Does social health insurance reduce financial burden? Panel Data Evidence from India

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Abstract

Indian government launched a National Health Insurance Scheme known as Rashtriya Swasthya Bima Yojana (RSBY) in 2008 that provides cashless health services to poor households in India. We evaluate the impact of RSBY on RSBY beneficiary households' (Average Treatment Impact on the Treated) utilization of health services, per capita out-of-pocket (OOP) expenditure, and per patient OOP expenditures on major morbidities. To address the issue of non-randomness in enrollment into the scheme, we exploit the longitudinal aspect of a large nationally representative household survey data to implement difference-in-differences with matching. We find some evidence of positive impact of RSBY on utilization of health services by RSBY beneficiary households in rural India but not in urban India. However, there is no evidence that the RSBY reduced per person OOP expenditure for RSBY households in both rural and urban areas. Conditional on having received medical treatment for major morbidity, we find lower expenditure on medicine for a RSBY cardholder patient in rural areas.

JEL: I1, I18, I38
Keywords: SHI, RSBY, IHDS, out-of-pocket expenditure, health services utilization

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1 Introduction

Access to health services, education, food, water, housing, sanitation, and information as well as enjoyment of a basic level of income security are, human rights enshrined in the Universal Declaration of Human Rights. Social protection is an important factor in enabling people to exercise these rights (UNDP, 2011). In recent past, Indian Parliament has passed many legislations towards achievement of these rights, such as National Rural Employment Guarantee Act (NREGA) that guarantees 100 days of work at minimum wage per household in a year, Right to Education Act that provides free and compulsory education for children between 6 and 14 till completion of elementary education in a neighborhood school. In the same spirit, Government of India (GOI) introduced a National Health Insurance Scheme known as Rashtriya Swasthya Bima Yojana (RSBY) in early 2008 that was initially designed to target only the Below Poverty Line (BPL) households, but has been expanded to cover other defined categories of unorganized workers.

Health care in India is financed through various sources, including individual out-of-pocket (OOP) payments, central and state government tax revenues, external aid and profits of private companies. National Health Accounts data from 2004-2005 show that central, state and local governments together account for only about 20 per cent of India's total health expenditure. More than 78 per cent of the health expenditure comprised OOP expenditures—one of the highest rates in the world. External aid to the health sector accounted for a negligible 2 per cent of the total health expenditure (Swarup and Jain, 2011). Given the large share of OOP payments in health care in India, RSBY is considered a very innovative scheme that relies on providing cashless health services to the beneficiary households without any paperwork with the use of smart cards (more details are provided in section 1.1) with only a marginal enrollment/renewal cost of 30 Indian Rupees (INR) (about $0.5) per year.[1] It covers up to five members of family. As of November, 2012, 33.19 million

[1]The World Bank hailed RSBY as a model of good design and implementation with important lessons for other programs in India. http://pib.nic.in/newsite/efeatures.aspx?relid=69262

BPL families were enrolled in RSBY, and an estimated 165.9 million persons were a part of "BPL-families-with-a-RSBY-card" (Ministry of Labour and Employment, 2012). This is about 13.6 percent of Indian population in 2012.

In this paper, we evaluate the impact of RSBY on RSBY beneficiary households' (Average Treatment Impact on the Treated, ATT) utilization of health services, per capita in-patient, out-patient, and total OOP expenditure. We distinguish between utilization of health services for short term morbidity and long term morbidity, and also consider different components of health expenditure such as hospitalization cost, medicine cost, and transportation cost. In addition, we also provide impact of RSBY on an individual's utilization of health services and expenditure conditional on having received medical treatment (i.e. actual patient) for long term illness. Using a nationally representative longitudinal survey, we combine difference-in-differences with matching to mitigate the self-selection issue that induces biases in impact evaluation of health insurances. Difference-in-differences with matching should take care of selection issues as long as the macro trend observed between treated and non-treated households remain same. Since we use the non-treated households from same area, and our propensity score matching does a good job in balancing the characteristics in baseline across RSBY and non-RSBY households, the assumption is likely to be satisfied. We also provide suggestive evidence in favor of similar trend between RSBY and non-RSBY households by carrying out a placebo exercise.

The Indian experiment with social health insurance is not new, and several developing countries have recently used tax revenues to subsidize health insurance for informal-sector (usually rural) workers and their families, or at least the poorer ones among them (Wagstaff et al., 2009). For example, Indonesia launched a health insurance scheme for the poor in 2004 with the ultimate objective of bringing all Indonesians (including those who are currently enrolled in social insurance schemes for formal sector workers) under one cover (Rokx et al., 2009). In 2003, China adopted a new health insurance system, the New Cooperative Medical Scheme (NCMS), in rural areas where 80% of people were without health insurance of any

kind (Wagstaff et al., 2009). The WHO (2010) and the World Bank (Hsiao and Shaw 2007) have endorsed the restriction of OOP expenditures for health care at the time of use through the prepayment of insurance as an important step toward averting the financial hardship associated with paying for health care (Acharya et al., 2012). Acharya et al. (2012) present a systematic review of the literature on the extent to which social health insurance schemes enhance access to care and offer protection from financial risk to households in the informal sector.[2]

There is a growing interest and literature on RSBY.[3] A number of studies examine the enrollment into RSBY. Nandi et al. (2013) use district-wise official data on RSBY enrollment, and correlate those with district characteristics, state-level information on fiscal health, political affiliation, and quality of governance. Based on probit and multivariate OLS analysis they find that districts with a higher share of socioeconomically backward castes are less likely to participate, and their enrolment rates are also lower. In addition, districts with more non-poor households may be more likely to participate, although with lower enrolment rates. Rajshekar et al. (2011) examine the implementation of RSBY in the state of Karnataka from the initial political and planning processes through the first six months of operation. They use a large survey of eligible households and interviews with empanelled hospitals in the state. They find that six months after initiation in early 2010, an impressive 85% of eligible households in the sample were aware of the scheme, and 68% had been enrolled. They also find that a large proportion of beneficiaries were yet to receive their cards, and many did not know how and where to obtain treatment under the scheme. Das and Leino (2011) find that Information and Education Campaign in Delhi is not associated

[2]Ekman (2004) provides a review of the literature on community based health insurance (CBHI) schemes.

[3]There exists literature that evaluate community based health insurance (CBHI) and state governments' health schemes in India. For example, Aggarwal (2010) evaluates the CBHI scheme 'Yeshasvini health insurance' for cooperative rural farmers and informal sector workers implemented in the state of Karnataka. Using a one-time survey of 4109 households and propensity score matching, she finds that the CBHI scheme increased the use of health services, reduced OOP spending and improved health outcomes. Fan et al. (2012) evaluate the impact of 'Aarogyasri health insurance' implemented in the state of Andhra Pradesh. They exploit variation in program roll-out over time and districts to evaluate the impacts of the scheme using difference-in-differences methodology.

with higher enrollment.

Another set of studies examine the RSBY households from certain geographical locations. Rathi et al. (2012) and Devadasan et al. (2013) use data from families enrolled in RSBY from one district (Amaravati district in the state of Maharashtra and Patan district in the state of Gujarat, respectively), and find that a large proportion of families enrolled in RSBY continue to incur OOP spending despite that RSBY is a cashless scheme with no co-payment or fees at point of service.

Unlike the above-mentioned studies which are based on beneficiary surveys in few districts, Johnson and Krishnaswamy (2012) use cross-section consumption surveys conducted by National Sample Survey (NSS) in 1999-00, 2004-05 and 2009-10. They matched districts based on the characteristics, and use a difference-in-differences strategy across RSBY districts vs non-RSBY districts. They find a small decrease in out-of-pocket household out-patient expenditure, and limited evidence of increase in the number of households that have had a hospitalization case. Similar to Johnson and Krishnaswamy (2012), Karan et al. (2015) use NSS cross-section consumption expenditure data from 1999-00, 2004-05, and 2011-12, and study the impact of RSBY on per household member monthly OOP spending, share of the OOP expenditure in households' total monthly consumption expenditure, and whether a household experienced catastrophic healthcare payments (defined as OOP spending greater than 10% of the total consumption expenditure). Their identification strategy also relies on treating all eligible households residing in RSBY districts as treated and all eligible households residing in non-RSBY districts as non-treated. They proxy eligibility of the households by restricting their sample to bottom two quintiles of consumption expenditure.[4] They do not find significant impact of RSBY on OOP expenditure. Ravi and Bergkvist (2015) use NSS cross-section consumption expenditure data from 2004-05 and 2009-10 and difference-in-differences methodology to study the impact of publicly provided

[4]They also report that the bottom two quintiles account for 65% of the households who reported having BPL card in the 2004-05 and 2011-12 NSS data. They choose to proxy by consumption quintiles as BPL card status is not reported in the 1999-00 NSS data.

health insurance schemes in India on the likelihood of impoverishment, catastrophic health expenditure, and the poverty gap index.[5] In essence, Johnson and Krishnaswamy (2012), Ravi and Bergkvist (2015), and Karan et al. (2015) provide estimates for 'intention to treat' (ITT) effect, and not the average treatment effect on the treated (ATT).[6] Although ITT is a useful policy parameter, in the case of low uptake of the program it has limited usefulness. In addition, given that medical insurances are targeted towards specific households, the impact on beneficiary households is warranted.

Raza et al. (2016) use a panel household survey collected from rural areas of three districts (two from the state of Uttar Pradesh and one from the state of Bihar) in India. They examine the determinants of enrollment and drop-out from RSBY. Using household fixed effects, they found RSBY membership is not significantly associated with the likelihood of hospitalization. However, they find that RSBY membership to be associated with a reduction in OOP spending in Bihar but not in Uttar Pradesh.

We add to the literature in following way. First, we add to the growing literature on social health insurance (SHI) by evaluating a large SHI from a densely populated large country with a large share of OOP expenditures in health care. Second, unlike Johnson and Krishnaswamy (2012) and Karan et al. (2015), our estimates are ATT and not ITT. Unlike Raza et al.

[5]In addition to RSBY, their sample also include the three states Andhra Pradesh, Karnataka, and Tamil Nadu which also have simultaneous more generous state government health schemes. Both Johnson and Krishnaswamy (2012) and Karan et al. (2015) drop these three states from their sample to study only impact of RSBY.

[6]The ITT interpretation also remains a suspect given the difficulty in identifying the eligible population in the NSS data used in these studies. As discussed later, although the initial target population was BPL families, the coverage of NREGA workers in late 2009 expanded the program to some non-BPL families also. Authors' calculations from the IHDS 2012 suggest that at all India level, about 42 percent of the NREGA familes do not have BPL status at all India level. Johnson and Krishnaswamy (2012) restrict their sample to households reporting BPL status. Although the NSS 2004-05 data contain BPL status information, the 1999-00 and 2009-10 do not. Johnson and Krishnaswamy predict BPL status in all three datasets using a model of BPL status fitted in 2004-05 data. Since Johnson and Krishnaswamy use 2009-10 as post program data, their sample comes much closer to the eligible sample for the program ignoring the inclusion/exclusion erorrs from the model. Karan et al. (2015) proxy BPL status by restricting their sample to households in the bottom two quintiles of consumption distribution. Nonetheless, authors calculations from NSS 2011-12 data (68th round consumption expenditure, Type 1) suggest that about 48 percent of the households in bottom two quintiles of consumption distribution at the all India level do not report BPL status. Similarly, Ravi and Bergkvist (2015) sample include the entire population of the treatment and control districts which means that a large proportion of their sample is ineligible (or never offered) for the program.

