UC Berkeley
Working Paper Series

Title
Prices Matter: Comparing Two Tests of Adverse Selection in Health Insurance

Permalink
https://escholarship.org/uc/item/135813k8

Authors
Polimeni, Rachel
Levine, David I.

Publication Date
2012-12-12

eScholarship.org Powered by the California Digital Library
University of California

PRICES MATTER: COMPARING TWO TESTS OF ADVERSE SELECTION IN HEALTH INSURANCE[*]

Rachel Polimeni and David I. Levine[1]

Abstract: A standard test for adverse selection in health insurance examines whether people with characteristics predicting high health care utilization are more likely to buy insurance (or buy more generous insurance). George Akerlof's theory of adverse selection suggests a test based on prices: those who purchase insurance at the regular price will have higher expected utilization than those buying insurance when offered a deeply discounted price. Both tests provide (different) lower bounds on self-selection. We use a randomly allocated coupon for deeply discounted health insurance in rural Cambodia coupled with a longitudinal survey to test for adverse selection. While the standard test can show only a small amount of self-selection, the Prices test shows vastly more self-selection – providing a much more informative lower bound.

JEL Codes: D82 (Asymmetric and Private Information); I13 (Health Insurance)

[*] We acknowledge AFD (*L'Agence Française de Développement*), USAID, CEDA (Center for the Economics and Demographics of Aging) and the Coleman Fung Foundation for their generous funding.

[1] Rachel Polimeni is a researcher at the Center of Evaluation for Global Action and David Levine is a professor at Haas School of Business, both at the University of California, Berkeley. Corresponding author David Levine: Walter A. Haas School of Business 545 Student Services Building # 1900 University of California Berkeley, CA 94720-1900; levine@haas.berkeley.edu; phone: 510-642-1697; fax: 510-643-1420. Cooperation from GRET and SKY were essential in implementing this study. We thank the staff at GRET for sharing their data and the field team at Domrei for their tireless data collection and cleaning. We worked closely with Ian Ramage of Domrei on the survey design and implementation of the SKY evaluation. Jean-David Naudet, Jocelyne Delarue, and Stephanie Pamies of AFD gave us much valuable guidance on the evaluation and papers. Rachel Gardner and Francine Anene provided excellent research assistance. Raj Arunachalam was an essential part of the early phases of the evaluation. We appreciate comments at seminars at USAID BASIS, UC Berkeley, CERDI and other presentations, and from Ted Miguel, Ronald Lee, Paul Gertler, and other colleagues and stakeholders.

Health insurance can increase access to health care and decrease the potentially catastrophic effects of large medical expenses. However, the economic theory of insurance demand predicts that households that anticipate high health care costs are those that are most likely to purchase health insurance (Akerlof 1970). This adverse selection can raise insurers' costs and may stop voluntary health insurance markets from providing protection to most consumers (unless there are large subsidies).

One standard way economists test for adverse selection in health insurance is to take a set of characteristics observable to the econometrician that predict high cost to the insurer (e.g., past health care utilization or risky behaviors such as smoking) and see if they predict purchase of insurance (or of more generous insurance; see citations below). This "Standard test" can demonstrate the presence of adverse selection, but it does not tell us the economic magnitude of the adverse selection if consumers have private information beyond what the econometrician observes. Thus, the Standard test provides only a lower bound on the economic magnitude of self-selection, and the bound may be quite misleading.

For example, assume (as we find) that insured households have 6 percentage points more members in self-reported poor health than uninsured households and that this difference in self-reported poor health predicts 3% higher insured medical costs, holding all else constant. An increase in costs of 3% might not be a first-order concern for an insurer deciding whether to enter this market.

At the same time, this measure of adverse selection involves only one observable factor. Without a complete physical exam or an electronic medical record (both of which are implausible in poor settings), no matter how many observables the econometrician or insurer

includes, consumers are very likely to know more about their health than the insurer. Thus, one would like a test that captures a greater share of potential self-selection.

George Akerlof's theory of adverse selection (1970) suggests such a test: Compare health care utilization among those who purchase when offered different prices. Intuitively, at a very low price everyone would like insurance. In contrast, at a high price, only those quite sure they will need care will want to purchase insurance. An analogous test has been applied in two seminal papers on adverse selection in credit markets (Ausubel 1999; Karlan and Zimmerman 2009), but (to our knowledge) this "Prices test" has not been applied in the market for health insurance[2].

We study an experiment that varied prices randomly during the expansion of the SKY Micro-Health Insurance program in rural Cambodia starting in late 2007. We find that self-selection based on prices raises the insurers' cost of care by roughly one third.

The adverse selection identified in the Prices test is still a lower bound, as it misses any adverse selection among those who purchase at the low price compared with those who decline insurance even at the low price. For example, Wang, *et al*., (2006) find evidence of adverse selection of buyers of even deeply discounted insurance in China. Nevertheless, if (as we find) the Prices test shows much higher adverse selection than the standard test, businesses, policy-makers and economists have a *much more informative* lower bound.

Our analysis adds to the literature in several ways. First, we present evidence on adverse selection in a developing country, while most empirical studies of insurance have taken place in developed countries.

In addition, in our setting, longitudinal data and ability to randomize prices make it possible

[2] The well-known RAND experiment (1974-1982) randomly varied copayment rates and looked at how this affected health care utilization and subsequent health. As there was no choice in insurance purchase, they did not measure adverse selection as we do in our study (e.g., Brooks, et al., 1983). Other important research examines the correlation between coverage and utilization, but cannot distinguish moral hazard from adverse selection, and thus measures asymmetric information more generally (e.g., Chiappori, et al., 2006).

to identify selection effects in this dataset separately from moral hazard. Studying asymmetric information is often difficult in societies with well-established health insurance markets. For example, it can be hard to tell whether high demand for health care services increased purchase of insurance or if insurance increased the utilization of health care. In addition, higher prices for insurance in most markets correlate with higher benefits such as lower copayments, with better care quality, or with customer characteristics (e.g., if insurance companies price discriminate or some customers search more than others). These concerns do not arise in this study because this population had no other source of health insurance and, most importantly, because we randomized prices.

Finally, unlike previous studies of health insurance, we measure a lower bound on self-selection based on observable factors and a (possibly more informative) lower bound based on self-selection that depends on the price of insurance.

Previous Research

George Akerlof's seminal article "The Market for Lemons" (Akerlof 1970) examines why health insurance companies do not raise their rates to match the risk of clients. Akerlof theorizes that individuals who are willing to pay the highest insurance premium are those people who expect the highest expected insurance payouts. For health insurance, poor health is a primary determinant of high expected insurance payouts. Individuals seeking insurance typically have more information on their health status than an insurance company. Akerlof's theory suggests a "Prices test" for adverse selection: Do those who purchase insurance at a higher price have higher utilization?

There is an extensive empirical literature on the extent of adverse selection in insurance markets in developed countries. Studies are of various types, comparing individual

characteristics by generosity of health plan, premium level, and choice of whether or not to remain uninsured (see Cutler and Zeckhauser 2000 for a review). Most use a version of the "Standard test," seeing if those with poor health select more generous health insurance plans (e.g., Cardon and Hendel 2001; Cutler, Finkelstein & McGarry 2008; Wang, *et al*., 2006).

Most studies have found evidence of adverse selection, although estimates of the magnitude vary. For example, several studies find that people with higher expected medical expenditures are more likely to buy insurance or choose health insurance with more generous benefits than those with lower expected medical expenditures (e.g., Cutler and Zeckhauser 1998; Cutler and Reber 1998; Ellis 1989). However, other studies find that adverse selection in health insurance and other insurance markets is minimal (e.g., Wolfe and Goddeeris 1991; Finkelstein and Poterba 2004) or non-existent (e.g. Finkelstein and McGarry 2006; Cardon and Hendel 2001; Cawley and Philipson 1999). There is even some evidence of positive selection into health insurance (e.g., Fang, Keane, and Silverman 2008).

The above studies are all from developed nations. There have been far fewer studies of selection in developing countries, but the few studies continue the pattern of inconsistent results. For example, the Standard test finds evidence of adverse selection of those in poor past health into health insurance in rural China (Wagstaff, Lindelow, Jun, Ling, and Juncheng 2009; Wang, *et al*. 2006) and in Nigeria (Lammers and Warmerdam 2010), but not in Burkina Faso (De Allegri, *et al*. 2006). Studies in poor nations also typically find higher enrollment rates among wealthier households, potentially leading to positive selection because wealthier people also tend to be healthier (e.g., Wagstaff, Lindelow, Jun, Ling, and Juncheng 2009; Wagstaff and Pradhan 2005; Jutting 2004; Lamiraud, Booysen, and Scheil-Adlung 2005).

The paucity of studies in poor nations is important because consumers in developing

countries may behave differently than what has been found in developing countries. For example, because insurance is a relatively new and unknown product, only those who are willing to take a risk on a new product may be willing to try it. More generally, Siegelman (2004) has argued there is plausibly much more adverse selection when people choose among insurance plans than when they choose whether or not to become insured.

Studying health care in poor nations is also important because expanding voluntary health insurance is a popular policy prescription for the billions of poor people who lack affordable access to health care. Most importantly, China has largely shifted to voluntary, government-subsidized health insurance for medical care coverage in rural areas (Wang 2007; People's Daily Online 2008). Other developing nations such as Vietnam and Thailand also have rapidly expanded health insurance coverage (Vietnam Social Security 2010; Antos 2007). The success of voluntary health insurance in poor nations depends on the ability to improve health and economic outcomes while maintaining financially sustainable, or at the least assuring donors that their money is being spent in the most efficient way possible. To understand the financial viability of voluntary insurance, in turn, it is crucial to understand who purchases insurance among poor populations.

Our study is most similar in design to the credit-market study of Karlan and Zinman (2009). They found that those who accept loan offers have worse observable credit histories than those who decline loans, a version of the "Standard test" looking at self-selection based on observable factors. They then test if those who accept high-interest loans default more often (holding constant the *ex post* loan rate actually offered), which is the credit-market analogue of the "Prices test" we use for health insurance.

