Analyses of enrolment, dropout and effectiveness of RSBY in northern rural India

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Abstract

The Rashtriya Swasthya Bima Yojana (RSBY) was launched in 2008 to provide inpatient insurance coverage to all below-poverty-line (BPL) households in India. Using household level panel data from Uttar Pradesh (UP) and Bihar (2012-2013), this paper investigates the determinants of enrolling and dropping-out of the scheme. We next investigate whether participation is positively associated with inpatient-care utilization and financial protection. We find that the presence of chronic illnesses, lower socioeconomic status, belonging to scheduled-castes or tribes (SCST), insurance related awareness and proximity to healthcare facilities are positively correlated with enrolment. SCST status and presence of chronic condition households deter households from dropping-out. The associations between RSBY membership and healthcare use and financial protection vary across the states. Unlike UP, we only find insured households in Bihar to experience lower out-of-pocket payments and debt following hospitalization. Overall, we conclude that though the RSBY does appear to be pro-poor and is inclusive of disadvantaged minorities, the scheme suffers from adverse selection. The RSBY has the potential to play an important role in India's move towards Universal Health Coverage. To do this however, scheme awareness should be increased; targeting mechanisms warrant improvement, and ensure that RSBY participation leads to cashless care. The differences in effectiveness between both states suggests that regulatory and infrastructural reform, may lead to more effective coverage.

1.0 Introduction

Improving access to adequate healthcare services and financial protection features high on policy agendas of low and middle income countries. In India, a developing country with a third of the population living below the poverty line and nearly 94% of the workforce in the informal sector, there has been little or no access to effective social protection schemes against catastrophic medical expenditures until recently (1).[i] Healthcare costs are typically financed out of pocket (OOP) and patients have strong preferences for private care providers, despite the country boasting a free public healthcare system (3, 4).[ii] Hospitalizations alone, account for more than a quarter of the population falling into poverty every year (6-8).

Since the 1990s, a number of interventions have been launched to fill this vacuum, with community based health insurance (CBHI) schemes being amongst the most popular (9, 10). Implemented predominantly by non-government organizations, these schemes are generally characterized by limited voluntary participation and shallow benefit packages (11). Their effectiveness in promoting healthcare utilization and providing financial protection are consequently mixed (12, 13). The Government of India (GoI) has also been active in this domain through a number of national and local schemes (14, 15).[iii] High administrative costs, lack of accountability and sustained efforts in implementation, monitoring and evaluation have however, led to the dissolution of many such programmes (5, 15, 17, 18). Taking into account the shortcomings of previous endeavours, in 2008, the GoI launched the Rashtriya Swasthya Bima Yojana (RSBY) insurance programme (19). A national level programme, the RSBY is expected to eventually provide universal healthcare coverage (UHC) (18, 20, 21).

Administered by state governments in partnership with private insurance companies, the heavily subsidized RSBY targets households below the poverty line (BPL) and provides cashless protection against hospitalization costs.[iv] Families of up to five persons pay an annual premium of INR 30 per

year for protection against hospitalization costs of up to INR 30,000 in any of the empanelled hospitals. The programme has been rolled out in 436 (of 479 targeted) districts in all 29 states of the country and enrolled 37 million households (approximately 55% of total BPL households) since 2008 (19). From 2011, the RSBY has also been piloting outpatient coverage across eight districts (23, 24).

Seven years after the start of the program, the evidence base on various aspects of the RSBY remains sparse. Sun (25) presents one of the first studies to investigate the determinants of enrolment using village level census data from seven states. The study reveals some evidence of cream-skimming by insurance companies in that they prioritize enrolling healthier villages first. Similarly, there is greater enrolment in villages with a larger number of BPL households, increased distance from the nearest town and greater availability of education and medical facilities. The second part of the study uses household level data to conclude that there is gender preference towards men when enrolling households with more than 5 members. Using a combination of district level data from 2007-2008 from 590 districts and matching it with the District Level Household Data survey, Nandi et al. (24) examine how socioeconomics, political and institutional factors correlate with RSBY participation at the district level. The paper first estimates the probability of a district participating in RSBY, followed by a model of the determinants of household enrolment in participating RSBY districts. They conclude that districts with a higher scheduled caste or tribe (SCST) population, weaker administrative capacity and pre-existing insurance schemes experience lower participation and enrolment rates. To understand the importance of insurance literacy in engaging potential clients, Das and Leino (26) collect household data to assess the impact of the Information and Education Campaign (IEC) on enrolment into the RSBY in Delhi. They find that IEC is not associated with higher enrolment and suggest the timing of the campaign (two months prior to the enrolment) as a potential explanation.

Evidence on the impact of the scheme on health care use and financial protection thus far has been mixed. Nandi et al. (24) find greater benefits of the programme being captured by higher socioeconomic groups. Hou and Palacios (27) observe higher rates of healthcare utilization among RSBY households. Neither of the studies however control for either observable or unobservable characteristics that may influence insurance uptake and health care use. Devadasan et al. (21) find continuing OOP despite RSBY membership, but the use of cross-sectional data also limits their ability to control for self-selection and hence claims of causality. Selvaraj and Karan (28) do control for district-level heterogeneity in observable and (time invariant) unobserved characteristics by using difference-in-differences on data from 321 RSBY districts and 291 non-RSBY districts in the Andhra Pradesh, Karnataka and Tamil Nadu states. The authors find that hospitals in RSBY districts inflate their costs over time due to weak scheme administration and operational oversight, leading to increases in expenses for inpatient care. This culminates in a greater likelihood of RSBY households facing catastrophic levels of expenditures.

This paper adds to the literature on RSBY in several ways. First, we analyse household level determinants of RSBY enrolment using household level panel data collected in 2012 and 2013. Earlier studies are primarily derived from administrative data collected during the initial stages of the programme (2008-2010). Second, this is the first study to investigate the determinants of dropping out of the scheme. Retaining membership is an important indicator of the sustainability/usefulness of the scheme. Third, we investigate whether RSBY membership is associated with increased use of hospital care and financial protection. Finally, this is the first paper to focus on the scheme in Uttar Pradesh (UP) and Bihar which are among the poorest and least educated states in the country.

The paper is organised as follows: The following section describes the details of the RSBY programme. Section 2 discusses the data while section 3 outlines the empirical approach. Section 4 presents the results and the final section contains a discussion and concluding remarks.