(2016) whose data is limited to three districts, our data is nationally representative, and our main estimates are based on difference-in-differences with matching. Third, in addition to the household level observations, we also use individual specific utilization of health services. We are able to distinguish expenditure on short term morbidity vs long term morbidity as the financial implications of long term morbidities are more serious than short term morbidities. Moreover, we break the total OOP expenditure in different components, such as expenditure on hospital and doctor, medicines, and transportation. Fourth, we provide impact of RSBY on individual's utilization of hospital, government doctor, and total OOP expenditures conditional on actually having received medical treatment.

The findings of the paper are the following. The RSBY households in rural India are 3.2 percentage points more likely to report a household member being treated mostly driven by higher treatment for long term morbidities (5.0 percentage points higher). There is no statistically significant impact of RSBY on hospitalization rate of RSBY households. Importantly, although there is some evidence that RSBY reduced per person household OOP expenditure for RSBY beneficiary households in rural India, those impact estimates are not statistically significant. RSBY households in rural India spend lower on medicines. In urban India, we do not find statistically significant impacts of RSBY on RSBY households' utilization of health service and expenditure on health. Conditional on having received medical treatment for a long term morbidity, a patient with RSBY card spend 31 percent less on medicines in rural areas, however, we do not find a statistically significant impact of RSBY on households' per person OOP expenditure in rural areas. In addition, we do not find any statistically significant impacts on the outcomes considered in urban areas conditional on being treated for a long term illness.

The paper is organized as follows. Section 1.1 describes the RSBY program in detail. Section 2 describes the data. Section 3 details the empirical strategy, and Section 4 presents the results. Section 5 concludes.

1.1 Rashtriya Swasthya Bima Yojana (RSBY)[7]

The Unorganized Workers Social Security Act (2008) enacted by the Central Government recommended that the Central Government provide social security schemes to mitigate risks due to disability, health shocks, maternity and old age which all unorganized workers get exposed to and are likely to suffer from. A National Health Insurance Scheme known as Rashtriya Swasthya Bima Yojana (RSBY) was launched in early 2008 and was initially designed to target only the Below Poverty Line (BPL) households, but has been expanded to cover other defined categories of unorganized workers.[8,9]

The beneficiary of RSBY is any Below Poverty Line (BPL) family, whose information is included in the district BPL list prepared by the state government.[10,11] State governments through a competitive public bidding process select a public or private insurance company. The financial bid is essentially an annual premium per enrolled household. The premium cost for enrolled beneficiaries under the scheme is shared by Government of India and the state governments in 75:25 ratio. Once a qualified insurer wins the bid in a particular district, the premium payments that it would receive depends on the number of BPL households that it manages to enroll during a four-month period.[12] This clearly provides the insurer

[7]The information provided in this section is taken from RSBY websites (Retrieved April 30, 2016): http://www.rsby.gov.in/about_rsby.aspx; https://india.gov.in/spotlight/rashtriya-swasthya-bima-yojana

[8]The unorganized workers category covers building and other construction workers registered with the welfare boards, licensed railway porters, street vendors, NREGA workers who have worked for more than 15 days during the preceding financial year, beedi workers, domestic workers, sanitation workers; mine workers, rickshaw pullers, rag pickers, and auto/taxi drivers.

[9]The Labour and Employment Ministry of Government of India was as in charge of RSBY, however, effective from April 1, 2015, RSBY has been moved to Ministry of Health and Family Welfare (source: http://pib.nic.in/newsite/PrintRelease.aspx?relid=117875).

[10]The Below Poverty Line is a threshold to identify poor households that need government aid. The BPL list used for RSBY is based on a census undertaken in 2002. It uses 13 socioeconomic parameters such as food security, literacy and sanitation and uses different criteria for rural and urban geographies to identify BPL families. There are concerns about exclusion criteria in the 2002 BPL list. To overcome this, some states cover additional households that they consider poor (Krishnaswamy and Ruchismita, 2011).

[11]The decision to include NREGA workers in late 2009 effectively expanded the coverage to non BPL families (source: http://archive.indianexpress.com/news/insurance-scheme-to-include-nrega-workers/511643/). There is little information on the overlap between the BPL list and NREGA rolls, but some estimates suggest that half of NREGA workers do not have BPL status (Palacios, 2010).

[12]While more than one insurer can operate in a particular state, only one insurer can operate in a single district at any given point in time.

with a strong incentive to enroll as many households as possible, other things constant. The insurer must agree to cover the benefit package prescribed by Government of India through a cashless facility that in turn requires the use of smart cards which conform to certain specifications and must be issued to all members.

Once an insurer is identified, an electronic list of eligible BPL households is provided to the insurer, using a pre-specified data format. An enrollment schedule for each village along with dates is prepared by the insurance company with the help of the district level officials. As per the schedule, the BPL list is posted in each village at enrollment station and prominent places prior to the enrollment and the date and location of the enrollment in the village is publicized in advance. Mobile enrollment stations are set up at local centers (e.g., public schools) in each village. These stations are equipped by the insurer with the hardware required to collect bio-metric information (fingerprints) and photographs of the members of the household covered and a printer to print smart cards with a photo. The smart card, along with an information pamphlet, describing the scheme and the list of hospitals, is provided on the spot once the beneficiary has paid the 30 rupee fee and the concerned government officer has authenticated the smart card.[13] The process normally takes less than ten minutes. The eligible family needs to come to the enrollment station, and the identity of the household head needs to be confirmed by the authorized official. There is no premium charged to the beneficiary household. The beneficiary household only pays Indian Rupees (INR) 30 (approximately, $0.5) per annum as registration/renewal fee.

The beneficiaries under RSBY are entitled to hospitalization coverage up to INR 30,000/- per annum on family basis, for most of the diseases that require hospitalization.[14,15] All

[13]The insurer usually contracts out the enrollment work to a smart card service provider (SCSP) who organizes the enrollment process under the supervision of the insurer and the State Nodal Agency. Besides the enrollment team, a designated district-level government officer must be present to oversee the enrollment process. Specifically, this official, in his role as Field Key Officer (FKO), must verify the identity of the household head and must insert his own smart card into the enrollment application to issue the personalized smart card.

[14]1 USD=56 INR in June, 2012.

[15]RSBY also includes many day care surgeries/procedures which do not require stay at hospital. A list of day care surgeries covered under RSBY are: hemodialysis, parenteral chemotherapy, radiotherapy, eye surgery, lithotripsy (kidney stone removal), tonsillectomy, D&C, dental surgery following an accident, surgery

expenses related to the delivery of the baby in the hospital are also covered. Pre-existing conditions are covered from day one and there is no age limit. The coverage extends to maximum five members of the family which includes the head of household, spouse and up to three dependents. Additionally, transport expenses of INR 100/- per hospitalization will also be paid to the beneficiary subject to a maximum of INR 1000/- per year per family.

The unique feature of the scheme is use of smart cards and cashless attendance to all covered ailments. A list of the hospitals (empanelled hospitals, both public and private) is provided at the time of enrollment, and the beneficiary can choose the hospital where they want to go. The patient will not have to spend any amount for taking the treatment and hospitalization for the treatment cost up to INR 30000. It is the job of hospital to claim from the insurer. Moreover, on receipt of the smart card, the beneficiary shall be able to use health service facilities in any of the RSBY empanelled hospital across India. Any hospital which is empanelled under RSBY by any insurance company will provide cashless treatment to the beneficiary.

As of November, 2012, 33.19 million BPL families were enrolled in RSBY, and an estimated 165.9 million persons were a part of "BPL-families-with-a-RSBY-card". The scheme was implemented in 439 districts across 26 States and Union Territories. As of 31st October, 2012, a total of 12531 hospitals were empanelled under the RSBY scheme out of which 8539 (68%) were private hospitals and 3992 (32%) were public hospitals (Ministry of Labour and Employment, 2012). The program has the target to cover 70 million households by the end of the Twelfth Five Year Plan (2012-17), and could become a strong pillar for the universal health care system laid down by Government of India.

of hydrocele, prostrate, few gastrointestinal Surgery, genital surgery, surgery of nose, throat, ear, and urinary system, treatment of fractures/dislocation (excluding hair line fracture), contracture releases and minor reconstructive procedures of limbs which otherwise require hospitalization, laparoscopic therapeutic surgeries that can be done in day care, identified surgeries under general anesthesia, and any disease/procedure mutually agreed upon.

2 Empirical Framework

We use the longitudinal data to implement a matching difference-in-differences (MDID). In the presence of longitudinal or repeated cross-section data, matching and difference-in-differences (DID) can be combined to weaken the underlying assumptions of both methods (Blundell and Dais, 2009). We start with a simple model that assume the outcome for household i in time period t, y_{it}, depends on household observables and unobservables in period t, and whether the household holds a RSBY health insurance.

$$y_{it} = f(x_{it}) + \beta.rsby_{i1} + \gamma_i + \delta_t + \varepsilon_{it} \; where \, t = 0, 1 \tag{1}$$

where γ_i is the household specific time invariant unobservables, δ_t represents a time specific component, and ε_{it} is household specific idiosyncratic shock. In period 0 (2005 in our context), none of the households had RSBY. In period 1 (2012 in our context), some households are covered while others are not. In other words, the treatment variable $rsby_{i1}$ equals 0 in period 0, and it switches from 0 to 1 with positive probability in period 1. β captures the impact of RSBY.

More formally equation (1) can be written for each time period:

$$y_{i1} = f(x_{i1}) + \beta.rsby_{i1} + \gamma_i + \delta_1 + \varepsilon_{i1} \tag{2}$$

$$y_{i0} = f(x_{i0}) + \gamma_i + \delta_0 + \varepsilon_{i0} \tag{3}$$

Differencing the equations (2) from (3) get rids of household time invariant unobservables (δ_i), and we are left with the following:

$$y_{i1}^T - y_{i0}^T = f(x_{i1}^T - x_{i0}^T) + \beta + (\delta_1^T - \delta_0^T) + (\varepsilon_1^T - \varepsilon_0^T) \tag{4}$$

$$y_{i1}^C - y_{i0}^C = f(x_{i1}^C - x_{i0}^C) + (\delta_1^C - \delta_0^C) + (\varepsilon_1^C - \varepsilon_0^C) \tag{5}$$

where T and C refer Treatment (RSBY households) and Control (non-RSBY households). The expectation of the difference between the changes among the RSBY and the non-RSBY households is equal to:

$$E(\Delta y_i^T) - E(\Delta y_i^C) = E(f(\Delta x_i^T)) - E(f(\Delta x_i^C)) + \beta + (\Delta\delta^T - \Delta\delta^C) + E(\Delta\varepsilon_i^T) - E(\Delta\varepsilon_i^C) \quad (6)$$

By careful selection of a subsample of 'treated' households (i.e. RSBY households) and 'untreated' households (i.e. non-RSBY households), and through matching each treated household with one or more untreated households who are similar in terms of observable variables, the differences in changes in outcomes due to differences in observables can be eliminated (Wagstaff et al., 2009). However, to recover impact of RSBY, we also need (a) that the period-specific aggregate shock exhibit the same trend between the treated and untreated (i.e. $\Delta\delta^T = \Delta\delta^C$), and (b) the expectation of the change in the idiosyncratic errors is zero among both the treated and untreated.

