

Anup K Karan

Green Templeton College

Changing Pattern of Household Expenditure on Health and the Role of
Public Health Insurance Schemes for the Poor in India: Case of Rashtriya
Swasthya Bima Yojana

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This research is an outcome of my deep and long standing interest in the subject of financial risk protection of households in the health sector. Like in many developing countries, the health related financial burden on households has been dubiously high in India as most parts of healthcare financing in India comes from direct, out-of-pocket payments. The intense scholarship at the University of Oxford helped me articulate my thoughts and allowed me to apply rigorous scientific methods to enquire into this subject. The present research would not have been possible without the support of a host of people who stood by me irrespective of the magnitude of challenges I faced.

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ABSTRACT

Background: In order to protect the poor from health shocks, the Government of India launched Rashtriya Swasthya Bima Yojna (RSBY) in 2008. The objectives of this study are: a) to assess the changes in the financial burden of health care on the poor population; b) to estimate the effects of RSBY in reducing the financial burden on the poor; and c) to examine the impact of RSBY on the labour supply of the poor.

Methods: The study is based on data from the National Sample Survey Organisation (NSSO). The sample size is between 100-125 thousand households at the all-India level. The study uses pooled cross-section regression analysis to assess the changing pattern of out-of-pocket (OOP) payments on healthcare. The impact of RSBY on financial risk protection and labour force participation rate in India were estimated using the difference-in-differences (DID) method.

Findings: My thesis consists of three papers. The findings in the first paper, changing pattern of out-of-pocket payments, reflect that the poorest 20% of households, compared to the richest 20%, realised a slower increase in out-of-pocket as a share of the household's total expenditure (-0.5%) and catastrophic payments (-2%) during the period of 2000-2012. However, during the same period, Scheduled caste/tribe and Muslim households reported an increased burden of out-of-pocket.

The second paper finds reduction in the probability of incurring 'any inpatient expenditure' and 'catastrophic inpatient expenditure' after RSBY intervention but

marginal increase in the 'per person monthly inpatient expenditure' and insignificant change in 'inpatient expenditure as a share of households' total expenditure'. The effects of the scheme on the total out-of-pocket payment are negligible and non-drug expenditure reflected significant increase.

The third paper finds that women's labour supply increased (3% per annum) but the elderly labour supply declined (1.5%). Further, men switched from self-employment to casual work while women moved to wage-paid regular and casual jobs at the cost of being self-employed.

Discussion and conclusion: The poor and other less advantaged population groups realised an increasing OOP burden mainly on account of two factors: i) outpatient care is not covered under RSBY; and ii) the benefit package under the scheme is very modest. Women's labour supply increased and the elderly labour supply declined in favour of leisure because of possible improvements in health. However, the overall labour supply did not change. The Indian government needs to consider broadening the benefit package and including outpatient coverage under RSBY.

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Abbreviations

ATT	Average Treatment effect on the Treated
AWE	Added Workers Effect
BPL	Below Poverty Line
CBGA	Centre for Budget and Governance Accountability
CBHI	Community Based Health Insurance
CES	Consumer Expenditure Survey
CHC	Community Health Centre
CI	Confidence Interval
CPI	Consumer Price Indices
DGET	Directorate General of Employment and Training
DID	Difference-in-Differences
EUS	Employment and Unemployment Survey
GDP	Gross Domestic Product
GOI	Government Of India
HLEG	High Level Expert Group
INR	Indian Rupees
IRDA	Insurance Regulatory and Development Authority
ITT	Intention to Treat
LFPR	Labour Force Participation Rate
LMIC	Low and Middle Income Countries
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoHFW	Ministry of Health and Family Welfare
MoL&E	Ministry of Labour and Employment
MPCE	Monthly Per Capita Expenditure
NCEUS	National Commission for Enterprises in the Unorganised Sector
NCMH	National Commission on Macroeconomics and Health
NE	North East
NGO	Non-Governmental Organisation
NHA	National Health Accounts
NHP	National Health Policy 2002
NHP	National Health Programmes
NRHM	National Rural Health Mission
NSSO	National Sample Survey Organisation
OBC	Other Backward Caste
OLS	Ordinary Least Squares
OOP	Out Of Pocket
OR	Odds Ratio
PDS	Public Distribution System
PHC	Primary Health Centre
RCH	Reproductive and Child Health
RSBY	Rashtriya Swasthya Bima Yojana
SC	Sub-Centre
SC	Scheduled Caste
SES	Socio-Economic Status
SHI	Social Health Insurance
ST	Scheduled Tribe
TPM	Two-Part Model

UHC	Universal Health Coverage
UPS	Usual Principal Status
UPSS	Usual Principal and Subsidiary Status
USS	Usual Subsidiary Status
UT	Union Territory
WHO	World Health Organisation
WPR	Work force Participation Rate

CHAPTER 1: INTRODUCTION

1.1. Background

The Indian economy grew at a brisk rate of more than 7 to 8 per cent per annum during the decade, ending in 2012-13 (Ministry of Finance, 2013). There is, however, an increasing realisation that the achievements in social sector development in general, and health outcomes of population in particular, seriously lagged behind (Ministry of Health and family Welfare [MoHFW] 2002; Planning Commission 2013). This concern has been particularly true with respect to the economically and socially underprivileged population. The National Health Policy (NHP) 2002 observes that “given a situation in which national averages in respect of most (health) indices are themselves at unacceptably low levels, the wide inter-state (provincial) disparity implies that, for vulnerable sections of society in several states, access to public health services is nominal and health standards are grossly inadequate” (MoHFW 2002; p. 7). At a time when the Indian economy is currently growing at a moderate rate of 5-6% and looks forward to regain the higher growth trajectory of 8-9%, that was realised in the recent past, concerns over protecting population against the health shocks and associated financial burden was underlined prominently in recent government policies (Planning Commission 2013).

It is widely acknowledged that the prevailing, unacceptably-high burden of diseases in the country, coupled with significantly high financial burden of seeking healthcare on households, continues to pose serious threats not only to Indian health sectors but

also to the sustenance of overall economic growth of the country (Planning Commission 2011, 2013; Reddy et al., 2011a). In general, on the one hand financial constraint restricts many poor households from seeking healthcare and, on the other, causes severe disruption in the living status of those who seek even the bare essentials of healthcare. Accordingly, ensuring enhanced equity in access to healthcare and the related financial burden on households has been one of the major concerns of the Indian health system (MoHFW, 2002; MoHFW, 2011; Planning Commission, 2013). The imperative of enhanced equity in healthcare and healthcare financing is reflected in the Indian Government's commitments to raise public expenditure on health by 2.5 to 3 times the present level by the end of the 12th Five Year Plan 2012-17 (Planning Commission 2013). At a time when universal health coverage (UHC) is high on the global health policy agenda (WHO 2010), Indian policy makers and planners similarly appreciate the need to achieve UHC.

The recent *Lancet* series on India's plan to achieve universal health coverage (UHC) clearly documents that "to sustain the positive economic (growth) trajectory India has had during the past decade, and to honour the fundamental rights of all citizens to adequate healthcare, the 'health of all Indian people' has to be given the highest priority in public policy" (Reddy et al., 2011a; p. 104). In this regard, enhanced access to quality healthcare by the poor has been one of the central concerns of several new policy initiatives of the Indian Government in recent years. The High Level Expert Group (HLEG), constituted by the Planning Commission, Government of India, in 2011 recommends the need for "ensuring equitable access for all Indian citizens ... to

affordable, accountable, appropriate health services of assured quality, as well as public health services addressing the wider determinants of health delivered to individuals and populations” (HLEG Report, 2012).

Two sets of major policy interventions can be identified with respect to the recent ongoing health sector reforms in India. These initiatives include supply as well as demand side interventions. On the supply side the National Rural Health Mission (NRHM), a national level flagship programme launched in April 2005 by the MoHFW, aims to improve availability of essential healthcare services and drugs in rural areas by revitalising the existing public sector structure at the lowest levels of administration, and forging private participation in providing health services in rural areas. In fact, the NRHM at present operates as an “omnibus broadband programme” by integrating all vertical health programmes of the MoHFW, including the reproductive and child health programme, and various diseases control programmes (MoHFW, 2011). NRHM was merged into a unified National Health Mission in 2014. The demand side interventions, on the other hand, aim to enhance the population’s access to quality healthcare provided by both the public and private sector by providing prepayment and risk pooling mechanism. Under this model, a large-scale social health insurance programme Rashtriya Swasthya Bima Yojana (RSBY) was initiated in April 2008 aimed at providing financial risk protection for poor families at the pan-India level (http://www.rsby.gov.in/about_rsby.html). In addition, there have also been individual state level interventions, such as Yeshasvini and Vajpayee Aarogyasri health insurance in Karnataka; Rajiv Aarogyasri in Andhra

Pradesh and the Chief Minister's Insurance Scheme for Life Saving Treatment in Tamil Nadu. RSBY is by far the single largest national health insurance scheme providing financial protection to poor ever to be launched in India. The scheme is also considered a business model for the social sector, which is scalable and sustainable at the pan-India level, with incentives built-in for each stakeholder of the programme. Most importantly, the key objective of the scheme is to protect poor families - i.e. below poverty line (BPL) households, from health shocks by providing them quality secondary level healthcare without suffering disruptive impact on general consumption pattern and impoverishing effect on its living standard (http://www.rsby.gov.in/about_rsby.html).

All these recent policy initiatives are primarily aimed at improving equity in health and access to healthcare by strengthening the Indian health system. However, one of the central and immediate objectives of these policy initiatives is to reduce financial the burden and ensure equity in healthcare financing. Against this backdrop, the present research aims to assess the changing pattern of out-of-pocket payments in India during the last decade. More specifically, the present study aims to assess how far the recent policy reforms have been successful in reducing the burden of out-of-pocket payments on poor households. Given that RSBY is the largest ever national level financial risk protection programme in the country, specially targeted to the poor, the present research aims to assess the role of RSBY in providing financial protection to the poor. Further, one could also expect expanded healthcare coverage to have a positive impact on other welfare measures of population such as those that

are non-medical, non-health risks related, including increased schooling of children, enhanced labour supply and workers productivity and even accelerated investment and growth in the economy. This study aims to assess the impacts of RSBY on the Indian labour market and labour supply among the poor.

This research adds to the existing literature on the financial burden of healthcare and the impacts of a national level health insurance scheme on households in several ways. Firstly, the method of estimating the impacts of health insurance, used in this study, is a substantial improvement over the existing literature in this field. Estimates of the program's impact were obtained using a method that, compared to the existing works in this area, is better equipped to address the issue related to observed and time-variant unobserved heterogeneity. The methods particularly address the 'parallel path assumption' of difference-in-differences method of impact assessment of a public policy. Secondly, the literature on assessing impact of health insurance on labour market in developing countries is scanty. This study fills this important gap in the literature by assessing the impacts of RSBY on labour supply and job switching among adult males, females and the elderly in India. In addition, the findings of the study are of crucial importance for the on-going health sector reforms in India. The findings on the burden on the disadvantaged population groups clearly identify the socio-economic groups that are at greater risks in India during the period of health sector reforms. Moreover, the study produces first-ever evidence on national level impacts of a publicly funded health insurance scheme in India - which is of significant importance for policy in order to achieve universal coverage.

1.2. Overview of Indian Health System

The Indian healthcare system has undergone significant changes over the last six and a half decades. During this period, the government set up various committees and commissions that recommended far-reaching, health sector reforms. Even before the Alma Ata declaration (1978) for “health for all”, the Bhore Committee (1946), Mudaliar Committee (1959) and Hathi Committee (1975) provided the footprint of a strong commitment to a comprehensive health focus in India. Among these, the Bhore (Health Survey and Development) Committee (1946) was by far the most comprehensive, reporting details the health conditions in the country and suggesting the setting up an extensive network of government facilities for providing primary and secondary healthcare. The Bhore Committee recommendations served as the basis of the health policies of the independent India for several years and public sector provisioning were integrated upwards from primary to secondary care and then to district level. Similar recommendations were made in the committees and commissions formed later. In 1983, when the first National Health Policy (1983) was announced, it emphasised the need to encourage private initiative in healthcare service delivery. This phase witnessed the implementation of National Health Programmes (NHPs) under the disease control approach, with a vertically designed and centrally monitored structure.

While the early post-independence years witnessed the dominant role of public sector provisions of primary healthcare services in the country, the subsequent government health policies gradually shifted focus onto the role of private sector

(National Commission on Macro Economics and Health [NCMH] 2005). Subsequently, several policy initiatives, such as, the passage of the Insurance Regulatory Development Authority (IRDA) Bill in 1999 (GOI 1999) and the Drug Policy of 2002, set the tone for an expanded private sector role in health care provisioning. Accordingly, the National Health Policy, 2002, reflected the changing landscape of policy-making – seeking greater roles to be played by private sector participation, including private health insurance business. While analysing the historical backdrop of the Indian healthcare system, NCMH (2005) noted that the post-2000 there is a shift that has the potential to profoundly affect the health sector in India in three important ways: (i) the desire and need to utilise private sector resources for addressing public health goals; (ii) liberalisation of the insurance sector to provide new avenues for health financing; and (iii) redefining the role of the state from being a provider to a financier of health services as well (NCMH 2005). More specifically, there has been a slow but steady move from hierarchal, often vertically integrated, forms of service delivery towards a model based on separation of responsibility for purchasing services from the responsibility of providing them. Accordingly, a distinct role of purchasing of healthcare services emerged as part of the recent reforms of the Indian healthcare system. The mechanism and models of purchasing have been worked out more explicitly in the case of recently launched government financed health insurance schemes. There follows a brief description of the organisation of the Indian health system, including financing and service delivery, and the recent changes therein.

1.2.1 Structure of the Current Indian Health System

The current Indian healthcare system is typically characterised by a pattern of mixed ownership and different systems of medicine. On the ownership front, both public and private sectors play their respective roles. The system of medicine practiced in India is a mix of the modern English system of Allopathy along with Homoeopathy and the traditional, indigenous systems of *Ayurvedic, Unani, Siddha etc.* (MoHFW, 2011).

In the public sector, the government provides publicly financed and managed curative, preventive and promotive health services to the people from primary to tertiary level throughout the country – either free of cost or at highly subsidised rates. In contrast, the private sector, which plays a dominant role in the provisioning of curative care, provides services on a fee-for-service basis. Further, while the public health sector consists of all levels of government, federal, state and local governments, the private sector is constituted of for-profit business enterprises and not-for-profit (non government organisations (NGOs), charitable institutions, missions, trusts, etc.) institutions. Within the public sector, while the state level organisational structure is multi-layered – ranging from different medical college hospitals at the top to village level sub-centres and primary health centres (PHCs) – the central government, besides directly managing all All-India level medical colleges also runs national level health programmes. The private sector in India has a dominant presence in all the submarkets – medical education and training, medical technology and diagnostics, pharmaceutical manufacture and sale, hospital

construction and ancillary services and, finally, the provisioning of medical care (MoHFW, 2010). Furthermore, the private sector encompasses all kinds of providers: general practitioners – qualified specialists, unqualified rural medical practitioners – chemists and diagnostic laboratories, etc. Most of these health providers are involved in providing curative care that address various healthcare market segments. Figure 1.1 is a pictorial presentation of different institutions engaged in delivery of health care services in the Indian health system.

Over the years, the private sector has occupied the dominant position in overall service delivery in the Indian health system. The national sample survey data on health and morbidity in India reveals that the contribution of the private sector share in providing inpatient health services in India increased from 40% in 1995-95 to more than 60% in 2004. The private sector share of outpatient health services continued to be over 80%. The role of the private sector can only be expected to have expanded further and today Indian health care is known to be one of the most privatised health sectors in the world.

Health in India is listed as a “state subject” in the Constitution of India and every state government, in addition to participating in national level programmes and schemes, enjoys significant flexibility in planning and implementation of state-based health policies. In fact, if the share of public expenditure is any indicator of the relative roles played by the central and state governments, it is the state governments who bear the bulk (more than 60%) of the total government expenditure in the health

sector. While central government is involved in running (on a cost sharing basis) national level vertical programmes and, in recent years, the NRHM, the state governments finance medical colleges, district hospitals, community health centres, primary health centres and sub-centres. State governments also share up to 10 per cent of the district level disbursement of the finances under the NRHM. During the last decade, a few state governments (particularly, Karnataka, Andhra Pradesh and Tamilnadu) introduced state-based health insurance schemes fully financed by state public resources. All these state level insurance schemes varied widely in terms of coverage of population, insurance premium and benefit packages, depending on the state policy and resources. Similarly, the states of Tamilnadu and Rajasthan introduced “free access to medicines” through their respective state level public sector health centres.

In general, different states also show high variability in health financing, outputs and outcomes. For example, in 2005-06, average per-person public expenditure on health varied from a low of INR 93 in Bihar and 145 in Madhya Pradesh (the less developed states) to INR 287 and INR 233 in Kerala and Tamilnadu (the both better off states in terms of human development indicators). Accordingly, people living in Kerala have 8 years more of higher life expectancy than in Bihar (65 years). Similarly, Kerala has approximately 100% of baby delivery attended by trained health personnel as against only about one-third of the total number of deliveries in Bihar. Many other states with low public health expenditure, as compared to the states with high per person public expenditure, fair worse in terms of health outcomes (Shiva Kumar et al. 2011).

In the public sector, the primary tier is designed to have three types of healthcare institutions, namely, a Sub-Centre (SC) for a population of 3,000-5,000, a Primary Health Centre (PHC) for 20,000 to 30,000 people and a Community Health Centre (CHC) as a referral centre for every four PHCs covering a population of 80,000 to 120,000. The district hospitals function as the secondary tier for the rural healthcare, and as the primary tier for the urban population. The tertiary healthcare is provided by healthcare institutions in urban areas, which are well equipped with sophisticated diagnostic and investigative facilities.

1.2.2 Pattern of Health Financing in India

Healthcare in India is overwhelmingly financed through out-of-pocket (OOP) payments, with the government contribution (including all central, state and local governments) being just approximately 20% of the total health expenditure in the country. The last detailed National Health Accounts (NHA), available for the year 2004-05, reported the total health expenditure in India as to be approximately 4.2% of GDP, which is one of the lowest among most of the developing economies (MoHFW 2009; Shiva Kumar et al., 2011). According to a recent estimate (Planning Commission 2012), total health expenditure in India is approximately INR 2,200 billion (US \$ 37 billion) in 2008-09 (Planning Commission, 2012) implying approximately US \$ 30 per capita per annum. Government expenditure is estimated to be INR 586,810 million, which comes to be approximately 1.1% of GDP an increase from 0.9% of GDP in 2001-02 (Planning Commission, 2012). The increase in government expenditure was a result of the introduction of NRHM in 2005 and RSBY

and other state-level, government financed health insurance schemes since 2007-08. However, the total health expenditure as a proportion of GDP in India reflects a decelerating trend during the last decade as total health expenditure declined from 4.8% of GDP in 2001-02 to 4.2% in 2004-05 to 4.1% in 2008-09 (Planning Commission 2012). The most disquieting picture that emerges from the NHA data is that India has one of the highest shares of private spending in the world and more than 90% of it is direct out-of-pocket spending (Mahal 2010; Shiva Kumar et al. 2011).

Out-of-pocket spending by private households (69% of spending) is the single largest component of the overall health expenditure. Insurance programmes (including government financed insurance schemes) account for a small proportion (up to 2-3%) of the total health expenditure covering approximately 10 per cent of the total population in the country (Shiva Kumar et al., 2011; Reddy et al., 2011b). The percentage distribution of health expenditure in India by different sources of financing is presented in Figure 1.2.

1.2.3 Current Scenario of Health Insurance in India

India had a low density of health insurance coverage – of about 75 million people (roughly about 16 million family beneficiaries) – until 2005, when it accelerated amounting to an estimated 302 million people by 2010, and thus covering approximately one-fourth of the population (Reddy et al., 2011b). This increase in insurance coverage was possible primarily due to the launch of several government financed health insurance schemes for the poor in different parts (or provinces) of the country during the last decade. Presently, other than the national level RSBY, several

state governments, namely Andhra Pradesh, Karnataka and Tamilnadu, are also running their state level insurance schemes for the poor population. In terms of the benefit package, all these schemes provide only hospitalisation coverage to the poor families. In terms of size of the benefit packages, while RSBY's package has been very moderate (Maximum INR 30,000), involving coverage of largely secondary care hospitalisations, Rajiv Aarogyasri and Tamilnadu's Chief Minister Schemes have been the most ambitious covering 'high-end' surgical procedures at the tertiary level (up to INR 150,000, approximately \$2,500). Similarly, Karnataka's Vajpayee Aarogyasri provides coverage to both secondary and tertiary care with a maximum limit of INR 200,000.

The landscape of health insurance in India in recent times appears to have recorded steady progress in terms of "breadth" of coverage, i.e. percentage of population covered by different health insurance schemes during the last decade or so. However, the 'depth' (size of risk cover) and the 'height' (size of risk fund) of the coverage in the country have been very limited so far. Moreover, while over two-third of households' health expenditure in India is spent on outpatient healthcare (Garg and Karan, 2009; Berman et al., 2010), the central focus of publicly financed health insurance schemes has been on hospitalisation coverage.