1.1 Background

The RSBY caters to the largely illiterate BPL households with little financial liquidity, by introducing smart cards that provide cashless care in any of the empanelled hospitals (29). In collaboration with the central government, the state governments recruit insurance companies through a competitive bidding process to launch the schemes. Insurance companies are paid a premium per beneficiary household such that they have an incentive to enrol more households (up to INR 750/beneficiary household). These companies are also tasked to empanel both public and private hospitals which are compensated directly for treating RSBY registered patients. The insurance companies are responsible for the monitoring of the hospital activities to ensure quality and prevent misuse (1). In order to monitor RSBY, a quality control mechanism is in place at the national level, but actual implementation lies with states. The state government is expected to monitor the selected insurance agencies and the hospitals that are attached. To what extent state government is ensuring the monitoring and quality control is unclear. There is a grievance redressal mechanism as well, but there is scant information on who is covering this and processes thereof.

The scheme is heavily subsidized and the benefit package may be considered very generous in comparison to the small premium paid by clients. The package includes more than 700 pre-defined surgical packages for maternal and neonatal care, coverage for same-day surgeries and transport costs to and from the hospital. Providers are paid on a fee-for-service basic with packages defined for each of the covered procedures (30) . All pre-existing diseases are covered under the scheme (19). While three quarters of the total costs are paid by the central government, the rest, including the cost of smart cards are paid by state governments. Depending on the state where the programme is being implemented, the government pays up to INR 750 per household to bridge the costs (29). The average subsidy per household paid by the state governments are INR 262 and INR 490 in UP and Bihar respectively (19).

Insurance companies begin the enrolment process by first implementing awareness campaigns at the village level, prioritizing those with greater proportions of BPL households (based on a BPL list created in 2001). Members are provided an opportunity to renew coverage towards the end of each calendar year (31). Since 2008 nearly 37 million BPL households have enrolled in the programme (19). With the enrolment process nearly complete (the scheme has been offered in 436 of 479 targeted districts), the proportions of the target group enrolled stand at 55% (19). It is important to note that the enrolment proportions are likely to be overestimated as they reflect cumulative enrolment which does not take into account dropouts. The RSBY began operating in UP in December 2008, while enrolment in Bihar started nearly a year later.

The RSBY is not without criticisms. First, the list of BPL households used in enrolment procedures was created between 2001 and 2002 and is therefore likely to be outdated leading to accusations of fraud and mis-targeting (25, 32). Concerns regarding the programme's operations have also been raised. Though designed to be cashless, due to lower educational and socioeconomic status, the RSBY covered patients are often unable to gain enough information or are unable to exercise their rights sufficiently (33, 34). Examples of this include the implementation of unnecessary and invasive procedures to claim money from insurance companies, and charging patients for medicines or tests allegedly not covered by the scheme. Das and Leino (26) point out that insurance companies are largely preoccupied with "outright" fraud prevention rather than assessing the medical necessities of the many procedures that are performed. Additionally, private hospitals were found to be reluctant to treat RSBY insured patients because the fees are considered insufficiently generous or because of disputes with insurance companies over compensation (such as delayed payment, disagreement over necessity of certain procedures) (33, 35).

2.0 Data

2.1 Data collection

The data used in this paper were collected as a part of an evaluation of three CBHI schemes rolled out in *Kanpur Dehat* and *Pratapgarh* districts in Uttar Pradesh and in *Vaishali* in Bihar. The surveys were implemented among all Self-Help Group households in the three locations.[v] Though the surveys did not collect information on BPL status, qualitative data collection suggests nearly two thirds of the sample own BPL cards and should be eligible for RSBY.[vi]

The baseline survey was canvassed between March and May 2010 and covered 3,686 households (the full census of SHG related households in these districts).[vii] The follow up survey was conducted between March and April in 2012 during which 3318 households were revisited. During the same time the following year, 3307 households were re-interviewed for the third time. As some of our variables, related to insurance awareness, were only collected in the 2012 and 2013 surveys, we only use the latter two survey waves in our analyses of enrolment and dropout. The primary respondents were the SHG members themselves or the head of the household if the member was not available.

2.2 Variables

The household survey collected detailed information on demographic and socioeconomic status, as well as information on healthcare utilization, expenses and coping strategies for both out- and inpatient care. Given the focus on RSBY in this paper, we primarily focus on inpatient care data that was collected with a recall period of one year.

2.2.1 Determinants of RSBY membership and non-renewals

To model the determinants of enrolment, we use data from 2012 and 2013 that contains an indicator of whether the household was enrolled in RSBY in the specific survey wave. To analyse factors

associated with dropping out, we only consider households that were enrolled in 2012 and have dropped by the subsequent wave in 2013.

We consider four categories of variables as possible determinants of enrolment and dropout from RSBY (see annex Table A1 for exact definitions). The first represents health related characteristics of the households: proportion of household members suffering from chronic illness[viii] and a binary variable depicting whether any members were hospitalized in the previous year.

The second category represents healthcare supply side characteristics and includes the (logarithm of the) average distance members of a community have to travel to reach a hospital.[ix] Unfortunately we do not have information on whether the hospital is empanelled by RSBY in the survey.[x]

The third category contains household characteristics related to insurance literacy and risk aversion. We include an indicator of whether any members are enrolled in the CBHI scheme and an index depicting the understanding of insurance.[xi, xii] Three questions were included in the index: whether the particular household was exposed to any insurance awareness campaigns; the respondent understands the concept of premiums and insurance in general; and whether the respondent believes such schemes can be beneficial. This index is represented in the models as tertiles of scores obtained from principal component analysis of questions applicable to insurance schemes.

The fourth category relates to demographic conditions such as the sex of the household head, household members' age and sex distribution and socioeconomic characteristics including education, occupational and educational status of the household head, whether the household belongs to a scheduled caste or tribe (SCST), and tertiles of an asset index generated through principal component analysis.[xiii]

2.2.2 Effect of RSBY on the use and financing of inpatient care

After having established patterns of enrolment and dropout, we investigate whether participating in the RSBY is associated with a higher probability of any hospitalizations within the household, a lower probability of having any expenses when hospitalized, lower direct cost of the hospitalization, lower probability of resorting to debt to finance the hospitalization, and finally a lower amount of debt incurred (conditional upon incurring any debt).[xiv]

2.3 Summary statistics

Table 1 shows rates of enrolment and non-renewals in 2010, 2012 and 2013. Among 3,685 households surveyed in 2010, 28% were already enrolled. In 2012, 14% of the households dropped out while the total proportion of enrolled increased to 31%. A considerable shift in enrolment is noted between 2012 and 2013. The proportion of enrolled increases to 51% while dropout reduces to 8% in 2013. Over time, the differences in state-level enrolment rates diminish and (at baseline enrolment rates are 18% in UP and 41% in Bihar) the proportion of enrolled increased in UP by 2013. Although more households drop out of the scheme in Bihar in 2012 (19%) than in UP (14%), the rates are more comparable in 2013 (8% and 11% respectively). The enrolment rates at the village level vary considerably (between 7% and 78%). Overall, despite the relatively modest enrolment rates, the low drop-out rates are suggestive of the perceived positive effects of RSBY by the insured.