As argued by Wagstaff et al. (2009), there is potentially two control groups. One non-participants residing in RSBY districts, and another all households residing in districts where RSBY was not implemented by 2012. We construct our control group from the household residing in same RSBY exposed districts (i.e. we drop the districts that were not exposed to RSBY). One can argue that aggregate shock will grow more similarly among people living in the same geographic areas than among people living in different areas—an important consideration when evaluating a program like RSBY that is also specific to certain districts.[16]

In essence, we compare average changes in outcomes before and after the introduction of RSBY between treated and untreated households, using matching to control for (initial) heterogeneity in terms of observable variables. A simple comparison between 'treated' and 'untreated' households after the program's implementation (i.e. a single difference) would

[16]If there are spillover effects on non beneficiary households residing in RSBY districts, comparing the RSBY beneficiary households to all households residing in districts where RSBY was not implemented can be used to assess the spillover effects (Wagstaff et al., 2009). In our case, we have limited number of non-exposed districts and households, hence we do not provide comparison with non-exposed districts.

give a biased estimate of the program's impact if factors influencing enrollment in the program or placement of the program were also correlated with post-treatment outcomes. For the longitudinal data, the MDID estimator is given by following equation (Blundell and Dias, 2009):

$$\hat{\alpha}^{MDIM,L} = \sum_{i \in T} \left\{ [y_{i1} - y_{i0}] - \sum_{j \in C} \widetilde{w}_{ij} [y_{j1} - y_{j0}] \right\} w_i \tag{7}$$

where T and C represent the treatment and comparison groups respectively, $\widetilde{w}_{ij}$ is the weight placed on comparison observation j for the treated individual i and w_i accounts for the reweighting that reconstructs the outcome distribution for the treated sample (Blundell and Dias, 2009).

2.1 Patient-level analysis

Another interesting question is to assess the impact of RSBY on those individuals who actually received some medical treatment. For this, we restrict our sample in both 2012 and 2005 to only those individuals who reported being treated for any long term disease in last 12 months, and treat both data sets as repeated cross section.[17] In this case, the matching-DID would be (Blundell and Dias, 2009):

$$\hat{\alpha}^{MDIM,RCS} = \sum_{i \in T_1} \left\{ \left[y_{i1} - \sum_{j \in T_0} \widetilde{w}^T_{ij0} y_{j0} \right] - \left[\sum_{j \in C_1} \widetilde{w}^C_{ij1} y_{j1} - \sum_{j \in C_0} \widetilde{w}^C_{ij0} y_{j0} \right] \right\} w_i \tag{8}$$

where RCS implies repeated cross section, (T_1, T_0, C_1, C_0) stand for the treatment group (RSBY card holders) and control group (non-RSBY) after (2012) and before (2005) the program, and $\widetilde{w}^G$ represent the weight attributed to individual j in group G and time t when comparing with the treated individual i.

[17] The probability that the same individual received medical treatment in both survey years is quite low. This leads to additional problem of defining $\triangle y$ conditional on having received medical treatment. Use of repeated cross-section MDID avoid this problem.

3 Data

We use three large scale household surveys: two waves of India Human Development Survey (IHDS) collected in 2011-12 and 2004-05 (henceforth, 2012 and 2005, respectively) and Human Development Profile of India (HDPI) collected in 1993-94 (henceforth, 1994). The IHDS are multi-topic surveys collected jointly by University of Maryland and National Council of Applied Economic Research (NCAER) in New Delhi, India (See Desai et al. 2010; Desai and Vanneman, 2015 for details). Both waves are publicly available through the Inter-university Consortium for Political and Social Research (ICPSR). IHDS-2 (2012) surveyed 42,152 households in 1,503 villages and 971 urban neighborhoods across India. These data are mostly re-interviews of households interviewed for IHDS-I in 2005. The HDPI survey was collected in 1993-94 by NCAER.[18] The HDPI is a random sample of 33,230 households from rural India. Importantly, 13,593 rural households surveyed in 1994 HDPI were randomly selected for re-interview in 2005 IHDS-1. About 82% of the households were contactable for re-interview in 2005 resulting in a resurvey of 11,153 original households as well as 2,440 households which separated from these root households but were still living in the village (NCAER, 2011). We use the the 1994 rural households sample which can be mapped to 2005 and 2012 IHDS households to provide suggestive evidence that there exists no pre-existing differential trend between RSBY and non-RSBY households over 1994-2005.

The IHDS-2 contain information on households from 375 districts, and are representative at national and state level. We dropped the state of Andhra Pradesh, Karnataka, and Tamil Nadu from our samples. While Andhra Pradesh and Tamil Nadu did not implement RSBY by May 2012, all three states had more generous state-funded health insurance schemes already in operation.[19] After dropping the three states, we are left with 34,102 households from 309 districts. We further drop 1484 households from our sample, as those households were not

[18]HDPI data can be accessed from NCAER on request. See ihds.info for more information about HDPI and IHDS surveys.

[19]At the state level, by 2012, Andhra Pradesh had Rajiv Aarogyashri scheme, Karnataka had Yeshasvini and Vajpayee Arogyashri scheme, while Tamil Nadu had implemented Kalaignar scheme (Forgia and Nagpal, 2012). Johnson and Krishnaswamy (2012) and Karan et al. (2015) also drop these states from their sample.

surveyed in 2005.[20] There are 48 districts in the data which were not exposed to RSBY as RSBY was not implemented in those districts by 2011. We treat those districts as non-exposed and drop from our main analysis which focused on comparing RSBY households with non-RSBY households in RSBY districts. Thus our final sample include 29755 households (21489 rural and 8257 urban) from 260 RSBY districts in India. These households were surveyed between October 2011 and October 2012.[21]

IHDS surveys capture health spending both through the household expenditure module and individual health module. Household consumption module collected total household expenditure for in-patient (in last 365 days) and out-patient services (in last 30 days). The in-patient expenditure is divided by 12 to get monthly expenditure. In addition, the total in-patient and out-patient expenditures are divided by household size and adjusted for prices using rural/urban state-specific poverty lines. The per capita OOP expenditure for the household is derived by adding per capita in-patient and out-patient expenditure. In addition, we also construct share of per capita OOP in household budget by dividing the per capita OOP by per capita monthly household expenditure. We also create an indicator for household incurring catastrophic health expenditure if household total health expenditure is more than 20% of the household pre-health payment consumption expenditure.[22]

Individual health module inquires about each household member's health through questions about issues related to short-term morbidity such as coughs, fevers, and diarrhea, and long-term morbidity from chronic diseases ranging from asthma to cancer category.[23] The health module also collects detailed information about the medical treatment received for each individual conditional on short term (past 30 days) and long term morbidity (past 365 days) such as where the treatment was received, how many days were spent in hospital if

[20] One district in 2011 data cannot be mapped in the 2005 data.

[21] We dropped 35 households which were surveyed before October 2011, however sample include 1000 households which were surveyed after October 2012.

[22] The choice of 20% is arbitrary. In literature, the catastrophic health expenditure is defined using various thresholds and denominators.

[23] IHDS inquire whether an individual suffer from cataract, tuberculosis, high blood pressure, heart disease, leprosy, cancer, asthma, polio, paralysis, epilepsy, STD/AIDS, accident, or other long term disease.

any, days lost due to sickness, amount spent on doctors and hospital fees, medicines, and transportation. Majority of hospitalization cases are reported for long term morbidity.[24] We create alternative utilization and expenditure from individual health modules for each individual. To establish comparability in health expenditure for short term and long term morbidity, expenditure on long term morbidity reported in survey is divided by 12 to get a monthly estimate.

In comparison to IHDS, the information provided in HDPI is limited. At the individual level, the HDPI collected total treatment cost incurred for ST and LT illness, and report total treatment cost at the household level which is derived from summing ST and LT expenditures at individual level. This is similar to per capita total OOP derived from individual module in IHDS data. In HDPI data, we create three variables which are comparable to outcomes considered in IHDS data at the household level: per capita total OOP from individual modules, per capita expenditure on ST morbidity, and per capita expenditure on LT morbidity. HDPI do not report the total consumption expenditure for the household, and hence the catastrophic expenditure as defined in IHDS cannot be defined in 1994 data.

Our identification of RSBY beneficiary household is based on household's resposnse to a direct quetsion about RSBY card. In our 2012 sample, 13.1 percent of the households reported having RSBY cards which implies 13.5 percent of persons in our 2012 sample belong to families-with-a-RSBY-card. This percentage is close to the official 13.6 percentage of population covered reported in November 2012. Importantly, IHDS also inquire about household having BPL and NREGA cards. In our 2012 sample, 24.2 percent of BPL cardholder households reported having RSBY card while 8.9 percent of households who do not report BPL card also report RSBY card.[25]

[24]In our sample, about 25% of individuals who recieved the treament for long term illness report some hospitalistaion (reported hospitalizaton for one or more days), while only 2.7% of individuals who recieved treatment for short term illness report some hospitalisation.

[25]It should be noted that the eligibility in RSBY is based on BPL lists of the state governments based on a census conducted in 2002. A household may have a BPL status in government records but may not have BPL card. In addition, as stated earlier, to overcome concerns about the BPL list, some states cover additional households that they consider poor. Moreover, inclusion of NREGA households expanded the coverage to non BPL families. In our sample, only about 40 percent of NREGA households also report BPL

Table 1 reports descriptive statistics for the outcomes variables defined at the household level for RSBY and non-RSBY households in RSBY exposed districts for baseline 2005 and 2012 data. RSBY households in rural areas are more likely to report long term illness, hospitalization, loan to meet medical expenses both in 2005 and 2012. Some of these differences may be a reflection of poor economic status of RSBY households as they are more likely to be below poverty line households. Importantly, the differences in OOP expenditures are not statistically significant. In urban India also, RSBY households are more likely to report illness, however, the differences in OOP expenditures are not statistically significant.

Table 2 presents the descriptive statistics at the individual level conditional on a person reporting medical treatment for any long-term morbidity by RSBY status. We focus on long term morbidity as those expenses are more likely to be covered by RSBY rather than expenses on short term morbidity. The short term morbidities are generally not covered by RSBY unless it lead to hospitalization, and the hospitalization rate for short-term morbidities is very low in our data. In rural India, conditional on getting treated for long term morbidity, there is no statistically significant difference in hospitalization rate by RSBY status. However, rural RSBY households spend considerably less on medicines, hospital, and total OOP compared to rural non-RSBY households.[26] In contrast to rural areas, there is no statistically significant difference in medical expenses in urban areas between RSBY and non-RSBY households. A patient in urban area with RSBY coverage is more likely to be hospitalized and receive treatment from a government doctor in 2012. Importantly, this is also true in baseline period for urban areas.

Table 3 reports the descriptive statistics of variables in 2005 that might plausibly be correlated with RSBY status. In general, RSBY household's income and consumption is lower in both in urban and rural areas. Similarly, a higher proportion of RSBY households have BPL cards, more RSBY household heads' work in casual work. In rural areas (but not

status.

[26]The IHDS data report the hospitalization and doctor cost together, and we consider the entire reported cost as hospitalization cost if a person is reported hospitalization.

in urban areas), there is some evidence of adverse selection into RSBY: a higher proportion of RSBY households' member reported short-term and long-term morbidities in 2005. Some of these in morbidities might be a reflection of differences in economic status.

4 Results

As discussed in the Data section, many characteristics are different between the RSBY and non RSBY households (Table 3). Appendix Table A1 reports the results for the probit models used to obtain the propensity scores for rural and urban areas. Since the enrollment in RSBY is at the household level, all explanatory variables are defined at the household level. Moreover, the explanatory variables are from the 2005 data when RSBY was not available, and hence could not have been affected by assignment of RSBY. In addition to the covariates reported in Table A1, the probit models also control for district fixed effects. Matching variables can roughly divided into household's head education, household's demographic composition, household's economic indicators, household's health expenditures and outcomes in 2005, household's participation in different bodies, household social networks, and village characteristics in the case of rural sample. As intended, having below poverty line card increases the probability of household holding RSBY card. Similarly, per capita income and consumption is negatively associated with having RSBY card in rural area, however, both these variables are statistically insignificant in urban areas. Having a casual job increases the probability of having RSBY in rural India as expected, however, it is statistically insignificant in urban areas.[27] The socially disadvantaged group Scheduled Caste households are more likely to have RSBY in rural areas but less likely to have RSBY in urban areas. Importantly, there seems little evidence of adverse selection after controlling for the economic status. For example, in rural areas none of household health indicators are significant determinant of RSBY card. Moreover, signs of many of the coefficients on the health indicators are negative.

