLS	Std. Err	2SLS probit	Std. Err	2SLS LPM	Std. Err
insured	=1 if has insurance	1.375***	(0.2355)	1.8760*	(0.9672)	1.285*	(0.5846)
age	age of the individual	-0.1180	(0.0693)	-0.1410	(0.1034)	-0.161*	(0.0715)
age2	square of the age	0.00164*	(0.0008)	0.0017	(0.0012)	0.00201**	(0.0007)
good	=1 if good health	0.971***	(0.0900)	0.876***	(0.1254)	0.873***	(0.1244)
average	=1 if average health	2.221***	(0.2131)	2.288***	(0.2077)	2.176***	(0.2246)
Below_average	=1 if below average health	1.603*	(0.6887)	2.043*	(0.8311)	1.8220	(0.9328)
degree_school	=1 if highest degree is school	3.572**	(1.0170)	-0.5310	(0.3639)	-0.3970	(0.5895)
degree_BA	=1 if highest degree is BA	3.892***	(0.4297)	0.489**	(0.1783)	0.456*	(0.1850)
degree_PhD	=1 if highest degree is PhD	-0.2030	(0.6326)	-0.1920	(0.1113)	-0.1600	(0.1248)
capital	=1 if lives in capital	0.400*	(0.1907)	0.514***	(0.0825)	0.509***	(0.0838)

	city Yerevan						
married	=1 if is married	-0.0566	(0.1136)	0.0974	(0.2016)	0.1250	(0.1570)
female	=1 if is a female	0.4930	(0.3728)	0.527***	(0.1581)	0.498***	(0.1500)
blue_collar	=1 if laborer/ transport	-0.0916	(0.3010)	-0.1950	(0.3164)	-0.1830	(0.2809)
white_collar2	=1 if clerk/sales worker/service	0.467**	(0.1606)	1.019***	(0.0532)	1.038***	(0.0101)
poor	=1 if poor health	-0.2340	(0.2438)			2.341*	(1.0488)
degree_none	=1 if does not have degree	0.896***	(0.1029)			3.767***	(0.2359)
_cons	constant	2.2620	(1.4202)	2.6840	(2.0278)	3.0970	(1.6207)
N	Number of observations	660		604		610	

Source: online survey conducted for this study. Table presents the ordinary least-squares estimates and second stage of the two stage least square estimation with clustered standard errors by city when using probit and linear probability models at the first stage respectively. Base group are individuals with excellent health status and MA degree. Significance levels: * p<0.05, ** p<0.01, *** p<0.001

According to the three models I have used, the results are consistent with the priory studies in this field (e.g. Anderson 2012, Zheng et al. 2008, Pauly 2005, etc.). As it was expected, health insurance has a positive and statistically significant effect on the number of the hospital visits. This is explained by the fact that people who own health insurance policy use medical care more because for such individuals costs of medical care decreases. However, the coefficients of the three estimates differ from each other in magnitudes. This may be explained by the concepts of adverse selection and moral hazard. First, the effect of adverse selection appears when ill individuals tend to obtain health insurance and in addition ill individuals visit hospital more frequently. Thus, adverse selection may lead to overestimation when OLS is used. However, in the case of the second effect, that is a moral hazard of health insurance, individuals may skip some forms of preventive health care or annual medical checks. The reason for this is the reliance on the health insurance company which will cover all the medical expenses in the case of illness. This will lead to underestimation of OLS estimates. Due to inverse direction of

these two effects, the direction of overall effect cannot be established. So overall, the OLS estimate can be either underestimated or overestimated. It will depend on the fact of which effect will dominate the other one.

Other factors affecting the number of hospital visits are age and square of the age. From the results in the Table 6 it can be calculated that individuals each year decreases the number of visits to a hospital till the age of 36. However, after reaching the age of 36, individual starts increasing the number of a hospital visits during the following years.

People decide about the number of visits based on their health status (Zheng and Zimmer 2008). Table 6 presents that, when controlling for health status, if individual is in a good health status, the number of visits for him is more by approximately one time compared to individual with excellent health status.

According to Grossman(2000) education should positively affect health status and thus negatively affect number of hospital visits. Base group are people with MA degree completed. As it can be seen from the Table 6 that individuals who haven't accomplished any educational degree or have completing a Bachelor's degree use more hospital visits as it was predicted by Grossman (2000). This results are significant at 1% and 5% significance level respectively. In contrast, if individual has competed PhD, the number of the hospital visits is decreased compared to those individuals with MA degree. This finding also coincide with the theory, however this result is not significant at 5%, 1% and 0.1% significance levels.

Cai and Lexin (2006) in their study state that living in capital means better access to health care, but also living in capital may be more stressful compared to living in other regions.

To control for this fact I have added an indicator variable capital, which takes value one if individual lives in the capital city Yerevan. As it can be seen living in capital indeed increases the number of visits to hospital, and the result is statistically significant at 5%, 0.1% and 0.1% significance level for OLS, 2SLS with probit and 2SLS with LPM in the first stage respectively.