Table 1: Membership in RSBY

	Pooled			Uttar Pradesh			Bihar		
	2010	2012	2013	2010	2012	2013	2010	2012	2013
Enrolled (renewal and new)	0.28	0.31	0.51	0.18	0.21	0.41	0.47	0.48	0.68
Dropped out (from previous period)		0.14	0.08		0.10	0.08		0.19	0.11
Not enrolled	0.72	0.55	0.41	0.82	0.69	0.51	0.53	0.33	0.21
Households in RSBY	1048	1039	1678	415	431	874	633	608	804
N	3685	3318	3307	2322	2045	2087	1363	1246	1183

Means of health and health care use related outcomes in 2010 among those enrolled in RSBY and those not enrolled are presented in Table 2 (summary statistics of outcomes in 2012 and 2013 in the

pooled sample are presented in Annex Table A2). Comparing RSBY and non-RSBY households in

the pooled data suggests that only the average distance to facilities significantly differs between the

two groups (27km and 37km respectively). Other factors such as the proportion of members with

chronic illnesses (17% and 14%) and the likelihood of hospitalization (19% for both) are do not vary

across the groups. When hospitalized, almost all households, both RSBY and non-RSBY covered,

incur out of pocket payments. The amount of expenses incurred by RSBY and non-RSBY

households (INR 12034 and INR 14020), the probability of incurring any debt (80% and 79%) and

the amount of debt do not differ significantly. State-level disaggregation suggests the significant

difference in the distance to facilities across both groups to stem from Bihar. Similarly, RSBY

households in this state are marginally more likely to incur debt when dealing with the expenses of a

hospitalization.

Table 2: Summary statistics of outcome variables in 2010

Definition	HH with RSBY membership	HH without RSBY membership	Test: RSBY HH=Non-RSBY HH	Test: RSBY HH=Non-RSBY HH	Test: RSBY HH=Non-RSBY HH
	Pooled Data			Uttar Pradesh	Bihar
			P-value (1)	P-value (2)	P-value (3)
Proportion of household (HH) members with chronic illnesses	0.17	0.14	0.773	0.163	0.145
Any hospitalizations in the household (1/0)	0.19	0.19	0.105	0.510	0.102
Probability of incurring expenses due to hospitalization(1/0)	0.98	0.97	0.824	0.992	0.168
Direct hospitalization expenses (INR)	12034	14020	0.214	0.210	0.440
Standard Deviation	(31846)	(33290)			
Average distance to facility (km)	27.23	37.02	0.000	0.461	0.000
Standard Deviation	(24.42)	(24.17)			
Household with debt due hospitalization (1/0)	0.86	0.80	0.104	0.370	0.089
Debt amount (INR)	8187	8328	0.894	0.243	0.951
Standard Deviation	(20096)	(15790)			

Notes: Table shows summary statistics across RSBY and non-RSBY households in 2010. P-values 1 through 3
refer to t-tests comparing means of the enrolled and non-enrolled at the pooled level and by sites.

A similar comparison of household level characteristics among the two groups in 2010 is presented in Annex Table A1 (summary statistics of control variables in 2012 and 2013 in the pooled sample are presented in Annex Table A3). As 2010 represents the baseline of the CBHI scheme for which the information was collected, enrolment in the CBHI scheme is missing. Similarly, information related to insurance related awareness was not collected until 2012. Regarding demographic variations in RSBY and non-RSBY households, the former have a higher proportion of working aged women (14-55 years) and a lower proportion of elderly women (55+ years).

RSBY enrolled household do appear to have lower socioeconomic status as those not-enrolled. Household heads among the non-enrolled are generally better educated (e.g., 45% of RSBY household heads have no education compared to 38% among non-RSBY) and belong to higher socioeconomic groups. Figure 1 shows distribution of insured households across wealth tertiles. While a clear and steep gradient is visible in Bihar where the highest proportion of enrolled households belong to the lowest asset tertile, trends in UP are not as clear (highest proportion belong to households in the middle tertile), potentially indicating problems with the targeting of the scheme (or the BPL cards) in UP. Enrolled households are more likely to belong to scheduled castes or tribes. A higher proportion of non-RSBY household heads are self-employed (43% vs 48%) whereas the opposite is true among the enrolled for casual wage labouring (32% vs 24%).

Figure 1: Proportion of enrolled households across wealth tertiles in 2010

In sum, these descriptive statistics suggest relatively little differences between households enrolled in RSBY and those not enrolled, at least in 2010. This could be indicative of little problems of adverse selection, but also of little impact of the scheme. The following section describes the regression

approaches used to identify the determinants of enrolment and non-renewals and to identify

whether RSBY membership is associated with increased health care use and health care spending.

3.0 Empirical Strategy

3.1 Determinants of RSBY membership and non-renewals

We first investigate factors correlated with membership, defined as household (i) having RSBY

coverage at time (t) in village (v) using the following linear probability model:

$$rsby_{itv} = \Gamma'_{itv}\beta_1 + \beta_2 D_{iv} + \Pi'_{itv}\beta_3 + X'_{itv}\beta_4 + v_v + t_t + \varepsilon_{itv}$$

$$[i = 1, \dots, N;\ t = 2012, 2013] \tag{1}$$

where Γ'_{itv} represents a vector of health related variables, and D_{iv} represents the average distance

to the hospitals. The household's insurance awareness related characteristics are captured by Π'_{itv}.