Theory and Methods

The "Standard test" of Selection on Observables

The theory of adverse selection posits that customers with high expected future health care costs will be more likely to buy health insurance. Adverse selection based on observables occurs when characteristics the econometrician can observe that predict future health care costs (such as high past health care utilization) also predict who buys insurance.

Our measures of high expected future health care costs (H_{ij}) include: the percentage of household members in poor health (as reported by the respondent); a recent serious health shock, defined as an illness or injury that resulted in missing 7 or more days of normal activities, a death[3], or an illness resulting in an expense of more than 100USD; a child who is stunted or wasted; and a member who is under 5 or over 64 (age groups with high rates of illness [DHS 2005]). If people with a serious health care problem chose to use public facilities in the past, they probably are also likely to use public facilities in the future. As SKY covers only public facilities, a preference for public facilities can also be a form of adverse selection. Thus, we also include in an interaction of having had a serious health shock and having received treatment for it in a public facility.

The Standard test of selection on observables is to estimate a probit predicting SKY member-ship for household *i* (SKY_i):

$$SKY_i = F\left(\sum\nolimits_j \beta_j \cdot H_{ij} + \sum \beta_{D_k} \cdot D_{k_i} + \varepsilon_i\right)$$

[3] Results are similar if we exclude a past death as a predictor of take-up (Table A 3)

Here $F(\bullet)$ is the probit function, D_{k_i} is a list of demographic and other control variables, and ε_i is an error term. A companion paper presents the effect of other household characteristics such as risk aversion on take-up[4] (Polimeni and Levine 2011).

The "Prices Test"

The insurer cares about health care utilization after buying insurance, not just the difference in pre-insurance characteristics studied by the Standard test. However, we cannot measure adverse selection by comparing utilization after being offered insurance of those who join versus those who decline, as insurance itself can increase utilization.

Our randomized price enables a test for adverse selection, even when the selection occurs based on factors we do not observe. The Prices test measures the extent that utilization of health facilities following SKY purchase is higher for households paying the regular price than for households who joined at a deeply discounted price. That is, we examine the coefficient γ_p in a regression among SKY members, predicting post-SKY health care utilization as a function of insurance price:

$$usage_i = F\left(\gamma_0 + \gamma_p p_i + \sum_j \gamma_{Hj} \cdot H_{ij} + \sum_{k=1}^{K} \gamma_{Dk} \cdot D_{ik} + u_i\right)$$

Here, $usage_i$ is one of three measures of health care utilization in the three months following SKY purchase: whether the household had at least one health center visit; whether the household had at least one hospital visit; and the natural log of \$1 plus the total of the list price of all services covered by SKY for all visits to public health centers and hospitals. The function $F(\bullet)$ is probit for predicting the indicator variables, and OLS or tobit for predicting total costs. We first

[4] Table A 6 controls for these factors but does not present coefficients on these covariates.

look at the total effect without the demographic and health measures (H_{ij} and D_{ik}), then at the increment to self-selection beyond the observed characteristics.

Because buyers paying different prices have identical health coverage, moral hazard due to different out-of-pocket costs cannot explain differences in utilization post-SKY between buyers paying full and discounted prices. Below we discuss a more behavioral version of moral hazard if some households who purchase SKY at full price want to "get their money's worth," a type of sunk cost effect (Tversky and Kahneman, 1981).

The Setting

In this section we describe health care in Cambodia, SKY health insurance, and our randomization procedures.

Health Care in Cambodia

Cambodia is among the world's poorest and least healthy nations. It ranks 188 out of 229 nations in GDP per capita, has the 38th highest infant mortality rate (of 224 countries with data), and the 46th lowest life expectancy (Central Intelligence Agency 2010).

Cambodians rely on a mix of healthcare providers: public providers, private medical providers, private drug sellers (typically with minimal pharmaceutical training), and traditional healers.

Public facilities consist of local health centers that provide basic care. Health centers refer more serious cases to Operational District Referral Hospitals for illnesses requiring more involved treatment and to Provincial Hospitals for the most severe problems. Public facilities are subsidized by the Cambodian government and often by other donors.

However, public facilities suffer from low utilization rates. The 2005 DHS reports less than a

quarter of those who sought treatment for illness or injury went to a public health facility. Private providers of varying capabilities are typically more popular than public ones, even when more expensive, because they often are more attentive to clients' needs, more available, willing to visit patients in their homes, and willing to provide more of the treatments patients prefer. They are also usually willing to extend credit (Collins 2000; Annear 2006). Private providers are not regulated by the government and quality varies widely. While a few private providers provide high quality care, many have low skill and frequently overprescribe drugs (Annear 2006).

In part because of high use of private facilities, many health shocks lead to indebtedness and sometimes loss of land (Van Damme, Van Leemput, Por, Hardeman, and Meessen 2004; Annear, *et al.,* 2006).

SKY Health Insurance

Since 1998 the French NGO GRET has operated SKY health insurance in rural Cambodia. SKY partners with public health facilities and provides free care in exchange for a small (subsidized) monthly premium. Historically, take-up of insurance has ranged from 2% in regions where insurance has been only recently introduced to 12% in the longest-served regions.

At the time of the study households were offered insurance at a rate ranging from $0.50 per household per month for a single-person household to around $2.75 per household per month for a household with eight or more members. With their insurance, household members are entitled to free services and prescribed drugs at local public health centers. SKY insurance also covers care at local public hospitals, but only with a referral from a local health center (except in cases of emergency; SKY 2009).

While SKY targets the rural poor, it also is trying to avoid financial losses and become financially sustainable (without donor support). Thus, the insurance policy includes several terms

intended to limit adverse selection. For example, SKY insurance does not cover the delivery of infants within the first few months of joining and it does not cover long-term care of chronic diseases. A government policy also reduces adverse selection: separate government programs pay for the very expensive drugs for HIV/AIDS and tuberculosis. A household can join SKY at any time, but coverage will not begin until the start of the next calendar month. Finally, insurance is purchased at the household-level, eliminating the possibility that households would purchase insurance for only very ill or frail members.

Households initially sign up for a six month cycle, paying for the first month's coverage plus two reserve months up front. A household that fails to pay the insurance premium for one month can remain insured, as the payment comes from the first month of reserve. However, if that household fails to pay back the reserve in the next month, insurance is cancelled and the second reserve month is forfeited.

Randomization procedure

Our randomized experiment was carried out as the SKY program expanded to 245 villages from November 2007 to December 2008. The expansion took place in Takeo, Kandal, and Kampot provinces, all rural areas of Cambodia.

When the SKY program first rolls out into a region, SKY holds a village meeting to describe the insurance product to prospective customers[5]. To randomize the price of insurance, we worked with SKY to hold a lottery whose winners received a deeply discounted price: 5 months of free insurance in the first 6-month cycle, with the option to renew for a second 6-month cycle with a coupon for 3 months free. Roughly 20% of attendees at each meeting won the coupon for a deep discount on insurance. Following the meeting, SKY insurance agents visited all

[5] See Robustness Checks for a discussion of the representativeness of our sample.

households that had been at the meeting to offer them health insurance. All households have the ability to purchase SKY at any time at the regular price. Details of the village meeting and price randomization are in Appendix C. The coupons induced a sharp increase in take-up.

Data

Our main data source is a panel survey of over 5000 households with information on health and health care utilization both before and after these households had the opportunity to purchase SKY. Our analysis relies largely on the first round survey, which took place from two to nine months after the initial SKY marketing meetings. (Households could first start SKY coverage between one and two months after these meetings.) The first survey wave covered demographics, wealth, self-perceived and objective health measures, health care utilization and spending, assets and asset sales, savings, debt, health risk behaviors, willingness to take financial risks, trust of health care institutions, means of paying for large health expenses, and time preference. The survey asked for month of recent health shocks (in the past 12 months) so we are able to differentiate shocks and health care occurring prior to the SKY Village Meeting and prior to SKY purchase. Appendix D describes the measures.

For the first round survey, we interviewed all Lucky Draw winners (the 20% of the village meeting attendees offered SKY at a deeply discounted price) and an equal number of households offered the standard price (specifically, every fourth house on the village meeting attendance list that was offered the standard price). To increase our sample of buyers who paid the full price, we also interviewed all additional households offered the regular price who bought insurance. In total, our sample consists of 2500 households offered the deep discount, 2505 households offered full price and randomly included in the sample, and 194 over-sampled households who purchased insurance at full price. Table A 1 presents sample sizes.

For each household that joins SKY we link in SKY data on health care utilization by dates of membership and of health care utilization. The utilization data covers visits to any health center or hospital with a SKY partnership, including the list price of the services provided. We use these data to measure utilization of public health centers and hospitals in the months following SKY purchase, as well as the total (list) cost of all visits paid for by SKY.

Randomization

Table A 2 shows average characteristics at the first-round survey of those offered the regular and deeply discounted prices (including the random sample only). We look at health events taking place in the twelve months before the month of the SKY meeting and control for time of survey to account for households without twelve months of recall data.

Of the thirty variables tested, only three show a statistically significant difference between regular and discount price offers at the 5% confidence level. Those offered insurance at the full price are slightly more likely to be Khmer (not Muslim, 95.2% vs. 94.6%), somewhat more likely to be rated "poor" (not middle or high wealth category) by enumerators (14% vs. 10%), and slightly more likely to live in a house made of palm, another measure of lower wealth. Other wealth indicators did not show significant differences. We control for wealth characteristics in our regressions and keep in mind this difference when interpreting results.

Results

We test our two hypotheses regarding adverse selection: whether insurance buyers have worse observables prior to joining SKY and whether health care utilization is higher for those paying full price (conditional on observables).

The "Standard Test" of Selection on Observables

Among households who purchased SKY, 36% of individuals in the household were in poor health (as reported by the respondent, household-weighted average) (Table I). This share was statistically significantly higher than for decliners (30%, $P < 0.01$). Buyers also had statistically significantly higher rates of major health shocks prior to the SKY meeting (23% vs. 20%, $P < 0.01$). This gap showed up among those who used both public health centers for care (7% vs. 5%, $P< .01$) and private care (16% vs. 14%, $P< 0.05$).

Results were similar when we estimated a probit predicting SKY membership as a function of pre-SKY health (equation 1) (Table II). We focus on all households in Table II, but results are similar for households that bought SKY within 63 days of the introductory marketing meeting (Table A 4) and for households that were interviewed soon after the Village Meeting (Table A 5).