Given the heavy reliance on OOP as a means of financing the health sector and relatively low presence of risk-pooling mechanism, a large proportion of households in the country face severe impoverishment impact of health shocks. Past research

(Mahal et al., 2004; Peters et al., 2002, 2003; Krishna, 2004) have found that the poor in India are often required to borrow and sell-off household assets to finance their healthcare needs, particularly for hospitalisation. There is also enough evidence to indicate that because of the OOP expenses of healthcare, many non-poor households plunge into poverty and poor households are pushed further down (Peters et al., 2002; Doorslaer et al., 2006; Garg and Karan 2009). For instance, in a multi-Asian country study, Doorslaer et al. (2006) note that OOP expenditure by households caused approximately 3.2% increase in the country's poverty ratio in 2004-05. Similarly, in a more recent study, Berman et al. (2010) emphasised that outpatient OOP expenditure has been more prominently associated with increase in poverty rather than inpatient OOP expenses by households.

1.3. Conceptual Framework of Demand for Healthcare and Health Insurance

The financial implications of seeking healthcare have been discussed in the theoretical literature on demand for health. Theoretical principles of health economics suggest that the individual demands healthcare as an input into her production of health. Hence, individuals purchase healthcare in order to maximise their health. This theoretical model – widely referred to as the Grossman model of the demand for health – views healthcare as an input along with other health inputs such as nutrition and personal exercise (Grossman, 1977) in the process of investment in health (human) capital. Specifically, the model views the individual as the sole decision maker as to 'if' and 'how much' healthcare to use in order to maximize the utility derived from alternative combinations of health and other goods.

The basic utility function of demand for health is defined as “ $U=U(X, H)$ ”. Where, U is a utility function, and X and H are alternative combinations of other goods and health which provides same level of utility (satisfaction) to the consumer. Anchored on this basic utility function, a behavioural model of demand for healthcare (or interchangeably used ‘medical care’) is derived as: $H=f(m)$, where H is amount of health selected by consumer and m stands for amount of medical care purchased by consumer from market along with other goods X . Economic theory also discusses relationship between health and consumption of medical care which specifies that the amount of health an individual can achieve, as a result of consuming healthcare, depends on the marginal productivity of medical care in producing health, which declines regularly with the increasing amount of medical care consumed. Since medical care is purchased from the market, this involves the price of medical care (say P_m) and income (budget) of the consumer. Accordingly, the budget constraint of a consumer is worked out to be: “ $I=X*P_x + m*P_m$ ”, where, the terms I and P_x represent the consumers budget and price of other goods respectively. The financial implication of seeking healthcare by individuals resonates here. At a given income level and utility function, if the price of medical care increases consumer will either reduce the amount of medical care or other goods in the consumption basket. In both scenarios, health is likely to be compromised since health also depends on the consumption of other goods (such as nutrition) along with the consumption of medical care. In contrast, if price of medical care falls, the consumption of the same will go up having positive impacts on health.

1.3.1 Effects of health insurance on demand for and price of healthcare

Health insurance plays an important role in reducing the effective prices (paying out-of-pocket at the point of service delivery by providers) of medical care and is therefore expected to reduce the financial burden on the consumer despite increase in demand for medical care (Phelps 2010). Furthermore, health insurance itself is a 'normal market good' having its own demand function with respect to price of the product and income of consumers (Phelps 2010). As in the case of demand for medical care, demand for insurance also depends on the type and the severity of illness. However, unlike demand for medical care, demand for health insurance also depends on the perceived possibility of future illness (risk) as well as the current level of illness. This encourages consumers to shift part of their income for the future through suitable insurance policies available in the market and so minimise the risk of the impacts of future perceived illness on their general living status.

However, the price of insurance, usually paid by consumers in the form of a premium doesn't only include the expected benefit to the consumers from the insurance plan but it also includes the operational cost of the plan incurred by insurers. These costs are usually related to charges for a variety of administrative and sales costs and risk bearing which are usually termed as a "loading fee". This explains why the premium for an individual insurance plan is usually higher compared to that for a group plan. In an individual plan, insurance company faces higher risks (as the buyer of the plan may be sicker than an average individual) and higher per person administrative and sales costs. Accordingly, the actual premium

paid by buyer of an insurance plan is given by: $\text{Premium} = (1 + \text{loading fee}) \times (\text{expected benefits})$.

Thus, if the loading fee (say L)=0, the premium is equal to the expected benefits and insurance itself would be “free”. However, since no insurance company can operate without charging other costs from consumers, in general, all insurance has a positive ‘loading fee’ and this is very crucial in determining the demand for health insurance. Given the theoretical principle, the price of insurance certainly affects the demand for it. Although risk pooling over time and population groups is the essential feature of health insurance, the demand for health insurance varies depending on the actual structure of health insurance in different settings such as overall methods of payments like (a) co-payments, (b) deductibles and (c) limits on coverage (Phelps, 2010). While the first two options, co-payments and deductibles, limits the financial burden of the households in terms of the share of their budget in the purchase of insurance, the third option limits the benefit packages accruing to households at a given price of insurance. Furthermore, the methods of financing (a) entirely private, (b) private-public mix and (c) entirely public (tax-financed), also determine the structure of health insurance and ultimately the demand for insurance (Vogel, 1980).

Economic literature also discusses the ‘market failures’ and ‘moral hazards’ prevailing in health insurance markets. Market failures in health insurance markets arise because of uncertainty and unpredictability of illnesses, monopoly power of the insurer, asymmetric information flow (adverse selection on the supply side and little

knowledge about types of illnesses and the required medical care on the demand side), etc. Moreover, the market may fail in the quest for a greater degree of equity in health, healthcare and the financial burden of healthcare. Similarly, moral hazards in the form of supply-induced sale of insurance products and over-utilisation of subsidised healthcare are inseparable parts of health insurance markets.

1.3.2 Effects of health insurance on labour market

Health insurance schemes in any country, either employment linked or publicly financed social health insurance (SHI), or even community based health insurance (CBHI), are primarily aimed at improving population health through enhanced access to healthcare at effectively reduced costs. Nonetheless, the impact of health insurance on several non-health indicators of consumer behaviour have also been discussed at length both in theoretical and empirical literature. The most important among these are the possible effects of health insurance on investment and growth, non-medical non-health risks and the income risks associated with ill health (Currie and Madrian 1999). These probable impacts mostly emanate from likely impacts of health insurance on labour market of the countries implementing health insurance schemes (Gruber and Madrian, 2002).

The Grossman model provides a comprehensive scope to yield a conditional labour supply function in which labour supply depends on health, demand for healthcare and health insurance (Currie and Madrian, 1999). In effect, health insurance not only reduces the 'effective price' of medical care but also it works as a mechanism of 'virtual income transfer' to households. With the savings on purchasing medical care,

because of the reduced effective price of medical care, households may spend more of their income on other goods and services, which in turn will have positive impacts on health (Currie and Madrian, 1999). At the macro level, the improved health condition of the population will have a positive impact on labour productivity, labour supply and earnings. The 'added workers effect' (AWE) hypothesis (Krueger and Meyer, 2002) emphasises that new workers are likely to join labour market owing to the improved health conditions and hence labour supply is likely to increase. The resultant virtual higher income transfer, but with the same underlying wage rate, is likely to reduce labour hours in favour of consumption of increased leisure. However, the leisure-work-time trade off also depends on the perceived risk by consumers about their health conditions in the future. In general, people may enjoy leisure more if they are healthier but risk-averse consumers will enjoy leisure less if leisure brings with it more uncertainty about healthcare expenditures (Currie and Madrian, 1999). Hence, theoretical predictions suggest two divergent paths of changes in labour supply as a result of the improved population health. Firstly, improved population health reduces labour loss related to ill health and enhances labour supply through AWE and labour productivity. Secondly, individuals may increase their leisure against labour time because of the potential indirect income transfer through health insurance schemes (Currie and Madrian, 1999; Phelps 2010). In general, Currie and Madrian (1999) note that if health insurance is tied to employment, it is likely to increase labour force participation, while, if it is not, it may well reduce labour force participation.

1.3.3 Potential implications for India

One basis of assessing the performance of the healthcare system in a country is through the extent to which households are protected from direct out-of-pocket payments on healthcare and poverty and indebtedness induced by such payments. Accordingly, the present study hypothesises that the current spate of health sector reforms in India should significantly reduce the out-of-pocket burden of accessing healthcare by the poor in particular.

However, it is not obvious that as a result of health sector reforms the expenditure on healthcare should always decline in a developing country like India where large unmet demands for healthcare, both in terms of quantity and quality, exist. If health sector reforms make quality health services available to the population, individuals may purchase a greater level of healthcare and better quality of services. This is expected to increase spending by households on healthcare despite a relatively improved health system being in place compared to the one that existed earlier. However, with any pre-payment mechanisms, either through public sector provisioning or any social health insurance scheme or a combination of the two (that is by means of subsidising the healthcare providers and/or purchasers), the distribution of financial burden on population will change in favour of those who need health care. In a possible scenario, in order to enhance equity in health and accessing health services, government may take the responsibility of financing (or subsidising) increased demand for healthcare by the poor population in the country. However, even if the health reforms are targeted to protect the poor from financial

burden, the extent of reduction in financial burden on the poor will necessarily depend, on the one hand, on the size of the government subsidy and, on the other, the extent of targeting (Mahal et al., 2002; O'Donnell et al., 2007). Further, if health sector reform is not comprehensive, it is equally possible that the non-poor population may face increased prices of healthcare due to a rise in demand for healthcare by the poor population as a result of the targeted policy.

The RSBY, being the largest ever health insurance scheme, at least in terms of coverage of population (also known as 'breadth' of coverage), is expected to bring down the health related financial burden on the poor. RSBY is expected to make healthcare services available to the poor 'free of cost' as the government has assumed the responsibility to pay the premium of insurance. Therefore, in all likelihood, the demand for healthcare services by the poor in India is expected to increase. However, the question is: will RSBY also reduce financial burden of seeking healthcare on the poor? Most likely answer is 'yes', that is RSBY should reduce financial burden on the poor because the consumers of the insurance policy pay neither for purchasing insurance nor for healthcare services. However, the reduction in the financial burden on the poor is possible only to the extent that RSBY is able to cover the medical expenses of the poor. Moreover, given the fact that RSBY covers only inpatient related expenditure, it is important to estimate the effect of the scheme not only on the inpatient utilisation and expenditure but also on outpatient related utilisation and expenditure by the poor.

In any case, RSBY is likely to enhance demand for healthcare services of the poor and as a result may also improve health conditions. However, as discussed above, the impact of RSBY on the financial risk protection is not straightforward. Further, since health insurance facilitates income transfer to households in favour of those who utilises healthcare services (in case of RSBY, transfer from rich to poor), the RSBY intervention is also likely to have implications for the general well-being for the households benefited under the scheme and those who pay for it. Studies of the economic impact of illness have highlighted various implications for labour supply and earnings. One might expect expanded healthcare coverage through RSBY to have a positive impact on labour supply and earnings while effects of income transfer may reduce labour supply in favour of consumption of leisure. Theoretical predictions on utilisation and financial risk protection and labour market indicators after the RSBY intervention are presented in chapter 3 and chapter 4 respectively.

1.4. Specific Objectives of the Study

In view of the underlying conceptual framework outlined above, and the current Indian health care financing scenario, this thesis intends to assess the changing pattern of out-of-pocket payments in India in general and the related financial burden on the poor in the country. In addition, the study also aims to examine the potential implications of RSBY on the Indian labour market in general and labour supply from the poor households in particular. More specifically, the objectives of the present study are as follows:

- a) To examine the changing pattern of OOP payments across various population groups in India over the last decade (2000 to 2012);
- b) To assess the role of RSBY in providing financial risk protection to the poor households and assess the impact of the scheme in reducing out-of-pocket expenditure for the poor;
- c) To assess the impact of RSBY on the Indian labour market in general and labour supply of the poor households in particular;
- d) To suggest policy measures to improve the design and functioning of RSBY and to suggest strategies for the scalability of the programme towards universal coverage.

1.5. Methodology

Detailed methods and data sources against each of the first three objectives of the study are outlined in the following three chapters. This chapter, however, presents a broad contour of methods that is followed in the subsequent chapters.

1.5.1 Methods:

This research uses the theoretical framework developed in the past for evaluating health systems and designing healthcare reform (WHO, 2002) and evaluation of public programmes in general and health insurance schemes in particular. The methods used in this study are a mix of regression and differencing techniques. Based on the premise that a fair health system ensures households make healthcare payments according to their ability to pay rather than the risk of illness (WHO, 2002), the study first, by using descriptive cross-tabulation and a time trend regression analysis, assesses the changing pattern of out-of-pocket expenditure in India and the

relative out-of-pocket burden on different socio-economic population groups. Subsequently, the impacts of RSBY on financial risk protection and labour-market outcome have been estimated using difference-in-differences (DID) methods. In order to control the 'unobserved heterogeneity', the study uses a method of controlling pre-intervention, time-trend differences between the treatment and control groups by using data from an additional pre-intervention period. Detailed methods are presented in the respective chapters.

1.5.2 Data

The study uses data mainly from two different secondary sources: (a) household level data from the National Sample Organisation (NSSO), Ministry of Statistics and Programme Implementation (http://mospi.nic.in/Mospi_New); and (b) back-end district level administrative database on RSBY available at the RSBY web-site (<http://www.rsby.gov.in/Overview.aspx>). A brief description of these data sources follows.

(a) NSSO: The household level NSSO data (unit records in electronic formats) is available for research purpose in the public domain. This is an anonymised survey database. I bought and obtained permission from the NSSO to use this data in my research. The primary household-level data for this study was extracted from the quinquennial (five yearly) rounds of consumer expenditure surveys (CESs), and employment and unemployment surveys (EUSs) conducted by NSSO for the years 1999-2000 (55th round) 2004-05 (61st round), 2009-10 (66th round) and 2011-12 (68th round). The CESs collect comprehensive information on items of consumer

expenditure (i.e. living status of households) including households' spending on health services and medicines. Medical spending of households typically includes both institutional (amount incurred as inpatient) and non-institutional (expenses on outpatient care) expenditure. NSSO's employment and Unemployment Surveys (EUSs) were utilised to assess the impact of RSBY on labour supply and job mobility of workers. Presently, on average, the sample size of both the CES and EUS surveys is approximately 100 to 125 thousand households, covering approximately 500 to 600 thousand individuals. Both the surveys are representative at national and state levels after applying the inbuilt weights at household levels given in the database. Since almost all the districts (approximately 600) are part of the sample and can be identified in the database, the RSBY intervention districts can be identified. Further, poor households can also be identified in the database.

(b) RSBY administrative data. The household level data underlying the RSBY programme is generated on a day-to-day basis at three levels: (a) uploading of BPL data from all the states where RSBY is operating; (b) enrolment of households and number of smart cards issued; and (c) utilisation data obtained at the time of swiping of the smart cards by the hospital authority. In addition, details related to insurers, empanelled hospitals, contracts and bids, etc. are also available with the Ministry of Labour and Employment, the implementing agency. However, at present, the household level back-end data of the programme is not available in public domain. The present study uses district level data on enrolment of households, empanelled hospitals and details about insurance companies accessed from the RSBY website.

1.6. Chapterisation Scheme

This dissertation consists of five chapters. Chapter 1 provides an overview of theoretical underpinnings and outlined the current scenario of structure and pattern of health systems and financing in India. Chapters 2, 3 and 4 are three independent research papers based on the core objectives of this study. Finally, chapter 5 presents the key summary, conclusions and policy implications. The respective titles of each chapter are outlined below:

Chapter 1: Introduction.

Chapter 2: Changing socio-economic correlates of out-of-pocket expenditure in India, 1999-00 to 2011-12.

Chapter 3: Extending health insurance to the poor in India: an impact assessment of Rashtriya Swasthya Bima Yojna on financial risk protection.

Chapter 4: Labour market impact of social health insurance in India: a case of Rashtriya Swasthya Bima Yojna.

Chapter 5: Summary, conclusions and policy implications.

1.7. Appendix:

Figure 1.1: Organizational structure of service delivery of Indian health system

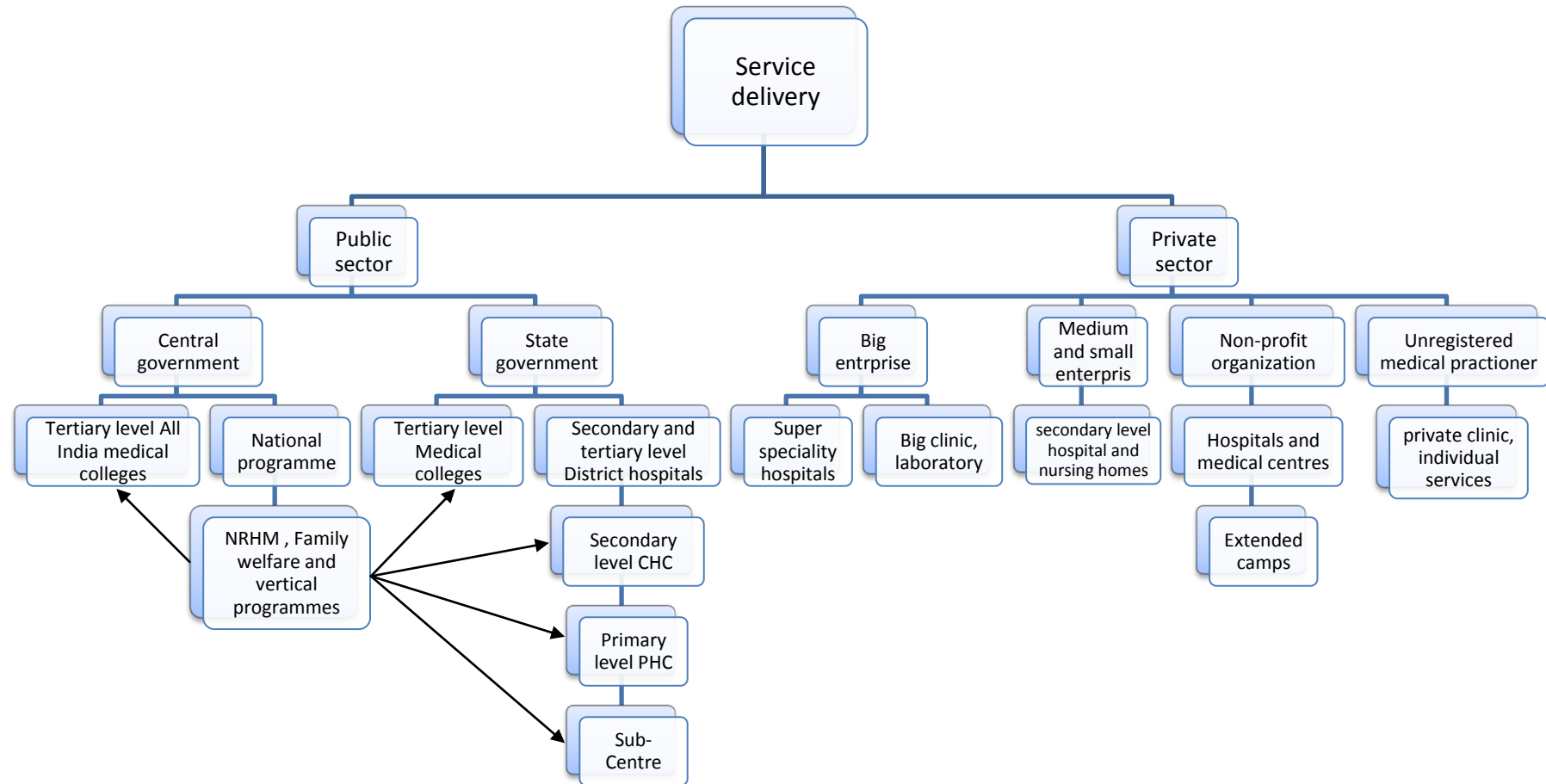
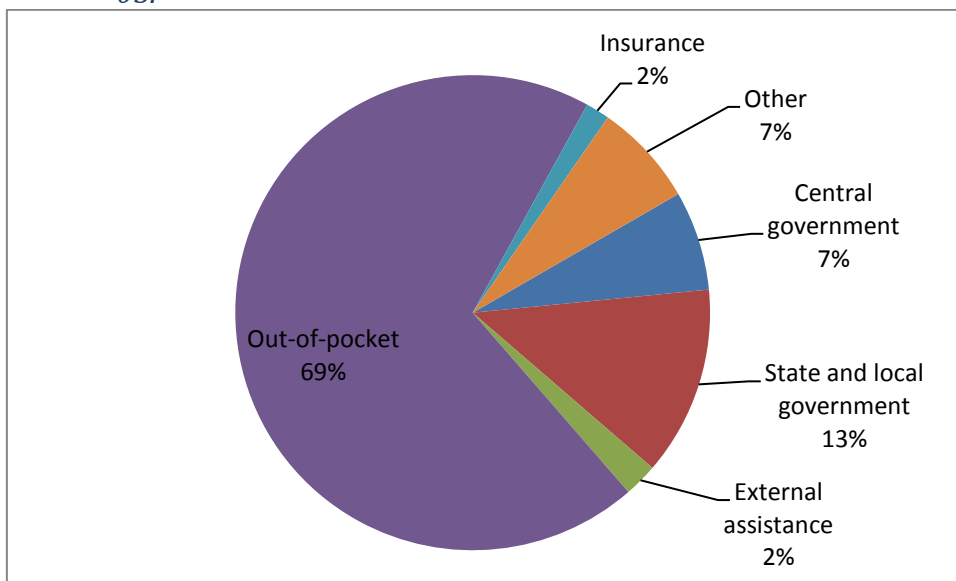


Figure 1.2: Percentage distribution of health expenditure in India by broad source, 2004-05.