A vector of socioeconomic and demographic characteristics is expressed through X'_{itv}. We control

for time trends (t_t) and geographical variations through village fixed effects (v_v).[xv]

The probability of not renewing the subscription in 2013 (conditional upon being enrolled in 2012),

is modelled using the same explanatory variables as in equation (1), set at their 2013 values, that is:

$$Dropout_{iv} = \Gamma'_{iv}\theta_1 + \theta_2 D_{iv} + \Pi'_{iv}\theta_3 + X'_{iv}\theta_4 + v_v + \mu_{iv} \tag{2}$$

3.2 Associations between RSBY membership and inpatient care use and spending

We estimate the effects of RSBY membership on a battery of outcomes related to inpatient care use

and spending (probability of hospitalization, probability of having healthcare spending conditional

on hospitalization, log of the amount of healthcare expenses conditional on any spending,

probability of incurring debt to meet healthcare expenses and the amount of debt, conditional on having any debt). For every outcome (Y_{itv}) we estimate the following linear model with household fixed effects:

$$Y_{itv} = \Omega_1 rsby_{itv} + X'_{itv}\Omega_2 + \Omega_3 \delta_{iv} + t_t + a_i + \rho_{itv} \qquad (3)$$
$$[i = 1, \ldots, N; \; t = 2010, 2012, 2013]$$

where t_t captures common time trends in healthcare use across households and α_i captures time invariant household level characteristics.[xvi] $rsby_{itv}$ is the key variable of interest that reflects whether the household i in village v is enrolled in RSBY at time t.[xvii]

Ω_1 identifies the effect of RSBY membership on outcome Y_{itv} under the assumption that there are no time-varying unobservables that correlate with both RSBY membership and the outcomes of interest. Given the targeting of the program to BPL households, and our inability to perfectly control for BPL status, and the voluntary nature of the program, this is a strong assumption. We expect our rich set of covariates to largely capture the self-selection into the program, especially because the program is highly subsidized and therefore attractive to the large majority of households.[xviii] To reduce the potential bias due to unobserved differences in socioeconomic characteristics that arise from the targeting of the program, we test sensitivity of our results by restricting the sample to the bottom two wealth thirds.[xix] It should be stressed though that our identifying assumptions might be violated, and we therefore interpret our results as associations rather than causal impacts.

Robustness of results is confirmed using non-linear specifications for the binary outcomes (results available upon request). All analysis was done using STATA version 13.0.

4.0 Results

4.2 Determinants of enrolment

Table 3 shows coefficients of the OLS model examining factors associated with enrolment in RSBY in 2012 or 2013. We find that the proportion of household members with chronic illness is positively correlated with the probability of being enrolled in RSBY (6pp). There is a negative correlation between distance to healthcare facilities and enrolment at the pooled level with a 1% increase in the distance reducing the probability of enrolment by 1pp. Insurance awareness is positively associated with RSBY membership (3pp). Households in the highest tertile of the index are 3pp more likely to be enrolled. Similarly, households who joined CBHI schemes are also more likely to be enrolled in RSBY (3pp), potentially indicating higher aversion to risk.

Table 3: Determinants of RSBY membership in 2012 and 2013

Variables	Pooled		Uttar Pradesh		Bihar	
	Marginal Effects	Standard Error	Marginal Effects	Standard Error	Marginal Effects	Standard Error
Proportion of household members with chronic illnesses (% of household)	0.056**	0.027	0.030	0.034	0.097**	0.046
Log of average Distance from facility	-0.008*	0.005	-0.010	0.030	0.004	0.016
Low insurance index score(1/0)	-0.010	0.035	-0.001	0.042	-0.038	0.063
High insurance index score (1/0)	0.026**	0.012	0.028*	0.015	0.019	0.021
Enrolled in CBHI(1/0)	0.032*	0.016	0.038*	0.021	0.016	0.027
Lowest asset tertile (1/0)	-0.006	0.015	-0.014	0.019	0.001	0.025
Highest asset tertile (1/0)	-0.039***	0.014	-0.028*	0.017	-0.058**	0.028
Household belongs to a scheduled tribe/caste (1/0)	0.070***	0.014	0.069***	0.017	0.077***	0.026
Primary education (1/0)	-0.034*	0.019	-0.015	0.023	-0.071**	0.032
Secondary education (1/0)	-0.042***	0.016	-0.026	0.020	-0.069**	0.028
Higher secondary education (1/0)	-0.060***	0.023	-0.014	0.027	-0.169***	0.044
Other employment (1/0)	-0.016	0.025	0.007	0.030	-0.065	0.048
Casual wage labourer (1/0)	0.023	0.016	0.028	0.020	0.012	0.026
Not working (1/0)	-0.010	0.025	-0.035	0.028	0.068	0.050
Doing housework (1/0)	-0.021	0.021	-0.016	0.026	-0.029	0.036
Female headed household (1/0)	0.009	0.020	0.012	0.025	0.013	0.033
Household size	0.011***	0.003	0.010***	0.004	0.016**	0.006
Female 0 to 13yrs (1/0)	-0.103**	0.048	-0.108*	0.060	-0.084	0.083
Female older than 55 (1/0)	-0.131***	0.050	-0.125**	0.059	-0.140	0.097
Male 0 to 13yrs (1/0)	-0.139***	0.047	-0.145**	0.058	-0.141*	0.082
Male 14 to 55yrs (1/0)	-0.037	0.048	-0.053	0.057	-0.006	0.090
Male older than 55 (1/0)	-0.025	0.072	0.033	0.085	-0.157	0.133
Year: 2012	0.215***	0.013	0.219***	0.016	0.207***	0.022
Observations	*6,367*		*4,085*		*2,282*	

Associations between socioeconomic variables and RSBY membership confirm the pro-poor targeting of the scheme. Households in the highest asset tertile are 4pp less likely to be enrolled compared to those in the middle. Members of scheduled castes or tribes (SCST) are more likely to enrol in the programme (7pp). Household heads with primary secondary or higher-secondary education, are less likely to be enrolled (3pp, 4pp and 6pp respectively).

Regarding demographics, we find that larger households are more likely to enrol (1pp), which likely is related to the premium not rising with household size (up to 5 members). Interestingly, households with a higher proportion of children or older women are less likely to be enrolled.

There appears relatively little variation in these associations across states. Factors such as the insurance awareness and CBHI membership only play a part in enrolment decisions among households in UP (3pp and 4pp respectively). Any education among household heads is only negatively associated with enrolment in Bihar (7pp for primary, 7pp for secondary and 17pp for higher-secondary education). As already expected from Figure 1, RSBY membership, conditional on other characteristics, is more concentrated among the poor in Bihar as compared to UP.

4.3 Determinants of non-renewals

Table 4 presents results from an OLS model analysing the determinants of not renewing RSBY membership in 2013, conditional upon being enrolled in 2012. Households with members who are chronically ill are much less likely to drop out. An increase in the proportion of chronically ill members (by 1pp) reduces the probability of non-renewal by 12pp. Households belonging to SCST are also less likely (12pp) to drop out from the RSBY. Lastly, household size is negatively associated with the likelihood of dropping out at the pooled level (3pp).