Around 30 percent of households in our sample buy SKY insurance (pooling regular and deeply discounted offers). A household with half its members in poor health in the first round survey (instead of none) is 8 percentage points more likely to buy SKY insurance (Table II, col. 1, $P < 0.001$). A serious health shock pre-meeting is associated with a 7.9 percentage point increase in the probability that a household will buy SKY insurance (col. 2, $P < 0.01$). This variable is somewhat collinear with having a household member in poor health (col. 3), and the result appears driven by households that used a public health center for care (col. 4-5, joint results for health shock followed by health center visit are significant at the 5% level, but hospital and private care are not). "Number of days ill" and "Spending more than 30 USD on a shock" do not have a significant impact on take-up above and beyond having a major shock.

The other measures of high expected health care costs such as having a child or elder in the

household and having a stunted or wasted child do not predict high SKY membership.

The "Prices test"

The "Prices test" posits that SKY members paying a higher price for insurance use more health care than those who paid a lower price. Summary statistics are presented in Table III.

In the regressions with no covariates, buyers paying the full price are 11.4 and 10.6 percentage points more likely to use a health center ($P < 0.001$) and hospital ($P < 0.001$), respectively, in the first 3 months after SKY purchase, than are buyers at the deeply discounted price (Table IV, col. 1 and 3).[6] Buyers who paid the full price also have roughly 42% higher health care costs than buyers at a deep discount (col. 5, treating 100 times the coefficient on the log as a percent change). We measure the natural log of ($1+health care costs) based on the list cost (that is, the fees paid by uninsured patients to public facilities) of services provided to SKY members.

We also measure how much of this higher utilization remains after controlling for health measured in the first round survey. The covariates are strong predictors of future health care utilization. For example, having two additional people of a four-person household in poor health instead of none (an increase of 0.5 in the share of the household with poor health) raises predicted health center utilization by 9 percentage points (0.50 share * 0.180 coefficient in col. 2, $P < 0.05$).

On average, having a major health shock prior to joining SKY does not predict higher utilization among those who join SKY.[7]

---

[6] The summary statistics (Table III) measure utilization in the first three months of SKY for all insured households, coding usage as zero in a month if a household dropped prior to that month. In Table IV we control for households that dropped SKY in the first three months (drop variables not shown).

[7] The negative coefficients on Major Health Shock presented in the table are misleading, as they apply only to households with a member who had a health shock but who used no public or private care, had no days of lost work or usual activity, and spent less than $30 on care; there are very few households that meet this description in the

However, even after we condition on our pre-SKY health covariates, the price of insurance continues to predict an increased likelihood of our three utilization measures (Table IV, col. 2, 4, 6). Estimated effect sizes rise slightly for health center use and decline slightly for hospital use and total cost, but none of the changes approach statistical significance.

Robustness Checks

In this section we present several robustness checks of our main results.

Alternative specifications

We re-ran the tests of selection on prices using a variety of specifications. We altered the list of covariates: we added additional covariates from the first-round survey (Table A 6) or an indicator variable for the timing of SKY purchase (immediately following the SKY meeting versus later, Table A 7). We restricted the estimation sample to only include the randomly selected sample of households who were offered the full price (that is, dropping the over-sample of SKY buyers who were offered full price, Table A 8). We re-ran our main specifications excluding deaths as a major shock (Table A 3 and Table A 12). We included only households in our second round of data collection, who were interviewed closer to the date of the Village Meeting (Table A 5 and Table A 13). Finally, we switched the functional form from OLS to Tobit for predicting health care expenditures

sample. When we consider a typical person with a health shock, not accounting for type of care, there is no significant impact of having a pre-SKY health shock on health utilization. For example, when we re-run the regression in column (6) without covariates for type of care, days of missed work, or costs of care over $30, Major Health Shock pre-SKY has a coefficient of 0.0102, SE = 0.0625 (regression not shown).

Table A 9). In general, results were very similar to those presented.

Behavioral Moral Hazard

Buyers paying the full price have an incentive to use more SKY services than those buying with a steep discount if they want to "get their money's worth" – a behavioral form of moral hazard related to the sunk cost effect (Tversky and Kahneman, 1981). Several pieces of evidence suggest this sunk cost effect is not the main driver of the relatively high utilization among those paying full price.

First, other research has not found evidence for this behavioral incentive to seek care. For example, in the case of treated bednets, Cohen and Dupas (2010) find no decreased usage of bednets for those receiving these nets for free, and Tarozzi *et al*. (2011) found that households randomly chosen to receive free bednets used them even more than households paying for these nets.

Second, the costs of health care include several costs that are not covered by SKY, including the opportunity cost of lost time and travel costs.

Finally, while households may try to "get their money's worth" by visiting health centers for small illnesses, those paying full price also have much higher utilization of hospital services. The higher rate of utilization of hospital services suggests that behavioral moral hazard is not driving most of our results, as hospital visits typically require referral from a health center.

To focus more specifically on very severe illnesses, we examined the subset of hospital visits with an overnight stay. Households purchasing SKY at the full price are more than twice as likely to have an inpatient visit in the first three months after SKY purchase than households purchasing at the discounted price (approximately 12.8% versus 4.5%,

Table A 10, $P < 0.015$). The much higher utilization among those buying at the full price remains after controlling for characteristics observed in the first-round survey ($P < 0.05$, col. 2).

Is our sample representative?

Our sample is restricted to households who had a member at the sales meeting. Our results can be applied to Cambodia in general only to the extent households with a representative at the meeting are similar to households as a whole.

We compare our survey data to the characteristics of rural households in the 2005 Demographic and Health Survey (DHS 2005). The mean household size in our data (5.0) is similar that in the DHS data (4.9). Our sample is slightly older than the DHS sample: We have 36% (versus DHS's 41%) under the age of 15, 58% (versus DHS's 54%) aged 16 to 64, and 6.3% (versus DHS's 4.7%) age 65 or older. This slightly higher representation of elderly may be because households were more likely to send a representative to the Village Meeting if there was an older member that was not occupied with household or out of the household work. The percentage of female respondents that have 0 to 2 years of education in our data (42.6%) is almost identical to the education of female respondents in rural areas in the DHS (40.6%)[8]. However, on average, average years of education is slightly higher in our survey (3.5 years) than in the DHS (3.1 years). This gap may be due to differences in how education is measured, the slightly later date of our data collection (2008, not 2005), or due to self-selection in attending the SKY sales meeting.

It is difficult to compare health characteristics of the two groups because of the differences in the way health shocks and utilization were measured in the two surveys: DHS asks

[8] However, years of education may have been interpreted differently in the two surveys: DHS data show 0.9%, 16.1%, and 23.6% with 0, 1 and 2 years of education, respectively, while our data show 30.5%, 4.6%, and 7.5% with 0, 1, and 2 years of education. In DHS data, 99% of female respondents have less than 6 years of education, while in our data, only 80% of respondents have less than 6 years, and some have as many as 12 years or more of education.

for information on any health shock in the 30 days prior to the survey, while our survey asks only for information on major health shocks (a 7 day illness, one resulting in a 100USD health care expense, or a death) in the 12 months prior to the survey. With this in mind, our survey shows that 3.3% of individuals experienced a major health shock prior to the Village Meeting and 49% used a public facility for care of that shock. DHS shows 15% with any health shock in the 30 days prior to the survey, with 23% seeking care at a public health facility.

In short, we cannot be sure our results generalize; there are few substantial differences in characteristics between those attending the sales meeting and the DHS means for rural Cambodia.

Conclusion

To study who buys health insurance, we randomized the price of SKY micro-health insurance and surveyed households close to the start of insurance purchase. Unlike many previous studies, the randomized price of insurance allowed us to eliminate the effect of moral hazard even when observing utilization of the insured after insurance purchase. Also unlike most previous studies, because insurance was not previously available, any differences in health care utilization prior to SKY's arrival were not influenced by past insurance.

We found some, but not always consistent, evidence of adverse selection on observable characteristics (the "Standard test"). Those who join SKY have had more past health shocks and are more likely to report a member in poor health.[9] At the same time, SKY buyers are not more likely to have very young or very old members. The net result of selection on observables is that

[9] Self-reported health was collected a few months after households joined SKY. Self-reports will under-estimate adverse selection if SKY insurance improves health but will over-estimate adverse selection if SKY insurance raises members' awareness of health problems.

it increases SKY's costs by less than two percent[10].

The lower bound on self-selection detected by the Standard test will not be very informative if the predictor variables are weak. We designed our survey to measure the main predictors we thought would be available to rural Cambodians. For example, several studies have shown that self-reported health often predicts future health and mortality as well as much more complex measures of health (e.g., DeSalvo, et al., 2006 and DeSalvo, et al., 2005). In addition, our measures are not weaker predictors than we find in other studies. For example, the effect of past health center use and self-reported health on future health center use (i.e., our measured coefficients on these covariates) are larger than almost any effect size of five characteristics (smoking, drinking, job risk, the fraction of gender-appropriate preventive health activity undertaken, and self-reported consistent seat belt use) in predicting insurance purchase or multiple health care and health outcomes in Cutler, Finkelstein and McGarry (2008, Tables 1 and 2).[11]

Nevertheless, we can see that the lower bound on self-selection detected by the Standard test

[10] Our estimate shows that observables predict 1.8% higher costs for SKY households versus pooled households. This estimation is calculated by obtaining the sum of the cross-product of the coefficients on the observable predictors of treatment cost in
Table A 11 with the means for these variables for SKY households, then subtracting the sum of the cross-product of the same coefficients with the means for these variables for all households. Coefficients from
Table A 11 are used instead of those in Table IV because only SKY households have data on pre-SKY health shocks; non-SKY households do not have "start SKY" date so we must use date of Village Meeting for shocks to compare SKY to non-SKY households.

[11] The relative effect sizes are not a measure of the "quality" of either paper; we present this comparison merely to show that our modest effects of selection on observables were not obvious on *a priori* grounds. The insurance purchase outcomes studied by Cutler, Finkelstein and McGarry (2008) are term life, annuity, long-term care, Medigap, and acute health. The outcomes are: Mortality; Used nursing home; Medical costs that Medigap could cover; and Entered a hospital in preceding two years.