[27]This is possibly because of coverage of casual workers working under NREGA. NREGA is restricted to rural areas.

Similar patterns are also observed in urban areas, however, per capita hospital days in 2005 is a statistically significant determinant of RSBY status in 2012.

Figure 1 shows the kernel density of the propensity scores before matching (the predicted probability of being covered by RSBY as estimated in appendix Table A1) for RSBY households and non-RSBY households for rural and urban area separately. There is considerable overlap of the propensity scores across treatment (RSBY households) and control group (non-RSBY households).[28] The density for the non-RSBY households is skewed to the left, however, given the large sample size of the comparison group compared to the treatment group (about 7:1), there are plenty of households with larger probabilities of being covered by RSBY but who are not actually covered by the RSBY.[29] We impose the common support in all our matching estimators and exclude 8 (18) RSBY households in rural (urban) sample because of lack of common support.

In the matching literature, there are many methods used to match control observations to treated observations, and there is no consensus about the method of matching. For our main results, we use kernel matching.[30] Kernel matching defines a neighborhood for each treated observation and constructs the counterfactual using all control observations within the neighborhood weighing each observation based on the distance between the treated and the control being matched, where the weighting function is decreasing in distance. By using more observations per treated, kernel weights reduce the variability of the estimator when compared with nearest neighbor weights and produces less bias then nearest neighbor with many matches per treated (Blundell and Dias, 2004). However, we also present the results using nearest neighbor matching with five neighbors.

The quality of matching can be assessed by comparing means of the conditioning variables for RSBY and non-RSBY households after matching. In appendix Table A2, we report the

[28]Figure 1 has imposed common support, and we lose 8 (18) RSBY households in rural (urban) India.

[29]Appendix Figure A1 shows the number of households with a probability of 0.4 or higher of having RSBY card. As is evident, there are enough number of non-RSBY households in each probability range over 0.4.

[30]We use psmatch2 (Leuven and Sianesi, 2003) in Stata. For kernel matching, the epanechnikov kernel and a fixed bandwidth of 0.10 is used. Confidence intervals are obtained using 50 bootstrap repetitions.

means of the conditioning variables after matching for rural and urban areas separately. Based on t-tests, we cannot reject the null of equality of each conditioning variable between RSBY and non-RSBY households after matching in both urban and rural sample (column (4) and (8) of Table A2). Column (3) and column (6) of Table A2 reports another indicator "standardized bias (SB)" to assess whether the difference in mean is large.[31] One possible problem with the SB approach is that one does not have a clear indication for the success of the matching procedure, even though in most empirical studies an SB below 3% or 5% after matching is seen as sufficient (Caliendo and Kopeinig, 2008). As evident from Table A2, for none of the variables in rural sample, the standardized bias exceeds 5%, while for urban sample only for one variable the standardized bias exceed 5%. The median (mean) standardized bias for all covariates is 3.8 (6.0) before matching and 1.1 (1.7) after matching in urban sample. Similarly, for rural sample the median (mean) standardized bias for all covariates is 5.8 (7.0) before matching and 1.1 (1.4) after matching.

In appendix Table A3, we present an alternative measure of effectiveness of matching: the *pseudo-*R^2 from the unmatched and matched sample. Matching reduces the *pseudo-*R^2 from 0.197 (0.175) to 0.008 (0.013) in rural (urban) areas. The hypothesis of the joint insignificance of all the regressors cannot be rejected after matching in both rural and urban areas ($p - value = 1.000$).[32] Thus matching does a good job in making the groups comparable, as after matching, there remains very little difference between RSBY and non-RSBY households on the observables.

Table 4 presents the MDID ($\hat{\alpha}^{MDIM,L}$) estimates for household level indicators for rural India. Column (3) of Table 4 presents the ATT estimates as percentage changes on pre

[31]The standardized bias (SB) for each covariate X is defined as the difference between the mean of the treated ($\bar{X}_{1M}$) and matched controls ($\bar{X}_{0M}$) as a percentage of the square root of the average of the variances in the two groups. Thus the SB after matching is given by $SB_{after\ matching} = 100.\frac{\bar{X}_{1M} - \bar{X}_{0M}}{\sqrt{0.5.(V_{1M}(X)+V_{0M}(X))}}$, where $V_{1M}(X)$ and $V_{0M}(X)$ are the variance in the treatment group and matched control group.

[32]Sianesi (2004) suggests to re-estimate the propensity score on the matched sample, i.e. only on participants and matched nonparticipants, and compare the $pseudo - R^2$s before and after matching. One can also perform a likelihood ratio test on the joint significance of all regressors in the probit or logit model. The test should not be rejected before, and should be rejected after matching (Caliendo and Kopeinig, 2008).

RSBY averages of RSBY households, and for reference column (6) provides the average for RSBY households in 2005. In rural areas, the RSBY households are 3.2 percentage points more likely to report any morbidity, and most of this is driven by an increase in reported case for long term morbidity. Probably some of these increases are driven by increased detections of those diseases through improved access to medical facilities for RSBY households. Similar results are reflected in the probability of someone in the household seeking treatment. There is no statistically significant impact of RSBY on the probability of a household member receiving treatment for short-term morbidity, however, RSBY households are 5.0 percentage points more likely to report medical treatment for a long-term morbidity. Moreover, although the impact of RSBY on the probability of a household member being hospitalized is positive, it is not statistically significant. Nevertheless, given the very low level of hospitalization reported by RSBY households in 2005, the impact of RSBY is about 18 percent more hospitalization cases.

In terms of financial protection, the impact of RSBY on the probability of a household reporting any OOP expenditure is positive, however, the estimate is not statistically significant. The impact of RSBY on per capita in-patient, out-patient, and OOP expenditure is negative, however, these estimates are not statistically significant. RSBY covers the hospitalization cost, and hence expected to make a dent in the in-patient OOP expenditures. However, out-patient expenditure can also be affected depending on whether out-patient care complements or substitute for in-patient care. Moreover, we do not find statistically significant impact of RSBY on the probability of a household incurring catastrophic expenditure on health and on the probability of a household taking a loan to meet medical expenses. We find similar results when we consider the health expenditures calculated from individual module. RSBY reduces the per capita OOP expenditure by 20 INR which is about 15 percent of the baseline per capita OOP expenditure. However, the estimate is not statistically significant. Similarly, there is no statistically significant impact of RSBY on per capita expenditure on either short-term morbidity or long-term morbidity. Importantly, RSBY reduces the cost of

medicines for the beneficiary households by INR 22 (which is about 31% of baseline medicine expenditure by RSBY households). Column (4) of Table 4 provide estimates for the nearest neighbor matching, and the estimates are qualitatively similar to estimates from the kernel matching.

Table 5 presents the results for urban India. In urban India, although there seems a positive impact of RSBY on treatment for any illness and LT illness, these estimates are not statistically significant. Similarly, RSBY impact on the probability of incurring any OOP expenditure and catastrophic health expenditure is negative, but statistically not significant at conventional level. Surprisingly, we find that the RSBY households are more likely to take a loan for medical purposes in urban areas. With regard to financial protection, the RSBY has a negative impact on the per capita in-patient, out-patient, and OOP expenditure. However, we are unable to reject the null of zero impact of RSBY on these expenditure indicators. Moreover, the direction of impact on the expenditure indicators do not match if we consider the expenditure indicators constructed from individual health module. Nevertheless, since none of the estimates are statistically significant, we cannot reject the null of zero impact of RSBY on expenditure indicators in urban areas.

Overall, RSBY seems to have increased the utilization of services for LT illness, however, the impact of RSBY on financial protection is quite limited. These findings are not out of line with the existing evidence in terms of RSBY and evidence on SHI/subsidized health insurance programs in other countries. For example, Acharya et al. (2012) review research on 19 health insurance studies across the world and find that enrollment in many schemes is less than expected and they conclude that impacts on utilization in terms of outpatient visits and hospitalization is limited. They also find weak evidence to show that health insurance reduced out-of-pocket health expenses. They find that only four of 16 studies reporting on costs provided conclusive indications of lower average OOP expenditures for the insured. Seven studies provided mixed results, and two showed no effect. Lei and Lin (2009) do not find any significant difference in OOP expenditures for people insured under China's New

Cooperative Medical Scheme (NCMS) NCMS. Wagstaff et al. (2009) note weak evidence for lower OOP expenditures for the insured under the NCMS; however, this evidence is sensitive to matching methods.

4.1 Patient-level results

Panel A and Panel B of Table 6 presents the results of the impact of RSBY conditional on being treated for long-term morbidity for rural and urban areas, respectively.[33] Column (1) of Table 6 presents the estimates of repeated cross-section matching difference-in-differences (RCS MDID, $\hat{\alpha}^{MDIM,RCS}$).[34] Column (4) of Table presents the single difference matching estimates for comparison purposes. Single difference matching although remove the bias caused by observables, however, it does not allow for selection on unobservables. Conditional on being treated for long-term morbidity, RSBY increases the probability of a patient's hospitalization by 4.6 percentage points in rural areas, and increases the probability of a patient being treated by a government doctor by 4.2 percentage points. Nevertheless, these estimates are not statistically significant at conventional level. Importantly, a RSBY patient in rural area spends 124 INR less on medicine which is about 31% of the baseline expenditure on medicine (INR 402 in 2005). However, there is no statistically significant impact of RSBY patient's expenditure on hospitalization and total OOP expenditure (that include cost of medicines, hospitalization and physician fees, and transportation cost) in rural areas. Moreover, there is no statistically significant impact of RSBY on the number of days lost due to long-term morbidity and number of days spent in hospital in rural areas. Importantly, the single difference estimates for rural areas suggest a positive and statistically significant impact of RSBY on the probability of a advice sought from government doctor, and reduced expenditure on medicine, which are qualitatively similar to the findings from RCS MDID estimates. However, the single difference estimator suggest a a much larger and statistically significant reduction in OOP expenditure.

[33]The results should be interpreted similar to an analysis done on patient level records.
[34]RCS MDID is estimated using the Stata diff command (Villa, 2016).

For urban areas, we do not find statistically significant impact of RSBY on a patient's utilization of hospital or government doctor. Surprisingly, the direction of the impact of RSBY on expenditure on medicine and OOP expenditure is positive although not statistically significant. The single difference estimates suggest similar conclusions except for the probability of a patient seeking advice from a government doctor.

4.2 Robustness

To recover impact of RSBY, we assumed that (a) that the period-specific aggregate shock exhibit the same trend between the RSBY and matched non-RSBY households (i.e. $\Delta\delta^T = \Delta\delta^C$ in equation (6)), and (b) the expectation of the change in the idiosyncratic errors is zero among both the treated and untreated. If the time-variant unobservables differ across RSBY and matched non-RSBY households, and are simultaneously associated with RSBY status and outcomes, our matched DID estimates will be biased.

One important reason why similar trend assumption fails is that the composition of treatment and control group changes over time.[35] Since our estimates are based on longitudinal data, the composition of RSBY and matched non-RSBY households remains same between baseline and post program period. Moreover, after matching, the RSBY households look similar to the matched non-RSBY households in the baseline period. These two facts makes the similar trend assumption more plausible. Nevertheless, we also provide suggestive evidence in favor of these assumptions using a placebo experiment.