Table 4: Determinants of non-renewals in 2013

Variables	Pooled		Uttar Pradesh		Bihar	
	Marginal Effects	Standard Error	Marginal Effects	Standard Error	Marginal Effects	Standard Error
Proportion of household members with chronic illnesses (percent of household)	-0.118*	0.067	0.008	0.120	-0.195**	0.078
Any hospitalizations in the household (1/0)	0.048	0.041	0.081	0.075	0.047	0.048
Log of average Distance from facility	0.019	0.030	0.070	0.111	0.022	0.031
Low insurance index score(1/0)	0.037	0.142	-0.109	0.289	0.083	0.158
High insurance index score (1/0)	-0.012	0.030	0.021	0.054	-0.031	0.035
Enrolled in CBHI(1/0)	-0.006	0.040	-0.015	0.072	-0.003	0.048
Lowest asset tertile (1/0)	0.038	0.036	0.052	0.068	0.017	0.041
Highest asset tertile (1/0)	0.045	0.037	0.051	0.060	0.042	0.048
Household belongs to a scheduled tribe/caste (1/0)	-0.120***	0.034	-0.139**	0.057	-0.113***	0.044
Primary education (1/0)	0.071	0.046	0.090	0.083	0.051	0.055
Secondary education (1/0)	-0.017	0.039	-0.019	0.067	-0.014	0.048
Higher secondary education (1/0)	0.070	0.060	0.059	0.093	0.059	0.087
Other employment (1/0)	0.005	0.076	-0.029	0.120	0.026	0.104
Casual wage labourer (1/0)	0.034	0.038	0.017	0.071	0.051	0.045
Not working (1/0)	0.022	0.065	0.195*	0.114	-0.094	0.077
Doing housework (1/0)	0.033	0.050	-0.008	0.094	0.046	0.058
Female headed household (1/0)	-0.053	0.047	-0.007	0.087	-0.059	0.055
Household size	-0.028***	0.009	-0.041***	0.014	-0.018	0.011
Female 0 to 13yrs (1/0)	0.122	0.121	0.312	0.210	0.027	0.153
Female older than 55 (1/0)	0.118	0.145	-0.047	0.257	0.210	0.174
Male 0 to 13yrs (1/0)	0.091	0.120	0.229	0.210	0.018	0.149
Male 14 to 55yrs (1/0)	-0.14	0.134	-0.12	0.223	-0.15	0.170
Male older than 55 (1/0)	0.125	0.202	-0.156	0.338	0.338	0.256
Observations	956		408		548	

Notes: Table shows marginal effects of OLS models using village level fixed effects. The binary dependent variable shows whether the household did not renew its subscription to the RSBY in 2013, conditional upon being enrolled in 2012. *, **, *** indicate significance at the 10%, 5% and 1% respectively.

Variation across states is once again limited. Adverse selection is more pronounced in Bihar, while there is no significant correlation between the proportion of household members with a chronic illness and RSBY dropout in Uttar Pradesh. Overall, we find fewer significant effects in models of dropout as compared to those of enrolment, which might be related to the relatively low drop-out rates and smaller sample size. The presence of chronic illnesses, being a member of SCST and household size play a positive role in both enrolling and remaining in the scheme. Factors such as

average distance from inpatient facilities, understanding of insurance, wealth and household demographics are related to enrolment but are not significantly related to of the probability of dropping out of RSBY.

4.4 Associations between RSBY membership and inpatient care use and spending

Table 5 presents results on the changes in health care use and spending that are associated with RSBY membership. The first row of results shows effects on the probability of hospitalization within a household over the preceding year. This is followed by the effects on the likelihood of incurring any expenses, and the amount spent, both conditional upon being hospitalized. We further investigate whether participation precipitates any change in the probability of incurring debt due to this hospitalization and the amount of debt, conditional on borrowing.

Table 5: Associations between RSBY membership and inpatient care use and spending

	Pooled		UP		Bihar	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Probability of hospitalizations (1/0)	0.000	(0.010)	-0.010	(0.013)	0.015	(0.017)
Observations	10125		6359		3766	
Probability of having healthcare expenses conditional on use (1/0)	0.007	(0.026)	0.001	(0.042)	0.007	(0.031)
Observations	1413		836		577	
Log of healthcare expenses conditional on spending (INR)	-0.056	(0.170)	0.224	(0.296)	-0.361*	(0.190)
Observations	1361		804		577	
Probability of debt conditional on use (1/0)	0.061	(0.058)	0.059	(0.085)	0.017	(0.083)
Observations	1413		836		577	
Log of the amount of debt conditional on borrowing (INR)	-0.078	(0.206)	0.251	(0.353)	-0.547**	(0.232)
Observations	1100		643		457	

Notes: Table shows coefficients of OLS models using household level fixed effects. Logged forms of healthcare expenses and the amount of debt are used in the respective models. *, **, *** indicate significance at the 10%, 5% and 1% respectively.

RSBY membership is not significantly associated with the likelihood of hospitalization or the likelihood of positive spending within a household, the latter most likely related to high likelihood of having expenses at baseline. This is true for the pooled sample, and for both of the state specific samples. We do however find RSBY membership to be associated with a reduction in OOP spending in Bihar (36%). RSBY households in Bihar concurrently experience a 55% reduction in the amount of debt incurred in dealing with the cost of hospitalization. We find no significant effects on financial protection in UP. We carry out additional sensitivity analysis by restricting the sample to households in the bottom two asset tertiles. Results in general are comparable and are presented in Annex Table A5.

5.0 Discussion and concluding remarks

The Government of India (GoI) initiated Rashtriya Swasthya Bima Yojana (RSBY) in 2008 to provide inpatient insurance coverage to below-poverty-line (BPL) households in India. To date, the RSBY provides coverage to nearly 37 million BPL households across all 29 states. This paper examines three aspects of the programme taking place in the Uttar Pradesh (UP) and Bihar states of India. Using household level panel data, we first examine determinants of enrolment into RSBY followed by the determinants of dropping out of the scheme. Lastly, the paper investigates whether RSBY membership is associated with increases in hospitalization rates and decreases in spending on inpatient care.

By 2013, more than half of our sample is enrolled in RSBY (51%). We do not have information on BPL status, but would expect about two-thirds of our sample to have BPL status, which would mean that coverage of RSBY in these states is reasonably high. While we do find coverage to be more concentrated among the poorest, the socioeconomic gradient is very weak in UP. This could

be related to either some mistargeting of RSBY or mistargeting of BPL cards. Our findings correspond with observations made in similar studies. Sun (25) for example speculated that the fact that the BPL list had been created nearly a decade prior to the launch of the RSBY considerably increased the potential for mistargeting. Subsequently, evidence of leakage was found by both Nandi et al. (24) and Bahcchi (32).