In addition, the much higher self-selection detected in the Prices test was not *a priori* apparent to us. Specifically, when we wrote the data collection instrument, we did not think most households in rural Cambodia knew much beyond past health facility use and self-reported health that would be useful in predicting their future health care costs. (Recall SKY does not pay for care for chronic conditions such as HIV/AIDS, TB, high blood pressure or diabetes.)

At the same time, if (as many insurers do in the United States) SKY could pay for a physical examination or had access to an electronic medical record, it is plausible its information would equal (or surpass) what consumers know about their future health care costs.

is not very informative, as the lower bound provided by the "Prices test" shows far more self-selection. Specifically, those buying insurance at the regular price have much higher health care utilization than those who bought when offered a lower price. This gap in utilization by insurance price remains when controlling for a number of observable characteristics. It is possible that some households that paid the full price used more health care to "get their money's worth" (a behavioral form of moral hazard). At the same time, the effect of prices on future utilization were just as strong for hospital visits (which require a referral) as for health center visits. Thus, we believe our estimated effect is largely due to self-selection. That is, rural Cambodians appear to have substantial private information of their acute health risks and use that information in choosing when to purchase insurance

Lowering prices as far as we did will not be profitable for SKY, as the price cut is larger than the reduction in utilization. At the same time, the strong price effect suggests insurers should experiment carefully with prices to limit self-selection.

More research is needed to deepen our understanding of insurance in developing countries. For example, it is important to know how much self-selection the Prices test does not capture, as we do not measure remaining self-selection of buyers of insurance at the deeply discounted price versus those who decline. In companion papers we examine the impact of SKY (Levine, Polimeni and Ramage 2011) and other factors that affect self-selection such as risk aversion (Polimeni and Levine 2011). It is also important to understand how well these results apply to insurance programs in other developing countries.

Table I: Buyers versus Decliners, Means

	Buyers, Mean	Decliners, Mean	Clustered ttest	
Observations	**1729**	**3431**		
Highest ranked wealth by enumerator	0.16	0.13	-2.99	**
Lowest ranked wealth by enumerator	0.11	0.13	1.43	
Household Size	5.11	4.99	-2.12	*
Answered all literacy/numeracy questions incorrectly	0.56	0.57	0.87	
Health decision-maker has 0 years of education	0.19	0.19	0.64	
Health decision-maker has 1 to 4 years of education	0.32	0.29	-1.43	
1 if any household member in poor self-reported health	0.79	0.67	-8.93	**
Percentage of household members with poor self-reported health	0.36	0.30	-6.78	**
At least one member 65 or over	0.26	0.25	-0.94	
No child age 4 or under	0.56	0.56	-0.08	
Household has a stunted or wasted child age 4 or under	0.16	0.16	0.04	
Major health shock (†) pre-Meeting	0.23	0.20	-2.90	**
Major health shock (†) and use health center for care (0 if no shock)	0.07	0.05	-3.13	**
Major health shock (†) and use hospital for care (0 if no shock)	0.08	0.06	-1.42	
Major health shock (†) and used private care (0 if no shock)	0.16	0.14	-2.11	*
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))	0.83	0.71	-2.35	*
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock)	0.13	0.11	-1.84	+
Khmer household	0.948	0.947	-0.09	
Ln (1 + approximate value of animals, durables, and business (USD))	6.55	6.45	-2.70	**
Ln (1 + approximate value of animals, durables, business, cash, and gold (USD))	6.75	6.69	-1.69	+
Hectares of farm land owned by household	0.87	0.81	-0.95	
Hectares of village land owned by household	0.15	0.13	-2.45	*
Household has at least one toilet	0.27	0.27	0.00	
House made of palm	0.03	0.03	0.88	
Roof made of palm	0.04	0.05	1.83	+
Roof made of tin	0.39	0.38	-0.94	
Roof made of tile	0.51	0.51	-0.02	
House made of brick	0.03	0.03	0.10	

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001, based on t-tests clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. All data are from the first round survey. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting with non-missing data on receipt of a discount.

Table II: Probit of SKY Take-up, First Round Survey

	(1)	(2)	(3)	(4)	(5)
Offered Full Price (d)	-0.378***	-0.380***	-0.381***	-0.382***	-0.386***
	[0.0187]	[0.0182]	[0.0182]	[0.0182]	[0.0186]
Percentage of household members with poor self-reported health	0.165***		0.149***	0.150***	0.176***
	[0.0241]		[0.0250]	[0.0251]	[0.0266]
Major health shock (†) pre-Meeting (d)		0.0786***	0.0601***	0.0542	0.0479
		[0.0178]	[0.0181]	[0.0443]	[0.0452]
Major health shock (†) and use health center for care (0 if no shock) (d)				0.0935**	0.0935**
				[0.0351]	[0.0356]
Major health shock (†) and use hospital for care (0 if no shock) (d)				0.0319	0.0333
				[0.0357]	[0.0374]
Major health shock (†) and used private care (0 if no shock) (d)				0.00354	0.00393
				[0.0316]	[0.0321]
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))				-0.0113	-0.00981
				[0.00906]	[0.00955]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)				0.0172	0.00664
				[0.0312]	[0.0300]
At least one member 65 or over (d)					-0.0147
					[0.0180]
At least one member age 4 or under (d)					-0.00196
					[0.0179]
Household has a stunted or wasted child age 4 or under (d)					0.00991
					[0.0227]
Observations	**5160**	**5160**	**5160**	**5160**	**4806**
Pseudo R-squared	0.137	0.137	0.143	0.144	0.15

Notes: LHS variable: 1 if bought SKY, 0 if declined (SKY Administrative data). + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activities for 7 or more days, a death, or an expense of over 100USD in the months prior to the Village Meeting. Depending on survey date, households have varying number of months of recall prior to the Meeting. Thus, a variable is included (not shown) to control for length of pre-Meeting recall. All data are from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table III: Characteristics of Buyers at Full versus Discounted Price

	Bought at Full Price	Bought with Deep Discount	
Percentage of household members with poor self-reported health	0.39	0.36	
Major health shock (†), pre SKY	0.25	0.29	
Major health shock (†) and use health center for care (0 if no shock)	0.11	0.08	
Major health shock (†) and use hospital for care (0 if no shock)	0.09	0.08	
Major health shock (†) and use private health care (0 if no shock)	0.16	0.19	
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))	0.86	0.94	
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock)	0.17	0.28	**
Major health shock (†) and visited public health center or hospital	0.17	0.14	
SKY paid for health center visit in first 3 months of SKY	0.73	0.64	*
Number of SKY-paid health center visits in first 3 months of SKY	4.59	3.57	
Cost of SKY-paid health center visits in first 3 months of SKY (USD)	1.64	1.42	
Ln (1 + Cost of SKY-paid health center visits in first 3 months of SKY (USD))	0.70	0.62	
SKY paid for hospital visit in first 3 months of SKY	0.21	0.11	
Cost of all SKY-paid care in first 3 months of SKY (USD)	4.11	2.48	+
Ln (1 + Cost of all SKY-paid care in first 3 months of SKY (USD))	1.15	0.81	**
SKY paid for inpatient visit in first 3 months of SKY	0.11	0.04	**
Observations	**237**	**1249**	

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001, based on t-tests clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD prior to the Village Meeting. Depending on survey date, households have varying number of months of recall prior to the Meeting. Post-SKY utilization data are from SKY records; zeros averaged in utilization for months 2 and 3 for households that dropped SKY in these months. All other data are from the first round survey. Sample is all SKY buyers who purchased SKY after the Village Meeting with data on coupon type and SKY data on utilization.

Table IV: SKY Utilization by Price of Insurance

	(1)	(2)	(3)	(4)	(5)	(6)
	Use HC	**Use HC**	**Use Hosp.**	**Use Hosp.**	**Ln(1 + Total Cost, USD)**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.114***	0.118***	0.106**	0.0895**	0.415***	0.353***
	[0.0315]	[0.0318]	[0.0334]	[0.0331]	[0.105]	[0.101]
Percentage of household members with poor self-reported health		0.180***		0.0800*		0.452***
		[0.0450]		[0.0334]		[0.0961]
Major health shock (†), pre SKY (d)		-0.101		-0.0197		-0.278*
		[0.0719]		[0.0387]		[0.118]
Major health shock (†) and use health center for care (0 if no shock) (d)		0.127*		-0.00572		0.190+
		[0.0507]		[0.0361]		[0.104]
Major health shock (†) and use hospital for care (0 if no shock) (d)		0.0566		0.0545		0.0925
		[0.0551]		[0.0455]		[0.107]
Major health shock (†) and use private health care (0 if no shock) (d)		0.131*		0.015		0.129
		[0.0513]		[0.0415]		[0.107]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))		-0.00504		-0.00037		0.0342
		[0.0160]		[0.00871]		[0.0258]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)		-0.00199		-0.00667		-0.00336
		[0.0519]		[0.0324]		[0.104]
At least one member 65 or over (d)		-0.0299		-0.00943		-0.137*
		[0.0315]		[0.0198]		[0.0577]
At least one member age 4 or under (d)		0.0834*		-0.00432		0.0753
		[0.0338]		[0.0245]		[0.0726]
Household has a stunted or wasted child age 4 or under (d)		0.0368		-0.0265		0.0965
		[0.0448]		[0.0264]		[0.0981]
Observations	**1486**	**1381**	**1486**	**1381**	**1486**	**1381**
Adjusted R-squared					0.025	0.052
Pseudo R-squared	0.009	0.042	0.024	0.046		

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Columns 1 and 2 (3 and 4): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Columns 5 - 6: Ln of 1 plus total USD cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. We control for households dropping in months 1, 2 or 3 (not shown). Columns 1-4 use probit, columns 5-6 use OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. Depending on survey date, households have varying number of months of recall prior to joining SKY. Thus, a variable is included (not shown) to control for length of pre-SKY recall data available. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data are from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY buyers who bought SKY following the Village Meeting with non-missing data for given variables. (d) for discrete change of indicator variable from 0 to 1.