We use the 2005 IHDS rural households which were also surveyed in 1994 to estimate the impact of RSBY using the 1994 data as baseline and the 2005 data as post program data.[36] As RSBY was not operational in 2005, the matched DID estimates closer to zero will suggest that the similar trend between the RSBY and matched non-RSBY households held over 1995

[35]The standard DID estimation as well as a newer non-parametric method called "changes-in-changes" (Athey and Imbens, 2006) rely on the group composition not systematically changing. However, changes in group composition are common with data that comes from repeated cross sections rather than longitudinal data.

[36]These results are based on 12458 rural households from 2005 data which were also surveyed in 1994.

and 2005, and will increase confidence in our matched DID estimates. Panel A of Table 7 provide the impact of RSBY ($\hat{\alpha}^{MDIM,L}$) on household level indicators. The magnitude of the impacts of RSBY is close to zero and we fail to reject the null of no impact of RSBY. Similarly, we fail to reject the null of no impact of RSBY on the per capita expenditure on short-term and long-term morbidity. Panel B provides the impact of RSBY ($\hat{\alpha}^{MDIM,RCS}$) on individual level expenditure on long term morbidity treatment conditional on positive expenditure. We fail to reject the null of zero impact of RSBY on patient OOP expenditure on long term illness.

Admittedly, the placebo experiment is carried out only for a few outcomes and restricted to a sub sample of rural households driven by data availability, however, zero impacts of RSBY in these placebo experiments increase the confidence in the matched DID estimates presented in earlier sections. Nevertheless, the concerns regarding time variant idiosyncratic shocks cannot be ruled out. For example, one may think of a scenario in which RSBY households may be in the program because they are experiencing (or have recently experienced) a deterioration in their health that is not captured by the health status in 2005 used in our propensity score model. As suggested by Wagstaff et al. (2009), this will be reflected in a positive $\triangle\varepsilon$ for RSBY households. By contrast, non-RSBY households may not have joined the RSBY because they are confident of not needing hospital care in the foreseeable future; this would be reflected in a negative or zero $\triangle\varepsilon$. So in equation (6), we may have $E(\Delta\varepsilon_i^T) - E(\Delta\varepsilon_i^C) > 0$, which would result in our estimates being upward biased. On the contrary, the degree to which contracted insurance companies are able to selectively enroll "healthier" households, a phenomenon known as "cream skimming" is also a concern. In that case, our estimates may have a downward bias.

These concerns although not completely ruled out are mitigated by some of the features and logistics of the program. First, the enrollment or renewal cost of RSBY program for households is very low, only 30 INR (about \$0.50), and they do not pay any premium. Second and most importantly, the insurer has a four month window to enroll, and enrollments take

place through mobile camps in villages. Given the geographic spread of a district, cost involved, and the requirement that a designated district-level government officer must be present, it is more likely the the insurer visit the village only once. Similarly, the presence of a government officer during enrollment process may discourage any cream-skimming from smart card service provider. Moreover, the smart card service provider works as a contractor and do not directly benefit from cream-skimming. In addition, since the contracting process is repeated over time, insurers would have additional incentive to meet other performance criteria that will be considered in future bidding rounds. Any cream-skimming, if understood by the nodal state agency paying the premium, could lead to subsequent disqualification (Sun, 2010).

5 Conclusion

The Government of India launched a national health scheme known as Rashtriya Swasthya Bima Yojana (RSBY) in 2008 that provides hospitalization coverage up to 30,000 Indian Rupees (INR, 1USD=56 INR as of June. 2012) per annum for a family of five at 30 INR enrollment/renewal cost per family per annum. The unique feature of RSBY is use of smart card and provision of cashless services up to the 30,000 INR limit. Using a nationally representative panel household survey data, we implement difference-in-differences with matching to evaluate the impact of RSBY (Average Treatment Impact on the Treated, ATT) on beneficiary households' utilization of health services and expenses incurred.

We find some evidence of positive impact of RSBY on utilization of health services by RSBY households in rural India but not in urban India. The RSBY increased the probability of a household receiving treatment by 3.2 percentage points in rural areas. However, there is no evidence that the RSBY reduced per person OOP expenditure for RSBY households in both rural and urban areas. There is some evidence that the RSBY reduced expenditure on medicines for beneficiary households in rural India. Conditional on having received medical

treatment for major morbidity, we find that RSBY increased probability of hospitalization and being treated by a government doctor in rural areas but no significant impact in urban areas. We also find lower expenditure on medicine for a RSBY cardholder patient in rural areas.

There are some limitations of the findings of this paper. First, we do not consider the impact of the RSBY on direct health outcomes. Second, we assume that there is no spillover impacts on non beneficiary households living in RSBY districts. Third, we do not consider the supply side factors.

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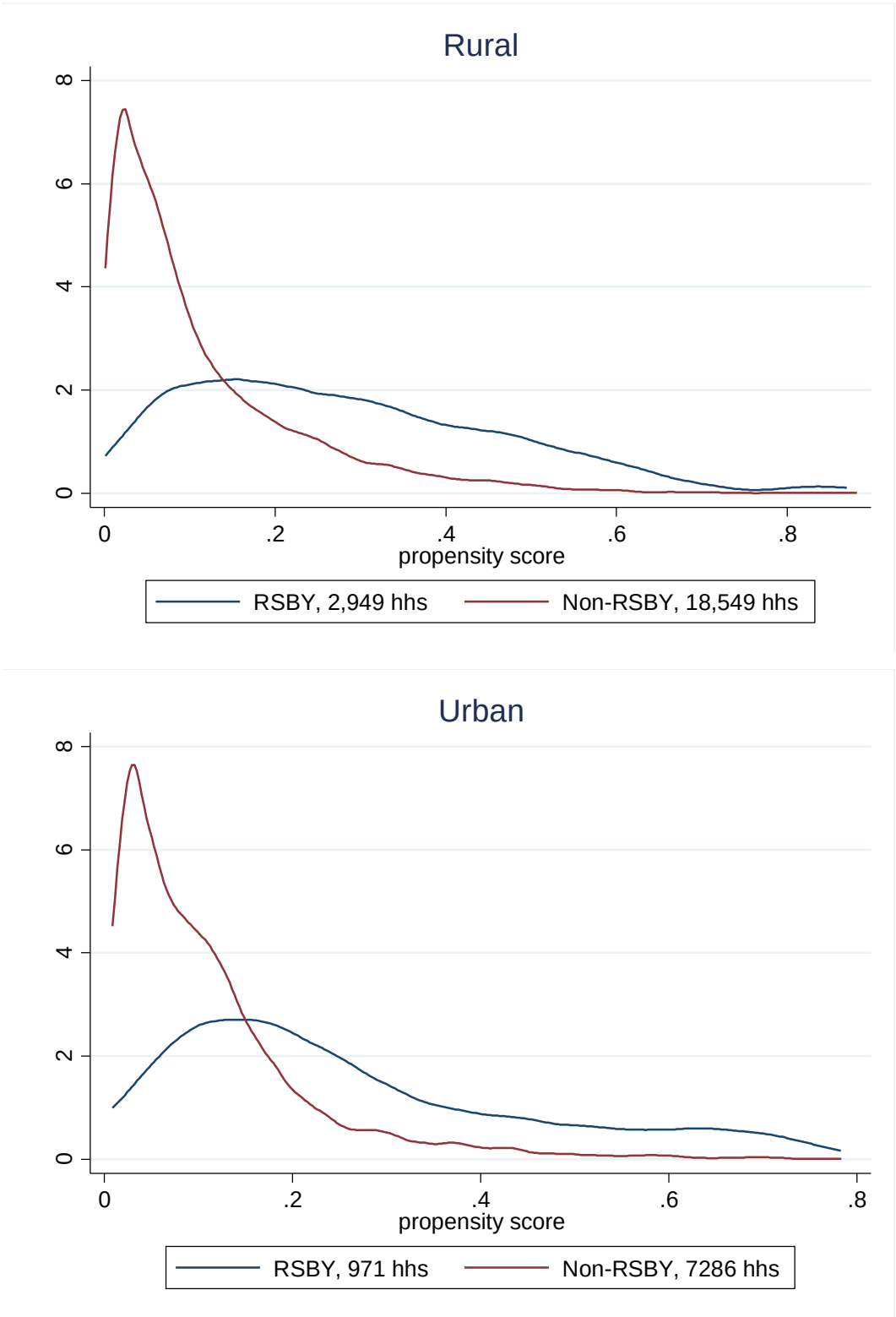
Figure 1: Overlap region



Note: Common support is imposed. In rural sample 8 RSBY households are dropped because of lack of common support. In urban sample 18 households are dropped because of lack of common support. A complementary figure (appendix Figure A2) plots the number of households with probability of RSBY participation 0.4 and above.

Table-1: Descriptive statistics for outcomes at household-level

Rural	**2011-12**			**2004-05**		
	RSBY	***Non-RSBY***	***Difference***	***RSBY***	***Non-RSBY***	***Difference***
Household reporting any illness	0.783	0.738	0.045***	0.668	0.632	0.037***
Household reporting any short term (ST) illness	0.618	0.599	0.019**	0.563	0.536	0.027***
Household reporting any long term (LT) illness	0.477	0.396	0.081***	0.284	0.253	0.032***
Household reporting any treatment	0.762	0.714	0.048***	0.638	0.604	0.034***
Household reporting treatment for ST morbidity	0.607	0.582	0.025***	0.534	0.511	0.023**
Household reporting treatment for LT morbidity	0.437	0.364	0.073***	0.261	0.232	0.029***
Household reported hospitalization for LT morbidity	0.059	0.046	0.012***	0.039	0.032	0.007**
Household reported out-of-pocket (OOP) expenditure	0.802	0.804	-0.002	0.714	0.709	0.005
Per capita inpatient expenditure in INR at 2012 prices	91.689	103.213	-11.524	59.423	59.197	0.226
Per capita outpatient expenditure in INR at 2012 prices	109.907	107.524	2.382	94.694	88.201	6.493
Per capita total OOP in INR at 2012 prices	201.521	210.617	-9.096	153.960	147.278	6.682
Share of OOP in household monthly expenditure	0.107	0.097	0.010***	0.097	0.085	0.012***
Catastrophic medical expenditure	0.216	0.189	0.027***	0.193	0.161	0.032***
Household took loan to meet medical expenses	0.132	0.090	0.042***	0.086	0.060	0.026***
Per capita expenditure on ST morbidity	114.323	110.806	3.517	83.858	73.050	10.809**
Per capita expenditure on LT morbidity	105.462	111.831	-6.370	47.789	49.136	-1.346
Per capita expenditure on medicines	107.352	110.773	-3.421	69.292	55.867	13.425***
Per capita expenditure on hospital and doctors	99.246	99.154	0.092	27.953	30.192	-2.239
Per capita expenditure on transportation	4.607	4.314	0.294	1.390	1.372	0.018
Per capita total OOP from individual modules	219.785	222.638	-2.853	131.648	122.185	9.462
Number of households	***2949***	***18549***		***2949***	***18549***	
Urban	**2011-12**			**2004-05**		
	RSBY	***Non-RSBY***	***Difference***	***RSBY***	***Non-RSBY***	***Difference***
Household reporting any illness	0.761	0.731	0.030**	0.613	0.581	0.032*
Household reporting any short term (ST) illness	0.522	0.534	-0.013	0.452	0.437	0.015
Household reporting any long term (LT) illness	0.500	0.455	0.045***	0.305	0.289	0.016
Household reporting any treatment	0.743	0.716	0.027*	0.590	0.561	0.029*
Household reporting treatment for ST morbidity	0.511	0.522	-0.011	0.431	0.417	0.014
Household reporting treatment for LT morbidity	0.471	0.434	0.037**	0.290	0.275	0.015
Household reported hospitalization for LT morbidity	0.078	0.055	0.023***	0.045	0.032	0.013**
Household reported out-of-pocket (OOP) expenditure	0.752	0.791	-0.040***	0.666	0.648	0.019
Per capita inpatient expenditure in INR at 2012 prices	125.275	125.953	-0.678	79.731	68.783	10.949
Per capita outpatient expenditure in INR at 2012 prices	87.989	111.526	-23.537**	70.333	86.309	-15.976
Per capita total OOP in INR at 2012 prices	212.608	237.286	-24.678	149.602	154.645	-5.043
Share of OOP in household monthly expenditure	0.070	0.072	-0.002	0.073	0.065	0.008**
Catastrophic medical expenditure	0.128	0.129	-0.001	0.133	0.116	0.017
Household took loan to meet medical expenses	0.082	0.064	0.018**	0.041	0.040	0.001
Per capita expenditure on ST morbidity	74.212	76.888	-2.675	45.121	49.076	-3.954
Per capita expenditure on LT morbidity	161.585	136.110	25.475	54.043	58.350	-4.307
Per capita expenditure on medicines	140.212	121.809	18.403	48.545	54.059	-5.514
Per capita expenditure on hospital and doctors	83.057	82.439	0.618	25.271	27.543	-2.272
Per capita expenditure on transportation	6.551	3.495	3.056**	1.053	0.919	0.134
Per capita total OOP from individual modules	235.797	212.998	22.799	99.165	107.426	-8.261
Number of households	***971***	***7286***		***971***	***7286***	