Analysis of the determinants of enrolment into the scheme reveals several insights. Firstly, the positive correlation between existing chronic conditions and enrolment suggests problems of adverse selection which might threaten sustainability of the scheme. The programme's pro-poor targeting is reflected in a higher concentration of poor wealth groups, lower educated households and SCST households among the enrolled. Insurance related awareness plays a considerable role in the household's decision to join the scheme. Additionally, we find enrolment rates vary considerably across villages (ranges between 7% and 78%), which might reflect geographical factors or variation in the efficacy of the RSBY partners (insurance companies) in enrolment activities. Distance to the nearest facility is negatively correlated to the likelihood of enrolling in the scheme. This indicates that the insured are indeed sensitive to accessibility and quality of care. Strengthening the health infrastructure by improving its quality and access will likely encourage more eligible households to join.

We find that the drop-out rates among RSBY households are relatively low (11% on average), suggesting that the program is considered to offer good value for (a limited amount of) money. Households with chronic illnesses are less likely to drop-out, further suggesting problems of adverse selection. SCST households are more likely to retain their membership.

We do not find RSBY membership to be associated with an increased likelihood of using inpatient care. The association between RSBY membership and financial protection appears to differ across

the states. While no effects are seen among RSBY households in UP, insurance coverage is associated with a substantial reduction in OOP (36%) and the amount of debt incurred (55%) in Bihar. This contradicts the findings of an earlier study focusing on Andhra Pradesh, Karnataka and Tamil Nadu by Selvaraj and Karan (2012), who find that that weak scheme administration, lack of effective operational oversight and absence of accountability mechanisms led to increased expenses in inpatient care. This difference in results is likely driven by the fact that each state has a heterogeneous number of players and methods of implementation. The larger effect in Bihar, as compared to UP, could be related to the development efforts by the Bihar government since 2005.[xx] These efforts include attempts to improve upon and enlarge access to basic services such as transportation and primary, secondary and vocational education (36). Most importantly, the development efforts placed considerable focus on health through upgrading of health infrastructure and manpower, outsourcing diagnostic facilities, providing access to free medication, provision of emergency services, and maintenance of accountability through web-based monitoring (37).

Despite the positive effect on financial protection in Bihar, confirming the findings of Devadasan et al. (2013), we find that the programme does not provide cashless access to inpatient care. We find the probability of incurring any expenses for hospitalization to be close to one in both states for the whole sample. This might be related to RSBY not covering the full costs of treatment given to insured patients, or to problems of awareness among the low SES target group of RSBY.

There are some limitations to this paper. First and foremost, the surveys did not collect information regarding the respondent households' BPL status and the duration of enrolment in the RSBY. We are unable to ascertain whether the respondents, when hospitalized, in fact sought care from RSBY empanelled institutions. The data on which the paper is based were collected to gauge the impact of a CBHI scheme and is restricted to SHG households. Furthermore, as we have a relatively small sample of households which experienced hospitalization, models that are conditional on use may

have low statistical power. RSBY was clearly not rolled out in a randomized way. While we do control for a rich set of observable characteristics and household fixed effects, there may still be unobservable time-varying characteristics that correlate with both the uptake of RSBY and the need for inpatient care. Notwithstanding these limitations, our study concludes that RSBY is indeed pro-poor, but there is evidence of adverse selection which might jeopardize long term sustainability. While insured households still need to make OOP payments for inpatient care in both states, RSBY is associated with increased financial protection in Bihar.

RSBY has the potential to contribute to India's move towards UHC. A further, more qualitative investigation, of the differences in RSBY implementation and management across the two states will provide useful insights on how to improve effectiveness of RSBY in UP. The focus on inpatient coverage might be a further point of concern. It is likely that generous inpatient care coverage in the absence of outpatient coverage might lead to inefficient and unnecessary use of hospital care.[xxi] Like many LMICs India is experiencing an epidemiological shift towards non-communicable diseases (39), and the management of such conditions, typically through outpatient based care, has been found to represent one of the largest shares of households' health related expenditures (34). Moving forward to UHC will therefore also have to entail an extension of outpatient care coverage, either through RSBY or separate schemes (34). Improving the targeting of RSBY, through a revision of the BPL list, should also rank high on the policy agenda.

6.0 Acknowledgements

7.0 References

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8.0 Annex:

Table A1: Summary statistics of control variables in 2010

Definition	Households with RSBY membership	Households without RSBY membership	Test: RSBY HH=Non-RSBY HH	Test: RSBY HH=Non-RSBY HH	Test: RSBY HH=Non-RSBY HH
	Pooled Data			Uttar Pradesh	Bihar
			P-value (1)	P-value (2)	P-value (3)
Insurance					
Client of CBHI (1/0)	0.00	0.00	1.000	1.000	1.000
Insurance awareness index (ranging from 0 to 1)	0.00	0.00	1.000	1.000	1.000
Demographics					
female headed household (1/0)	0.24	0.23	0.444	0.399	0.456
household size	5.76	5.81	0.539	0.162	0.062
Female 0-13 years (1/0)	0.18	0.16	0.000	0.681	0.214
Female 14-55 years (1/0)	0.29	0.31	0.006	0.972	0.016
Female 55 year+ (1/0)	0.05	0.05	0.057	0.035	0.060
Male 0-13 years (1/0)	0.19	0.19	0.729	0.004	0.759
Male 14-55 years (1/0)	0.25	0.26	0.009	0.521	0.431
Male 55 year+ (1/0)	0.04	0.04	0.941	0.810	0.859
Socioeconomics					
no education (1/0)	0.45	0.38	0.000	0.707	0.030
primary education (1/0)	0.16	0.15	0.622	0.539	0.927
secondary education (1/0)	0.31	0.35	0.016	0.714	0.786
higher secondary education (1/0)	0.08	0.12	0.000	0.487	0.000
Lowest asset tertile (1/0)	0.43	0.35	0.000	0.535	0.008
Middle asset tertile (1/0)	0.34	0.33	0.611	0.345	0.210
Highest asset tertile (1/0)	0.23	0.32	0.000	0.108	0.000
household belongs to a scheduled tribe/caste (1/0)	0.40	0.29	0.000	0.000	0.000
self-employed (1/0)	0.43	0.48	0.011	0.605	0.383
other employment (1/0)	0.04	0.08	0.000	0.073	0.049
casual wage labourer (1/0)	0.32	0.24	0.000	0.316	0.003
not working (1/0)	0.05	0.06	0.030	0.907	0.255
doing housework (1/0)	0.16	0.14	0.105	0.640	0.338
Location					
Bihar	0.54	0.27			
UP	0.46	0.73			

Notes: Table shows summary statistics across RSBY and non-RSBY households in 2010. P-values 1 through 3 refer to results derived from t-tests comparing values from the enrolled and non-enrolled at the pooled level and by sites.