Source: MoHFW, 2005.

CHAPTER 2: CHANGING SOCIO-ECONOMIC CORRELATES OF OUT-OF-POCKET PAYMENTS FOR HEALTHCARE IN INDIA, 1999-2000 TO 2011-2012

2.1. Introduction

The World Health Report 2000 identified financial protection against the costs of ill health as a fundamental objective of health systems, on the premise that a fair health system ensures households make health care payments according to their ability to pay rather than the risk of illness (WHO, 2002). At a time when universal health coverage is on the health policy agenda in most developing countries, ensuring all are financially protected from direct payments in order to access health care is believed to be one of the primary preconditions of achieving universal coverage (WHO, 2010). Moreover, in recent years there has been growing interest in addressing the challenges of equity in health care financing within the overall framework of universal health coverage (McIntyre and Mills, 2012; Mills et al., 2012). These goals are especially pertinent in developing the context of the countries studied because their population often rely heavily on out of pocket payments to finance their healthcare, with the poor and socially deprived segments being especially at risk (World Bank, 2003; WHO, 2010).

Equity in health care and healthcare financing is a key policy concern in India, as suggested in multiple policy documents, including, most recently, a policy report of an expert group on universal health coverage (High Level Expert Group [HLEG], 2011; Planning Commission, 2012). Governments at the centre and in a few states in

India have introduced both supply and demand-effort interventions to improve the affordability of and physical access to health care. On the supply side, the National Rural Health Mission (NRHM) was initiated in 2005 to improve the availability of healthcare services in rural India, primarily by revitalizing existing public sector facilities (MoHFW 2011; <http://nrhm.gov.in/nrhm-components/health-systems-strengthening.html>, Accessed 15 December 2013). Demand side interventions in India include both providing direct financial assistance as well as new risk pooling mechanisms. A publicly funded insurance scheme supported by central and state funds, the RSBY was initiated in 2008 to enhance financial risk protection among poor families, and is amongst the largest such schemes in the world (http://www.rsby.gov.in/about_rsby.aspx, Accessed 15 December 2013). In addition, there are state-level initiatives, including the Yeshasvini and Vajpayee Aarogyasri health insurance schemes (Karnataka), the Rajiv Aarogyasri scheme (Andhra Pradesh) and the Chief Minister's Insurance Scheme for Life Saving Treatment (Tamil Nadu). All of these interventions are aimed at reducing the financial burden of health care and improving access to health care services, particularly among groups with low socioeconomic status (Planning Commission 2012; Ministry of Health and Family Welfare [MoHFW], 2011; Reddy et al., 2011).

This chapter aims to assess changes in the OOP burden on the poor and other socially less advantaged populations (poorest 20% households, Scheduled Caste/Tribe [SC/ST] and Muslims) relative to their better-off counterparts (richest, non-SC/ST, and Hindu respectively) in India over the period from 2000 to 2012, a

period during which many of the above interventions were established. Pooling three waves of household-level consumption expenditure data from the National Sample Survey Organisation (NSSO), the analyses reflect increased OOP burden on SC/ST and Muslim households. Poorest quintile groups, compared to the richest 20% households, although reflected a total of 8-9% faster growth during 2000-12 in share of households reporting any OOP payments, they realised slower growth in reporting any inpatient expenditure (by approximately 2% during the same period), OOP as a share of household's total expenditure declined (by approximately 0.7%) and percentage of households reporting catastrophic payments declined (by approximately 2%) during the period 2000-12 . SC/ST households witnessed a total of 0.6 per cent faster increases in OOP spending as a proportion of total household expenditure compared to non-SC/ST households during 2000-2012. Results also indicated that religious minorities such as Muslims witnessed approximately 1% faster increase in OOP as a share of household expenditure during 2000-2012 compared to non-Muslims.

Few studies have focused on the equity dimensions of out of pocket health spending in India in recent years and most existing analyses rely on an examination of one point of time-based cross-sectional data. One set of analyses focused on rich-poor differences highlight that richer households typically pay more out of pocket for healthcare in monetary terms, but as a proportion of ability to pay, OOP expenses tend to be greater for poorer households (Roy and Hill, 2007; Yip and Mahal, 2008; Garg and Karan, 2009). A second strand of the literature in India has focused on caste

and rural-urban differentials in OOP expenses incurred by households. Bonu et al. (2007) using nationally representative NSSO data for the year 2004-05 found, that rural agricultural households, scheduled castes and other backward castes (OBCs) incurred higher catastrophic OOP health payments than households belonging to higher castes and urban-based households. Another cross-sectional household study for 550 households in Kerala also found that households belonging to lower-castes experience higher shares of OOP in total income, although they also noted for chronic conditions that lower castes tended to spend less OOP relative to their high caste counterparts, even after controlling for income (Mukherjee et al. 2011). While these findings are noteworthy, results from existing cross-sectional analyses are unable to shed much light on trends in the burden of OOP on the poor and other disadvantaged groups, particularly over the last decade, characterized by significant government funding expansion in the health sector. In fact, only one study in recent past, using the same data as in this study, attempted to do this for the period 2005-2010 for groups ranked by economic status (Selvaraj and Karan, 2012). The study concluded that the poorest 20% of Indian households witnessed the fastest increase in percentage of households incurring any and catastrophic OOP payments even in districts where the government subsidized public insurance programmes were rolled out.

This paper builds on this earlier literature on the financial burden of health care in four ways. Firstly, it presents trends in multiple indicators of the burden of OOP spending by poor and disadvantaged groups over a longer period – from 2000 to

2012 – than earlier work. Secondly, analysis in this paper covers a larger group of social groups than analysed in previous work. In addition to groups ranked by economic status and caste, religious minorities particularly Muslims, were considered who have been the subject of a recent major policy report (Government of India [GOI] 2006). Unlike the previous work by Selvaraj and Karan (2012), the present study is also able to test for inter-group differences in trends in OOP indicators and better control for confounders using multivariate analysis. Overall, the chapter can also help provide a more robust assessment of the on-going supply-side public sector investments in terms of their equity implications.

2.2. Methods

2.2.1 Data

The data for this study are drawn from nationally representative consumer expenditure surveys (CES), conducted by the National Sample Survey Organisation (NSSO) in 3 quinquennial (five yearly) rounds: 1999-2000, 2004-05 and 2011-12. The number of households surveyed during the three surveys varied between 100 and 120 thousand, with approximately 70% of the sample located in rural areas.

The CES gathers information on households' consumption expenditure for roughly 350 food and non-food items. Under the non-food category, the survey collects household out of pocket (OOP) expenditure for inpatient and outpatient medical spending¹ using different recall periods. This study uses data on OOP health

¹ These are covered under item numbers 410 to 419 and 420 to 429 for institutional and non-institutional health expenditure respectively in the survey questionnaire.

spending on outpatient care, using a 30-day recall period, and on inpatient care using a 365-day recall period in the three surveys.

In addition to household expenditure, the survey data include information on a range of socio-economic and demographic characteristics of households. These include caste (Scheduled Caste, Scheduled Tribe, Other Backward Classes, and Others); religion (Hindu, Muslims, Christian and 5 other religions); main source of livelihood for household members (whether self-employed, agriculture labour, holding a regular job, etc.); place of residence (state and whether rural or urban); household size, gender, age, marital status and educational attainment of individual household members.

2.2.2 Outcome variables

The analysis used multiple indicators of the financial burden of ill-health using information on OOP expenditure on healthcare incurred by households. The specific indicators used were: (a) monthly OOP spending (at constant 1999-2000 prices) per household member, (b) share of OOP in total household spending, (c) proportion of households that incurred any OOP spending and (d) proportion of households incurring catastrophic levels of OOP spending as indicated by: i) OOP share being more than 10% of total household expenditure; and ii) OOP share being more than 25% of the total non-food expenditure. The specific thresholds used in the analysis reflect two features of the literature: the use of two types of denominators for constructing measures of catastrophic spending: non-food spending and total spending; and a range of ratios of health spending (to the specific denominator) as

thresholds to construct measures of catastrophic spending. The present analysis uses thresholds that lie roughly in the mid-point for each type in the literature. As a robustness check, additional analyses have been conducted by varying thresholds for OOP as a share of total expenditure and non-food expenditure. Analyses were conducted separately for OOP spending on inpatient care, outpatient care and for medicines. Appendix Table 2AI presents descriptive statistics of these outcome variables.

The analysis assessed trends in the burden of OOP spending across three dimensions of household socio-economic status (SES): economic rank based on household spending per capita, caste² status and religion. Our measure of economic position was a household's quintile ranking based on expenditure per capita (after using sample weights), separately for rural and urban populations. The caste affiliation of households was determined by their response to a question inquiring whether they belonged to Scheduled Tribes (STs), Scheduled Castes (SCs) other backward classes (OBCs) and 'Other' category. Among the religion categories, three broad categories were considered for the analysis: Hindu, Muslims and other religious minorities³.

2.2.3 Regression specification

Theoretical motivation behind the foregoing regression specification is discussed in details in the forthcoming chapter 3. However, for the present analysis, I hypothesise

² Caste is an informal social hierarchy system in Indian society. Disadvantaged castes population groups are considered to have gone through various forms of social discrimination for centuries and continue to be vulnerable. India provides various affirmative social actions to protect the interest of these caste groups. For the implementation of social affirmative action, these caste groups have been identified as Scheduled Tribe (ST), Scheduled Caste (SC) and other backward classes (OBC) by the Indian constitution.

³ Other minority included Christian, Sikh, Buddhism, Jainism, Zoroastrian and other small religious communities.

that given the present spate of health sector reforms in the country, poor and other less advantaged population groups should increase healthcare utilisation along with reduction in financial burden (see chapter 3, page 79-80). Our primary goal was to compare the performance of less advantaged population groups with their more advantaged counterparts with respect to multiple indicators of the financial burden described earlier. The following equation, in a pooled dataset comprising the three CES surveys, rounds was estimated:

$$Y_{it} = \alpha + d_t + \beta_1 \cdot Q1_{it} + \beta_2 \cdot Q2_{it} + \beta_3 \cdot Q3_{it} + \beta_4 \cdot Q4_{it} + \beta_5 \cdot Q1_{it} \cdot d_t + \beta_6 \cdot Q2_{it} \cdot d_t + \beta_7 \cdot Q3_{it} \cdot d_t + \beta_8 \cdot Q4_{it} \cdot d_t + \varepsilon_{it} \dots\dots\dots (2.1)$$

Where, Y_{it} is the outcome indicator for household 'i' in time 't' (an indicator of OOP spending), d_t stands for the time dummy ('t1' for the year 2004-05 and 't2' for the year 2011-12 as against 't0' for the year 1999-2000), 'Q1' to 'Q4' represent time specific dummies for the poorer 4 quintile groups with the richest quintile being the comparative group. The interaction terms ' $Q_{it} \cdot d_t$ ' provide estimates for the changes in the outcomes for the respective poorer groups as against the richest group, that is, the relative changes in outcomes for the less advantaged groups vis-à-vis the best placed population group. The actual magnitude of the outcome for the richest in the baseline period of 1999-2000 is represented by the constant term ' α ' in equation (2.1) and ' ε_{it} ' is the usual error term.

Equation (2.1) was replicated for other two indicators of socioeconomic status considered for analysis in this paper, i.e., the caste and religion affiliation of

households. The simple formulation of equation (2.1) which considered only one set of socioeconomic rankings at a time was generalized to include all 3 socioeconomic ranking indicators, and also to adjust for other socio-economic and demographic correlates that could be confounders. In addition, to capture any state-specific characteristics that might influence outcomes, state fixed effects were used. The final equation, including all three different dimensions of socio-economic status that were of interest, the interaction terms of socio-economic status with time dummies, other correlates and state-level fixed effects is as follows:

$$\begin{aligned}
 Y_{ijt} = & \alpha + dt + \sum_{q=1}^4 Q_q \beta_{1q} + \sum_{e=1}^4 R_r \beta_{2e} + \sum_{c=1}^3 C_c \beta_{3c} \\
 & + \sum_{t=2}^3 \sum_{q=1}^4 Q_q .dt .\beta_{4q} + \sum_{t=2}^3 \sum_{e=1}^4 R_r .dt .\beta_{5e} + \sum_{t=2}^3 \sum_{c=1}^3 C_c .dt .\beta_{6c} + \beta_7 X_{ijt} + \eta_j + \varepsilon_{it}
 \end{aligned}
 \tag{2.2}$$

In equation (2.2), the additional terms ‘R_r’ and ‘C_c’ represent religion and caste groups of households. Accordingly, the new additional interaction terms R_r.dt, and C_c.dt represent the estimates for the relative changes in the outcome indicators for the religion and caste groups for 2005 (t1) and 2012 (t2) as against the base line period of 2000 (t0). X_{ijt} represents a set of other socio-demographic covariates likely to be associated with the changes on OOP related outcome indicators. The additional subscript ‘j’ stands for state level variations and ‘η_j’ denotes state level fixed effects. The ‘other’ covariates in the analysis include household size, main source of livelihood, of household, religion, ratio of males to females in the household, the proportion of children in the household, the proportion of elderly and the proportion of married members in the household, and rural/urban location. Summary statistics for these covariates are presented in Appendix Table 2AII.

Both equation (2.1) and equation (2.2) were estimated as ‘linear probability models’ when the outcome indicators are indicator variables, as when the dependent variables were whether a household reported ‘any OOP’, ‘any inpatient (outpatient) OOP’ or any catastrophic OOP spending. Estimates based on equation (2.2) were used to assess relative changes in outcomes for the most disadvantaged household groups (poorest quintile, schedule caste/tribe (SC/ST) and Muslim religion as against changes for their respective best placed counterparts (richest quintile, ‘Other’ caste and Hindu religion respectively).

Since some of these socio-economic groups can also interact with one another, a robustness check was conducted in a separate analysis by including interaction between the expenditure quintile and SC/ST on the one hand and the expenditure quintile and Muslims on the other. Since, SC/ST (caste) and Muslims are mutually exclusive groups, no interaction of policy interest remain to be analysed between caste and religion.

2.3. Results

2.3.1 Descriptive statistics

Table 2.1 and Table 2.2 report descriptive statistics on key outcomes by place of residence (rural or urban) and socio-economic groups. The data in Table 2.1 show that the share of households reporting any OOP spending first declined (in 2005) in comparison to 2000, both in rural and urban areas (by about 4 to 5 percentage points) but then increased in 2012, relative to their 2005 share, by more than 11 percentage points in rural areas and 9 percentage points in urban areas. The decline in the share

of households reporting any OOP spending between 2000 and 2005 was due mainly to declines in the reporting of any inpatient expenditure, with the share of households reporting any outpatient OOP spending remaining roughly unchanged between 2000 and 2005. However, the rise in the share of households reporting any OOP spending post-2005 was accompanied by increased household shares reporting OOP spending for both outpatient and inpatient care.

OOP spending per household member (at 1999-2000 prices) was also higher in 2012 compared to 2000. Among rural households, monthly OOP spending per member was almost 60% higher in 2012 compared to 2000 (INR 29.59 in 2000 versus INR 47.05 in 2012) and approximately 68 per cent higher among urban households (INR 43.28 in 2000 versus INR 72.36 in 2012) over the same period. While household OOP expenses (per member) rose both for inpatient and outpatient care, inpatient OOP spending saw faster increases than outpatient OOP spending between 2000 and 2012. These basic conclusions about trends in OOP spending do not change even when OOP shares in total household expenditure were considered. Overall, the share of OOP healthcare expenses in total household spending increased from 5.8% in 2000 to 6.7% in 2012.

Trends in the share of population incurring catastrophic spending were similar to those for the OOP indicators discussed above. The share of households reporting OOP spending being more than 10% of their total household expenditure increased from 15.0% in 2000 to 18.9% in 2012 among rural households and from 12.4 per cent

in 2000 to 15.9% among urban households. In Table 2.2, similar descriptive statistics are reported for the three socioeconomic categorisations considered in this paper: quintiles based on household expenditure per capita, caste and religion.

Socioeconomically disadvantaged groups, specifically the poorest 20% of households and SC/ST households, had lower OOP expenses on healthcare compared to their better-off counterparts (the richest 20% and other-caste households respectively). This holds for a broad range of indicators, including the share of households reporting any OOP expenditure, OOP spending per household member, the share of OOP in total spending, and measures of catastrophic spending.

As explained, in the Introduction (Chapter 1), there is significant variations in health sector related policy, implementation and outcomes across different Indian states. Accordingly, burden of OOP also varied significantly across the Indian states. Variations in the burden of OOP spending on health care and changes over time across the different Indian states have been presented in Appendix Table 2AIII and 2AIV. State-level trends suggest that many of the poorer states, specifically Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jammu & Kashmir, Jharkhand, Karnataka, and Rajasthan, registered large increases in the proportion of households reporting any OOP expenditure. Most of these states also witnessed increases (1% to 2%) in the OOP share of total household expenditure between 2000 and 2012, as well as in the share of households incurring catastrophic OOP payments. This occurred even

among states like Andhra Pradesh and Karnataka that implemented major state level health insurance schemes during this period.

2.3.2 Assessing trends: regression results

2.3.2a Total out-of-pocket payments

The descriptive statistics in Tables 2.1 and 2.2 are likely to be inadequate for an informed assessment of trends. Confounding is a risk given that socioeconomic groups can be concentrated in specific areas (e.g. greater proportions of Muslims [46%] live in urban areas than Hindus [37%]), there may be region-specific differences in healthcare coverage and trends (e.g. coverage of publicly-funded insurance programmes is higher in Southern Indian states that may be correlated with specific populations of socioeconomically disadvantaged), and the publicly financed RSBY program has grown differentially across Indian states having differential impacts on OOP in different states. Thus a multivariate analysis based on equations (2.2) is more appropriate for assessing trends in the financial burden of OOP across groups. Tables 3 through 6 report the results from this analysis (one table for each outcome indicator), using regression results for equations (2.1) and (2.2). Although the results are not too different across the different specifications, our discussion of the results is based on equation (2.2) that controls multiple indicators of socioeconomic status and other confounders. Throughout the tables, estimates of other covariates are omitted from the tables in order to economise space.

Table 2.3 indicates that in our preferred set of results based on specification (2), the best placed households (the richest 20%, other caste and non-Muslim estimated by

the coefficient of the time dummy 't2') registered an increase in the share reporting 'any OOP spending' by 8 percentage points during the period 2000-12 and in the share of OOP to total household spending by 1.5 percentage points. The poorest 20% registered a faster increase in the indicator reporting any OOP payment compared to the richest 20% during 2000-2012 (a difference between the two groups of 8.4%). Over the same period, the proportion reporting any OOP grew more slowly for SC/ST groups (relative to non-SC/ST populations) (a difference of -1.2%) and the change in the proportion reporting any OOP remained similar for Muslim and non-Muslim households. In contrast, the share of OOP to total spending grew at a slower rate for the poorest 20% of households (i.e., by -0.7% points relative to the richest 20% from a low base share of 3.2% versus 7.2% in 2000, and faster for the SC/ST households relative to non-SC/ST households by 0.6 per cent points (base shares of 5.2% and 5.4% in 2000, respectively). Muslim households also saw their household shares of OOP to total spending increase faster by 0.9 percentage points relative to non-Muslim households during 2000-12 (base shares of 5.5% and 5.6%, respectively).

The results in Table 2.3 also allow us to look at changes over the sub-period 2000-2005. The poorest and the richest 20% groups both reported a decline in the share of households reporting any OOP expenses during this period, as apparent from the coefficients of 't1' indicator (for the richest 20%) and the interaction term 't1_quintile1' (the difference in growth between poorest 20% and richest 20%). In particular, the proportion of households reporting 'any OOP' declined by 6.6 per cent for the poorest 20% and by 4.6 per cent for the richest 20% during 2000-2005. When

taken as a share of total household spending, the poorest 20% reported a slower (but statistically insignificant) growth in OOP (by -0.8% points) relative to the richest 20% over the same period.

SC/ST households also saw a slower rate of growth in households reporting any OOP (by 0.9 percentage points) and a higher growth in the share of OOP (by 0.4 percentage points) during 2000-05, but both estimates are statistically indistinguishable from zero at the 5% level of significance. However, for 2000-12 in entirety, SC/ST households witnessed a 0.6 percentage point increase in the share of OOP compared to the non-SC/ST households. Finally, Muslim households experienced faster rates of increases in any OOP spending during 2000-2005 (of 2.4 percentage points) and in the OOP share of total health spending (0.7 percentage points, but statistically indistinguishable from zero) relative to non-Muslim households. However, the faster increase of OOP share (by 0.9 percentage points) among Muslims (compared to non-Muslims) during 2000-12 is statistically significant.

A separate analysis including two additional groups, identified as poor SC/ST and poor Muslim, reflected that poor SC/ST and poor Muslim groups reflect statistically significant decline in the reporting of any OOP in the range of 1 to 3 per cent compared to approximately 8% decline among all poor in the year 2011-12. However, the main results on changes in OOP burden for poor, SC/ST and Muslims remain largely the same even after including the two interaction groups in the analysis.