Note: All expenditures are monthly expenditures in Indian Rupees (INR) at 2012 prices. *** p<0.01, ** p<0.05, * p<0.1

Table 2: Descriptive statistics for outcomes at patient level for long-term morbidity treatment

	2011-12			2004-05		
	RSBY	***Non-RSBY***	***Difference***	***RSBY***	***Non-RSBY***	***Difference***
Rural						
Hospitalized	0.270	0.256	0.014	0.286	0.308	-0.022
Treated by government doctor	0.317	0.230	0.087***	0.301	0.244	0.057***
Expenditure on medicines in INR	546.511	759.767	-213.255***	402.867	430.344	-27.477
Expenditure on hospital in INR	86.997	127.531	-40.534***	129.697	178.673	-48.976
Total out-of-pocket in INR	842.038	1092.204	-250.166***	782.452	988.756	-206.304**
Days lost	47.818	44.877	2.941	54.259	61.563	-7.304*
Days in hospital	2.877	3.062	-0.185	4.426	4.160	0.266
Observations	***1641***	***8489***		***787***	***3981***	
Urban						
Hospitalized	0.253	0.222	0.031*	0.326	0.242	0.084***
Treated by government doctor	0.334	0.213	0.121***	0.378	0.246	0.132***
Expenditure on medicines in INR	812.349	683.906	128.443	368.269	394.070	-25.802
Expenditure on hospital in INR	111.116	110.768	0.348	158.064	119.735	38.329
Total out-of-pocket in INR	1162.699	1003.935	158.764	779.970	800.804	-20.834
Days lost	34.361	34.930	-0.569	44.606	46.025	-1.420
Days in hospital	3.189	2.308	0.881***	6.130	3.228	2.902***
Observations	***604***	***4052***		***307***	***2119***	

Note: All expenditures are monthly expenditures in Indian Rupees (INR) at 2012 prices. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Household characteristics in 2004-05

	Rural			Urban		
	RSBY households	*Non-RSBY households*	*Difference*	*RSBY households*	*Non-RSBY households*	*Difference*
Other Backward Castes+	0.333	0.330	0.003	0.330	0.243	0.086***
Scheduled Castes+	0.277	0.226	0.051***	0.159	0.182	-0.023*
Scheduled Tribes+	0.112	0.102	0.009	0.032	0.036	-0.004
Muslim+	0.089	0.095	-0.006	0.152	0.171	-0.019
Household Size	5.978	6.281	-0.304***	5.515	5.511	0.004
Household Size Square	43.794	50.131	-6.336***	36.475	37.062	-0.588
% of age 0-14 in HH	0.325	0.308	0.018***	0.269	0.261	0.008
% of age 61 and above in HH	0.074	0.077	-0.003	0.059	0.066	-0.007
% of age 15-49 female in HH	0.246	0.249	-0.003	0.280	0.278	0.002
log per capita consumption	6.841	6.994	-0.153***	7.295	7.381	-0.085***
log of per capita income	8.905	9.030	-0.125***	9.673	9.792	-0.118***
No ration card+	0.123	0.124	0.000	0.144	0.154	-0.010
BPL card+	0.386	0.281	0.105***	0.268	0.153	0.114***
Poor+	0.315	0.228	0.087***	0.270	0.202	0.068***
Head age	47.966	48.742	-0.776***	47.883	47.822	0.061
Head is female+	0.093	0.084	0.009	0.111	0.106	0.005
Head's education	4.037	4.238	-0.201**	6.965	7.558	-0.593***
Head's work type-casual+	0.554	0.427	0.127***	0.369	0.309	0.060***
Head's work-type-government+	0.045	0.060	-0.015***	0.189	0.178	0.012
Per capita inpatient expenditure	59.461	59.240	0.221	79.978	68.834	11.145
Per capita outpatient expenditure	94.803	88.214	6.590	70.419	86.386	-15.967
% of members reported- fever	0.142	0.124	0.018***	0.108	0.095	0.012**
% of members reported- cough	0.113	0.100	0.014***	0.083	0.083	0.000
% of members reported- diarrhea	0.041	0.033	0.009***	0.021	0.021	0.000
% of members reported- short term (ST) problems	0.159	0.142	0.017***	0.122	0.115	0.006
% of members reported- received treatment for ST problems	0.148	0.133	0.015***	0.114	0.107	0.006
% of members reported- government doctor for ST	0.034	0.027	0.007***	0.025	0.019	0.007***
% of members reported- private doctor for ST problem	0.103	0.096	0.007**	0.076	0.075	0.001
% of members reported- long term (LT) problems	0.068	0.057	0.011***	0.076	0.075	0.001
% of members reported- cataract	0.007	0.006	0.002*	0.003	0.004	-0.001
% of members reported- tuberculosis	0.004	0.003	0.001	0.003	0.002	0.001
% of members reported- blood pressure	0.014	0.009	0.005***	0.023	0.024	0.000
% of members reported- heart disease	0.005	0.003	0.001*	0.007	0.009	-0.002
% of members reported- diabetes	0.008	0.004	0.004***	0.014	0.012	0.002
% of members reported- leprosy	0.001	0.001	0.001**	0.001	0.001	0.000
% of members reported- cancer	0.000	0.001	0.000	0.001	0.001	-0.001
% of members reported- asthma	0.008	0.007	0.002*	0.005	0.006	0.000
% of members reported- polio	0.001	0.001	0.000	0.001	0.001	0.000
Per capita hospital days	0.256	0.211	0.045	0.551	0.239	0.312***
Per capita days lost in illness	4.230	3.985	0.244	3.666	3.695	-0.029
HH has piped water access+	0.205	0.248	-0.043***	0.682	0.672	0.009
HH has hand pump water access+	0.400	0.429	-0.029***	0.133	0.177	-0.044***

HH has no access to toilet+	0.725	0.707	0.017*	0.292	0.238	0.054***
HH has no electricity+	0.396	0.326	0.070***	0.071	0.055	0.016**
House building in poor conditions+	0.189	0.177	0.012	0.167	0.136	0.031***
HH have health insurance+	0.018	0.019	-0.001	0.039	0.047	-0.007
HH use radio+	0.133	0.130	0.003	0.110	0.121	-0.011
HH use paper+	0.127	0.124	0.003	0.428	0.408	0.020
HH use Television+	0.215	0.266	-0.051***	0.574	0.573	0.001
HH know some doctor+	0.314	0.298	0.016*	0.355	0.375	-0.020
HH know some teacher+	0.374	0.383	-0.008	0.438	0.422	0.015
HH know some government servant+	0.260	0.290	-0.030***	0.412	0.446	-0.034**
Anyone in HH member of self-helf group+	0.115	0.057	0.058***	0.112	0.036	0.076***
Anyone in HH member of Development of NGO+	0.026	0.014	0.012***	0.023	0.021	0.002
Attended local body meeting+	0.430	0.355	0.076***	0.168	0.130	0.038***
HH suffered death in last year+	0.052	0.047	0.005	0.022	0.037	-0.015**
Great deal of confidence in Medical staff+	0.637	0.673	-0.036***	0.685	0.605	0.080***
Great deal of confidence in state government+	0.281	0.275	0.006	0.261	0.230	0.031**
Large village-5000 population+	0.252	0.172	0.080***			
Distance to town in km	14.407	13.399	1.008***			
Distant to district HQ in km	42.005	42.358	-0.353			
No access to surfaced road+	0.887	0.925	-0.037***			
No bus stop in village+	0.518	0.489	0.029***			
Number of anganwadis in village	3.210	2.285	0.925***			
Health sub center in village+	0.375	0.393	-0.018*			
Primary health center in village+	0.174	0.132	0.042***			
Village have trained private doctor+	0.227	0.232	-0.006			
Number of Households	***2949***	***18549***		***971***	***7286***	

Note: + implies indicator variable. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of RSBY on household utilization and health spending, Rural India

Rural	(1)	(2)	(3)	(4)	(5)	(6)
			ATT as % of RSBY hhs' 2005 average	***NN Matching***		***2005 average for RSBY hhs***
	ATT	***SE (ATT)***		***ATT***	***SE (ATT)***	
Household reporting any illness+	0.032**	(0.014)	4.84	0.028*	(0.017)	0.668
Household reporting any short term (ST) illness+	0.017	(0.014)	2.94	0.004	(0.019)	0.563
Household reporting any long term (LT) illness+	0.050***	(0.015)	17.70	0.047***	(0.017)	0.284
Household reporting any treatment+	0.031**	(0.015)	4.93	0.023	(0.016)	0.638
Household reporting treatment for ST morbidity+	0.023	(0.015)	4.37	0.008	(0.019)	0.534
Household reporting treatment for LT morbidity+	0.050***	(0.013)	19.25	0.043**	(0.019)	0.261
Household reported hospitalization for LT morbidity+	0.007	(0.007)	17.86	0.011	(0.008)	0.039
Household reported out-of-pocket (OOP) expenditure	0.011	(0.013)	1.56	0.006	(0.018)	0.714
Per capita inpatient expenditure in INR	-11.567	(12.897)	-19.46	-20.810	(13.951)	59.423
Per capita outpatient expenditure in INR	-11.257	(11.200)	-11.89	-12.501	(13.044)	94.694
Per capita total OOP in INR	-22.717	(20.156)	-14.76	-33.398	(20.657)	153.960
Share of OOP in household monthly expenditure	0.001	(0.004)	0.82	-0.003	(0.006)	0.097
Catastrophic medical expenditure+	0.006	(0.013)	2.86	-0.006	(0.016)	0.193
Household took loan to meet medical expenses+	0.008	(0.008)	9.45	0.003	(0.013)	0.086
Per capita expenditure on ST morbidity	-6.148	(10.240)	-7.33	-3.467	(13.708)	83.858
Per capita expenditure on LT morbidity	-13.450	(12.531)	-28.14	-21.139	(21.577)	47.789
Per capita expenditure on medicines	-21.782**	(9.492)	-31.43	-23.732	(15.017)	69.292
Per capita expenditure on hospital and doctors	-0.834	(10.110)	-2.98	-2.090	(10.764)	27.953
Per capita expenditure on transport	-0.908	(1.011)	-65.35	-0.695	(1.233)	1.390
Per capita total OOP from individual modules	-19.598	(17.835)	-14.89	-24.607	(21.887)	131.648