Table A2: Summary statistics of outcome variables for pooled sample in 2012 and 2013

Definition	Households with RSBY membership	Households without RSBY membership	Test: RSBY HH=Non-RSBY HH	Households with RSBY membership	Households without RSBY membership	Test: RSBY HH=Non-RSBY HH
	2012			2013		
			P-value			P-value
Proportion of household members with chronic illnesses	0.255	0.233	0.014	0.266	0.256	0.243
Any hospitalizations in the household (1/0)	0.138	0.126	0.342	0.144	0.127	0.162
Probability of incurring expenses due to hospitalization(1/0)	0.944	0.968	0.230	0.963	0.931	0.132
Direct hospitalization expenses (INR)	16876	19912	0.518	16452	17927	0.633
Standard Deviation	(42289)	(32221)		(23004)	(40736)	
Average distance to facility (km)	29	36	0.000	34	39	0.000
Standard Deviation	(24)	(17)		(25)	(24)	
Household with debt due hospitalization (1/0)	0.720	0.788	0.120	0.805	0.757	0.227
Debt amount (INR)	10238	11918	0.431	13072	13233	0.933
Standard Deviation	(16704)	(35372)		(19854)	(20443)	

Notes: Table shows summary statistics across RSBY and non-RSBY households in 2012 and 2013. P-values refers to t-tests comparing means of the enrolled and non-enrolled of the pooled sample.

Table A3: Summary statistics of control variables for the pooled sample in 2012 and 2013

Definition	Households with RSBY membership	Households without RSBY membership	Test: RSBY HH=Non-RSBY HH	Households with RSBY membership	Households without RSBY membership	Test: RSBY HH=Non-RSBY HH
		2012			2013	
			P-value			P-value
Insurance						
Client of CBHI (1/0)	0.343	0.300	0.014	0.331	0.254	0.000
Insurance awareness index (ranging from 0 to 1)	0.495	0.497	0.765	0.536	0.526	0.090
Demographics						
female headed household (1/0)	0.313	0.302	0.547	0.294	0.300	0.744
household size	5.498	5.565	0.440	5.549	5.542	0.933
Female 0-13 years (1/0)	0.121	0.104	0.002	0.182	0.180	0.716
Female 14-55 years (1/0)	0.358	0.357	0.877	0.297	0.300	0.571
Female 55 year+ (1/0)	0.057	0.065	0.124	0.046	0.056	0.040
Male 0-13 years (1/0)	0.130	0.128	0.698	0.207	0.200	0.267
Male 14-55 years (1/0)	0.285	0.293	0.249	0.227	0.222	0.343
Male 55 year+ (1/0)	0.049	0.053	0.400	0.040	0.042	0.590
Socioeconomics						
no education (1/0)	0.493	0.412	0.000	0.473	0.396	0.000
primary education (1/0)	0.153	0.153	0.984	0.137	0.160	0.070
secondary education (1/0)	0.271	0.325	0.002	0.303	0.323	0.214
higher secondary education (1/0)	0.083	0.111	0.014	0.086	0.121	0.001
Lowest asset tertile (1/0)	0.401	0.326	0.000	0.312	0.226	0.000
Middle asset tertile (1/0)	0.349	0.339	0.547	0.344	0.307	0.025
Highest asset tertile (1/0)	0.250	0.336	0.000	0.345	0.467	0.000
household belongs to a scheduled tribe/caste (1/0)	0.353	0.316	0.033	0.362	0.290	0.000
self-employed (1/0)	0.381	0.449	0.000	0.436	0.442	0.732
other employment (1/0)	0.064	0.088	0.017	0.048	0.055	0.409
casual wage labourer (1/0)	0.357	0.237	0.000	0.266	0.236	0.047
not working (1/0)	0.046	0.060	0.110	0.069	0.079	0.246
doing housework (1/0)	0.152	0.167	0.296	0.181	0.188	0.592
Location						
Bihar	0.585	0.283	0.000	0.479	0.238	0.000
UP	0.415	0.717	0.000	0.521	0.762	0.000

Notes: Table shows summary statistics across RSBY and non-RSBY households in 2012 and 2013. P-value refers to results derived from t-tests comparing values from the enrolled and non-enrolled at the pooled level.

Table A4: Determinants of RSBY membership in 2012 and 2013

Variables	Pooled		Uttar Pradesh		Bihar	
	Marginal Effects	Standard Error	Marginal Effects	Standard Error	Marginal Effects	Standard Error
Proportion of household members with chronic illnesses (percent of household)	0.046*	0.041	0.032*	0.051	0.055	0.068
Log of average Distance from facility	0.024	0.024	0.080	0.052	0.006	0.029
Low insurance index score(1/0)	-0.061	0.045	-0.076	0.054	-0.036	0.079
High insurance index score (1/0)	0.021	0.016	0.024	0.019	0.012	0.027
Enrolled in CBHI(1/0)	0.019*	0.023	0.050*	0.028	-0.026	0.038
Lowest asset tertile (1/0)	-0.03	0.022	-0.025	0.028	-0.032	0.036
Highest asset tertile (1/0)	0.013	0.022	0.007	0.026	0.022	0.040
Primary education (1/0)	-0.030	0.032	-0.019	0.042	-0.054*	0.050
Secondary education (1/0)	-0.005**	0.036	0.013	0.046	-0.027	0.059
Higher secondary education (1/0)	0.054	0.058	0.091	0.071	0.001	0.105
Other employment (1/0)	-0.010	0.038	0.044	0.047	-0.097	0.067
Casual wage labourer (1/0)	-0.009	0.023	0.008	0.029	-0.035	0.038
Not working (1/0)	0.006	0.037	0.017	0.044	-0.011	0.071
Doing housework (1/0)	-0.020	0.029	-0.002	0.036	-0.053	0.049
Female headed household (1/0)	0.023	0.036	0.093*	0.048	-0.053	0.057
Household size	0.023***	0.007	0.028***	0.009	0.020	0.014
Female 0 to 13yrs (1/0)	0.006	0.087	-0.053	0.110	0.083	0.144
Female older than 55 (1/0)	-0.279***	0.107	-0.262**	0.126	-0.374*	0.214
Male 0 to 13yrs (1/0)	-0.212*	0.115	-0.184	0.142	-0.306	0.197
Male 14 to 55yrs (1/0)	-0.139	0.095	-0.038	0.117	-0.337**	0.169
Male older than 55 (1/0)	-0.064	0.147	-0.054	0.182	-0.065	0.253
Year: 2013	0.178***	0.038	0.176***	0.045	0.186***	0.070
Observations	*6,367*		*4,085*		*2,282*	

Notes: Table shows marginal effects of OLS models using household level fixed effects. The binary dependent variable shows whether a household is enrolled in RSBY. Data is pooled across the three survey years. *, **, *** indicate significance at the 10%, 5% and 1% respectively.