2.3.2b Inpatient and outpatient OOP Spending

Tables 2.4 and 2.5 report results separately for OOP expenditure on inpatient and outpatient care. During 2000 to 2012, the share of the richest 20 per cent households reporting 'any OOP for inpatient care' declined by -2.9 percentage points. The poorest 20 per cent however witnessed a faster (an additional -2.1 percentage points) decline compared to the richest quintile. The slower growth of households reporting any OOP in the poorest quintile also held for the sub-period 2000-2005. Moreover, the poorest 20% of households saw a (significantly) slower rate of increase (-1.3 percentage points) in the share of inpatient OOP expenses in total household spending during 2000-2012, and by -0.8 percentage points during 2000-2005.

The findings for SC/ST households differ from that for the poorest quintile. SC/ST households also saw slower growth in the proportion reporting 'any inpatient OOP' relative to non-SC/ST households in 2000-2005 and 2005-2012, but the differences (-0.3% and -0.4%, respectively) were small in magnitude and statistically insignificant. However, the share of OOP for inpatient care in total household spending for SC/ST households rose faster than non-SC/ST households in 2000-2005 and 2000-2012, by 0.2 per cent points and 0.3 per cent points respectively (relative to base shares of 1.1% and 1.4% for the two groups in 2000). Finally, Muslim households saw faster increases than non-Muslim households in both periods and for both indicators, namely "any inpatient OOP" and the share of inpatient OOP in total spending.

The results on trends in Table 5 for OOP spending for outpatient care are somewhat different. The share reporting any OOP spending for outpatient care increased faster for the poorest 20% households than for the richest 20%, by 9.9 percentage points over the period 2000-2012. The differences between SC/ST households and non-SC/ST households in the growth of any OOP spending on outpatient care are rather small, -1.0 percentage points and -1.2 percentage points for 2000-2005 and 2005-2012, respectively (compared to base levels of 58% and 64%, respectively). A similar finding emerges for differences in the outcome indicator any OOP for outpatient care for Muslim and non-Muslim households. There was no such ambiguity when the outcome was the share of OOP for outpatient care in total spending, which rose faster for the poorest 20%, SC/ST and Muslim households related to their more advantaged counterparts (richest 20%, non-SC/ST and non-Muslim) over the period 2000-2012. Moreover, the difference observed in the growth between disadvantaged and advantaged groups during 2000-2012 ranged from 0.3 per cent to 0.6 per cent points, which was large given the base shares in 2000, which ranged from 2.8% to 5.2% across all groups.

2.3.2c Catastrophic expenditure

Over the period 2000 to 2012, the share of households reporting catastrophic payments increased by roughly 3% when a 10% threshold ratio of OOP spending to total household spending was used, and by roughly 1% when a threshold ratio of 25% for OOP spending to non-food spending was used (see Table 2.1). However, Table 2.6 shows that there are differences in trends across socioeconomic groups in the proportion of households incurring catastrophic spending.

Specifically, the poorest household quintile experienced a slower increase (ranging between -2.3% and -2.9% points depending on the thresholds of catastrophic payment used) in the proportion reporting catastrophic OOP compared to the richest quintile, during the period 2000-2012. However, results for SC/ST households versus non-SC/ST households show no differences in rates of change in the population share incurring catastrophic spending during 2000-2012. Finally, over the period 2000-2012, the growth in the share of Muslim households reporting catastrophic spending exceeded that of non-Muslims by 0.8 percentage points using the 10% threshold, and by 0.4 percentage points using the 25% catastrophic threshold, although the results did not attain statistical significance. This was in contrast to the period 2000-2005, where Muslim households experienced increases in the share reporting catastrophic spending that exceeded the increases for non-Muslim households by 1.7 percentage points for the 10% threshold and by 1.6 percentage points for the 25% threshold.

To assess the sensitivity of findings to other thresholds for catastrophic spending, additional analyses were undertaken using equations (1) and (2) with alternative catastrophic spending outcomes for thresholds varying between 5% and 25%, and considering both types of denominators: non-food spending and total spending (see Appendix Tables 2AV). The results broadly confirm our findings reported in Table 2.6.

2.3.2d Expenditure on drug

Given the fact that drug expenses alone constitutes up to two-third of the total OOP and more than 85% of the total OOP in case of the poorest 20% households, a separate analysis for drug expenses was conducted (Table 2.7). Most results on drugs are more or less similar to that for the total OOP in general. Percentage of households reporting any expenditure on drugs increased faster but the share of drug expenditure in total household expenditure and percentage of households reporting catastrophic drug expenditure has risen slower for the poorest 20% households compared to the richest quintile. For SC/ST, percentage households reporting any drug expenditure increased slower but the share of drug expenditure to total household expenditure increased faster compared to that for the non-SC/ST. For Muslims, all the three indicators (share of household any drug expenses, percentage of drug expenses to total household expenditure and percentage household reporting catastrophic payments) reflect faster increase during 2000-2012, although share of households reporting any drug expenditure and catastrophic payments remained undistinguishable from zero during 2000-2012.

2.4. Discussions and Conclusions

The findings on trends suggest that the relative performance of the financial burden from OOP spending among the three groups of disadvantaged households - the poorest quintile households, SC/ST households and Muslim households (with respective advantaged counterparts) - varies, depending on the group under consideration. The key to understanding these differences is to interpret any OOP spending as an indicator of utilisation of healthcare services (or access to care),

particularly for outpatient care that is supplied mostly by private providers in India. It can be argued that the interpretation of any OOP as an indicator of utilisation would also be valid for inpatient care utilisation which, although free in public facilities, often require medicines to be purchased from outside. In India, though this would work well only for the pre-2006 period. After 2007, the expansion of cashless (no payment at the point of delivery) insurance (especially public insurance) for inpatient care makes such an interpretation more difficult.

Consider first the position of the poorest quintile, relative to the better-off households. Overall, there was an increase in households reporting any OOP during 2000-2012 but as the preceding paragraph suggests, it is preferable to consider a breakdown by any OOP for outpatient care and any OOP for inpatient care. While the rise in any OOP for outpatient care among the poorest quintile exceeded that for the richest quintile substantially, the opposite was true for any OOP for inpatient care. The interpretation is that this data indicates enhanced access for outpatient care. The evidence for inpatient care is less clear, although the rapid expansion of publicly financed cashless insurance after 2007 and would support the view that relative access for inpatient care also increased for the poorest quintile. Some earlier research suggests that this may indicate lower access to inpatient care instead, because households may have to buy medicines from the outside for an inpatient at a hospital (Devadasan et al., 2013), but it is also possible that a large part of increased access to inpatient care by poorer groups may not be reported in the expenditure data (CES)

because of the availability of the cashless schemes such as RSBY, *Arogyasri* etc. exclusively for inpatient care.

The slower rise in the share of overall (combined inpatient and outpatient) OOP spending in total household spending as well as in the share of OOP inpatient spending (in total household spending) for the poorest quintile over the period 2000-2012 is consistent with this interpretation. A rising share of OOP spending for outpatient care in total household spending for the poorest quintile (relative to the richest 20%) is also to be expected when inpatient insurance cover increases, allowing households to shift more of their resources to necessary outpatient care. Notice also that measures of catastrophic spending rose more slowly for the poorest quintile (than for the richest 20%) over this period and this is consistent with our hypothesis of improved inpatient insurance coverage for the poorest, enhancing their access to inpatient and outpatient care.

For SC/ST households, the conclusions suggest little or no-change in their position with respect to access, but an increased financial burden, relative to non-SC/ST households. Although the proportion of SC/ST households reporting any OOP, any inpatient OOP and any outpatient OOP rose less quickly than for non-SC/ST households, the differences were often statistically insignificant and their magnitude small. Relative to non-SC/ST households, their access to healthcare is unlikely to have improved. The analyses also show that OOP rose as a share of total household spending faster for SC/ST households relatively to non-SC/STs, irrespective of

whether overall OOP, OOP for inpatient care, or OOP limited to outpatient care are considered (the coefficients for indicators of catastrophic spending were mostly positive, but all statistically indistinguishable from zero).

Muslim households experienced marginally faster increases in the proportion reporting any OOP (overall, inpatient or outpatient), relative to non-Muslim households. However, the share of OOP in total household spending increased sharply among Muslims (relative to non-Muslims) in all three of the indicators of OOP shares – outpatient care, inpatient care and overall. This too, points to worsening financial burden of OOP spending among Muslim households, relative to non-Muslims. Although the coefficients for Muslim versus non-Muslim differences in trends in catastrophic expenses are statistically insignificant, they are fairly large in absolute terms (e.g. 0.75 percentage points difference relative to a base of 10.5% for a catastrophic threshold of 10%; and 0.37 percentage points relative to a base of 10.1% for a catastrophic threshold of 25% for Muslim households in 2000). Moreover, this likely reflects a situation where fewer Muslim households use care, but those households that do experience much higher shares than average.

The findings can be interpreted to suggest that over the period from 2000 to 2012, the poorest quintile has reduced its financial burden relative to the richest quintile of households. However, the findings suggest that SC/ST and Muslim households are likely to have experienced a rise in their financial burden relative to their respective advantaged counterpart households. Because a slew of policy interventions were

introduced after 2005, it is of interest whether there were differences in (relative) outcomes for the sub-period 2005-12. The difference in the coefficients for the interaction terms in the two periods in specification (2) allows us to obtain information on trends in 2005-12. It can be readily checked that the central findings are broadly the same as for the period 2000-2012. While I am unaware of any previous analyses that took into account the relative position of Muslim households with respect to the financial burden, the findings in this paper for SC/ST households are similar to those reported in Fan et al. (2012) in their work on the Arogyasri scheme in Andhra Pradesh.

While the findings related to the poorest households are encouraging, the analysis and findings in this paper still raises the question of why some groups – specifically SC/ST and Muslim households – have experienced sharper increases in OOP expenses compared to their better-off counterparts. Also of concern are the rising shares of OOP spending for outpatient care even in the group that seems to have done relatively well – the poorest quintile of households. These findings are of policy interest because the period 2000-2012 was a period when multiple major government programs, such as the RSBY and NRHM, were implemented. To recall from earlier in the present chapter, NRHM involved a large-scale provision and financing intervention of the public sector intended to make healthcare available in rural India through public sector provision. RSBY, on the other hand, was intended to make inpatient healthcare available free of cost to the poor through a subsidised risk-pooling mechanism.

One possibility is that these schemes (and similar schemes at the state level) resulted in increased health service use (and associated OOP spending). This is indeed suggested by findings for at least the group of 20 per cent households that are the poorest for outpatient care. Some recent studies for India have found that health care utilisation increased significantly following the introduction of the NRHM and RSBY programs and other state-level health insurance initiatives (Hou and Palacios, 2011; Mazumdar, Mills and Powell-Jackson, 2011). This optimistic conclusion, however, needs to be tempered by the observation of the rising share of OOP spending for outpatient care for all disadvantaged groups considered in this paper. In particular, the findings suggest serious gaps in existing programs such as access to affordable outpatient care and drugs which account for the bulk of OOP spending on healthcare in India (Table 2.1). Notwithstanding a few exceptions, state-level governments in India have not been able to provide access to subsidized drugs and as a consequence people are likely to have been forced to pay for medicines from private pharmacists. As drug prices in open market have increased substantially over the years, the overall OOP burden is also likely to have increased (Selvaraj and Nabar, 2010).

Apart from budgetary limitations, some of the government programs have tended to end up with a narrower focus than their original mandate. For instance, the NRHM was primarily intended to strengthen existing public health facilities and to facilitate the provision of free or highly subsidised health care services. However, its primary focus has been on reproductive and child health (RCH). The relative neglect of other

elements of primary care, including management of chronic conditions, is likely to have translated into increased financial burden on poor and other less advantaged population groups who needed access to other types of care, especially range of primary healthcare (Centre for Budget and Governance Accountability [CBGA] 2011; Powell-Jackson, Acharya and Mills, 2013).

Publicly financed insurance coverage is relatively limited in the financial benefits it offers. For instance, the benefit package covered under the largest of these schemes (RSBY) has been very modest (only up to INR 30,000 equivalent to approximately US \$ 500 per annum) and limited up to five members in a family. These schemes may facilitate healthcare use, but they may also facilitate additional (OOP) contributions due to the limited financial cover, especially if the demand for health service use exceeds the approved upper limit for coverage and also because coverage of post-hospitalization care is limited. Supplier induced utilisation over and above the approved limit may be a factor here, although it is very difficult to test this hypothesis. Healthcare provision and financing innovations are possibly poorly targeted. Earlier research for India has shown that, in the absence of effective targeting, benefits from public services will disproportionately flow to richer groups (Mahal et al., 2002; O'Donnell et al., 2007). One driver of this outcome is the reliance of existing schemes on the so-called BPL (Below Poverty Line) lists prepared by different state governments based on survey data in the year 2002-03 to identify program beneficiaries. It is well known that this BPL list suffers from a high degree of exclusion and inclusion errors (Jalan and Murgai, 2007, Palacios, 2011; Sun, 2011)

with obvious implications for the findings in this chapter. Existing literature also suggests that SC/ST populations tend to benefit less from public programs than other population sub-groups (Mahal et al, 2002; Bonu et al., 2007; Mukherjee et al., 2011) which is consistent with our findings, pointing to systematic challenges in reaching this group. I could not locate equivalent evidence for Muslims' access to public healthcare services in earlier literature, but recent work (GOI 2006) as well as lack of specific emphasis on reaching Muslim households under RSBY and NRHM could explain the findings on the relative performance of Muslim households.

The findings in this chapter have a few obvious limitations. Focusing solely on OOP payments for healthcare has its weaknesses in assessing the financial burden of illness. Illness can also translate into income losses and sale of productive assets (World Bank, 2003; Mahal et al., 2002) and these do not readily show up in OOP expense data. Our approach to catastrophic headcount used in this paper has also been a subject of considerable recent debate among researchers and although consistent with the vast majority of the literature and is simplistic (Xu et al., 2003; Doorslaer et al., 2007), does not allow for differing catastrophic thresholds for the difference socioeconomic groups. Another source of concern is that the analysis is based on health expense questions in household consumer expenditure survey data and these tend to underestimate health spending. This need not be a problem, however, if underreporting is reasonably stable across time and sub-groups.

2.5. Tables

Table 2.1: Mean outcome indicators in rural and urban India in the 2000, 2005 and 2012

	Rural			Urban		
	2000	2005	2012	2000	2005	2012
Percentage of households reporting OOP						
Inpatient	18.48	8.95	14.02	19.35	9.76	14.76
Outpatient	61.85	61.44	78.76	61.36	62.86	75.92
Total OOP	69.82	64.04	81.36	69.10	65.41	78.52
Per person monthly OOP (INR) current prices						
Inpatient	6.66	9.54	30.73	12.33	16.10	52.31
Outpatient	22.93	26.93	64.52	30.95	41.54	98.85
Total OOP	29.59	36.47	95.25	43.28	57.64	151.16
Per person monthly OOP (INR) at constant 1999-2000 prices*						
Inpatient	6.66	8.50	15.07	12.33	13.24	25.03
Outpatient	22.93	24.18	31.98	30.95	34.12	47.33
Total OOP	29.59	32.68	47.05	43.28	47.36	72.36
OOP as share (%) of household expenditure						
Inpatient	1.30	1.59	2.36	1.31	1.32	1.86
Outpatient	4.74	4.75	5.37	3.60	3.73	3.89
Total OOP	6.05	6.34	7.73	4.91	5.05	5.74
Percentage of household reporting OOP share >10% of household expenditure						
Inpatient	2.48	3.18	4.85	2.71	3.14	4.66
Outpatient	11.44	11.60	13.31	8.50	9.53	9.91
Total OOP	15.00	15.07	18.86	12.36	13.26	15.86
Percentage of household reporting OOP share >25% of non-food expenditure						
Inpatient	2.01	3.13	4.28	1.89	2.70	3.63
Outpatient	10.99	8.91	8.29	5.95	5.47	4.64
Total OOP	14.70	15.21	15.36	9.29	10.59	10.84

Source: Authors' estimates from respective NSSO surveys

Note: * State level average consumer price indices (CPI) separately for rural (CPI for rural labour) and urban areas (CPI for industrial workers) were used to convert the OOP values at constant 1999-2000 prices.

Table 2.2: Percentage of households reporting OOP, share (%) of OOP in total household expenditure and percentage of households reporting catastrophic expenditure among low and high SES separately for total OOP, inpatient, outpatient and total drug expenditure

Outcome	Household expenditure group						Caste group						Religion group					
	Poorest 20%			Richest 20%			SC/ST			Other caste			Muslim			Hindu		
	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012
Percentage of households reporting																		
Total OOP	59.95	53.19	75.93	75.87	72.33	83.00	66.65	60.10	78.07	72.15	67.78	82.69	73.82	69.88	84.73	68.89	63.25	79.87
Inpatient	14.57	4.40	9.36	24.64	16.28	22.02	18.18	7.41	12.63	20.60	10.85	15.66	18.59	10.64	14.65	18.59	8.63	14.07
Outpatient	51.33	51.24	73.30	68.22	68.86	79.58	57.95	57.36	75.14	64.23	65.18	80.31	66.49	67.20	82.76	60.88	60.76	77.22
Only drug	58.46	52.33	74.06	73.93	71.39	81.50	65.19	59.09	76.37	69.77	66.92	81.24	71.97	69.12	83.77	67.11	62.43	78.37
Per person monthly OOP (INR) at constant 1999-2000 prices																		
Total OOP	9.53	9.26	15.89	95.39	111.14	164.07	23.91	25.19	38.25	41.27	47.20	72.89	30.48	33.52	48.35	32.75	35.73	53.70
Inpatient	1.37	0.93	2.77	29.14	40.55	70.88	4.93	5.48	10.72	11.18	13.90	27.26	6.53	8.95	14.58	7.96	9.32	17.83
Outpatient	8.16	8.33	13.12	66.26	70.59	93.19	18.98	19.71	27.53	30.09	33.30	45.62	23.94	24.57	33.76	24.78	26.42	35.87
Only drug	8.14	7.84	12.40	64.56	71.27	99.64	18.95	19.20	26.79	29.73	32.00	46.97	23.33	24.42	32.84	24.50	25.61	35.65
OOP as share (%) of household expenditure																		
Total OOP	3.21	2.95	4.12	7.18	7.59	8.52	5.23	5.29	6.57	5.43	5.70	6.59	5.49	6.03	7.02	5.60	5.69	6.68
Inpatient	0.45	0.28	0.64	1.99	2.49	3.36	1.06	1.08	1.83	1.39	1.58	2.28	1.13	1.59	1.92	1.29	1.41	2.10
Outpatient	2.76	2.67	3.48	5.19	5.10	5.16	4.16	4.22	4.75	4.04	4.11	4.30	4.35	4.44	5.10	4.31	4.28	4.59
Only drug	2.75	2.49	3.24	4.94	4.95	5.21	4.17	4.05	4.59	3.93	3.85	4.24	4.21	4.38	4.80	4.17	4.05	4.42
Catastrophic expenditure at 10% of household expenditure																		
Total OOP	8.19	7.43	10.82	21.88	23.69	26.99	13.09	12.76	16.49	13.99	14.98	17.77	13.95	15.16	17.39	14.28	14.41	17.92
Inpatient	0.76	0.77	1.77	5.59	7.32	10.17	1.91	2.39	3.82	2.75	3.73	5.53	2.09	3.41	4.25	2.53	3.11	4.84
Outpatient	6.80	6.30	8.04	15.27	16.60	16.68	10.16	10.12	11.81	10.06	10.78	11.27	10.72	11.19	12.27	10.68	10.97	12.17
Only drug	6.15	5.44	6.75	15.64	16.71	17.36	9.89	9.62	10.42	9.92	9.76	11.00	10.52	10.66	11.18	10.37	10.15	11.13
Catastrophic expenditure at 25% of non-food expenditure																		
Total OOP	8.77	8.74	8.68	18.09	20.10	21.07	12.66	12.85	12.83	12.49	13.46	13.58	13.82	15.32	14.27	13.16	13.75	13.91
Inpatient	0.55	1.07	1.81	4.10	6.15	8.40	1.54	2.43	3.45	2.11	3.43	4.43	1.60	3.36	3.72	1.98	2.94	4.13
Outpatient	7.26	5.02	4.65	12.01	11.17	9.67	9.68	7.81	6.76	8.61	7.23	6.20	10.46	8.97	7.76	9.63	7.86	7.08
Only drug	6.33	6.33	5.45	11.94	13.99	12.54	9.10	9.59	8.12	8.29	8.99	8.04	10.09	10.72	9.27	9.02	9.67	8.26

Source and note: same as Table 2.1.