Note: + indicates binary variable. Standard errors are in the parenthesis. Standard errors are derived through bootstrap with 50 replications. The expenditures are in 2012 Indian Rupees. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Impact of RSBY on household utilization and health spending, Urban India

	(1)	(2)	(3)	(4)	(5)	(6)
	Kernel matching		***ATT as % of RSBY hhs 2005 average***	***NN matching***		***2005 average for RSBY hhs***
	ATT	***SE (ATT)***		***ATT***	***SE (ATT)***	
Household reporting any illness+	0.024	(0.026)	3.86	0.033	(0.026)	0.613
Household reporting any short term (ST) illness+	-0.004	(0.022)	-0.91	0.010	(0.033)	0.452
Household reporting any long term (LT) illness+	0.024	(0.028)	7.86	0.024	(0.025)	0.305
Household reporting any treatment+	0.023	(0.026)	3.93	0.038	(0.031)	0.59
Household reporting treatment for ST morbidity+	-0.003	(0.029)	-0.67	0.019	(0.031)	0.431
Household reporting treatment for LT morbidity+	0.015	(0.020)	5.13	0.005	(0.029)	0.29
Household reported hospitalization for LT morbidity+	0.016	(0.014)	35.80	0.017	(0.015)	0.045
Household reported out-of-pocket (OOP) expenditure	-0.037*	(0.020)	-5.56	-0.030	(0.032)	0.666
Per capita inpatient expenditure in INR	-3.786	(38.906)	-4.75	-12.104	(38.346)	79.731
Per capita outpatient expenditure in INR	-10.574	(11.390)	-15.03	-7.505	(12.807)	70.333
Per capita total OOP in INR	-14.540	(35.198)	-9.72	-20.447	(36.899)	149.602
Share of OOP in household monthly expenditure	-0.008	(0.006)	-10.28	-0.007	(0.007)	0.073
Catastrophic medical expenditure+	-0.010	(0.016)	-7.38	-0.004	(0.023)	0.133
Household took loan to meet medical expenses+	0.030**	(0.013)	72.74	0.039***	(0.012)	0.041
Per capita expenditure on ST morbidity	5.439	(11.211)	12.05	22.799*	(12.584)	45.121
Per capita expenditure on LT morbidity	40.978	(31.105)	75.83	29.242	(38.296)	54.043
Per capita expenditure on medicines	28.763	(31.492)	59.25	26.636	(37.350)	48.545
Per capita expenditure on hospital and doctors	13.189	(10.786)	52.19	19.808	(15.307)	25.271
Per capita expenditure on transport	3.137	(2.010)	297.96	3.949	(2.430)	1.053
Per capita total OOP from individual modules	46.417	(41.527)	46.81	52.041	(34.964)	99.165

Note: + indicates binary variable. Standard errors are in the parenthesis. Standard errors are derived through bootstrap with 50 replications. The expenditures are in 2012 Indian Rupees. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Impact of RSBY conditional on having received medical treatment (patient level) for long term disease

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	DID, pooled cross section			*Single difference*			
	ATT	***SE (ATT)***	***ATT as % of RSBY patients' 2005 level***	***ATT***	***SE (ATT)***	***ATT as % of RSBY patients' 2005 level***	***Average of RSBY patients' in 2005***
Panel A: Rural							
Hospitalized+	0.046*	(0.025)	16.16	0.022	(0.015)	7.54	0.286
Treated by government doctor+	0.042	(0.032)	14.00	0.063***	(0.014)	20.81	0.301
Expenditure on medicines	-124.429**	(63.083)	-30.89	-139.859***	(53.770)	-34.72	402.867
Expenditure on hospital*	20.145	(51.455)	15.53	-34.390*	(18.450)	-26.52	129.697
Total out-of-pocket expenditure	-14.532	(131.837)	-1.86	-145.230**	(59.791)	-18.56	782.452
Days lost due to illness	3.423	(6.321)	6.31	4.851*	(2.531)	8.94	54.259
Days spent in hospital	-0.187	(0.775)	-4.23	-0.253	(0.263)	-5.71	4.426
Panel B: Urban							
Hospitalized+	-0.014	(0.036)	-4.15	0.030	(0.019)	9.12	0.326
Treated by government doctor+	-0.028	(0.039)	-7.37	0.059**	(0.024)	15.49	0.378
Expenditure on medicines	259.143	(274.247)	70.37	182.109	(225.643)	49.45	368.269
Expenditure on hospital*	-35.530	(51.214)	-22.48	14.636	(24.871)	9.26	158.064
Total out-of-pocket expenditure	256.293	(270.490)	32.86	250.755	(195.640)	32.15	779.97
Days lost due to illness	1.652	(7.209)	3.70	4.786	(3.649)	10.73	44.606
Days spent in hospital	2.098	(3.458)	34.22	0.862**	(0.431)	14.06	6.13

Note: + indicates binary variable. Standard errors are in the parenthesis. Standard errors are derived through bootstrap with 50 replications. The expenditures are in 2012 Indian Rupees. *** p<0.01, ** p<0.05, * p<0.1

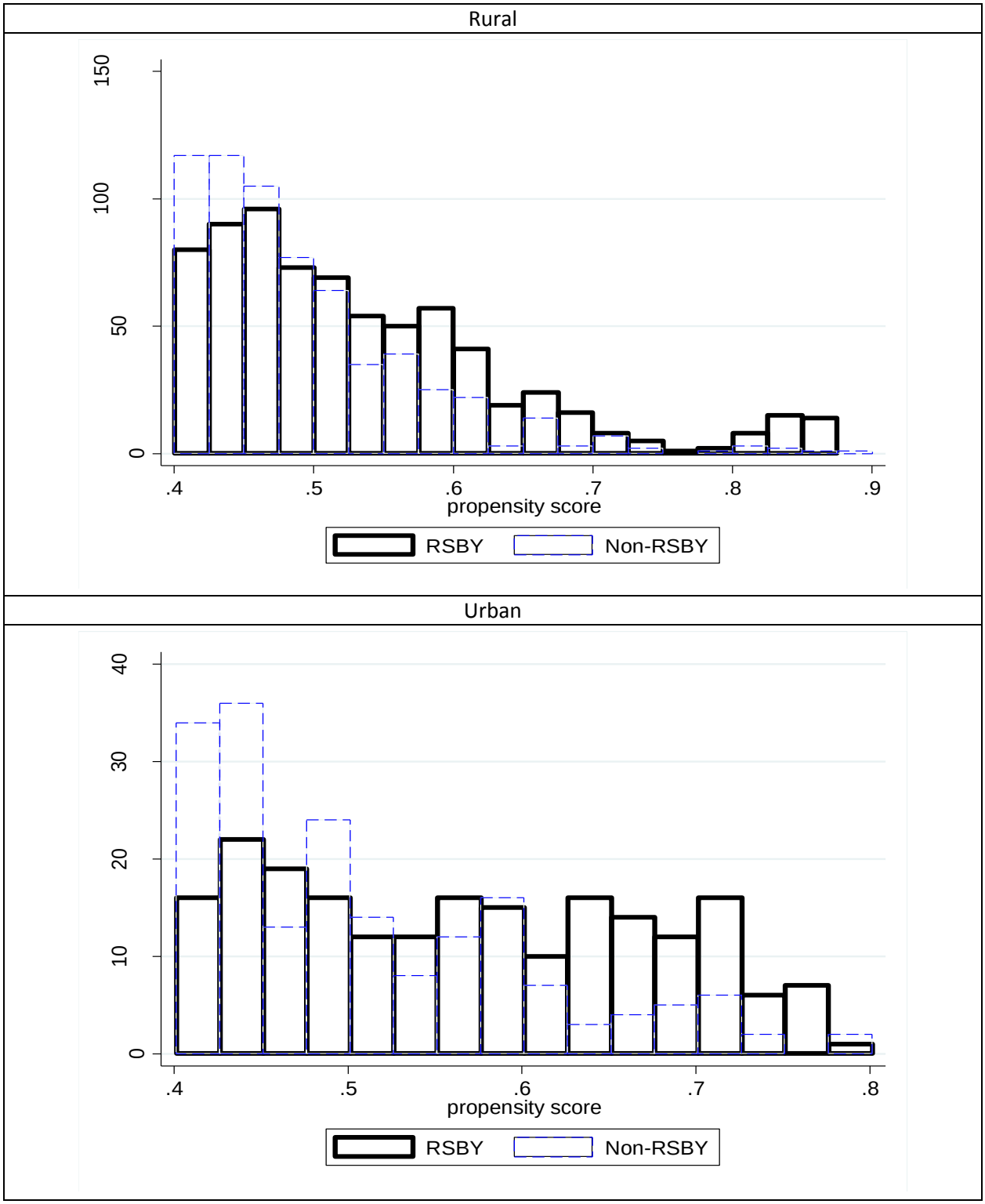
Table 7: Impact of RSBY- placebo, rural India

	Kernel matching	
	ATT	***SE (ATT)***
Panel 1 : At household-level (DID, longitudinal)		
Per capita total OOP from individual modules in INR	0.886	(15.654)
Per capita expenditure on ST morbidity in INR	-4.278	(8.617)
Per capita expenditure on LT morbidity in INR	7.417	(5.359)
Panel 2: Patient level (DID, pooled cross section)		
Total out-of-pocket expenditure on long term morbidity in INR	6.953	(5.775)

Note: Standard errors are in the parenthesis. Standard errors are derived through bootstrap with 50 replications. The expenditures are in 2012 Indian Rupees.

Appendix

Figure A1: Number of households in each propensity score bin



Note: This Figure is complementary to Figure 1 reported in main text, and plots the number of households with probability of 0.4 and higher to participate in RSBY.