Everything else equal, females visit hospital more than males and the result is significant at 0.1% significance level for the 2SLS with probit and 2SLS with LPM in the first stage. The fact of more hospital for females can be explained by the fact of pregnancy and birth. In contrast, this result is not significant in case of OLS regression. The results of marital status are insignificant in case of all three models. According to Cai and Lexin (2006) occupation should also affect health care utilization. The results presented in Table 6 provides that individuals with occupation in professions such as clerk, sales worker, service worker visit hospital more than people employed as administrators and manager. This result holds for OLS as well as 2SLS with probit and 2SLS with LPM in the first stage, and is statistically significant at 0.1% significance level. Overall, results of this analysis are consistent with the priory findings in the literature.

V. Conclusion

The Government of Republic of Armenia is planning to legalize mandatory health insurance in 2014. The aim of this study is reveal the impact that such a law may have on the number of hospital visits and indirectly on the health status of the Armenian population. This case study for the Armenian population has showed that holding health insurance policy increased the number of hospital visits by more than one time. In addition, health care utilization has a positive and significant effect on the health status of the individual. These results imply that if health insurance is implemented in a mandatory form in Republic Armenia overall population will increase its' consumption of health care and thus indirectly will affect health status of the population.

Additional findings of the study are that females on average consume more health care than males. Until 36 years, people consume less medical care during each additional year, however afterwards they start increasing their consumption for the following lifetime. Individuals living in the capital city Yerevan consume more health care than inhabitants of the other regions do. This might be due to two facts, first, living in Yerevan means better access to health care, and second, living in Yerevan is more stressful and it positively affects health care consumption thorough negatively affecting health care status. Education decreases health care consumption, this might be because education increases health related knowledge and thus negatively affect the number of hospital visits.

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Appendix A

Questionnaire

Q1: How would you evaluate your current health status **(health)**

1. Excellent
2. Good
3. Average
4. Below Average
5. Poor

Q2: Do you smoke? **(smoker)**

1. Yes
2. No

Q3: Approximately how many on a typical day? **(how_many_cig)**

Q4: How often do you use alcohol on average in a week?(**drinker)**

1. Very Frequently
2. Frequently
3. Occasionally
4. Rarely
5. Very rarely

Q5: Do you prefer healthy food over fast food? **(healthyfood)**

1. Yes
2. No

Q6: Thinking more about your health, would you say you are: **(health1)**

1. In good physical health (No significant illnesses or disabilities. Only routine medical care

such as annual checkups required).

2. Mildly physical impaired. (You have only minor illnesses and/or disabilities which might benefit from medical treatment).

3. Moderately physically impaired. (You have one or more diseases or disabilities which are either painful or which require substantial medical treatment).

4. Severely physical impaired. (You have one or more illnesses or disabilities which are either severely painful or life threatening, or which require extensive medical treatment).

5. Totally physically impaired. (Confined to bed requiring full-time medical assistance or nursing care to maintain vital bodily functions).

Q7: Which of the following best describes your capacities to perform everyday physical activities **(health2)**

1. You can perform all physical activities of daily living without assistance. (excellent capacity)

2. You can perform all physical activities without assistance but may need some help with the heavy work (Good capacity)

3. You regularly require help with certain physical activities and/or heavy work but can get through any single day without help (Moderate capacity)

4. You need help each day but not necessarily throughout the day or night. (Severely impaired capacity)

5. You need help throughout the day and/or night to carry out the activities of daily living.(Completely impaired capacity)

Q8: How convenient is it to reach hospital from your location? **(conv_hospital)**

1. Very convenient
2. Somewhat convenient
3. Neutral
4. Somewhat inconvenient
5. Very inconvenient

Q9: How satisfied are you with the performance of the available hospitals in the area you live? **(satisfy_hospital)**

1. Very Satisfied
2. Somewhat satisfied
3. Neutral
4. Somewhat dissatisfied
5. Very dissatisfied

Q10: Is there a wide difference in the cost of the different hospitals in the area you live?**(price_hospital)**

1. Yes
2. No
3. Not aware

Q11: Do you receive considerable amount of pressure from other family members to get health care problems taken care of promptly? **(pressure)**

1. Often
2. Sometimes
3. Seldom
4. Never

Q12: How many times did you visit doctor during last year?**(hosp_visit)**

Q13: How many times any member of your family has been to doctor during last year?**(hosp_visit_family)**

Q14: What type of medical insurance do you have **(insurance)**

1. None
2. Private
3. Employer sponsored
4. Other (specify)

Q15: If you have insurance what type of coverage do you have? **(coverage)**

1. Full insurance
2. Partial insurance
3. Full insurance for you and for your family members
4. Partial insurance for you and for your family members

Q16: If you are covered by health insurance, what is the copayment when visiting a doctor?**(copayment)**

Q17: If you don't have health coverage, can you specify reason why you do not have it?(**reason_no_ins)**

1. Annual total premium is too high
2. The coverage provided by the insurance company is too small
3. In my opinion Armenian insurance market is not reliable enough for me to purchase insurance policy
4. I do not need it
5. Other (specify)