Table 2.3: Changes in households reporting any OOP and OOP as a share (%) of total household expenditure

	Whether incurred any OOP				OOP as % of household expenditure			
	(1)		(2)		(1)		(2)	
t1 (dummy for year 2005)	-3.541***	-4.376***	-5.643***	-4.586***	0.4025	0.2624	0.0896	0.2363
	[0.4279]	[0.3301]	[0.2105]	[0.4751]	[0.5199]	[0.5205]	[0.3768]	[0.6091]
t2 (dummy for year 2012)	7.135***	10.537***	10.98***	8.324***	1.332***	1.156***	1.082***	1.4561***
	[0.4099]	[0.3211]	[0.2018]	[0.4598]	[0.0692]	[0.0663]	[0.0492]	[0.0799]
quintile1 (dummy for poorest 20%)	-15.92***			-26.24***	-3.974***			-6.608***
	[0.4374]			[0.4693]	[0.1463]			[0.1504]
t1_ quintile1 (interaction term: year 2005 and poorest 20%)	-3.213***			-2.056***	-0.666			-0.8038
	[0.6047]			[0.6115]	[1.2837]			[1.2723]
t2_ quintile1 (interaction term: year 2012 and poorest 20%)	8.845***			8.43***	-0.4199**			-0.722***
	[0.5792]			[0.5865]	[0.1654]			[0.1641]
SCST (dummy for SC/ST)		-5.502***		1.598***		-0.2058**		0.3004**
		[0.3487]		[0.3694]		[0.1047]		[0.1067]
t1_ SCST (interaction term: year 2005 and SC/ST)		-2.172***		-0.917*		-0.1997		0.4101
		[0.4895]		[0.5086]		[0.9164]		[0.9214]
t2_ SCST (interaction term: year 2012 and SC/ST)		0.878**		-1.198**		0.1904*		0.5798***
		[0.4733]		[0.4874]		[0.1184]		[0.1185]
muslim (dummy for religion Muslim)			4.9295***	1.702***			-0.1165	-0.1425
			[0.4481]	[0.4534]			[0.1328]	[0.1289]
t1_ muslim (interaction term: year 2005 and Muslim)			1.7002**	2.3524***			0.4528	0.7336
			[0.6154]	[0.6155]			[1.1492]	[1.1085]
t2_ muslim (interaction term: year 2012 and Muslim)			-0.0734	0.3243			0.453***	0.9049***
			[0.5846]	[0.5820]			[0.1493]	[0.1436]
Constant	75.869**	72.155***	68.895***	74.548***	7.185***	5.433***	5.603***	2.432***
	[0.3097]	[0.2298]	[0.1523]	[0.8298]	[0.0621]	[0.0581]	[0.0439]	[0.1600]
Observations	346603	346329	346473	346299	346603	346329	346473	346299
R-squared	0.04	0.03	0.03	0.11	0.02	0	0	0.12

Notes: 1. *** significant at 1%, ** significant at 5% and * significant at 10%; 2. Standard errors in brackets; 3. Columns under (1) represent results based on equation (1) for the three socio-economic groups separately without controlling for covariates and columns under (2) represent results from equation

(2) i.e. by considering all the three socio-economic groups together and other control variables; 4. The control variables used in specification (2) include household size, proportion of persons with different educational achievements, main source of livelihood of household, the ratio of males to females in the household, the proportion of children in the household, the proportion of elderly in the household, the proportion of married members in the household, and rural/urban location..

Table 2.4: Changes in households reporting inpatient OOP and inpatient OOP as a share (%) of total household expenditure

	Whether incurred any inpatient OOP				Inpatient OOP as % of household expenditure			
	(1)		(2)		(1)		(2)	
t1 (dummy for year 2005)	-8.36***	-9.75***	-9.96***	-9.789***	0.4919	0.1915	0.1168	0.4302
	[0.3324]	[0.2567]	[0.1637]	[0.3772]	[0.3501]	[0.3502]	[0.2535]	[0.4255]
t2 (dummy for year 2012)	-2.62***	-4.95***	-4.52***	-2.91***	1.363***	0.893***	0.8063***	1.4675***
	[0.3184]	[0.2497]	[0.1569]	[0.3651]	[0.0466]	[0.0446]	[0.0331]	[0.0558]
quintile1 (dummy for poorest 20%)	-10.07***			-15.04***	-1.546***			-2.611***
	[0.3397]			[0.3726]	[0.0985]			[0.1050]
t1_ quintile1 (interaction term: year 2005 and poorest 20%)	-1.813***			-1.497***	-0.6597			-0.8123
	[0.4697]			[0.4855]	[0.8645]			[0.8888]
t2_ quintile1 (interaction term: year 2012 and poorest 20%)	-2.589***			-2.137***	-1.174***			-1.299***
	[0.4499]			[0.4656]	[0.1114]			[0.1147]
SCST (dummy for SC/ST)		-2.418***		1.0261***		-0.328***		-0.0026
		[0.2712]		[0.2933]		[0.0704]		[0.0745]
t1_ SCST (interaction term: year 2005 and SC/ST)		-1.0296**		-0.2697		-0.1809		0.1746
		[0.3807]		[0.4038]		[0.6167]		[0.6437]
t2_ SCST (interaction term: year 2012 and SC/ST)		-0.611*		-0.4142		-0.1308*		0.2574**
		[0.3681]		[0.3870]		[0.0797]		[0.0828]
muslim (dummy for religion Muslim)			-0.0009	-0.9518*			-0.1594*	-0.274**
			[0.3485]	[0.3600]			[0.0894]	[0.0900]
t1_ muslim (interaction term: year 2005 and Muslim)			2.006***	2.5081***			0.3384	0.4923
			[0.4786]	[0.4887]			[0.7733]	[0.7744]
t2_ muslim (interaction term: year 2012 and Muslim)			0.5859	1.446**			-0.015	0.3099**
			[0.4546]	[0.4621]			[0.1004]	[0.1003]
Constant	24.637**	20.6011	18.59***	19.726***	1.995***	1.392***	1.293***	0.88***
	[0.2406]	[0.1787]	[0.1185]	[0.6588]	[0.0418]	[0.0391]	[0.0295]	[0.1118]
Observations	346603	346329	346473	346299	346603	346329	346473	346299
R-squared	0.03	0.01	0.01	0.06	0.02	0	0	0.05

Notes: same as Table 2.3

Table 2.5: Changes in households reporting outpatient OOP and outpatient OOP as a share (%) of total household expenditure

	Whether incurred any outpatient OOP				Outpatient OOP as % of household expenditure			
	(1)		(2)		(1)		(2)	
t1 (dummy for year 2005)	0.641	0.9496**	-0.1286	0.2231	-0.0894	0.0709	-0.0272	-0.1939
	[0.4446]	[0.3427]	[0.2186]	[0.4935]	[0.3698]	[0.3671]	[0.2659]	[0.4325]
t2 (dummy for year 2012)	11.37***	16.08***	16.34***	13.043***	-0.0307	0.264***	0.276***	-0.0114
	[0.4259]	[0.3333]	[0.2095]	[0.4777]	[0.0492]	[0.0468]	[0.0347]	[0.0567]
quintile1 (dummy for poorest 20%)	-16.89***			-26.87***	-2.428***			-3.997***
	[0.4544]			[0.4875]	[0.1041]			[0.1068]
t1_ quintile1 (interaction term: year 2005 and poorest 20%)	-0.7291			0.5029	-0.0067			0.0085
	[0.6282]			[0.6352]	[0.9131]			[0.9034]
t2_ quintile1 (interaction term: year 2012 and poorest 20%)	10.598***			9.9178***	0.754***			0.5773***
	[0.6018]			[0.6093]	[0.1177]			[0.1165]
SCST (dummy for SC/ST)		-6.28***		1.0721**		0.122*		0.303***
		[0.3620]		[0.3838]		[0.0738]		[0.0758]
t1_ SCST (interaction term: year 2005 and SC/ST)		-1.539***		-0.9714*		-0.0188		0.2356
		[0.5081]		[0.5283]		[0.6464]		[0.6543]
t2_ SCST (interaction term: year 2012 and SC/ST)		1.114**		-1.1796**		0.3212***		0.3224***
		[0.4913]		[0.5063]		[0.0835]		[0.0841]
muslim (dummy for religion Muslim)			5.604***	1.9568***			0.0429	0.1314
			[0.4653]	[0.4710]			[0.0937]	[0.0915]
t1_ muslim (interaction term: year 2005 and Muslim)			0.836	1.3058**			0.1144	0.2413
			[0.6390]	[0.6394]			[0.8110]	[0.7872]
t2_ muslim (interaction term: year 2012 and Muslim)			-0.0682	0.2014			0.4681***	0.595***
			[0.6069]	[0.6046]			[0.1053]	[0.1020]
Constant	68.215***	64.231***	60.8841	67.689***	5.19***	4.041***	4.3097***	1.554***
	[0.3218]	[0.2386]	[0.1581]	[0.8620]	[0.0442]	[0.0410]	[0.0310]	[0.1136]
Observations	346603	346329	346473	346299	346603	346329	346473	346299
R-squared	0.04	0.03	0.03		0.01	0	0	0.1

Notes: same as Table 2.3

Table 2.6: Percentage of household reporting catastrophic expenditure at 10 per cent of total and 25 per cent of non-food expenditure

	Whether incurred OOP more than 10% of household expenditure				Whether incurred OOP more than 25% of non-food expenditure			
	(1)		(2)		(1)		(2)	
t1 (dummy for year 2005)	1.812***	0.9879***	0.1312	1.565***	2.013***	0.9767***	0.587***	1.6489***
	[0.3503]	[0.2718]	[0.1733]	[0.3945]	[0.3326]	[0.2569]	[0.1638]	[0.3749]
t2 (dummy for year 2012)	5.107***	3.7757***	3.6453***	5.807***	2.9884***	1.0916***	0.7518***	4.1842***
	[0.3356]	[0.2643]	[0.1661]	[0.3819]	[0.3186]	[0.2498]	[0.1570]	[0.3629]
quintile1 (dummy for poorest 20%)	-13.69***			-20.96***	-9.3115***			-16.67***
	[0.3580]			[0.3897]	[0.3399]			[0.3703]
t1_ quintile1 (interaction term: year 2005 and poorest 20%)	-2.573***			-2.206***	-2.045***			-1.866***
	[0.4950]			[0.5078]	[0.4699]			[0.4826]
t2_ quintile1 (interaction term: year 2012 and poorest 20%)	-2.468***			-2.27***	-3.0786***			-2.913***
	[0.4742]			[0.4871]	[0.4502]			[0.4628]
SCST (dummy for SC/ST)		-0.897***		1.4036***		0.1706		1.0925***
		[0.2871]		[0.3068]		[0.2713]		[0.2915]
t1_ SCST (interaction term: year 2005 and SC/ST)		-1.319***		0.1163		-0.7831		0.4773
		[0.4030]		[0.4224]		[0.3809]		[0.4013]
t2_ SCST (interaction term: year 2012 and SC/ST)		-0.381***		0.1799		-0.9164*		-0.2689
		[0.3896]		[0.4048]		[0.3683]		[0.3847]
muslim (dummy for religion Muslim)			-0.3225	-0.0795			0.6569*	0.5215
			[0.3689]	[0.3765]			[0.3487]	[0.3578]
t1_ muslim (interaction term: year 2005 and Muslim)			1.0712**	1.7444***			0.9137**	1.5988***
			[0.5067]	[0.5112]			[0.4788]	[0.4857]
t2_ muslim (interaction term: year 2012 and Muslim)			-0.2035	0.7593			-0.3009	0.3729
			[0.4813]	[0.4833]			[0.4548]	[0.4593]
Constant	21.878***	13.9896***	14.275***	5.042***	18.086***	12.487***	13.163***	2.429***
	[0.2535]	[0.1892]	[0.1254]	[0.6891]	[0.2407]	[0.1788]	[0.1185]	[0.6548]
Observations	346603	346329	346473	346299	346603	346329	346473	346299
R-squared	0.02	0	0	0.07	0.01	0	0	0.06

Notes: same as Table 2.3

Table 2.7: Changes in percentage of household reporting drug expenditure, drug OOP as share (%) of household expenditure and percentage households reporting catastrophic payments for drug

	Whether incurred drug expenditure				Drug expenditure as a share (%) of household expenditure				Whether incurred drug expenditure more than 10% of household expenditure			
	(1)		(2)		(1)		(2)		(1)		(2)	
t1	-2.535***	-2.84***	-4.681***	-3.105***	0.0135	-0.0811	-0.1134	-0.1199	1.072***	-0.1615	-0.2132	0.6578**
	[0.4345]	[0.3352]	[0.2138]	[0.4832]	[0.3514]	[0.3495]	[0.2530]	[0.4095]	[0.2978]	[0.2302]	[0.1468]	[0.3359]
t2	7.572***	11.475***	11.267***	9.136***	0.272***	0.312***	0.2499***	0.3827***	1.714***	1.0796***	0.7643***	2.665***
	[0.4163]	[0.3260]	[0.2049]	[0.4676]	[0.0468]	[0.0445]	[0.0330]	[0.0537]	[0.2853]	[0.2239]	[0.1407]	[0.3251]
quintile1	-15.47***			-26.43***	-2.19***			-4.0172	-9.49***			-15.07***
	[0.4442]			[0.4773]	[0.0989]			[0.1011]	[0.3044]			[0.3318]
t1_ quintile1	-3.598***			-2.027***	-0.2702			-0.3983	-1.78***			-1.925***
	[0.6141]			[0.6219]	[0.8676]			[0.8553]	[0.4209]			[0.4323]
t2_ quintile1	8.0338***			7.902***	0.2223**			0.0017	-1.116**			-1.482***
	[0.5882]			[0.5965]	[0.1118]			[0.1103]	[0.4032]			[0.4146]
SCST		-4.573***		2.332***		0.238***		0.3316***		-0.0301		0.997***
		[0.3541]		[0.3757]		[0.0703]		[0.0717]		[0.2432]		[0.2612]
t1_ SCST		-3.253***		-2.089***		-0.0404		0.3289		-0.1104		0.9746**
		[0.4970]		[0.5172]		[0.6153]		[0.6195]		[0.3414]		[0.3595]
t2_ SCST		-0.3028		-2.237***		0.1112		0.27**		-0.5465*		-0.2227
		[0.4805]		[0.4957]		[0.0795]		[0.0796]		[0.3301]		[0.3446]
muslim			4.864***	1.977***			0.0419	0.0568			0.1522	0.2444
			[0.4550]	[0.4611]			[0.0892]	[0.0867]			[0.3125]	[0.3205]
t1_ muslim			1.828**	2.099***			0.2866	0.4562			0.3501	1.1688**
			[0.6248]	[0.6260]			[0.7717]	[0.7452]			[0.4291]	[0.4351]
t2_ muslim			0.5312	0.6233			0.3364***	0.5056***			-0.1078	0.4357
			[0.5935]	[0.5919]			[0.1002]	[0.0965]			[0.4076]	[0.4115]
Constant	73.926***	69.766***	67.107***	71.63***	4.939***	3.9299***	4.168***	1.618***	15.641***	9.917***	10.3678	2.553***
	[0.3145]	[0.2333]	[0.1546]	[0.8439]	[0.0420]	[0.0390]	[0.0295]	[0.1076]	[0.2156]	[0.1603]	[0.1062]	[0.5866]
Observations	346603	346329	346473	346299	346603	346329	346473	346299	346603	346329	346473	346299
R-squared	0.03	0.02	0.02	0.1	0.01	0	0	0.11	0.01	0	0	0.06

Notes: same as Table 2.3 and row headings are same as in table 2.3

2.6. Appendix Tables

Appendix Table 2A1: Mean and 95% confidence interval of outcome indicators (%) during 1999-2000, 2004-05 and 2011-12

	1999-2000	2004-05	2011-12
	Mean [CI]	Mean [CI]	Mean [CI]
Percentage of households reporting OOP			
Total OOP	69.62 [69.36, 69.88]	64.43 [64.17, 64.70]	80.48 [80.23, 80.72]
Inpatient	18.72 [18.50, 18.94]	9.17 [9.01, 9.33]	14.25 [14.03, 14.46]
Outpatient	61.71 [61.44, 61.99]	61.85 [61.58, 61.12]	77.87 [77.62, 78.13]
Total drug	67.82 [67.56, 68.09]	63.58 [63.32, 63.85]	79.04 [78.79, 79.29]
Per capita value (INR) current prices			
Total OOP	33.08 [32.45, 33.70]	41.68 [40.93, 42.43]	111.23 [109.14, 113.32]
Inpatient	8.11 [7.78, 8.45]	11.05 [10.51, 11.58]	36.89 [35.32, 38.47]
Outpatient	24.96 [24.47, 25.45]	30.64 [30.18, 31.10]	74.33 [73.18, 75.49]
Total drug	24.69 [24.33, 25.05]	29.77 [29.31, 30.22]	73.89 [72.53, 75.26]
Per capita value (INR) at constant 1999-2000 prices			
Total OOP	33.08 [32.45, 33.70]	35.01 [34.38, 35.64]	52.28 [51.29, 53.26]
Inpatient	8.11 [7.78, 8.45]	9.28 [8.83, 9.73]	17.34 [16.60, 18.08]
Outpatient	24.96 [24.47, 25.45]	25.74 [25.35, 26.12]	34.94 [34.39, 35.48]
Total drug	24.69 [24.33, 25.05]	25.99 [25.59, 26.38]	36.13 [35.48, 36.78]
OOP as share of household expenditure			
Total OOP	5.71 [5.66, 5.76]	5.85 [5.80, 5.91]	6.76 [6.70, 6.84]
Inpatient	1.40 [1.37, 1.43]	1.55 [1.51, 1.59]	2.11 [2.07, 2.16]
Outpatient	4.31 [4.27, 4.35]	4.30 [4.26, 4.34]	4.65 [4.61, 4.70]
Total drug	4.15 [4.11, 4.19]	4.10 [4.06, 4.14]	4.49 [4.44, 4.54]
Catastrophic headcount at 10% of household expenditure			
Total OOP	14.28 [14.09, 14.48]	14.53 [14.33, 14.73]	17.92 [17.69, 18.16]
Inpatient	2.54 [2.45, 2.63]	3.12 [3.03, 3.22]	4.79 [4.66, 4.92]
Outpatient	10.64 [10.47, 10.82]	11.03 [11.86, 11.21]	12.24 [12.04, 12.45]
Total drug	10.38 [10.21, 10.56]	10.25 [10.08, 10.42]	11.19 [10.99, 11.38]
Catastrophic headcount at 25% of non-food expenditure			
Total OOP	13.23 [13.04, 13.42]	11.18 [11.00, 11.35]	14.57 [14.35, 14.79]
Inpatient	1.98 [1.90, 2.06]	2.16 [2.08, 2.24]	4.18 [4.06, 4.31]
Outpatient	9.62 [9.45, 9.79]	8.97 [7.82, 8.12]	7.51 [7.34, 7.68]
Total drug	9.06 [8.90, 9.23]	9.77 [9.61, 9.94]	8.39 [8.22, 8.56]
Number of Observations	120297	124644	101662

Note: Figures in brackets are 95% confidence interval.

Source: NSSO, respective years.