References

AKERLOF, G. A. (1970): "The Market for "Lemons": Quality Uncertainty and the Market Mechanism," The Quarterly Journal of Economics, 84(3), pp. 488-500.

ANNEAR, P. (2006): "Study of Financial Access to Health Services for the Poor in Cambodia. Phnom Penh," Research report, Cambodia Ministry of Health, WHO, AusAID, RMIT University.

ANTOS, J. R. (2007): "Health Care Financing in Thailand: Modeling and Sustainability," Mission report, World Bank.

AUSUBEL, L. (1999): "Adverse Selection in the Credit Card Market," University of Maryland.

BROOK, R.H., J.E. WARE, W.H. ROGERS, E.B. KEELER, A.R. DAVIES, C.A. DONALD, G.A. GOLDBERG, K.N. LOHR, P.C. MASTHAY, AND J.P. NEWHOUSE (1983). "Does free care improve adults' health? Results from a randomized controlled trial." The New England Journal of Medicine, 309(23), pp. 1426-1434.

CARDON, J. H., AND I. HENDEL (2001): "Asymmetric Information in Health Insurance: Evidence from the National Medical Expenditure Survey," The RAND Journal of Economics, 32(3), pp. 408-427.

CAWLEY, J., AND T. PHILIPSON (1999): "An Empirical Examination of Information Barriers to Trade in Insurance," The American Economic Review, 89(4), pp. 827-846.

CENTRAL INTELLIGENCE AGENCY (2010): "The CIA World Factbook,"

https://vTww.cia.gov/library/publications/the-worldfactbook/.

CHIAPPORI, P., JULLIEN, B., SALANIE, B. and SALANIE, F. (2006), Asymmetric Information in Insurance: General Testable Implications. The RAND Journal of Economics v.37, p.783-798 .

COHEN, J., AND P. DUPAS (2010): "Free Distribution or Cost-Sharing? Evidence from a Randomized Malaria Prevention Experiment," The Quarterly Journal of Economics, 125(1), 1-45.

COLLINS, W. (2000): "Medical Practitioners and Traditional Healers: A Study of Health Seeking Behavior in Kampong Chhnang, Cambodia," Discussion paper.

CUTLER, D. M., AND S. J. REBER (1998): "Paying for Health Insurance: The Trade-Off between Competition and Adverse Selection," The Quarterly Journal of Economics, 113(2), pp. 433-466.

CUTLER, D. M. A. FINKELSTEIN AND K. MCGARRY (2008): "Preference Heterogeneity and Insurance Markets: Explaining a Puzzle of Insurance," American Economic Review. 98, 2, pp. 257-162. [http://scholar.harvard.edu/cutler/files/preference_heterogeneity_and_insurance_markets.pdf], last accessed August 14, 2012.

CUTLER, D. M., AND R. J. ZECKHAUSER (1998): "Adverse Selection in Health Insurance," Forum for Health Economics & Policy, 1, 2.

_____ (2000): "Chapter 11 The anatomy of health insurance," vol. 1, Part 1 of Handbook of Health Economics, pp. 563 – 643. Elsevier.

DE ALLEGRI, Manuela, *et al*. (2006). "Understanding enrolment in community health insurance in sub-Saharan Africa: a population-based case-control study in rural Burkina Faso." *Bull*

World Health Organ [online]. 2006, vol.84, n.11, pp. 852-858 . [http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S0042-96862006001100009&lng=en&nrm=iso], last accessed October 4, 2012.

DESALVO, KAREN B., VINCENT S. FAN, MARY B. MCDONNEL AND STEPHEN D. FIHN (2005). "Predicting Mortality and Health Care Utilization with a Single Question," Health Services Research. August 40(4), pp.1234-1246.

DE SALVO, KAREN B., NICOLE BLOWER, KRISTI REYNOLDS, JIANG HE AND PAUL MUNTNER (2006). "Mortality Prediction with a Single Self-Rated Health Question: A Meta Analysis," Journal of General Internal Medicine. 21 (3), pp. 267-275.

DHS (2005): "DHS Demographic and Health Survey, Cambodia," http://www.measuredhs.com.

ELLIS, R. P. (1989): "Employee Choice of Health Insurance," The Review of Economics and Statistics, 71(2), pp. 215-223.

FANG, H., M. P. KEANE, AND D. SILVERMAN (2008): "Sources of Advantageous Selection: Evidence from the Medigap Insurance Market," Journal of Political Economy, 116(2), pp. 303-350.

FINKELSTEIN, A., AND K. MCGARRY (2006): "Multiple Dimensions of Private Information: Evidence from the Long-Term Care Insurance Market," The American Economic Review, 96(4), pp. 938-958.

FINKELSTEIN, A., AND J. POTERBA (2004): "Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market," Journal of Political Economy, 112(1), pp. 183-208.

JUTTING, J. P. (2004): "Do Community-based Health Insurance Schemes Improve Poor People's Access to Health Care? Evidence From Rural Senegal," World Development, 32(2),

273-288.

KARLAN, D., AND J. ZINMAN (2009): "Observing Unobservables: Identifying Information Asymmetries With a Consumer Credit Field Experiment," Econometrica, 77(6), 1993-2008.

LAMIRAUD, K., F. BOOYSEN, AND X. SCHEIL-ADLUNG (2005): "The Impact of Social Health Protection on Access to Health Care, Health Expenditure and Impoverishment: A Case Study of South Africa," International Labour Office, Department of Social Security, Extension of Social Security No. 23, 2005.

LAMMERS, J. and WARMERDAM, S. (2010) "Adverse selection in voluntary micro health insurance in Nigeria" University of Amsterdam, Amsterdam Institute for International Development, AIID Research Series 10-06. [http://www.aiid.org/conference/uploads/File/Research%20Papers/Judith/Lammers_Warmerdam_2010_Adverse%20selection%20in%20voluntary%20health%20insurance%20in%20Nigeria%20AIID%20RS%2010-06.pdf], last accessed October 4, 2012.

LEVINE, D. I., R. GARDNER, AND R. POLIMENI (2009): "Briefing Paper: A Literature Review on Effects of Health Insurance and Selection into Health Insurance," Discussion paper.

LEVINE, D. I., R. POLIMENI, AND I. RAMAGE (2011): "A Rigourous Evaluation of SKY Health Insurance," Discussion paper.

PEOPLE'S DAILY ONLINE (2008):"China's New Rural Cooperative Medical Plan," http://english.peopledaily.com.cn/90002/95607/6524401.html.

POLIMENI, R., AND D. I. LEVINE (2011): "Going Beyond Adverse Selection: Take-up of a Health Insurance Program in Rural Cambodia," Working paper, University of California, Berkeley.

ROTHSCHILD, M., AND J. STIGLITZ (1976): "Equilibrium in Competitive Insurance Markets:

An Essay on the Economics of Imperfect Information," The Quarterly Journal of Economics, 90(4), pp. 629- 649.

SIEGELMAN, P. (2004): "Adverse Selection in Insurance Markets: An Exaggerated Threat," The Yale Law Journal, 113(6), pp. 1223-1281.

SKY (2009): "SKY Health Insurance Schemes," www.sky-cambodia.org/efirstrestuls.html.

TAROZZI, A., A. MAHAJAN, B. BLACKBURN, D. KOPF, L. KRISHNAN, AND J. YOONG (2011): "Micro-Loans, Insecticide-Treated Bednets and Malaria: Evidence from a Randomized Controlled Trial in Orissa (India)," Economic Research Initiatives at Duke (ERID) Working Paper No. 104.

VAN DAMME, W., L. VAN LEEMPUT, I. POR, W. HARDEMAN, AND B. MEESSEN (2004): "Out-of-pocket Health Expenditure and Debt in Poor Households: Evidence from Cambodia," Tropical Medicine and International Health, 9(2), 273-280.

VIETNAM SOCIAL SECURITY (2010): "History Development and Expanding Program of Voluntary Health Insurance in Vietnam," http://vTww.asean-ssa.org.

WAGSTAFF, A., M. LINDELOW, G. JUN, X. LING, AND Q. JUNCHENG (2009): "Extending health insurance to the rural population: An impact evaluation of China's new cooperative medical scheme," Journal of Health Economics, 28(1), 1-19.

WAGSTAFF, A., AND M. PRADHAN (2005): "Health insurance impacts on health and nonmedical consumption in a developing country," Policy Research Working Paper Series 3563, The World Bank.

WANG, Y. (2007): "Development of the New Rural Cooperative Medical System in China," China & World Economy, 15(4), 66-77.

WOLFE, J. R., AND J. H. GODDEERIS (1991): "Adverse selection, moral hazard, and wealth effects

in the medigap insurance market," Journal of Health Economics, 10(4), 433-459.

A Supplementary Tables

Table A 1: Research Sample

		Offered Full Price	Offered Deep Discount	Total
(1)	Randomized at the Village Meeting	2618	2617	5235
(2)	*For randomization test*: Randomized with Complete First Round Survey	2504	2500	5004
(3)	All households with Complete First Round Survey	2698	2500	5198
(4)	*For Take-up regressions*: Complete First Round, including only decliners and buyers after Village Meeting	2680	2480	5160
(5)	*For robustness test*: Complete First Round, including only decliners and buyers 62 days or fewer after Village Meeting	2503	2138	4641
(6)	SKY Buyers with Complete First Round Survey	431	1336	1767
(7)	*For Price Selection regressions*: SKY buyers after Village Meeting with complete first round survey, plus SKY utilization data	237	1249	1486
(8)	*For robustness test*: SKY buyers after Village Meeting with complete first round survey, plus SKY utilization data, no oversample	193	1249	1442

Notes: Row (1) refers to the number of households chosen for our randomized survey sample. Of those, row (2) refers to the number that completed the first round survey. Row (3) refers to randomized households, plus additional households that were interviewed to increase sample size. Row (4) includes all decliners but only buyers that purchased SKY after (not before) the SKY Village Meeting. Row (5) includes all decliners but only buyers that purchased SKY within 62 or fewer days after the Village Meeting. Row (6) refers to only SKY buyers with complete first round data. Row (7) refers to only SKY buyers with complete first round data and utilization data from SKY. Row (8) is similar to row (7) but includes only households that are part of the randomized sample (no oversampled buyers). SKY take-up by full price households appears larger than the usual SKY take-up rate because we include any household that *ever* purchase SKY following the Village Meeting. Not all of these households are members at once, as some drop out as others join.