Table A1: Probit model used for propensity score

Dependent variable: HH has RSBY in 2011	(1)	(2)	(3)	(4)
	Rural		*Urban*	
Household correlates in 2005	***coef***	***se***	***coef***	***se***
Other Backward Castes+	0.018	(0.040)	0.016	(0.058)
Scheduled Castes+	0.143***	(0.041)	-0.148**	(0.069)
Scheduled Tribes+	-0.063	(0.061)	-0.021	(0.140)
Muslim+	0.012	(0.057)	-0.163**	(0.078)
Household Size	-0.003	(0.015)	0.023	(0.030)
Household Size Square	-0.001	(0.001)	-0.001	(0.002)
% of age 0-14 in HH	0.147*	(0.080)	0.155	(0.131)
% of age 61 and above in HH	-0.049	(0.099)	-0.293	(0.196)
% of age 15-49 female in HH	-0.104	(0.104)	0.103	(0.159)
log per capita consumption	-0.137***	(0.036)	0.047	(0.061)
log of per capita income	-0.023***	(0.009)	-0.022	(0.018)
No ration card+	-0.128***	(0.044)	0.021	(0.067)
BPL card+	0.167***	(0.030)	0.249***	(0.061)
Poor+	-0.018	(0.039)	0.002	(0.070)
Head age	0.001	(0.001)	0.000	(0.002)
Head is female+	0.004	(0.047)	-0.008	(0.073)
Head's education	-0.000	(0.004)	-0.012**	(0.006)
Head's work type-casual+	0.126***	(0.030)	-0.060	(0.053)
Head's work-type-government+	-0.007	(0.060)	0.164***	(0.062)
Per capita inpatient expenditure	0.000	(0.000)	0.000	(0.000)
Per capita outpatient expenditure	0.000	(0.000)	-0.000*	(0.000)
% of members reported- fever	0.313	(0.203)	0.120	(0.351)
% of members reported- cough	-0.061	(0.129)	0.118	(0.248)
% of members reported- diarrhea	0.111	(0.152)	0.551*	(0.319)
% of members reported- short term (ST) problems	-0.304	(0.292)	-0.118	(0.564)
% of members reported- received treatment for ST problems	0.235	(0.295)	0.142	(0.541)
% of members reported- government doctor for ST	-0.054	(0.227)	0.010	(0.406)
% of members reported- private doctor for ST problem	-0.182	(0.203)	0.012	(0.348)
% of members reported- long term (LT) problems	0.191	(0.149)	0.113	(0.246)
% of members reported- cataract	-0.427	(0.293)	-0.783	(0.744)
% of members reported- tuberculosis	-0.104	(0.455)	0.618	(0.861)
% of members reported- blood pressure	0.167	(0.250)	-0.172	(0.329)
% of members reported- heart disease	0.219	(0.392)	-0.290	(0.509)
% of members reported- diabetes	-0.530	(0.323)	-0.028	(0.386)
% of members reported- leprosy	0.276	(0.842)	-0.119	(1.356)
% of members reported- cancer	-2.331	(1.486)	-3.466*	(1.814)
% of members reported- asthma	-0.003	(0.294)	0.260	(0.603)
% of members reported- polio	-0.134	(0.643)	-1.854	(2.125)
Per capita hospital days	-0.005	(0.009)	0.013**	(0.006)
Per capita days lost in illness	-0.000	(0.001)	-0.001	(0.002)
HH has piped water access+	0.079*	(0.044)	0.033	(0.071)
HH has hand pump water access+	0.062*	(0.038)	-0.120	(0.097)
HH has no access to toilet+	0.085**	(0.039)	0.104*	(0.060)

HH has no electricity+	0.099***	(0.034)	0.060	(0.097)
House building in poor conditions+	-0.013	(0.040)	0.108	(0.068)
HH have health insurance+	0.028	(0.094)	-0.067	(0.111)
HH use radio+	-0.002	(0.040)	-0.057	(0.068)
HH use paper+	0.022	(0.048)	0.046	(0.057)
HH use Television+	-0.016	(0.036)	-0.006	(0.051)
HH know some doctor+	0.055	(0.034)	-0.006	(0.055)
HH know some teacher+	-0.066**	(0.034)	0.074	(0.056)
HH know some government servant+	-0.015	(0.035)	-0.061	(0.053)
Anyone in HH member of self-helf group+	0.157***	(0.051)	0.249**	(0.098)
Anyone in HH member of Development of NGO+	-0.074	(0.116)	-0.189	(0.157)
Attended local body meeting+	0.051*	(0.029)	-0.014	(0.067)
HH suffered death in last year+	0.031	(0.057)	-0.190	(0.130)
Great deal of confidence in Medical staff+	-0.020	(0.029)	0.093*	(0.048)
Great deal of confidence in state government+	0.036	(0.030)	0.046	(0.051)
Large village-5000 population+	-0.092*	(0.049)		
Distance to town in km	-0.001	(0.001)		
Distant to district HQ in km	-0.001*	(0.001)		
No access to surfaced road+	0.079	(0.059)		
No bus stop in village+	0.111***	(0.032)		
Number of anganwadis in village	-0.011**	(0.005)		
Health sub center in village+	-0.001	(0.032)		
Primary health center in village+	-0.042	(0.048)		
Village have trained private doctor+	0.017	(0.038)		
Constant	-0.706*	(0.395)	-2.271***	(0.595)
Observations	20,825		7,629	
Pseudo-R2	0.190		0.186	

Note: + implies indicator variable. Robust standard errors in parentheses. The models also include district fixed effects not reported in Table. *** p<0.01, ** p<0.05, * p<0.1

Table-A2: Post matching difference in 2005 correlates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rural				Urban			
	Treated	*Control*	*SB*	*p-value*	*Treated*	*Control*	*SB*	*p-value*
Other Backward Castes+	0.334	0.330	0.8	0.752	0.328	0.297	6.8	0.153
Scheduled Castes+	0.279	0.273	1.3	0.633	0.159	0.154	1.3	0.767
Scheduled Tribes+	0.112	0.114	-0.4	0.892	0.032	0.037	-2.6	0.571
Muslim+	0.089	0.083	1.9	0.470	0.155	0.159	-1.2	0.799
Household Size	6.007	6.020	-0.4	0.858	5.540	5.524	0.6	0.891
Household Size Square	44.263	44.514	-0.4	0.849	36.844	36.680	0.4	0.927
% of age 0-14 in HH	0.325	0.321	1.9	0.481	0.272	0.269	1.5	0.753
% of age 61 and above in HH	0.072	0.074	-0.9	0.731	0.060	0.061	-0.8	0.862
% of age 15-49 female in HH	0.246	0.247	-0.7	0.785	0.278	0.276	1.8	0.698
log per capita consumption	6.828	6.857	-4.3	0.107	7.298	7.323	-3.7	0.427
log of per capita income	8.889	8.923	-2.3	0.396	9.673	9.680	-0.5	0.915
No ration card+	0.124	0.126	-0.6	0.828	0.146	0.148	-0.6	0.895
BPL card+	0.383	0.365	4.0	0.148	0.256	0.243	3.2	0.514
Poor+	0.320	0.303	3.9	0.164	0.273	0.263	2.2	0.643
Head age	47.943	48.312	-2.7	0.295	47.896	48.023	-1.0	0.831
Head is female+	0.093	0.093	-0.3	0.908	0.112	0.111	0.5	0.914
Head's education	3.974	4.111	-3.2	0.227	6.956	7.106	-3.1	0.499
Head's work type-casual+	0.552	0.531	4.2	0.115	0.361	0.330	6.4	0.168
Head's work-type-government+	0.045	0.051	-2.8	0.276	0.192	0.194	-0.4	0.927
Per capita inpatient expenditure	58.587	59.406	-0.3	0.929	78.193	80.304	-0.5	0.920
Per capita outpatient expenditure	93.320	90.445	0.9	0.739	69.796	72.104	-0.9	0.811
% of members reported- fever	0.139	0.138	0.9	0.734	0.106	0.105	0.9	0.858
% of members reported- cough	0.111	0.110	0.6	0.834	0.081	0.078	1.9	0.672
% of members reported- diarrhea	0.042	0.042	0.0	0.999	0.021	0.022	-0.5	0.906
% of members reported- short term (ST) problems	0.156	0.155	0.8	0.769	0.120	0.120	0.0	0.994
% of members reported- received treatment for ST problems	0.147	0.144	1.2	0.668	0.113	0.114	-0.9	0.857
% of members reported- government doctor for ST	0.032	0.030	1.7	0.541	0.025	0.025	0.2	0.970
% of members reported- private doctor for ST problem	0.103	0.103	0.0	0.995	0.075	0.076	-0.4	0.927
% of members reported- long term (LT) problems	0.067	0.066	0.7	0.798	0.075	0.076	-0.7	0.883
% of members reported- cataract	0.007	0.007	0.8	0.758	0.003	0.003	-0.3	0.947
% of members reported- tuberculosis	0.004	0.004	0.6	0.819	0.003	0.002	2.7	0.565
% of members reported- blood pressure	0.013	0.014	-0.7	0.816	0.023	0.025	-2.6	0.579
% of members reported- heart disease	0.004	0.005	-2.3	0.437	0.006	0.007	-1.0	0.808
% of members reported- diabetes	0.007	0.007	-0.1	0.961	0.014	0.014	-0.3	0.953
% of members reported- leprosy	0.001	0.001	-1.2	0.728	0.001	0.001	0.6	0.876
% of members reported- cancer	0.000	0.000	0.3	0.849	0.001	0.001	-0.7	0.846
% of members reported- asthma	0.008	0.008	0.7	0.789	0.005	0.005	0.7	0.867
% of members reported- polio	0.001	0.002	-1.1	0.692	0.001	0.000	2.3	0.564
Per capita hospital days	0.249	0.246	0.2	0.954	0.530	0.685	-3.8	0.596

Per capita days lost in illness	4.249	4.078	1.2	0.639	3.551	3.625	-0.5	0.906
HH has piped water access+	0.206	0.211	-1.1	0.674	0.682	0.672	2.1	0.651
HH has hand pump water access+	0.408	0.406	0.4	0.866	0.135	0.142	-2.0	0.647
HH has no access to toilet+	0.743	0.726	3.9	0.142	0.296	0.287	2.1	0.662
HH has no electricity+	0.404	0.395	1.8	0.515	0.070	0.073	-1.1	0.826
House building in poor conditions+	0.194	0.195	-0.4	0.888	0.168	0.157	3.0	0.533
HH have health insurance+	0.017	0.017	-0.5	0.842	0.038	0.044	-2.8	0.533
HH use radio+	0.131	0.135	-1.0	0.704	0.111	0.111	0.2	0.972
HH use paper+	0.118	0.131	-4.0	0.136	0.427	0.433	-1.1	0.806
HH use Television+	0.205	0.221	-3.8	0.144	0.572	0.586	-2.9	0.521
HH know some doctor+	0.308	0.318	-2.2	0.416	0.358	0.366	-1.6	0.721
HH know some teacher+	0.372	0.381	-1.9	0.484	0.442	0.450	-1.5	0.738
HH know some government servant+	0.257	0.262	-1.2	0.649	0.413	0.436	-4.7	0.310
Anyone in HH member of self-helf group+	0.104	0.105	-0.6	0.832	0.098	0.087	3.9	0.446
Anyone in HH member of Development of NGO+	0.024	0.026	-1.2	0.686	0.023	0.027	-2.5	0.617
Attended local body meeting+	0.425	0.425	-0.1	0.984	0.170	0.177	-1.9	0.694
HH suffered death in last year+	0.052	0.051	0.4	0.892	0.021	0.025	-2.4	0.560
Great deal of confidence in Medical staff+	0.634	0.626	1.6	0.552	0.682	0.687	-1.0	0.817
Great deal of confidence in state government+	0.278	0.282	-0.9	0.723	0.265	0.265	0.1	0.977
Large village-5000 population+	0.231	0.230	0.4	0.901				
Distance to town in km	14.369	14.244	1.1	0.678				
Distant to district HQ in km	41.993	42.327	-1.3	0.629				
No access to surfaced road+	0.911	0.917	-2.1	0.446				
No bus stop in village+	0.533	0.519	2.6	0.321				
Number of anganwadis in village	3.226	3.086	3.1	0.319				
Health sub center in village+	0.382	0.385	-0.5	0.844				
Primary health center in village+	0.176	0.172	1.2	0.668				
Village have trained private doctor+	0.234	0.239	-1.3	0.627				

Note: + implies indicator variable. *p*-value is the *p*-value of *t*-test of equality of treatment observations with matched control observations. SB implied standardized bias for each variable, and $SB = \frac{\bar{X}_{T,M} - \bar{X}_{C,M}}{\sqrt{0.5(V_{T,M}(X) + V_{C,M}(X))}}$, where $\bar{X}_{T,M}, and\ \bar{X}_{C,M}$ are the means of matched treated and control groups, while $V_{T,M}$ and $V_{C,M}$ are variances in matched treatment and control groups.

Table A3: Reduction in bias on observables

	Rural	Urban
Before matching pseudo-R^2	0.190	0.186
Prob > chi2	0.000	0.000
After matching pseudo-R^2	0.008	0.013
Prob > chi2	1.000	1.000