Appendix Table 2All: Mean and standard deviations of households with different socio-economic characteristics

Variable	1999-2000		2004-05		2011-12	
	Mean	SD	Mean	SD	Mean	SD
Quintile1	0.2006	0.4005	0.2000	0.4000	0.2000	0.4000
Quintile2	0.2011	0.4008	0.2000	0.4000	0.2000	0.4000
Quintile3	0.1986	0.3989	0.2000	0.4000	0.2000	0.4000
Quintile4	0.2002	0.4002	0.2000	0.4000	0.2000	0.4000
Quintile5	0.1995	0.3996	0.2000	0.4000	0.2000	0.4000
caste1 (ST)	0.0888	0.2845	0.0877	0.2829	0.0892	0.2851
caste2 (SC)	0.1925	0.3943	0.1970	0.3978	0.1902	0.3925
caste3 (OBC)	0.3522	0.4777	0.4015	0.4902	0.4308	0.4952
caste4 (Other)	0.3664	0.4818	0.3137	0.4640	0.2898	0.4537
edu1 (Illiterate)	0.3168	0.4652	0.2253	0.4178	0.1730	0.3782
edu2 (Primary)	0.1428	0.3499	0.1610	0.3675	0.1174	0.3219
edu3 (Middle)	0.1921	0.3940	0.2274	0.4192	0.1945	0.3958
edu4 (Higher secondary)	0.2408	0.4276	0.2666	0.4422	0.3534	0.4780
edu5 (Graduate and above)	0.1074	0.3097	0.1196	0.3245	0.1617	0.3682
religion1 (Hindu)	0.8335	0.3725	0.8338	0.3722	0.8317	0.3741
religion2 (Muslim)	0.1089	0.3115	0.1124	0.3158	0.1181	0.3228
religion 3 (Christian)	0.0272	0.1626	0.0240	0.1532	0.0245	0.1547
religion 4 (Other)	0.0304	0.1718	0.0298	0.1699	0.0256	0.1579
Household size<5	0.6634	0.4726	0.6913	0.4620	0.7433	0.4368
Proportion female	0.4761	0.2056	0.4791	0.2047	0.4767	0.2108
Proportion married	0.4659	0.2564	0.4751	0.2606	0.4903	0.2672
Age 0-4 years	0.0928	0.1395	0.0863	0.1379	0.0693	0.1274
Age 5-14 years	0.2130	0.2182	0.2027	0.2185	0.1816	0.2137
Age 15-29 years	0.2725	0.2539	0.2729	0.2559	0.2796	0.2657
Age 30-59 years	0.3341	0.2352	0.3474	0.2375	0.3700	0.2457
Age 60 years and above	0.0876	0.1981	0.0907	0.2051	0.0994	0.2181
Self-employed in non-agriculture	0.1898	0.3921	0.2166	0.4119	0.2180	0.4129
Self-employed in agriculture	0.2431	0.4289	0.2574	0.4372	0.2366	0.4250
Regular wage earners	0.1126	0.3161	0.1123	0.3158	0.1911	0.3932
Casual wage earners	0.3374	0.4728	0.3033	0.4597	0.2766	0.4473
Others	0.1172	0.3217	0.1104	0.3134	0.0777	0.2677
Rural	0.7279	0.4450	0.7250	0.4465	0.6875	0.4635
Number of observations	120297		124644		101662	

Appendix Table 2AIII: Percentage of households reporting OOP and share of OOP (%) in total household expenditure in different states separately for inpatient, outpatient and total OOP expenditure

States	Percentage of households reporting OOP Expenditure									OOP as share of total household expenditure								
	Inpatient			Outpatient			Total OOP			Inpatient			Outpatient			Total OOP		
	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012
Andhra Pradesh	16.19	7.31	12.28	54.41	57.28	77.02	63.05	59.47	79.08	1.26	1.25	1.81	4.30	4.69	5.88	5.57	5.94	7.69
Assam	26.33	3.62	4.70	47.31	56.92	77.09	63.49	58.57	78.31	0.80	0.47	0.46	2.04	1.67	2.62	2.85	2.14	3.08
Bihar	14.82	2.56	15.37	62.49	59.86	85.05	69.21	60.70	87.13	0.51	0.29	1.17	3.96	2.70	4.25	4.47	2.99	5.42
Chhattisgarh	13.97	5.70	8.55	50.22	49.39	63.29	56.98	50.50	66.17	0.71	0.93	1.19	4.09	5.13	4.22	4.80	6.06	5.41
Delhi	29.04	1.94	8.35	67.42	75.53	77.34	79.29	76.59	78.18	1.14	0.20	0.92	2.43	1.87	2.83	3.57	2.07	3.75
Goa	26.99	8.39	14.45	68.14	55.10	76.98	75.92	55.58	79.96	1.45	1.48	0.96	3.33	2.54	4.03	4.78	4.03	4.98
Gujarat	23.71	14.94	19.79	51.98	51.39	72.33	63.90	57.41	76.61	1.54	1.81	2.18	3.11	3.60	3.24	4.65	5.42	5.42
Haryana	18.55	9.22	8.99	72.17	63.61	84.59	77.61	65.65	85.96	1.98	1.43	1.09	4.85	3.69	3.54	6.83	5.12	4.62
Himachal	20.21	11.54	15.66	60.83	63.44	79.30	71.14	66.06	82.36	1.25	1.54	1.78	3.72	4.39	3.93	4.97	5.93	5.71
J&K	9.89	8.60	16.29	62.22	75.51	84.24	66.43	77.24	86.35	0.48	0.20	1.29	2.61	2.25	3.72	3.09	2.45	5.01
Jharkhand	10.83	3.42	9.04	50.39	53.08	71.41	56.60	54.36	73.50	0.36	0.35	1.06	2.70	3.29	3.14	3.06	3.63	4.20
Karnataka	22.89	6.13	16.31	52.13	50.04	73.75	62.71	52.10	77.49	1.28	0.82	2.04	3.11	3.03	3.26	4.39	3.84	5.30
Kerala	33.98	32.76	26.89	71.88	73.39	76.98	80.00	78.67	80.59	2.66	3.58	3.70	4.92	5.67	6.08	7.59	9.26	9.77
Madhya Pradesh	21.70	8.07	10.76	54.84	56.49	71.61	66.95	59.04	74.92	1.37	1.41	1.23	4.70	4.88	4.62	6.06	6.29	5.85
Maharashtra	23.69	12.82	19.66	60.65	58.29	76.59	70.01	62.45	81.24	1.89	2.21	3.20	4.73	4.60	4.02	6.62	6.82	7.23
Orissa	23.21	7.77	10.25	56.98	56.83	69.61	70.07	59.55	72.54	0.89	0.94	1.63	4.32	3.82	5.12	5.21	4.76	6.75
Punjab	13.33	11.08	13.15	82.46	79.26	91.81	84.57	81.41	92.55	1.68	1.85	2.44	5.11	4.01	5.44	6.79	5.87	7.88
Rajasthan	14.31	7.28	12.00	52.53	51.23	73.81	58.74	53.75	76.25	0.95	1.32	1.59	3.81	3.60	4.13	4.76	4.92	5.72
Tamilnadu	15.14	7.69	13.35	56.31	52.62	68.38	62.87	55.41	71.62	1.45	1.33	2.17	3.66	4.06	4.87	5.10	5.39	7.05
Uttar Pradesh	12.85	8.08	14.62	78.88	77.91	88.41	81.76	79.55	89.54	1.03	1.59	2.58	6.53	5.89	5.91	7.57	7.49	8.49
Uttaranchal	23.61	6.48	7.87	68.49	60.44	75.58	76.34	62.38	76.97	1.14	0.90	1.21	3.81	3.01	2.94	4.95	3.91	4.15
West Bengal	18.80	10.76	13.14	67.20	73.60	84.13	73.79	75.73	85.55	0.93	1.48	2.28	3.79	5.52	6.17	4.72	7.00	8.45
NE states	30.53	16.11	19.16	51.08	52.72	64.02	69.87	61.69	71.83	0.52	0.52	0.53	2.18	1.92	2.35	2.69	2.44	2.88
UTs	15.10	5.51	8.07	55.43	57.91	62.18	61.49	59.29	64.29	1.04	0.87	0.95	3.26	2.81	3.29	4.30	3.68	4.25

Appendix Table 2AIV: Percentage of households reporting OOP share more than 10% of total household expenditure and OOP share more than 25% of non-food expenditure, separately for inpatient, outpatient and total OOP expenditure

States	At 10% of total household expenditure									At 25% of total non-food expenditure								
	Inpatient			Outpatient			Total OOP			Inpatient			Outpatient			Total OOP		
	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012	2000	2005	2012
Andhra Pradesh	3.10	3.25	4.54	11.59	13.65	16.63	14.81	16.61	22.29	2.59	3.09	3.76	10.77	10.01	9.40	14.24	15.06	17.32
Assam	1.28	1.10	0.99	2.51	1.81	3.19	3.72	2.97	4.06	1.08	1.11	0.75	2.89	1.47	2.05	4.12	3.94	3.60
Bihar	0.58	0.71	3.02	9.95	4.16	9.55	11.19	5.06	13.02	0.37	0.76	2.26	10.90	3.23	6.60	12.41	6.77	10.44
Chhattisgarh	0.99	1.80	2.29	10.81	13.96	12.31	12.45	15.94	15.09	0.91	1.41	2.21	11.07	10.54	5.91	12.77	16.86	11.58
Delhi	2.15	0.55	3.10	5.09	3.65	3.68	8.46	4.28	7.13	1.13	0.03	2.30	3.79	1.60	1.35	6.06	2.72	4.73
Goa	3.39	2.92	1.55	6.84	2.19	10.01	14.11	8.45	14.01	1.83	2.87	0.93	7.21	0.50	5.35	12.27	7.27	6.92
Gujarat	4.06	4.61	5.53	6.98	8.91	5.54	12.57	14.78	13.00	3.09	5.42	4.04	6.10	6.06	3.31	11.27	15.02	9.23
Haryana	4.11	4.25	2.19	13.24	9.97	8.67	18.19	14.14	11.58	3.10	3.55	1.84	9.39	6.38	4.57	14.30	12.36	8.13
Himachal	3.06	4.58	3.70	8.99	11.96	10.27	12.26	17.20	14.76	2.15	4.62	3.24	7.64	7.41	5.38	10.75	17.40	12.33
J&K	0.49	0.60	2.22	2.27	2.25	7.45	3.15	2.96	9.93	0.28	0.55	2.13	3.82	1.43	3.32	4.70	3.45	7.86
Jharkhand	0.42	0.90	1.59	4.42	8.00	8.02	5.17	9.08	10.99	0.58	0.94	1.79	6.00	6.12	4.52	6.73	8.95	7.90
Karnataka	2.47	2.09	5.83	6.74	5.82	7.46	10.20	8.23	14.56	1.88	2.13	5.04	5.86	3.48	3.11	9.20	8.10	11.18
Kerala	6.49	9.56	8.54	14.35	18.28	20.52	24.59	30.40	30.64	5.19	8.71	6.57	12.73	12.12	10.91	22.76	27.72	22.59
Madhya Pradesh	2.20	2.42	2.67	10.99	12.60	11.98	14.58	15.45	15.37	1.60	2.04	2.22	8.61	9.14	7.06	12.00	13.90	10.89
Maharashtra	4.25	4.41	7.51	11.78	12.96	10.58	18.01	18.14	19.88	3.08	4.08	6.37	9.10	8.16	5.57	14.84	15.73	15.04
Orissa	1.62	2.19	3.79	10.78	8.88	12.64	12.98	11.40	17.00	1.43	2.70	3.73	12.30	7.86	8.09	15.11	13.10	14.40
Punjab	3.60	3.63	5.84	11.70	9.58	15.28	16.86	13.97	21.72	2.87	3.13	4.26	7.86	5.32	6.20	13.01	11.90	14.99
Rajasthan	1.90	3.12	4.23	9.44	10.23	11.50	12.50	13.32	15.68	1.53	2.58	3.32	8.08	7.39	6.74	10.88	11.76	11.62
Tamilnadu	3.15	2.85	5.65	9.23	8.61	13.86	13.85	11.88	20.33	2.32	2.77	5.05	7.75	5.58	7.46	11.73	11.12	15.43
Uttar Pradesh	2.16	3.71	5.97	17.59	16.26	16.07	20.53	19.95	22.52	1.66	3.21	5.15	15.87	12.41	10.13	19.15	19.27	18.32
Uttaranchal	3.04	2.85	2.61	8.59	5.69	6.39	11.96	8.88	10.19	2.36	2.35	2.34	7.00	4.49	3.50	10.70	7.82	7.37
West Bengal	1.21	3.19	4.65	7.46	13.48	15.82	10.00	17.11	21.34	1.27	3.49	4.66	8.03	11.37	11.10	10.87	17.70	18.65
NE states	0.40	0.79	0.80	3.58	3.77	5.06	4.57	4.96	6.32	0.25	0.82	0.77	3.38	2.45	2.49	4.26	5.07	4.98
UTs	2.44	1.82	2.46	7.79	6.26	8.03	10.73	8.23	10.97	1.63	1.19	1.92	5.45	3.13	4.16	8.55	6.15	7.96

Appendix Table 2AV: Percentage of household reporting OOP share being above different thresholds of total and non-food expenditure.

	thresholds (%) of household expenditure					thresholds (%) of non-food expenditure				
	5%	10%	15%	20%	25%	5%	10%	15%	20%	
t1 (dummy for year 2005)	-1.069**	1.565***	1.891***	2.1029***	1.7886***	-3.33***	-2.13***	-0.1232	0.9662**	1.0000
	[0.5003]	[0.3945]	[0.3118]	[0.2521]	[0.2055]	[0.5375]	[0.5177]	[0.4704]	[0.4206]	[0.3744]
t2 (dummy for year 2012)	5.251***	5.8066***	5.454***	4.912***	4.0967***	1.4242***	1.8***	3.1799***	4.0166***	4.0000
	[0.4843]	[0.3819]	[0.3018]	[0.2440]	[0.1989]	[0.5202]	[0.5011]	[0.4553]	[0.4071]	[0.3621]
quintile1 (dummy for poorest 20%)	-26.28***	-20.96***	-16.52***	-13.02***	-9.989***	-21.40***	-21.44***	-20.56***	-18.81***	-16.0000
	[0.4942]	[0.3897]	[0.3080]	[0.2491]	[0.2030]	[0.5310]	[0.5114]	[0.4646]	[0.4155]	[0.3700]
t1_ quintile1 (interaction term: year 2005 and poorest 20%)	-1.3903**	-2.206***	-2.354***	-2.319***	-1.961***	-1.7688**	-0.5216	-1.1218*	-0.9866*	-1.0000
	[0.6440]	[0.5078]	[0.4014]	[0.3245]	[0.2645]	[0.6919]	[0.6664]	[0.6054]	[0.5414]	[0.4821]
t2_ quintile1 (interaction term: year 2012 and poorest 20%)	3.023***	-2.27***	-3.610***	-3.663***	-3.537***	5.2048***	2.6116***	-0.1046	-1.963***	-2.0000
	[0.6177]	[0.4871]	[0.3849]	[0.3113]	[0.2537]	[0.6636]	[0.6391]	[0.5807]	[0.5192]	[0.4621]
SCST (dummy for SC/ST)	1.2104***	1.404***	0.9309***	0.6222***	0.6831***	0.9361**	0.8557**	1.3057***	1.5277***	1.0000
	[0.3891]	[0.3068]	[0.2425]	[0.1961]	[0.1598]	[0.4180]	[0.4026]	[0.3658]	[0.3271]	[0.2931]
t1_ SCST (interaction term: year 2005 and SC/ST)	0.2377	0.1163	0.4689	0.5306**	0.4368**	0.0812	0.2198	0.0562	-0.0881	0.0000
	[0.5356]	[0.4224]	[0.3338]	[0.2699]	[0.2200]	[0.5754]	[0.5542]	[0.5035]	[0.4502]	[0.4031]
t2_ SCST (interaction term: year 2012 and SC/ST)	1.0204**	0.1799	-0.2062	0.2139	0.0443	1.1824**	0.4519	-0.3477	-0.7078*	-0.0000
	[0.5133]	[0.4048]	[0.3199]	[0.2587]	[0.2109]	[0.5515]	[0.5311]	[0.4826]	[0.4315]	[0.3844]
muslim (dummy for religion Muslim)	0.1679	-0.0795	-0.2152	-0.2634	-0.0941	2.5705***	2.7095***	1.6915***	1.6334***	0.0000
	[0.4775]	[0.3765]	[0.2976]	[0.2406]	[0.1961]	[0.5130]	[0.4940]	[0.4489]	[0.4014]	[0.3521]
t1_ muslim (interaction term: year 2005 and muslim)	1.935***	1.744***	1.4189***	0.9689***	0.363	0.5709	-0.0758	0.5388	0.6672	1.0000
	[0.6482]	[0.5112]	[0.4040]	[0.3267]	[0.2663]	[0.6964]	[0.6707]	[0.6094]	[0.5449]	[0.4831]
t2_ muslim (interaction term: year 2012 and muslim)	0.4106	0.7593**	0.2571	0.6757**	0.2432	0.4115	0.0876	-0.1974	-0.4552	0.0000
	[0.6130]	[0.4833]	[0.3820]	[0.3089]	[0.2518]	[0.6585]	[0.6342]	[0.5762]	[0.5153]	[0.4521]
Constant	13.645***	5.042***	2.759***	1.426***	1.0007***	29.58***	13.52***	5.712***	3.3***	2.0000
	[0.8739]	[0.6891]	[0.5446]	[0.4404]	[0.3589]	[0.9388]	[0.9042]	[0.8215]	[0.7346]	[0.6521]
Observations	346299	346299	346299	346299	346299	346299	346299	346299	346299	346299
R-squared	0.08	0.07	0.06	0.05	0.05	0.08	0.07	0.07	0.06	0.06

Notes: same as notes 1,2 and 4 in Table 2.3

CHAPTER 3: EXTENDING HEALTH INSURANCE TO THE POOR IN INDIA: AN IMPACT ASSESSMENT OF *RASHTRIYA SWASTHYA BIMA YOJANA* (RSBY) ON FINANCIAL RISK PROTECTION

3.1. Introduction

In recent years, several developing countries have used tax revenues to finance health insurance schemes and extend subsidised health insurance to their poor population. Examples include Mexico, China, Columbia, the Philippines, Vietnam and Thailand (Wagstaff and Lindelow, 2008). India joined this group of countries by launching the first ever fully subsidised health insurance scheme Rajiv Aarogyasri, in the year 2007, in the state of Andhra Pradesh. In 2008, the Indian Ministry of Labour and Employment (MoL&E) initiated a national scheme for the poor throughout India, known as the Rashtriya Swasthya Bima Yojana (RSBY). By October 2013, approximately 36 million families (consisting of approximately 140 million people), living across more than 500 districts in 25 states, were enrolled in the scheme. The scheme aims to reach out to all the poor families (approximately estimated 65 million) in the country with the main objective of providing protection from financial risk arising because of out-of-pocket payments on medical care. The RSBY states prominently that ‘the objective of RSBY is to provide protection to poor households from financial liabilities arising out of health shocks that involve hospitalization’ (<http://www.rsby.gov.in/Overview.aspx>).

This chapter assesses the impact of RSBY on financial risk protection of households using 4 waves of cross-sectional household dataset from the National Sample Survey Organisation (NSSO) (and district level RSBY administrative data). Exploiting differential roll-out rates across different districts, difference-in-differences (DID) method has been used to estimate the causal effects of RSBY on a set of out-of-pocket (OOP) related outcome indicators of households. The results indicate that probability of incurring inpatient expenditure declined in the range of 30% to 40% during the period 2008 to 2012. The probability of incurring catastrophic payments by households because of inpatient expenditure also declined significantly. However, there were no reductions in per person monthly inpatient expenditure and inpatient expenditure as a share of households' total consumption expenditure. In fact, per person monthly inpatient expenditure on the non-drug component of total inpatient (and also outpatient) expenditure increased significantly for the treated households after the intervention. The findings also suggest a very small decline in per capita inpatient payments by households living in the districts where insurance take up is high. The effects of the scheme on the total out-of-pocket expenditure of the treated households remain negligible. The analysis also reflects some adverse spillover effects of the scheme on the non-eligible (non poor) households as they realised increased burden of out-of-pocket, both in terms of probability of incurring and intensity of such expenditure.

Despite more than five years of RSBY implementation and substantial investments in the scheme – INR 25.6 billion (approximately \$475 million) during the period 2008-09

to 2012-13 (INR 10.6 billion during 2012-13) – little is known about the actual effectiveness of RSBY in achieving its prime objective of reducing health related financial burden on households. Most of the existing studies related to RSBY are concerned with the issues related to enrolment of households, patients satisfaction related qualitative information, implementation barriers (Palacios, 2011; Sun, 2011; Rajasekhar et al., 2011), role of information and education campaign (Das and Leino, 2011), hospitalisation patterns (Hou and Palacios, 2011) determinants of participation of districts in the scheme (Nandi et al., 2013) and a few other studies discussing largely emerging implementation issues⁴. To our knowledge, there are only two single-district studies (Rathi et al., 2012; Devadasan et al., 2013) which highlight impacts of RSBY on hospitalisation rates and financial risk protection and their findings reflected increased hospitalisation rates but also increased out-of-pocket payments among the RSBY beneficiaries. For instance, Devadasan et al. (2013) finds that 44% of patients who had enrolled in RSBY and had used the RSBY card still faced OOP payments, mainly because they were asked to pay for medicines/diagnostic.

The present study presents a substantial improvements on the existing studies on impact evaluation of RSBY at least on two different counts: i) the study presents a pan-India estimates of the effects of RSBY which may be crucial for policy implications; ii) the study uses a robust methodology using pre and post-intervention data with extended time period on the both sides, and hence accounting for the roles

⁴ A series of working papers on these issues are available on the RSBY website and later published in an edited volume, Palacios, Das and Sun, 2011.

of a large number of observed and unobserved heterogeneity which might be correlated with the programme implementation.

In general, typical evaluation studies of health insurance impacts have focused on three categories of outcomes⁵ – health status of population, utilisation of health care and financial risk protection. In a recent multi-country review study, Moreno and Smith (2012) find that broader health coverage through insurance generally leads improved population health, particularly for poor people by to improving access to necessary healthcare. They also noted that the health gains derived from broader coverage are likely to depend on factors such as institutional framework and governance arrangements. However, despite some emerging evidence on positive impacts of insurance on health, the literature on this subject is scanty and largely inconclusive (Giedion and Diaz, 2010). In a recent study Moreno-Serra and Smith (2012) noted that In contrast, analyses of the impacts of insurance schemes on health care utilisation and financial risk protection are much more common in developing countries. A recent review by Escobar, Griffin and Shaw (2010) of health insurance schemes in 10 different low and middle income countries (LMICs) highlights five general findings: health insurance i) produces significant positive impacts on access to and use of health care, ii) may benefit poor in increased access to health care along with financial protection as much as rich depending on the targeting design of the scheme, iii) impacts on health status are weak and inconsistent, iv) reduces out-of-pocket burden but decline in catastrophic payments is not certain, v) has varied

⁵ A few studies also measure impacts on general welfare indicators such as consumption smoothening or increase in non-medical household expenditure (Wagstaff and Pradhan, 2005), school enrolment of children (Yip and Berman 2001)..

impacts in different settings. Similarly, Acharya et al. (2011) in a detailed review of approximately 20 health insurance schemes across the world noted that the uptake of the insurance schemes in many cases was less than expected and evidence on impact on utilisation, protection from financial risk and health status are inconclusive. However, they specify that once the households are enrolled in the scheme, a few insurance schemes reflected significant protection from incurring high level of out-of-pocket expenditure. They also highlighted that the poorest among the insured fared less well, in general, because insured poor faced increased financial burden compared to their non-insured counterparts (Acharya et al., 2011).