Table A 2: Randomization Test - Comparison of Means

	Offered Full Price, Mean	Offered Deep Discount, Mean	Clustered ttest	
Observations	**2504**	**2500**		
Highest ranked wealth by enumerator	0.13	0.14	-1.14	
Lowest ranked wealth by enumerator	0.14	0.10	3.63	**
Household Size	5.02	5.01	0.17	
Answered all literacy/numeracy questions incorrectly	0.56	0.58	-1.17	
Health decision-maker has 0 years of education	0.19	0.19	-0.41	
Percentage of household members with poor self-reported	0.31	0.32	-1.39	
At least one member 65 or over	0.25	0.26	-1.29	
No child age 4 or under	0.55	0.57	-1.57	
Household has a stunted or wasted child age 4 or under	0.17	0.15	1.00	
All vaccines fulfilled for members age 5 or under, 0 if no 5 or under, pre-mtg	0.27	0.25	1.08	
Major health shock (†) pre-Meeting	0.21	0.21	0.50	
Major health shock (†) and use health center for care (0 if no shock)	0.06	0.05	0.35	
Major health shock (†) and use hospital for care (0 if no shock)	0.07	0.06	1.42	
Major health shock (†) and used private care (0 if no shock)	0.15	0.15	-0.12	
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))	0.77	0.74	0.79	
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock)	0.12	0.12	0.26	
Khmer household	0.952	0.946	1.99	*
Ln (1 + approximate value of animals, durables, and business (USD))	6.47	6.49	-0.65	
Ln (1 + approximate value of animals, durables, business, cash, and gold (USD))	6.68	6.74	-1.81	+
Hectares of farm land owned by household	0.80	0.86	-1.05	
Hectares of village land owned by household	0.14	0.13	0.85	
Household has at least one toilet	0.26	0.26	0.54	
House made of palm	0.04	0.03	2.21	*
Roof made of palm	0.05	0.04	1.30	
Roof made of tin	0.37	0.38	-0.68	
Roof made of tile	0.51	0.52	-0.50	
House made of brick	0.03	0.03	-0.35	

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001, based on t-tests clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. All data is from the first round survey. Sample is all SKY decliners and all SKY buyers in the randomized sample.

Table A 3: SKY Take-up, only 7-day or 100USD Shocks (no deaths)

	(1)	(2)	(3)	(4)	(5)
Offered Full Price (d)	-0.378***	-0.380***	-0.381***	-0.382***	-0.386***
	[0.0187]	[0.0181]	[0.0181]	[0.0181]	[0.0186]
Percentage of household members with poor self-reported health	0.165***		0.151***	0.151***	0.177***
	[0.0241]		[0.0249]	[0.0250]	[0.0265]
Major health shock (†), pre meeting		0.0757***	0.0565**	0.0362	0.0232
		[0.0189]	[0.0192]	[0.0481]	[0.0487]
Major health shock (†) and use health center for care (0 if no shock) (d)				0.114**	0.118**
				[0.0359]	[0.0367]
Major health shock (†) and use hospital for care (0 if no shock) (d)				0.0304	0.0283
				[0.0363]	[0.0379]
Major health shock (†) and used private care (0 if no shock) (d)				0.00458	0.00872
				[0.0322]	[0.0332]
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))				-0.0112	-0.00936
				[0.00925]	[0.00977]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)				0.0324	0.023
				[0.0324]	[0.0309]
At least one member 65 or over (d)					-0.0144
					[0.0180]
At least one member age 4 or under (d)					-0.00182
					[0.0179]
Household has a stunted or wasted child age 4 or under (d)					0.00887
					[0.0227]
Health decision-maker has 1 to 4 years of education (d)					0.0351+
					[0.0200]
Observations	**5160**	**5160**	**5160**	**5160**	**4806**
Pseudo R-squared	0.137	0.136	0.142	0.144	0.15

Notes: LHS variable: 1 if bought SKY, 0 if declined (SKY Administrative data). + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days or a 100USD health care expense. All data is from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 4: SKY Take-up, Early Buyers Only

	(1)	(2)	(3)	(4)	(5)
Offered Full Price (d)	-0.362***	-0.364***	-0.364***	-0.365***	-0.370***
	[0.0170]	[0.0171]	[0.0170]	[0.0170]	[0.0171]
Percentage of household members with poor self-reported health	0.165***		0.150***	0.149***	0.183***
	[0.0226]		[0.0232]	[0.0232]	[0.0250]
Major health shock (†) pre-Meeting (d)		0.0912***	0.0721***	0.0558	0.0533
		[0.0187]	[0.0188]	[0.0456]	[0.0462]
Major health shock (†) and use health center for care (0 if no shock) (d)				0.0963**	0.0928**
				[0.0348]	[0.0355]
Major health shock (†) and use hospital for care (0 if no shock) (d)				0.00305	0.00322
				[0.0334]	[0.0353]
Major health shock (†) and used private care (0 if no shock) (d)				-0.000133	-0.00254
				[0.0293]	[0.0300]
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))				-0.00295	-0.00188
				[0.00893]	[0.00949]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)				0.000969	-0.00441
				[0.0277]	[0.0271]
At least one member 65 or over (d)					-0.0211
					[0.0156]
At least one member age 4 or under (d)					-0.00653
					[0.0161]
Household has a stunted or wasted child age 4 or under (d)					0.0201
					[0.0212]
Observations	**4641**	**4641**	**4641**	**4641**	**4330**
Pseudo R-squared	0.164	0.159	0.168	0.17	0.181

Notes: LHS variable: 1 if bought SKY, 0 if declined (SKY Administrative data). + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. All data is from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and buyers 62 or fewer days after the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 5: Take-up, Phase 2 Only (Interviews closer to Meeting Date)

	(1)	(2)	(3)	(4)	(5)
Offered Full Price (d)	-0.331***	-0.329***	-0.332***	-0.334***	-0.341***
	[0.0223]	[0.0227]	[0.0223]	[0.0224]	[0.0226]
Percentage of household members with poor self-reported health	0.210***		0.192***	0.188***	0.216***
	[0.0317]		[0.0316]	[0.0314]	[0.0328]
Major health shock (†), pre meeting (d)		0.101***	0.0748**	0.0417	0.0395
		[0.0274]	[0.0271]	[0.0505]	[0.0542]
Major health shock (†) and use health center for care (0 if no shock) (d)				0.115*	0.116*
				[0.0502]	[0.0508]
Major health shock (†) and use hospital for care (0 if no shock) (d)				-0.00235	-0.00352
				[0.0436]	[0.0462]
Major health shock (†) and used private care (0 if no shock) (d)				-0.012	-0.00663
				[0.0359]	[0.0381]
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))				0.00748	0.00925
				[0.0104]	[0.0110]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)				-0.0149	-0.026
				[0.0355]	[0.0339]
At least one member 65 or over (d)					-0.0229
					[0.0213]
At least one member age 4 or under (d)					0.0141
					[0.0217]
Household has a stunted or wasted child age 4 or under (d)					-0.005
					[0.0242]
Observations	**2273**	**2273**	**2273**	**2273**	**2118**
Pseudo R-squared	0.158	0.148	0.164	0.167	0.184

Notes: LHS variable: 1 if bought SKY, 0 if declined (SKY Administrative data). + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD in the months prior to the village meeting. Depending on survey date, households have varying number of months of recall prior to the Meeting. Thus, a variable is included (not shown) to control for length of pre-Meeting recall. All data are from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting, and who were interviewed in phase 2 of the survey implementation. The average lag between Village Meeting and Interview for this group is 83 days (versus 211 days for phase 1). (d) for discrete change of indicator variable from 0 to 1.

Table A 6: Selection by Price, with Additional Covariates

	(1)	(2)	(3)
	Use HC	**Use Hosp**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.122***	0.0834*	0.360***
	[0.0324]	[0.0341]	[0.105]
Percentage of household members with poor self-reported health	0.142**	0.0811*	0.436***
	[0.0489]	[0.0348]	[0.105]
Major health shock (†), pre SKY (d)	-0.0998	-0.0204	-0.240+
	[0.0767]	[0.0402]	[0.134]
Major health shock (†) and use health center for care (0 if no shock) (d)	0.0966+	0.0279	0.199+
	[0.0561]	[0.0385]	[0.106]
Major health shock (†) and use hospital for care (0 if no shock) (d)	0.0854	0.0725	0.129
	[0.0538]	[0.0507]	[0.111]
Major health shock (†) and use private health care (0 if no shock) (d)	0.123*	0.0292	0.151
	[0.0527]	[0.0420]	[0.109]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))	-0.00677	-0.000371	0.0258
	[0.0177]	[0.0105]	[0.0268]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)	0.0187	-0.017	-0.0163
	[0.0564]	[0.0323]	[0.112]
At least one member 65 or over (d)	-0.0305	-0.0077	-0.133*
	[0.0337]	[0.0194]	[0.0598]
At least one member age 4 or under (d)	0.0624	0.00019	0.0123
	[0.0503]	[0.0354]	[0.112]
Household has a stunted or wasted child age 4 or under (d)	0.00363	-0.0245	0.0997
	[0.0493]	[0.0271]	[0.110]
Observations	**1322**	**1322**	**1322**
Adjusted R-squared			0.05
Pseudo R-squared	0.082	0.085	

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Column 1 (2): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Column 3: Ln of 1 + total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. We control for households dropping in months 1, 2 or 3 (not shown). Columns 1-2 use probit, column 3 uses OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the first round survey. Wealth, household size and education, and additional variables as described in the Appendix, are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 7: Selection by Price: Additional Covariates plus Indicator for Early Buyer