Table A5: Effects of RSBY

	Pooled		UP		Bihar	
	Coefficient	Standard error	Coefficient	Standard error	Coefficient	Standard error
Probability of hospitalizations (1/0)	0.000	(0.013)	-0.011	(0.017)	0.014	(0.020)
Observations	*6755*		*3973*		*2782*	
Probability of having healthcare expenses conditional on use (1/0)	0.014	(0.039)	-0.007	(0.078)	0.043	(0.045)
Observations	*897*		*476*		*421*	
Log of healthcare expenses conditional on spending (INR)	-0.278	(0.195)	0.577	(0.438)	-0.675***	(0.234)
Observations	*858*		*455*		*403*	
Probability of debt conditional on use (1/0)	0.047	(0.074)	-0.013	(0.115)	0.174	(0.100)
Observations	*897*		*476*		*421*	
Log of the amount of debt conditional on borrowing (INR)	-0.166	(0.269)	0.347	(0.572)	-0.611***	(0.277)
Observations	*740*		*385*		*355*	

Notes: Table shows coefficients of OLS models using household level fixed effects. Association between RSBY membership and inpatient utilization/financial protection identified for the bottom two-third of the households. Logged forms of healthcare expenses and the amount of debt are used in the respective models. *, **, *** indicate significance at the 10%, 5% and 1% respectively.

Endnotes

[i] Less than 15% of the population was covered by health insurance in 2009 (2).

[ii] Private expenditure constitutes 81% of total health expenditure in India of which 94% is out-of-pocket expenditure (2-5)

[iii] Schemes from state governments include Sanjeevani implemented in Punjab, the Chief Minister's Health Insurance scheme in Assam and the Aarogyasri in Andhra Pradesh. At the national level, the ministry of finance had implemented the Universal Health Insurance Scheme along with Employees State Insurance Scheme and the Central Government Health Scheme (14-16).

[iv] Recently the programme has been expanded to include additional categories of poor households such as construction workers, rural employment guarantee scheme workers, street vendors and so forth (22).

[v] A self-help group (SHG) usually consists of between 10–20 poor women living in the same village who come together and agree to save a specific amount each period. The savings of all SHG members are combined and deposited in a bank or a co-operative organization. Members may borrow from the pooled savings when the SHG agrees to give the loans. SHGs are usually supported and trained by NGOs. According to Fouillet, Augsburg (2008), there are about 40 million SHG members in India.

[vi] Nearly 50% of the households in our sample with RSBY membership have reported per capita household expenditures that are greater than the rural poverty line in the respective states. This could indicate either mistargeting of the RSBY scheme, or mistargeting of the BPL cards. Reports of mistargeting and corruption in the issuance of BPL cards are well documented in the existing literature (24, 28).

[vii] Ethical approval, for all data and their intended purposes for this and related studies, were acquired from the independent ethics committee of the University of Cologne. Informed verbal consent was taken prior to each interview, and respondents were free to halt the interview at any time, or to refuse to answer specific questions. Verbal consents were strategically sought considering the majority of the respondents were illiterate. After reading a statement iterating the purposes for the survey (in the local language), the following question was asked, the reply recorded and appropriate actions undertaken: "Are you willing to answer this survey?" Each of the aforementioned procedures were explicitly cleared by the ethics committee.

[viii] Chronic conditions are defined as outpatient illnesses that have lasted longer than 30 days preceding the survey.

[ix] Since respondents only report distance (in kilometres) for the providers they actually visit, we impute the distance to the nearest hospital for those households that have not used inpatient care (Borah 2006, McFadden, Train 2000, Qian et al. 2009). We estimate a log linear model on the sample of hospital users and subsequently predict the distance (Qian et al. 2009, Raza et al. 2013). Covariates used to predict the distance include household level demographic, socioeconomic and regional indicators.

[x] We attempt to match the self-reported names of the hospitals visited to the list provided in the RSBY website to get an understanding of the extent of use of such empaneled hospitals, but were only successful in matching 20% of the used hospitals (Government of India 2014).

[xi] The CBHI enrolment indicator is included as a proxy for the risk averseness of the household rather than to capture any substitution effects within the schemes given the RSBY coverage is considerably more generous and that the bulk of CBHI coverage pertains to outpatient care.

xii In the way it is measured, insurance related awareness may be a consequence of enrolment into an insurance scheme rather than a determinant. We have confirmed robustness of results to omitting this potentially endogenous variable, and omit this variable from model 3 (described in Section 3.2) as the household fixed effects should capture awareness (to the extent that it is time-invariant).

xiii The asset tertiles includes household level characteristics such as availability of running water, toilet, electricity, roof material and the ratio of cement to dirt floors. The index also includes durable assets such as livestock, fans, radio/televisions, sewing machines, bicycles/motorcycles, mobile telephones and generators.

xiv Direct costs refer to consultation fees, costs of medicine and lab/imaging tests, net of reimbursements from any schemes such as the CBHI.

xv We prefer village over household level fixed effects because some of the more interesting determinants, like the SCST status do not change over time. We have checked and confirmed robustness of results to using household level fixed effects (see Annex Table A4). While most results remain consistent, some differences arise for the coefficients on the insurance awareness indices and distance to healthcare facilities, which is related to their limited variation over time.

xvi As we are less interested in the coefficients on the household level covariates, we prefer using household fixed effects rather than village fixed effects as the former allow capturing more of the unobserved household level heterogeneity that may bias our coefficients on the RSBY variable.

xvii Note this is different from difference-in-differences models in the sense that we use both households that enroll and drop out from one year to another as 'treatment' households, and those that are enrolled throughout or never enrolled as controls.

xviii Limiting the sample to those not enrolled in 2010 would not be particularly helpful in addressing the sample selection problem, because we do not know whether households have never enrolled, or have dropped out recently.

xix Qualitative data collection suggests that around two-thirds of our sample should possess a BPL card.

xx The departments heading the RSBY in Bihar (DoHFW) and in UP (DoRD) were different, thereby leading to line management differences in the initial implementation. Subsequently, RSBY in UP was implemented by DoHFW. Secondly, political governance and administration has had different trajectory in Bihar as compared to UP, with the latter facing scams involving National Rural Health Mission and its repercussions on community perceptions. In Bihar, the government ownership to RSBY at the district-level was relatively higher than UP. These observations were communicated by the field-partners and some officials engaged with the implementation of RSBY.

xxi Lessons from the Chinese New Cooperative Medical System for example suggests the absence of outpatient coverage is likely to increase incidences of out-of-pocket payments and reduce impact on financial protection (38).