However, in general the evidence suggests increased health care use due to health insurance, although the magnitude varies by population groups and geographical settings (Wagstaff et al. 2007; Chen et al. 2007; Trujillo et al. 2005; Giedion et al., 2007; Yip and Hsiao, 2010). The impacts of these schemes (including large scale ones) on financial burden on households are limited, if any. Results vary widely ranging from a reduction in financial burden (Wagstaff and Yu, 2007; Hsiao and Yip, 2008; Miller et al., 2009; Aggarwal, 2010; Wagstaff, 2010; Yip and Hsiao, 2010), to no significant impacts (Wagstaff et al., 2009; Lei and Lin, 2009; King et al, 2009; Thornton et al., 2010) and to even an increase in financial burden (Trivedi, 2002; Wagstaff, 2007; Ekman, 2007; Wagstaff and Lindelow, 2008). It has been suggested that at least some of the counter-intuitive results may have arisen due to inadequate handling of observed and unobserved heterogeneity, such as the likelihood that the sickest get self-selected into the insurance scheme, or different health seeking behaviour of

persons and various non-price constraints, such as population living in remote areas, low level of education and skepticism about benefits of Western medicines among some or other ethnic population groups etc. (Acharya et al. 2011; Wagstaff, 2010).

The limited evidence on health insurance impacts available for India reflects the reality that until recently there were no insurance schemes in India with a large enough coverage to be of policy interest (Fan et al., 2012). Most of the existing studies (Ranson 2002; Devadasan et al., 2007; Devadasan et al., 2010) have focused primarily on a few community-based health insurance (CBHI) and micro insurance and have highlighted positive impacts of these schemes both in terms of increased utilisation rates and reduced financial burden on households. However, recently two studies Aggarwal (2010) and Fan et al. (2012) looked at two state-level government sponsored schemes (Yeshasvini in Karnataka and Rajiv Aarogyasri in Andhra Pradesh respectively) also found positive impacts of the respective schemes on the financial risk protection of poor in general.

3.2. Background on the RSBY Scheme

RSBY was launched by the Indian Ministry of Labour and Employment (MoL&E), in April 2008, to provide health insurance coverage for hospital-based care to families living in poverty (often labeled 'Below Poverty Line' [BPL] families). A household covered under RSBY is entitled to hospitalization coverage up to INR 30,000 (approximately US \$500) for a (large) list of health conditions. Pre-existing conditions are covered, but outpatient services are not. Presently, coverage is limited to a maximum of five members of the family, including the head of household, spouse

and up to three dependents. Beneficiaries need to pay only INR 30 (approximately US \$ 0.50) as a registration fee.

The scheme is managed by public and private insurance companies, selected through a competitive bidding process, who are funded by premium contributions from the central and state governments on a pro-rata basis of number of households enrolled in the scheme in a particular district. The premium rates per household enrolled widely differ across districts ranging from approximately INR 500 in the states of Bihar and Uttar Pradesh to more than INR 1,000 in the state of Kerala. Medical care service is delivered by a large number of hospitals empanelled under the scheme. At the all India level, presently there are 11 insurance companies (4 public and 7 private) and more than 12,000 empanelled service providers (more than 7000 in private sector). Table 3.1 summarizes the main features of the program.

The decision on which districts will participate in RSBY in which year is decided by state governments. The *Policy Guideline* of the MoL&E mentions that the scheme will be implemented by the state governments and states would be responsible for proposing selected district(s) for inclusion in the scheme in a phased manner during a period of five years after the launch of the scheme in the state (MoL&E, 2008a). According to the criteria, as laid down by the MoL&E for districts participation, one-fifth of the total number of districts may participate in the scheme in the first year of the launch of the scheme in a state. Subsequently, every year an additional one-fifth of the total number of districts may be recommended by the states for participating

in the scheme after ensuring the minimum required criteria in terms of infrastructural facilities such as number of providers, insurance companies, status of the BPL list, and minimum recommended level of service delivery.

The main eligibility criterion for the households to enrol in the scheme is that the households should be on the state BPL list. State governments conduct the BPL Census in order to distribute subsidised food grain under the public distribution system (PDS). The last such Census was conducted in 2002-03 which is also the criteria of the enrolment under RSBY. However, the BPL estimates differ widely from the national estimates of poverty as conducted approximately every five years by the Planning Commission of India.

3.2.1 Progress of enrolment

To date, more than 35.5 million health cards have been issued to poor households covering more than 140 million people listed as being in the BPL category. Programme coverage now extends to nearly 470 districts (call it participating districts) out of a total of 625 districts in the country, with varied proportion of eligible (BPL) families enrolled into the scheme across districts. Trends in enrolment ratios (percentage of enrolled household to all eligible [BPL] households) and the number of districts covered in the scheme thus far are depicted in Figure 3.1.

Figure 3.1 reflect that total number of districts participating in the scheme increased progressively from approximately 55 in the first year (2008-09) to 470 in the fifth year (2012-13) of the scheme. The cumulative number of districts with passes of time

(months) is represented by the ogive-curve type line measured on the Y-axis and the enrolment ratios across districts are represented by the scatter-dots measured on the opposite Y-axis. The sharpest increase in the number of participating districts were between the 3rd and 4th years (month 25th to 48th since the initial roll out) of the rolling out. Most of the districts, throughout the period of rolling out of the scheme reflected an average enrolment ratio of 40% to 60% as indicated by most of the scatter plots concentrating between 40% and 60% on the opposite Y-axis.

Not all states participated in RSBY. The state of Andhra Pradesh has not adopted RSBY as it already has a substantially more generous state level programme than RSBY which pre-dates RSBY and also covers nearly 80% of its population (Fan et al., 2012). The other two major states that haven't yet participated in RSBY are Jammu and Kashmir and Madhya Pradesh. The scheme could not be launched successfully in Jammu and Kashmir till late 2012. Madhya Pradesh initially planned to launch its own state level health insurance scheme but so far has not been able to do so. By early to middle 2013 a couple of districts, however, in both the states (Jammu and Kashmir and Madhya Pradesh) have been recommended by the respective government to be included by the scheme. RSBY is being implemented as a complementary scheme in states like Tamilnadu and Karnataka while both the states also have state-based insurance scheme, which are in operation in all the districts in the respective states. Karnataka has been running the Yassahwini health insurance scheme for farmers since 2003 and Tamilnadu runs Chief Minister's Kalaignar Health Insurance Scheme for the poor population. However, since late 2012 to early 2013

RSBY is being implemented in addition to the existing schemes in almost all the districts in Karnataka and in a couple of districts in Tamilnadu. Rajasthan is in very initial stage of rolling-out of the scheme and only 5 out of 30 districts in the state had participated till March 2013.

The three states, Andhra Pradesh, Karnataka and Tamil Nadu running their state level schemes, have been dropped from the impact assessment analysis in the present study. We also dropped the state of Delhi from the analysis because the district-level enrolment data was not available for Delhi from the RSBY website. This essentially implies that the districts from these four states were neither included in the treatment nor in the control group for the impact analysis of the RSBY.

3.2.2 Enrolment ratio and the uncovered population

There is significant inter-district and inter-state variation in the percentage of eligible households enrolled in RSBY (i.e. enrolment ratio). By the end of 2012, the enrolment ratio was roughly 51% in all (participating) districts combined. At present, state governments are using the BPL Census conducted in the year 2002-03 for identifying the poor households and enrolment in the scheme as no BPL survey has been conducted after that. Across states, the enrolment ratio varies from a low of 24% in Arunachal Pradesh and 36% in Haryana to more than 75% in Kerala. Table 3.2 presents data on the number of districts covered under RSBY in the participating Indian states and the average enrolment ratios at three different points of time at a 2 years interval ever since the first rolling out of the scheme.

Across districts, the variation in enrolment ratios is even larger. The enrolment ratio varies from a low of 0.9% in the district of Nagpur in Maharashtra to nearly 90% in many districts of Kerala. The break-up of districts in terms of different ranges of enrolment ratios in different states during June 2010, June 2012 and June 2013 is presented in Appendix Table 3A-I. Of the 470 districts covered under RSBY thus far, almost one-half have enrolment ratios below 50%. The ratio is less than 20% in 11 districts and less than 30% in 47 other districts. Because enrolment processes are still ongoing in many newly participating districts, some of the currently low enrolment ratios can be expected to increase over time. In some districts, however, enrolment ratios have remained low in spite of several years of participation in the RSBY.

The on-going enrolment process, hence, reflects a systematic pattern of uncovered families/population under the scheme. The uncovered population may be any of the following:

- i. Households living in districts not covered under RSBY thus far;
- ii. Eligible households living in villages not yet reached by RSBY enrolment agencies in each participating district;
- iii. Individuals in eligible households living in villages where the programme has conducted an enrolment drive, but were somehow not enrolled (e.g. personal reasons, lack of adequate outreach by the programme officials, etc.).

3.2.2 Theoretical predictions for impacts of RSBY

The likely impacts of RSBY on utilisation of health care services and out-of-pocket payments are assessed in the context of the following model where a household aims to maximize a utility function that is concave in health (H) and x (all goods other than healthcare services), a health production function that is a function of both inpatient care (q1) and outpatient care (q2) and an associated household budget constraint. Taken together, the household's utility maximisation problem can be written as:

$$\text{Max } U = u(H, x) \dots \dots \dots (1);$$

$$H = g(q_1, q_2) \dots \dots \dots (2); \text{ and}$$

$$I = P_1 * q_1 + P_2 * q_2 + x \dots \dots \dots (3)$$

Here g(.) is increasing and concave in q1 and q2, 'I' is full income, 'P1' and 'P2' are unit prices for inpatient (q1) and outpatient (q2) services respectively and 'x' is the numeraire good.

The solution to (1)-(3) and the associated choices of q1, q2 and x will depend on the prices of inpatient and outpatient services, P1 and P2 and income I. To assess the impacts of RSBY, we assume that RSBY lowers the price of a unit of inpatient care. In the context of the above model, it is fairly straightforward to show that inpatient care use is inversely related to price of inpatient care and thus RSBY is likely to increase the use of inpatient care by eligible households (i.e. $\frac{\partial q_1}{\partial P_1} < 0$).

The next relationship of interest is the impact of inpatient care price on the use of outpatient care. But the direction of this impact is unclear [i.e. $Sign\left(\frac{\partial q_2}{\partial p_1}\right) = ?$]. The condition ($f_{12} \geq 0$) (interpreted as increased use of outpatient care raises the marginal effect of inpatient care on health outcomes) supports an increase in the use of outpatient services due to RSBY, but is not sufficient by itself. For example, the income effect of a price reduction of inpatient care could be expected to increase outpatient care use. On the other hand, lower prices for inpatient care might lead to a substitution away from outpatient care.

If some inpatient OOP spending is incurred because RSBY coverage is less than 100%, then we should also expect that the introduction of RSBY will raise the likelihood of inpatient spending being reported. Given RSBY, we should expect the average OOP per inpatient care stay to fall. The effect on likelihood of reporting outpatient OOP spending is unclear for reasons outlined in the previous paragraph.

The predictions of our simple model need to be supplemented by additional influences not readily captured in the formulation (1)-(3). For example, there could be spill-over effects to households not eligible for RSBY. Rising demand for inpatient care could raise the price of health services and OOP expenses for individuals without coverage as hospitals are free to follow the market rates for the non-eligible households. RSBY contracts with hospitals could also benchmark rates charged to households without RSBY coverage.

3.3. Data

The data for this study come from two main sources. Firstly, the study relied on Consumer Expenditure Surveys (CES) conducted by the National Sample Survey Organisation (NSSO) in 1999-2000, 2004-5, 2009-10 and 2011-12. The study used four waves of the quinquennial survey where the sample sizes are larger than for other years (annual rounds). Total number of sample households in these quinquennial rounds varied between 100 to 125 thousands with approximately 70% of households located in rural areas.

The CES collect socioeconomic and demographic information on households, but their major focus is on household consumption spending. Information is collected for roughly 350 consumption items for which households incur expenditure, including both food and non-food categories. Out of pocket medical expenses incurred by households are recorded for different items of expenditure for inpatient and outpatient. We used 30 days recall for outpatient and 365 days recall for inpatient across the four surveys.

These are repeated cross-section surveys with multi stage stratified random sampling design and are representative at the national as well as state levels. In most cases, each district of a state is included as part of either the rural or urban stratum for sampling purposes. Households are sampled evenly in quarterly sub-rounds beginning on 1 July and ending on 30 June, with equal numbers of households

allotted in each quarterly sub-round to address concerns about seasonality. All the estimates in the present paper are weighted by the sample weights.

The second data source used in the analysis is the district level information on enrolment available at the RSBY website (<http://www.rsby.gov.in/Overview.aspx>). Since the RSBY website presents data only on cumulative basis of enrolment, the district level data was downloaded from the website at three different points of time: April 1, 2010, April 1, 2012 and July 1, 2013.

3.3.1 Pre- and post-intervention years

The implementation of the RSBY scheme began in April 2008. For this reason, the years 2004-05 and 2009-10 were considered as the immediate pre and post-intervention years respectively. The additional pre- and post-intervention years considered are the years of 1999-2000 and 2011-12. For further analysis, these four years are defined as 2000 (t_1), 2005 (t_2) 2010 (t_3) and 2012 (t_4).

3.3.2 Outcome indicators

All outcome indicators are derived from measures of out of pocket spending on medical care as reported in the NSSO database. The study considered four sets of outcome indicators: a) incidence of households incurring any health expenditure; b) per household member monthly out of pocket health expenditures (after adjusting for inflation); c) share of out of pocket health expenditure in aggregate household expenditure; and d) percentage of households reporting catastrophic payments due to out of pocket payments for health. All these outcome indicators have been measured for inpatient and outpatient expenses separately. A further dis-aggregation

of inpatient, outpatient and total out-of-pocket expenditure were made into drug and non-drug components.

3.3.3 Control variables

Control variables included: indicators of caste (Scheduled Caste [SC], Scheduled Tribe (ST), Other Backward Classes (OBC), religion (Hindu, Muslims or other); main source of livelihood (employment status of household: self-employment, regular wage labour, casual wage labour, and others), geographical location (rural or urban), household size and demographic structure of the household such as proportion of persons in different age groups, educational attainment of head of household and ratio of female to male members in the family. Summary statistics for all of the control variables across the four years of data are available in Appendix Table 3A-II.

3.4. Methods

The study used difference-in-differences (DID) methods to evaluate the causal impacts of RSBY on measures of financial risk protection at the household-level. Identification strategy (outlined below in the following paragraphs) identifies all eligible households in the NSSO data and not exactly the enrolled households in the scheme, as such the study estimated intention to treat (ITT), and not the average treatment effect on the treated (ATT) (Imbens and Wooldridge, 2009). The ITT can be approximated to ATT closely if the 'insurance uptake' (percentage of enrolled to eligible population) is at very high level (Miller et al., 2009; Acharya et al., 2012).

3.4.1 DID estimators

DID estimators exploit available information on observables at two or more points of time with cross sectional data (or longitudinal data, as appropriate) by defining treatment and control population groups on the basis of programme interventions (Abadie, 2008). In brief, DID estimators compare the change in mean outcomes before and after the intervention among households who acquire coverage (treated) and those remaining not exposed (untreated). DID estimation typically assume that, in the absence of the treatment, the average difference in the outcome between treated and untreated would have stayed roughly constant over time (Abadie, 2008). However, in many cases, this parallel trend assumption may not satisfy because treated and untreated may differ in the distribution of both observable and unobservable characteristics. For instance, Heckman and Vytlacil (2007) and Ravallion (2008) highlighted that unobservable variables may play a bigger (or smaller) role in influencing the with-treatment outcome than the without-treatment outcome. In simple terms, these unobservable variables may be correlated with the programme implementation itself and thus having differential effects on the treated and control groups. For instance, health-seeking behaviour of the population may be typically higher (lower) in the RSBY intervention districts and hence the demand for health care is likely to increase faster (slower) in those districts compared with that in the non-intervention districts after the intervention. Inability to control for such systematic trends in a typical two-time period based DID is likely to provide under (over) estimation of the effects of the programme.

DID methods have sufficient flexibility to address the common trend assumption by introducing various socio-economic factors into the regression model and by enabling an extension of the time period of study on both sides (pre and post) of programme implementation. Recent papers that have adopted such strategies to augment the basic DID procedure include Wagstaff (2010) and Fan et al. (2012). In this analysis, four points of time (two pre-intervention and two post-intervention) were used as means to control for the trends in changes in outcome indicators. Further, controlling household socio-economic and individual demographic characteristics also helped controlling the ‘observed heterogeneity’. Finally, state level fixed effect was used to control for geographical variations in the outcome variables. State level effect was controlled for mainly because the state level policy such as decision on which district will participate in the scheme is likely to have impacts on the outcome indicators. The final regression specification of DID with four points of time data and controlling for socio-economic characteristics and state level effects is as follows:

$$y_{ijt} = \alpha + \delta_t + \beta_1.treat + \beta_2.t_2.treat + \beta_3.t_3.treat + \beta_4.t_4.treat + \beta_5.X_{ijt} + \eta_j + \varepsilon_i \dots\dots\dots(3.1)$$

Where, y_{ijt} is the outcome of interest for household i living in district j in time period t , δ_t stand for the time dummies for the later three years (‘ t_2 ’, ‘ t_3 ’ and ‘ t_4 ’) with ‘ t ’ varying from 2 to 4. The term ‘ $treat$ ’ represents dummy for eligible households in the RSBY intervention districts. The terms ‘ $t_2.treat$ ’, ‘ $t_3.treat$ ’ and ‘ $t_4.treat$ ’ stand for the dummy for interaction between treatment and year dummies representing DID estimates for the three respective years (in this case, 2005, 2010 and 2012 respectively). X_{ijt} stands for a set of socio-economic covariates for households ‘ i ’

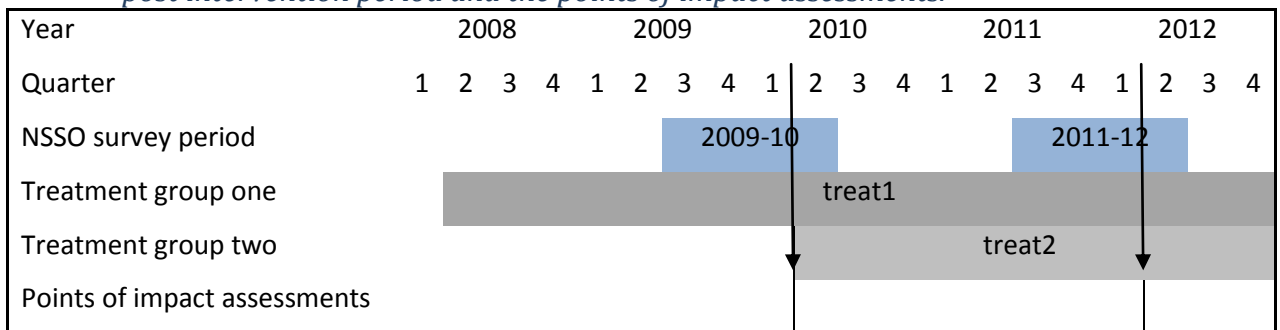
living in district ' j ' in period ' t '. The two error terms respectively stand for state level fixed effects (η_j) and usual error term (ε_{it}). Finally, robust standard errors were clustered at district level and sampling weights were used.

In equation (1), the first interaction term ' $t2.treat$ ' represent a 'virtual' (comparable treatment households identified in the pre-intervention period) DID estimates in the immediate pre-intervention year 2005 compared to the base line situation in 2000. The other two interaction terms ' $t3.treat$ ' and ' $t4.treat$ ' stand for the actual DID estimates during the post intervention years of 2010 and 2012 respectively. The common trend assumption can be taken as satisfied if β_2 in equation (1) equals '0' (i.e. the coefficient value of the first interaction term ' $t2.treat$ ' is not statistically significant). In that case the values of β_3 and β_4 directly provides estimate of the effects of RSBY for the years 2010 and 2012 respectively. However, if β_2 is not equal to '0', the common trend assumption is not satisfied and the actual effects of RSBY, after controlling for the trend, will be represented by the difference between β_2 and β_3 for 2010 and between β_2 and β_4 for 2012.

Next, districts with different years of exposure to the RSBY intervention may have different effects of the scheme. Since number of districts participating in the scheme increased systematically with number of years, the number of households in the 'treatment' and 'control' groups also varied over the years. The analysis purposively considered two discrete cut-off points, March 2010 and March 2012, mainly because these are the two years for which household data from the NSSO are available

during the post-intervention period. The effects of RSBY were estimated at these two points of time separately for the two differently placed treatment groups: i) households living in districts which first participated in RSBY on or before March 2010 (call it treat1) and continuing since then and ii) households in districts which participated between April 2010 and March 2012 (call it treat2) and continuing (Figure 3.2).

Figure 3.2: Periods of NSSO data, intervention for the two treatment groups during the post intervention period and the points of impact assessments.