	(1)	(2)	(3)
	Use HC	**Use Hosp**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.125***	0.0844*	0.374***
	[0.0326]	[0.0341]	[0.105]
Joined 62 or fewer days after the village meeting (d)	0.0432	0.00983	0.227*
	[0.0508]	[0.0292]	[0.103]
Percentage of household members with poor self-reported health	0.140**	0.0802*	0.423***
	[0.0490]	[0.0345]	[0.104]
Major health shock (†), pre SKY (d)	-0.0968	-0.0194	-0.225+
	[0.0766]	[0.0403]	[0.134]
Major health shock (†) and use health center for care (0 if no shock) (d)	0.0968+	0.0277	0.197+
	[0.0561]	[0.0386]	[0.107]
Major health shock (†) and use hospital for care (0 if no shock) (d)	0.0843	0.0723	0.126
	[0.0537]	[0.0506]	[0.109]
Major health shock (†) and use private health care (0 if no shock) (d)	0.119*	0.0282	0.13
	[0.0525]	[0.0418]	[0.109]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))	-0.00786	-0.000615	0.0197
	[0.0176]	[0.0104]	[0.0262]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)	0.0283	-0.0151	0.0362
	[0.0566]	[0.0327]	[0.114]
At least one member 65 or over (d)	-0.0303	-0.00766	-0.131*
	[0.0339]	[0.0194]	[0.0599]
At least one member age 4 or under (d)	0.0639	0.000566	0.0161
	[0.0502]	[0.0353]	[0.111]
Household has a stunted or wasted child age 4 or under (d)	0.00179	-0.0248	0.0913
	[0.0494]	[0.0270]	[0.109]
Observations	**1322**	**1322**	**1322**
Adjusted R-squared			0.054
Pseudo R-squared	0.083	0.085	

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Column 1 (2): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Column 3: Ln of 1 plus total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. We control for households dropping in months 1, 2 or 3 (not shown). Columns 1-2 use probit, column 3 uses OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the first round survey. Wealth, household size and education, and additional variables as described in the Appendix, are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1. This regression includes an indicator variable for joining within 63 days of the Village Meeting.

Table A 8: Selection by Price, Randomized Sample Only

	(1)	(2)	(3)	(4)	(5)	(6)
	Use HC	**Use HC**	**Use Hosp.**	**Use Hosp.**	**Ln(1 + Total Cost, USD)**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.0638	0.106*	0.116**	0.108*	0.338**	0.361**
	[0.0425]	[0.0440]	[0.0436]	[0.0433]	[0.115]	[0.116]
Percentage of household members with poor self-reported health		0.169***		0.0818*		0.437***
		[0.0471]		[0.0345]		[0.0942]
Major health shock (†), pre SKY (d)		-0.114		-0.0168		-0.295*
		[0.0764]		[0.0392]		[0.126]
Major health shock (†) and use health center for care (0 if no shock) (d)		0.135*		0.00106		0.157
		[0.0526]		[0.0394]		[0.109]
Major health shock (†) and use hospital for care (0 if no shock) (d)		0.0726		0.0695		0.146
		[0.0570]		[0.0471]		[0.112]
Major health shock (†) and use private health care (0 if no shock) (d)		0.142**		0.0351		0.171
		[0.0537]		[0.0455]		[0.110]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))		-0.0096		-0.006		0.0267
		[0.0167]		[0.00870]		[0.0274]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)		0.00964		-0.0051		-0.0069
		[0.0541]		[0.0322]		[0.108]
At least one member 65 or over (d)		-0.0182		-0.0082		-0.111+
		[0.0335]		[0.0197]		[0.0571]
At least one member age 4 or under (d)		0.0905*		-0.0022		0.0643
		[0.0372]		[0.0253]		[0.0785]
Household has a stunted or wasted child age 4 or under (d)		0.0445		-0.0314		0.0871
		[0.0477]		[0.0257]		[0.0986]
Observations	**1363**	**1269**	**1363**	**1269**	**1363**	**1269**
Adjusted R-squared					0.008	0.043
Pseudo R-squared	0.001	0.04	0.012	0.044		

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Columns 1 and 2 (3 and 4): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Columns 5 and 6: Ln of 1 + total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. We control for households dropping in months 1, 2 or 3 (not shown). Columns 1-4 use probit, columns 5-6 use OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting, only if they are part of the randomized sample (no oversampled low coupon buyers included). (d) for discrete change of indicator variable from 0 to 1.

Table A 9: Selection by Price - Costs using Tobit

	(1) Ln(1 + Total Cost, USD), Tobit	(2) Ln(1 + Total Cost, USD), Tobit
Offered Full Price	0.565***	0.497***
	[0.129]	[0.121]
Percentage of household members with poor self-reported health		0.683***
		[0.132]
Major health shock (†), pre SKY		-0.398*
		[0.183]
Major health shock (†) and use health center for care (0 if no shock)		0.275+
		[0.141]
Major health shock (†) and use hospital for care (0 if no shock)		0.167
		[0.145]
Major health shock (†) and use private health care (0 if no shock)		0.247
		[0.150]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))		0.0369
		[0.0385]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock)		-0.0122
		[0.141]
At least one member 65 or over		-0.162+
		[0.0832]
At least one member age 4 or under		0.158
		[0.103]
Household has a stunted or wasted child age 4 or under		0.13
		[0.128]
Observations	**1486**	**1381**
Adjusted R-squared		
Pseudo R-squared	0.009	0.025

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Ln of 1 + total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY, using Tobit regressions. We control for households dropping in months 1, 2 or 3 (not shown). Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 10: Selection by Price - Inpatient Visits

	(1) **Inpatient Visit**	(2) **Inpatient Visit**
Offered Full Price (d)	0.0767**	0.0539*
	[0.0246]	[0.0216]
Percentage of household members with poor self-reported health		0.0499**
		[0.0194]
Major health shock (†), pre SKY (d)		0.0143
		[0.0303]
Major health shock (†) and use health center for care (0 if no shock) (d)		-0.00493
		[0.0206]
Major health shock (†) and use hospital for care (0 if no shock) (d)		0.0128
		[0.0270]
Major health shock (†) and use private health care (0 if no shock) (d)		0.0096
		[0.0258]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))		-0.00626
		[0.00620]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)		0.00776
		[0.0200]
At least one member 65 or over (d)		-0.0161
		[0.0115]
At least one member age 4 or under (d)		0.0104
		[0.0160]
Household has a stunted or wasted child age 4 or under (d)		0.00165
		[0.0186]
Observations	**1468**	**1365**
Adjusted R-squared		
Pseudo R-squared	0.029	0.059

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Indicator for an inpatient visit at a SKY-covered hospital in the first 3 months post SKY purchase, using probit regression. We control for households dropping in months 1, 2 or 3 (not shown). Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 11: Selection by Price - with Pre-Meeting Controls

	(1)
	Ln(1 + Total Cost, USD)
Offered Full Price	0.363***
	[0.0998]
Percentage of household members with poor self-reported health	0.436***
	[0.0972]
Major health shock (†) pre-Meeting	-0.282*
	[0.139]
Major health shock (†) and use health center for care (0 if no shock)	0.214*
	[0.105]
Major health shock (†) and use hospital for care (0 if no shock)	-0.00286
	[0.120]
Major health shock (†) and used private care (0 if no shock)	0.0139
	[0.116]
Ln (1 + max days ill for a major health shock (†), pre meeting (0 if no shock))	0.026
	[0.0272]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock)	0.0686
	[0.0993]
At least one member 65 or over	-0.111+
	[0.0563]
At least one member age 4 or under	0.0912
	[0.0699]
Household has a stunted or wasted child age 4 or under	0.0862
	[0.0959]
Observations	**1384**
Adjusted R-squared	0.074

Notes: This table uses pre-Meeting shocks rather than pre-SKY shocks on the RHS of the equation. + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variable: Ln of 1 plus total USD cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. We control for households dropping in months 1, 2 or 3 (not shown). Columns 1-4 use probit, columns 5-6 use OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates health shock causing missed daily activies for 7 or more days, a death, or an expense of over 100USD. Depending on survey date, households have varying number of months of recall prior to the Village Meeting. Thus, a variable is included (not shown) to control for length of pre-Meeting recall data available. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data are from the first round survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 12: Selection by Price, Using 7-day or 100USD Shocks only (no death)

	(1)	(2)	(3)	(4)	(5)	(6)
	Use HC	**Use HC**	**Use Hosp.**	**Use Hosp.**	**Ln(1 + Total Cost, USD)**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.114***	0.118***	0.106**	0.0891**	0.415***	0.353***
	[0.0315]	[0.0317]	[0.0334]	[0.0333]	[0.105]	[0.101]
Percentage of household members with		0.177***		0.0794*		0.444***
poor self-reported health		[0.0451]		[0.0334]		[0.0965]
Major health shock (†), pre meeting		-0.0673		-0.0014		-0.201
		[0.0765]		[0.0460]		[0.137]
Major health shock (†) and use health		0.118*		-0.0046		0.171
center for care (0 if no shock) (d)		[0.0517]		[0.0375]		[0.105]
Major health shock (†) and use hospital		0.0333		0.0565		0.116
for care (0 if no shock) (d)		[0.0592]		[0.0493]		[0.118]
Major health shock (†) and use private		0.118*		0.00472		0.0786
health care (0 if no shock) (d)		[0.0547]		[0.0417]		[0.116]
Ln (1 + max days ill for a major health		-0.0079		-0.0037		0.03
shock (†), pre SKY start(0 if no shock))		[0.0172]		[0.00904]		[0.0289]
Major health shock (†) and spent 120,000		0.011		-0.0112		-0.0192
riel on care (USD30) (0 if no shock) (d)		[0.0532]		[0.0317]		[0.105]
time_skytoint		-0.0003		0.000198+		-0.0005
		[0.000184]		[0.000106]		[0.000348]
At least one member 65 or over (d)		-0.0314		-0.0093		-0.139*
		[0.0315]		[0.0197]		[0.0577]
At least one member age 4 or under (d)		0.0829*		-0.0048		0.0745
		[0.0337]		[0.0245]		[0.0728]
Household has a stunted or wasted child		0.0389		-0.0265		0.101
age 4 or under (d)		[0.0446]		[0.0263]		[0.0977]
Observations	**1486**	**1381**	**1486**	**1381**	**1486**	**1381**
Adjusted R-squared					0.025	0.051
Pseudo R-squared	0.009	0.041	0.024	0.046		

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Columns 1 and 2 (3 and 4): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Columns 5 and 6: Ln of 1 + total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. Columns 1-4 use probit, columns 5-6 use OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates major health shock causing missed daily activities for 7 or more days or a 100USD health care expense. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the baseline survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meeting. (d) for discrete change of indicator variable from 0 to 1.