Q18: Are you a student now?**(student)**

1. Yes
2. No

Q19: Are you employed?**(If)**

1. Yes
2. No

Q20: What is your occupation? (**occupation)**

1. Manager
2. Administrator
3. Clerk
4. Sales worker
5. Service worker
6. Tradesperson
7. Laborer
8. Physician
9. Transport worker
10. Other (specify)

Q21: What is your industry of employment? **(industry)**

1. Agriculture
2. Manufacturing
3. Electricity
4. Construction
5. Vehicles: sales, maintenance, and repair
6. Accommodation and Restaurants
7. Transport, Storage, and Communication
8. Banking, Insurance, and Financial Institutions
9. Real Estate and Business Activities
10. Public Administration
11. Education
12. Health Services
13. Social Work

14. Other (specify)

Q22: Where do you work? **(workplace)**

1. Self-employed
2. Public sector
3. Private sector
4. NGO
5. International organization
6. Academic Institution
7. Other (specify)

Q23: How long have you been in your current work place in months? **(current_experiance)**

Q24: Overall how satisfied are you with your job? **(work_satisfaction)**

1. Very dissatisfied
2. Somewhat dissatisfied
3. Not satisfied or dissatisfied
4. Somewhat satisfied
5. Very satisfied

Q25: What is your typical monthly wage? **(wage)**

1. Less than 40000 Dram
2. 40000 Dram-100000 Dram
3. 100000 Dram - 160000 Dram
4. 160000 Dram – 220000 Dram
5. 220000Dram – 300000 Dram
6. More than 300000 Dram

Q26: How many hours do you work in a typical week? **(hours)**

Q27: Your work experience in years? (**experience)**

Q28: What is your non labor income? (**NLincome)**

1. None
2. Less than 40000 Dram
3. 40000 Dram-100000 Dram
4. 100000 Dram - 160000 Dram
5. 160000 Dram – 220000 Dram
6. 220000Dram – 300000 Dram
7. More than 300000 Dram

Q29: Marital Status **(marital_status)**

1. Single
2. Married
3. Other (specify)

Q30: Is your spouse in labor force? **(spouse_lf)**

1. Yes
2. No

Q31: What is your spouse's normal weekly hours?**(spouse_hours)**

Q32: If yes, what is your spouse's typical monthly income? **(spouse_income)**

1. Less than 40000 Dram

2. 40000 Dram - 100000 Dram
3. 100000 Dram - 160000 Dram
4. 160000 Dram – 220000 Dram
5. 220000Dram – 300000 Dram
6. More than 300000 Dram

Q33: What is the total income in your family? **(family_income)**

1. Less than 40000 Dram
2. 40000 Dram - 140000 Dram
3. 140000 Dram - 240000 Dram
4. 240000 Dram – 340000 Dram
5. 340000 Dram – 440000 Dram
6. More than 440000 Dram

Q34: Gender **(gender)**

1. Male
2. Female

Q35: What is your age?(**age)**

Q36: Which Village/City are you from (e.g. c. Yerevan/ v.Davtashen)? **(city)**

Q37: How many people live in your household? **(HH_member)**

Q38: Do you have children? **(children)**

1. Yes
2. No

Q39: How old are your children? (e.g. 7,14) **(child_age)**

Q40: What is your highest completed degree? **(drgree)**

1. No primary education
2. Primary education
3. Secondary education
4. Secondary technical education
5. Some College
6. Higher education: BA
7. Higher education: MA
8. Higher education: PhD

Q41: Compared to other families, do you consider your family to be: **(living_status)**

1. Very poor
2. Poor
3. Middle class
4. Rich
5. Very rich

Q42: How many cars do the members of your household own? **(cars)**

Q43: How many rooms does the house you live in consists of? **(rooms)**

Appendix B (Tables)

Table B1 Residence distribution of the sample

city	Freq.	Percent	Cumulative
c Abovyan	12	1.62	1.62
c Armavir	5	0.68	2.3
c Artashat	7	0.95	3.24
c Ashtarak	4	0.54	3.78
c Dilijan	1	0.14	3.92
c Ejmiacin	7	0.95	4.86
c Goris	1	0.14	5
c Gyumri	3	0.41	5.41
c Hrazdan	1	0.14	5.54
c Ijevan	1	0.14	5.68
c Kapan	2	0.27	5.95
c Mecamor	2	0.27	6.22
c Nor hachn	1	0.14	6.35
c Sevan	3	0.41	6.76
c Spitak	2	0.27	7.03
c Stepanakert	16	2.16	9.19
c Vanadzor	11	1.49	10.68
c Vedi	1	0.14	10.81
c Yeghegnadzor	1	0.14	10.95
c Yerevan	631	85.27	96.22
v Davtashen	13	1.76	97.97
v Dzanfida	1	0.14	98.11
v Dzitahankhov	6	0.81	98.92
v Dzitahovit	3	0.41	99.32
v Gavar	1	0.14	99.46
v Martuni	1	0.14	99.59
v Qarakert	1	0.14	99.73
v Qassax	1	0.14	99.86
v Vardenik	1	0.14	100
Total	740	100	

Source: the online survey conducted for this study.