Table A 13: Selection by Price, Phase 2 Only (Interviews closer to Meeting Date)

	(1)	(2)	(3)	(4)	(5)	(6)
	Use HC	**Use HC**	**Use Hosp.**	**Use Hosp.**	**Ln(1 + Total Cost, USD)**	**Ln(1 + Total Cost, USD)**
Offered Full Price (d)	0.114***	0.118***	0.106**	0.0891**	0.415***	0.353***
	[0.0315]	[0.0317]	[0.0334]	[0.0333]	[0.105]	[0.101]
Percentage of household members with poor self-reported health		0.177***		0.0794*		0.444***
		[0.0451]		[0.0334]		[0.0965]
Major health shock (†), pre meeting		-0.0673		-0.0014		-0.201
		[0.0765]		[0.0460]		[0.137]
Major health shock (†) and use health center for care (0 if no shock) (d)		0.118*		-0.0046		0.171
		[0.0517]		[0.0375]		[0.105]
Major health shock (†) and use hospital for care (0 if no shock) (d)		0.0333		0.0565		0.116
		[0.0592]		[0.0493]		[0.118]
Major health shock (†) and use private health care (0 if no shock) (d)		0.118*		0.00472		0.0786
		[0.0547]		[0.0417]		[0.116]
Ln (1 + max days ill for a major health shock (†), pre SKY start(0 if no shock))		-0.0079		-0.0037		0.03
		[0.0172]		[0.00904]		[0.0289]
Major health shock (†) and spent 120,000 riel on care (USD30) (0 if no shock) (d)		0.011		-0.0112		-0.0192
		[0.0532]		[0.0317]		[0.105]
time_skytoint		-0.0003		0.000198+		-0.0005
		[0.000184]		[0.000106]		[0.000348]
At least one member 65 or over (d)		-0.0314		-0.0093		-0.139*
		[0.0315]		[0.0197]		[0.0577]
At least one member age 4 or under (d)		0.0829*		-0.0048		0.0745
		[0.0337]		[0.0245]		[0.0728]
Household has a stunted or wasted child age 4 or under (d)		0.0389		-0.0265		0.101
		[0.0446]		[0.0263]		[0.0977]
Observations	**1486**	**1381**	**1486**	**1381**	**1486**	**1381**
Adjusted R-squared					0.025	0.051
Pseudo R-squared	0.009	0.041	0.024	0.046		

Notes: + p<0.10, * p<0.05, ** p<0.01, *** p<0.001. LHS variables: Columns 1 and 2 (3 and 4): Indicator for use of a SKY-covered health center (hospital) for the first 3 months post SKY purchase; Columns 5 and 6: Ln of 1 + total cost (user fees, covered by SKY) of all SKY-covered health center and hospital visits in the first 3 months post-SKY. Columns 1-4 use probit, columns 5-6 use OLS. Marginal effects; Standard errors in brackets. Robust standard errors clustered at the village level. (†) indicates major health shock causing missed daily activities for 7 or more days or a 100USD health care expense. SKY status and LHS variables use SKY data. Coupon status is recorded at the Village Meeting. All other data is from the baseline survey. Wealth, household size and education are included in the regression but not presented. Sample is all SKY decliners and all SKY buyers who bought SKY following the Village Meetingand who were interviewed in phase 2 of the survey implementation. The average lag between Village Meeting and Interview for this group is 83 days (versus 211 days for phase 1). . (d) for discrete change of indicator variable from 0 to 1.

B Other Datasets

B.1 Village Leader Interview

In each village we interviewed the village chief or another village leader in order to collect general village-level information, including travel time and cost to the nearest public health center; recent village-level shocks (drought, flood, epidemics, etc.); availability of lending institutions; and price and availability of paid transportation.

Selected variables from this survey are used only as controls in the unobserved selection analysis, and are described in the Appendix to Polimeni and Levine 2011.

B.2 Health Center Data Collection

Households may be more likely to purchase SKY if the quality of the local public health clinic with which SKY partners is of good quality. To measure this, we administered a simple survey of health clinics in areas covered by our study.

To minimize data collection costs, the health center survey focuses on observations by SKY member facilitators. SKY hires member facilitators to be present at health facilities to facilitate treatment for SKY members and manage client complaints and questions as needed. Member facilitators typically work mornings at one particular Health Center. The survey consists of checklists of operating hours, drug supply, cleanliness, and equipment supply. In the current

paper, these variables are used only as controls in the selection in prices analyses. These variables are listed in the Appendix to Polimeni and Levine 2011.

B.3 Village Meeting Data

At the end of each village meeting, our field team spoke to a village leader to collect village-level data relevant to our study. In the results presented in this paper, we use these variables only as controls in the analysis of selection in prices. The Appendix to Polimeni and Levine 2011 lists variables created from responses to these interviews.

C Lucky Draw Implementation

To implement the Lucky Draw, attendance was taken at the beginning of each meeting, and names of people who arrived late to the meeting were added to the roster as they arrived. We collected one name for each household represented at the meeting, so that households with more than one member attending were not counted more than once. While a SKY representative conducted the meeting, staff from our field team counted out the number of high and low coupons to be distributed to the meeting attendees. The number of high coupons was set equal to 20% of households up to a cap of 12 per meeting. The high coupons were put into a bag along with enough low coupons to cover all other households attending the meeting.

At the end of the meeting, the research team's field coordinator announced that there would be a raffle where the prize is a large-valued coupon for

insurance and explained the rules of the coupon. Family names were called off one by one from the roster. When a name was called off, a representative from the household came to the front of the room and pulled a coupon from the bag. High coupons were brightly colored so that everyone could see what coupon was drawn after the fact, but care was taken to ensure people could not see coupons as they were drawing. As coupons were drawn, the names of households who received a high coupon were recorded so that coupons could not be traded and used by other households.

D Description of Variables

Dependent variables

Independent Variables	Description
Purchase SKY	1 if purchase SKY, 0 if not (Standard test regression)
Health Center Use, first 3 Months	1 if any household member used a SKY-partnered health center in the first 3 months after insurance purchase, 0 if not (SKY data) (Prices test regression)
Hospital Use, first 3 months	1 if any household member used a SKY-partnered hospital in the first 3 months after insurance purchase, 0 if not (SKY data) (Prices test regression)
Cost of Health Center and Hospital Visits, first 3 Months	Log of $1 plus total cost of visits to a SKY-partnered health center or hospital in the first 3 months after insurance purchase, by any household member (SKY data) (Prices test regression)

Basic controls used in regressions measuring adverse selection

Additional controls used in robustness tests can be found in the Appendix to Polimeni and Levine 2011.

Variable Name	Questionnaire Question	Description
Subjective poor health	How healthy is each household member? (Excellent health, good health, poor health). Primary respondent to questionnaire gives subjective response for all household members.	Percentage of household members respondent describes as being in "poor" health

Major health shock	Three questions: In the last year, were there any health problems in your household that made someone unable to work or go to school for one week or more? In the last year did anyone in your household pass away? In the last year did anyone in your household spend more than 400,000 riel ($100 USD) on a single health problem?	1 if respondent answers "yes" to any of these three health questions. Control included to account for households with fewer than 12 months of recall data.
Visit public facility for a major health shock, 2-4 months pre-meeting	[If household member experienced major shock in 2-4 months pre-meeting:] Did [sick member] seek treatment for this health problem? If yes, where? [Respondent chose "Health center" or "public hospital"]	Two Variables: 1 if, following a major health shock in the 2-4 months pre-meeting, a household member visited a public health center [hospital] for first or subsequent treatment, 0 otherwise
Visits a private facility for a major health shock	[If household member experienced major shock in 2-4 months pre-meeting:] Did [sick member] seek treatment for this health problem? If yes, where? [Respondent chose "private doctor (village or town)"]	1 if, following a major health shock in the 2-4 months pre-meeting, a household member visited a private doctor for first or subsequent treatment, 0 otherwise
Max days ill following major health shock	[If household member experienced a major health shock in the 12 months prior to the Village meeting] how many days was he/she unable to do his/her usual activities because of this health problem?	Maximum days ill for any single health problem for any household member experiencing a health shock in the 12 months prior to the Village meeting.
Spent more than 120,000 riel (30USD) on major health shock	[If household member(s) were treated for a major shock in the 12 months prior to the Village meeting] what was the cost of treating the health problem (at any facility)?	Sum of treatment costs at any facility (including traditional healers, drug sellers, etc.) for all household members experiencing a major health shock in the 12 months prior to the Village meeting.

Household has a stunted or wasted child	Height, age, and weight measured for all children age 4 and under	1 if household has a child that is stunted or wasted, 0 otherwise (including if household has no child age 4 or under)
Household has a member age 65 or older	Date of birth of each household member	1 if any household member is age 65 or older, 0 otherwise
Household member has a member age 4 or under	Date of birth of each household member	1 if any household member is age 4 or under, 0 otherwise

Controls in the Prices test regressions (but not shown)

Variable Name	**Questionnaire Question**	**Description**
Household size	Household roster: Name of people who usually sleep here (slept in the house 5 out of 7 nights immediately preceding the interview)	Number of household members listed in the household roster
Poor household	Enumerator subjective wealth ranking: poorest/medium/better-off	1 if enumerator rates household as poor
Better-off household	Enumerator subjective wealth ranking: poorest/medium/better-off	1 if enumerator rates household as better off
Respondent is literate and numerate	(Round 2 survey) Four literacy and numeracy questions: Draw a line from each picture to the correct word; Write the name of the village, commune and district where you live; Write the correct number of objects in the pictures, and what the object is; Tell me what time it is (picture of a clock shown)	1 if respondent gets any literacy/numeracy questions incorrect
Education of health decision-maker	Who makes the decisions about health care in your family? What is the highest grade this person completed? What is the highest grade you completed?	Education from 1 to 13 (13 = tertiary education). If respondent decides with another household member, use maximum education of the two members. Indicator variables for 0 years or 1 to 4 years of education used in regressions.