The number of districts and the sample households in the two treatment groups and their common control group is presented in Table 3.3. For, both the treatment groups, the control are the households in districts that never participated (but are eligible to participate) in RSBY up to March 2012. Accordingly, we modified equation (3.1) as follows:

$$y_{ijt} = \alpha + d_t + \beta_1 \text{treat1} + \beta_2 \text{treat2} + \sum_{t=2}^4 d_t \cdot \text{treat1} \cdot \phi_t + \sum_{t=2}^4 d_t \cdot \text{treat2} \cdot \varphi_t + \gamma \cdot X_{ijt} + \eta_j + \varepsilon_i \dots \dots (3.2)$$

In equation (2) the three time dummies 'd_t' (with t varying from 2 to 4) interacted with the two treatment groups separately and the coefficients of the six interaction terms (three each for treat1 and treat2) provides the DID estimates. The explanations for these interaction terms are as follows:

1. for treatment group joining RSBY up to March 2010 (treat1)-

' ϕ_2' : virtual DID for the 2005 controlling for the trend

' $\phi_3 - \phi_2'$ - immediate effects of RSBY in 2010 for treat1;

' $\phi_4 - \phi_2'$ - long-run effect of RSBY in 2012 for treat1; and

' $\phi_4 - \phi_3'$ - inter-temporal effect of RSBY between the period 2010 and 2012.

2. for treatment group joining RSBY between March 2010 and March 2012 (treat2)-

' ϕ_2' and ' ϕ_3' : virtual DID for the year 2005 and 2010 respectively;

' $\phi_4 - \phi_2'$ - immediate effect of RSBY in the year 2012 for treat2.

Further, in order to capture two different but related dimensions of financial protection: i) changes in the probability of incurring any health expenditure by households and ii) changes in the intensity of the burden of health expenditure for those who make such payments, equation (2) was estimated using the two-part-model (TPM) (Manning, Newhouse and Duan, 1983; Yip and Berman, 2001). In a basic specification under TPM: part one is a logit model estimating the household's probability of paying for health care and part two is a semi-log model that estimates a relationship between the (log of) expenditures incurred by households and explanatory variables, conditional on positive payments for using health care. Accordingly, equation (2) can be specified under the TPM framework as follows:

$$\log it(y_{ijt}) = \alpha + d_t + \beta_1 treat1 + \beta_2 treat2 + \sum_{t=2}^4 d_t.treat1.\phi_t + \sum_{t=2}^4 d_t.treat2.\varphi_t + \gamma.X_{ijt} + \eta_j + \varepsilon_i$$

..... (3.3.1)

$$\log(y_{ijt} | y_{ijt} > 0) = \alpha + d_t + \lambda_1 treat1 + \lambda_2 treat2 + \sum_{t=2}^4 d_t.treat1.\omega_t + \sum_{t=2}^4 d_t.treat2.\psi_t + \zeta.X_{ijt} + \nu_j + \mu_i$$

..... (3.3.2)

For the outcome indicator, OOP as a share to household expenditure: since its value is between 0 and 1, Part II of the TPM was estimated using simple OLS. Finally, equations (3.3.1) and (3.3.2) were estimated for different outcome indicators and odds ratios (OR) from equation (3.3.1) and coefficients from equation (3.3.2) of all the interaction terms are reported in the results section.

Since the percentage of households reporting positive OOP expenditure (total, inpatient and outpatient) varied across the years, it may be argued that the sub-sample for equation (3.3.2) may not be strictly comparable over the years. For instance, percentages of poor households reporting inpatient OOP were 72%, 66%, 74% and 83% in the years 2000, 2005, 2010 and 2012 respectively. However, given the fact that both equations (3.3.1) and (3.3.2) were estimated only among the poor population after controlling for a range of individual socio-economic characteristics, such sub-sample may not be very different from one another over the years. However, as an additional robustness check, a simple OLS, by considering full sample, was estimated for those outcome indicators which were used as dependent variables in the Part II of the TPM in equation 3.3.2).

As described earlier, the main focus in the present analysis is to assess the effects of RSBY on the eligible households, i.e. households identified as BPL. The NSSO data identifies the BPL status of households in 2004-05 and 2011-12 but not in 1999-2000 and 2009-10. However, the poverty status of households can be identified on the

basis of monthly per capita expenditure (MPCE) of households in all the four surveys. A comparison of BPL and MPCE statuses in 2004-05 and 2011-12 indicates that the lowest two quintile groups of MPCE cover approximately 65 per cent (more than 70 per cent in the RSBY intervention districts) of households with BPL status across different major Indian states (see Appendix Table 3A-III). Hence, the lowest two quintile groups of MPCE were considered to proxy the BPL households across all the four surveys under consideration. Similarly the lowest two quintile groups in the non-intervention districts formed the control groups. Even with covering the 75% BPL households through the lowest three quintile groups doesn't make much difference in the results. Moreover, the results based on the lowest two quintile is far more robust than considering the additional third quintile in order to cover marginally higher proportion of BPL households. Additional results after higher levels of concordance are available with author and can be supplied on request.

Lastly, since the BPL status of households is the primary eligibility criterion for enrolment in RSBY, as a robustness check, the main specifications (equations 3.3.1 and 3.3.2) were re-estimated by comparing analysis defining eligible households using MPCE and BPL statuses of households. However, the BPL-based analysis is constrained by the fact that the BPL status of households is available only for two years – 2005 during pre-intervention and 2012 during post intervention period. This limitation rules out the possibility of controlling for the pre-intervention trends in the data. However, it is possible to distinguish between the districts covered under RSBY

before and after 2010 (i.e treat1 and treat2 districts). The TPM specification for the two-time period based analysis is as follows:

$$\log it(y_{ijt}) = \alpha + \delta_t + \beta_1 treat1 + \beta_2 treat2 + \beta_3 t_2.treat1 + \beta_4 t_2.treat2 + \beta_5.X_{ijt} + \eta_j + \varepsilon_i. \quad (3.4.1)$$

$$\log(y_{ijt} | y_{ijt} > 0) = \alpha + \delta_t + \lambda_1 treat1 + \lambda_2 treat2 + \lambda_3 t_2.treat1 + \lambda_4 t_2.treat2 + \lambda_5.X_{ijt} + \nu_j + \mu_i \quad (3.4.2)$$

In equations (3.4.1) and (3.4.2) 't2' is dummy for the post intervention year 2012. treat1 and treat2 are dummies for the BPL (and alternatively the two poorest quintile groups) households in the participating districts separately during 2008 to 2010 and 2010 to 2012 respectively. The two interaction terms 't2.treat1' and 't2.treat2' provide DID estimates for districts covered during 2008 to 2010 and 2010 to 2012 respectively representing the effects of RSBY in the post-intervention year of 2012 as compared to the pre-intervention year of 2005.

3.5. Results

3.5.1 Descriptive statistics

To start with, the summary statistics of outcome indicators across the treatment and control in 2000, 2005, 2010 and 2012, are reported in Appendix Table 3A-IV. The means of the outcome indicators reflect that almost all the measures of the out-of-pocket expenditure were higher in the RSBY intervention districts before the intervention and that remained higher even after the intervention. What is also evident is that the districts covered under the RSBY during the first two years, i.e. during April 2008 to March 2010 (treat1 districts), had higher out-of-pocket expenditure not only compared to the control districts but also compared to the

districts covered later, i.e. during April 2010 to March 2012 (treat2 districts). The mean out-of-pocket expenditure also indicated that there was a decline in the percentage of households reporting inpatient expenditure and also the inpatient expenditure as a share of the total household expenditure, even before the RSBY intervention. As described earlier, a requirement of the DID estimation is that the trends in the treated and control groups need to be similar. The trends in inpatient and outpatient expenditure as shares of household expenditure across the two treatment groups and the control together are presented in Figure 3.3a and 3.3b. Both inpatient and outpatient expenditure as percentage to total household expenditure reflect different trends across the two treated groups and control before the intervention.

3.5.2 Effects of RSBY

Based on equations (3.3.1) and (3.3.2) the results on the effects of RSBY on outcome indicators are presented in Tables 3.4-3.7. The results in the Tables 3.4-3.7 are presented only for the coefficient estimates of the interaction terms which stand for DID estimates for the immediate pre-intervention year and the two post-intervention years. As described earlier, the effects for the districts covered during the first two years (2008-10 i.e. treat1) and the next two years (2010-12 i.e. treat2) of the implementation of RSBY are distinguished by the interaction terms suffixed with treat1 and treat2 respectively.

The results in Table 3.4 reflect that compared to the control in the base-line year of 2000, the probabilities of incurring inpatient expenditure in the treat1 districts

increased faster by 14 per cent and 39 per cent in the post-intervention years 2010 and 2012 respectively. The treat2 districts reflected almost no change in the probability of incurring inpatient expenditure in the post intervention year of 2012 (odds ratio is 1.03). The corresponding per-person value of inpatient expenditure for the treatment groups increased faster by 10 and 6 percentage points (but statistically insignificant) in the years 2010 and 2012 respectively in the treat1 districts and 42 percentage point faster (significant at 1 per cent) in 2012 in the treat2 districts compared to the control in 2000. The outpatient expenditure during the post intervention periods compared to the base line year of 2000, however, reflected decline in the probability of incurring expenditure (odds ratios ranging from 0.75 to 0.87) and very small increase in the value of per person monthly expenditure (coefficient estimates ranging from positive 1 to 4 percentage points). Considering inpatient and outpatient expenses together (Total OOP), probability of making such expenditure has declined by approximately 17 per cent each in 2010 in treat1 and in 2012 in treat2 districts. There seems no significant change in the long-term effects, i.e. effect in 2012 for the treat1 districts (odds ratio is 0.96). Per person total OOP also reflect a marginally slower increase, only up to -2 percentage points and statistically insignificant, in the treat1 districts and in fact a 5 percentage points faster increase in 2012 in the treat2 districts.

As described in the method section, additional analysis using OLS was conducted for per person monthly expenditure as inpatient and outpatient (and also both taken together). The results on changes in the absolute value of per person monthly OOP

expenditure (in INR terms) are very similar to those as reflected by the Part II of the TPM. For instance, the OLS estimate by using full sample for per person monthly inpatient expenditure was higher in treat2 districts after intervention by INR 0.56 and which is significant at 10% level of significance. Similarly, the increase in the inpatient expenditure by INR 1.36 in the year 2012 as estimate using OLS is not very different from the results of 6% increase in the same indicator in Part II of the TPM. Other coefficients for the OLS estimates for treat1 and treat2 also reflected similar direction of change as in case of the Part II of the TPM.

Probability of households incurring catastrophic inpatient expenditure and the conditional inpatient expenditure as a share of household expenditure both increased faster during the first two years of RSBY intervention in the treat1 districts compared to those in the control in the base line year 2000. However, the catastrophic inpatient expenses and the inpatient expenditure share to household expenditure reflect a decline with increase in the number of years of intervention as the corresponding odds ratio (1.08) and the coefficient values (0.003) become statistically insignificant in 2012 for treat1 districts. Effects on the outpatient catastrophic payment and outpatient expenditure share to household expenditure remain more or less statistically insignificant except the fact that there is some indication of decline in the probability of making outpatient related catastrophic payments in the year 2012 for the treat1 districts (odds ratio 0.783). In the treat2 districts most of catastrophic payment and the conditional out-of-pocket share results are statistically insignificant

except the conditional inpatient out-of-pocket share reflected faster increase by 1.1 percentage point in 2012 for the treat2 districts compared to the control in 2000.

Results are also presented with a further dis-aggregation of inpatient and outpatient expenses into drug and non-drug components. The results in Table 3.5 reflect that changes in the probabilities of making inpatient expenditure across drug and non-drug components are statistically insignificant in treat1 districts in 2010 and in treat2 districts in 2012. However, the increase in per person monthly inpatient expenditure in treat1 district, as reflected in Table 3.4, was mainly contributed by significantly faster in non-drug expenditure, approximately 35% in the year 2010 and 17% in 2012 in the treat1 districts. However, in treat2 districts the increase in inpatient expenditure was contributed by both drug and non-drug expenditure, more than 54 per cent faster increase in drug expenditure and 38% faster increase in non-drug expenditure. For the outpatient, again changes in the probabilities of making any drug or non-drug expenditure are either statistically insignificant or declined compared to those in the base line year of 2000. However, per person monthly out-of-pocket, although statistically insignificant, reflected faster increase by 2 to 3 percentage points in treat1 district and 4 percentage points faster increase in treat2 districts compared to the year in 2000. Per person monthly non-drug outpatient expenditure shows a mixed trend in treat1 districts, first slowed down by -12 per cent in 2010 then increased faster by 9 per cent in 2012. In 2012, the treat2 districts also reflected 26% faster increase in the non-drug expenditure.

The results in Table 3.4 and Table 3.5 also reflected that the common trend assumption is not satisfied for many outcome indicators as the virtual DID estimates for the immediate-pre-intervention period for a few outcome indicators were significantly different from zero. For instance, the probability of incurring any inpatient expenditure and catastrophic payments changed faster (odds ratio 1.80 and 1.94 respectively) in the immediate pre-intervention year (2005) for the treat1 districts. In the treat2 districts, treatment groups reflected significantly slower change (odds ratio is 0.55) in the probability of incurring inpatient expenditure during the immediate pre-intervention year of 2010. Both the situations essentially reflect that the control and treatment groups had no common trends during the pre-intervention years. These results justify our strategy to extend the time period of the study and consider an older point of time data to control the trend in outcomes.

To establish the effects of RSBY on different outcome indicators, the main interest, hence, is to estimate the differences in changes in the indicators between the immediate pre-intervention and the post-intervention periods. A summary of these differences, with statistical significance, is presented in Table 3.6. Table 3.6 indicates that after RSBY intervention in the treat1 districts, the probability of making any inpatient expenditure declined by 67 percentage points in 2010 and then marginally increased by approximately 25 percentage points between 2010 and 2012. The probability of catastrophic expenditure continuously declined through 2008 to 2012 with a total 86 percentage point reduction in the catastrophic headcount of households in 2012 in the treat1 districts. However, per person monthly inpatient

expenditure in real terms (after adjusting for inflation) in the treat1 districts reflect approximately an 8 percentage point increase in 2010 and then marginal decline by approximately 4 percentage point between 2010 and 2012. Similarly, inpatient expenditure as a share of household expenditure also increased by approximately 0.5 percentage points in 2010 then declined by approximately 1.3 percentage points between 2010 and 2012 with a total effect of 0.8 percentage points decline during 2008-12 in the treat1 districts. The declines in the probability of incurring inpatient expenditure in the treat1 districts were more or less similar across drug and non-drug expenditure as in case of the total inpatient expenditure. However, what is important to note is that the increase in per person monthly inpatient expenses was contributed mainly by the increase in the per person non-drug expenditure (approximately 46% during 2008-10 and with a total of 27% during 2008-12) in the treat1 districts. In districts covered in the scheme later between 2010 and 2012 (treat2) all the indicators show increase in the inpatient expenditure excepting for inpatient expenditure as a share of household expenditure (declined by 0.3 percentage points) and per person monthly non-drug expenditure (decline by 20 percentage points). However, both the declines do not turn out to be statistically significant.

Effects of the scheme on the outpatient and total out-of-pocket expenditure remained more or less statistically insignificant. However, a few outcome indicators such as probability of making any, catastrophic and any drug outpatient expenditure reflected decline (although statistically insignificant) in the year 2010 in the treat1 districts. In these districts, probability of making catastrophic outpatient expenditure,

outpatient expenditure as a share of household expenditure and probability of non-drug outpatient expenditure also reflected marginal decline during the period 2010 to 2012. Many of these indicators also reflected marginal decline in the treat2 districts. However, per person monthly outpatient non-drug expenditure again reflected increase ranging between 17% and 22% depending on the time period of coverage of districts in the scheme.

3.5.3 BPL households

A two-time period (2005 and 2012) based analysis only for the BPL households and as a part of the robustness check a comparable two-time period based result for the MPCE based poor households are presented in Table 3.7 and Table 3.8. Two results for BPL and two poorest quintiles are presented simultaneously in upper and lower panels respectively in Table 3.7 and 3.8.

The results for most of the outcome indicators are statistically insignificant and not very different across the two alternatively defined poor households (BPL households and the poorest two expenditure quintile households). The direction of DID estimates for most of the outcomes are same as in case of the main 4 time period-based analysis. For instance probabilities of incurring catastrophic inpatient expenditure for the treated are lower by 40 per cent in the treat2 districts. Probability of incurring any inpatient expenditure was also lower (odds ratio 0.92 and 0.97 for treat1 and treat2 districts) but not statistically significant. The only difference that can be noted is that the conditional per person monthly out-of-pocket reflected slower increase for the treated in the BPL based analysis as against marginal increase in 4-

time period based analysis. Similarly, out-of-pocket as a share of total household expenditure also reflected marginally slower increase for the treated BPL households particularly in treat2 districts. However, the reduction in the conditional expenditure for the BPL households is not statistically significant and overall results on the effects of the scheme on out-of-pocket remains very modest to no effect.

The drug and non-drug division of out-of-pocket payments also reflect more or less similar results as the probability of making both drug and non-drug expenditure declined faster among BPL treatment groups but the per person monthly non-drug inpatient expenses shows increase in treat1 districts in case of BPL households. Estimates for outpatient non-drug per person monthly expenses are also positive both in case of BPL and quintile based poor households.

3.5.4 High enrolment districts

As indicated in the methods section, one may expect the results to be different in districts where enrolment ratio is high, say more than 50 per cent or so. Accordingly, a separate 4-time, period-based analysis were conducted only for those districts where the enrolment ratio is more than 50 per cent of the total eligible population. The results in Appendix Table 3A-V indicate slightly higher, compared to that in all intervention districts, decline (a decline of approximately 80 percentage points) in the probability of incurring inpatient expenditure in treat1 districts. In the treat2 districts also, compared to the immediate pre-intervention period, the probability of inpatient expenditure declined in 2012. An almost similar situation is recorded in the probability of incurring catastrophic inpatient expenditure.

However, as far as the conditional (for households reporting non-zero expenditure) per person monthly out-of-pocket expenditure and out-of-pocket as a share of household total expenditure are concerned, both again reflected either statistically insignificant decline or significantly increased burden on the treated households. The inpatient expenditure as a share of household expenditure increased faster for treated in the range of 0.2 to 0.4 percentage points in 2012. Per person monthly inpatient expenditure recorded a faster increase of 48 percentage points in 2012 in the treat2 districts although the treat1 districts witnessed very small change in per person monthly inpatient expenditure in 2010 and 2012 respectively.

On the outpatient front, the per person monthly expenditure increased faster in treat1 districts in the range of 13 to 17 percentage point while outpatient expenditure as share of household expenditure registered 15 percentage point faster increase in the year 2012 in treat1 districts.

Non-eligible households in intervention districts

Lastly, an additional analysis was conducted to capture any spillover effects of the scheme on the households living in the RSBY intervention districts but not eligible to enrol in the scheme i.e. non-poor households. These spillover effects are likely to take place through, for example, impacting price of health care and health seeking behaviour in the intervention districts. For this, the 4 time period based full DID analysis was replicated for the top two expenditure quintile (i.e. non-poor

households) groups of households in the RSBY intervention with the control coming from similar households from the no-intervention districts. Since, such spillover effects is more likely to take place in high enrolment districts as compared to low enrolment districts, this analysis was conducted only in the high enrolment districts. The results are presented in Appendix Table 3A-VI. The results indicate no significant decline in the probability of incurring any or catastrophic inpatient expenditure in the treat1 districts but significantly faster increase in the per person monthly inpatient expenditure by as high as 27 percentage points in the year 2010 and then marginally declined to an increase of 10 percentage points in 2012. Similarly, per person monthly outpatient expenditure also reflected significantly faster increase in the year 2012 by approximately 13 percentage points. On the whole, for the total OOP, although probability of making any OOP reflected slower increase in 2010 and no change in 2012, per person monthly OOP reflected 13 per cent faster increase in the year 2012 in the treat1 districts. However, the inpatient and outpatient expenditure as shares of households' total expenditure did not show any significant change for rich households, although probability of making catastrophic inpatient expenditure reflects marginally faster increase in the year 2012.

3.6. Discussions and Conclusions

Since the launch of the RSBY in April 2008, the scheme was rolled out in 469 districts till March 2012 with varying degree of enrolment ratio across different districts. Overall, the enrolment ratio till March 2012 remains at approximately 50 per cent. The mean outcome indicators across treatment and control groups indicate that the initial roll out of the scheme was done in the districts of high out-of-pocket burden.

The subsequent roll out, however, included many districts where out-of-pocket burden was lower in the intervention districts as compared with other districts. The utilisation rate under the scheme remains extremely low. Out of a total 35.8 million families (approximately 140 million persons) enrolled so far in the scheme total hospitalization so far has been little more than just 5.8 million since 2008.

The present study, using the methods of difference-in-differences and two-part-model, assesses impacts of RSBY on the financial risk protection of households in India. By using the 4 waves of household level data, the study controls time-based pre-intervention unobserved heterogeneity that might be correlated with the programme implementation. The analysis distinguished between the districts covered under RSBY during the first two years and the next two years of rolling out of the scheme.

Robustness checks were performed by forming two alternative treatment groups, BPL households and household consumption expenditure based poverty status of households. In order to control the role of variations in enrolment progress across the intervention districts, a parallel analysis only for high enrolment districts was conducted. BPL status of households being the sole eligibility criteria of enrolment of households in the scheme, separate analyses were taken up only for the BPL households. All the alternative scenarios reflect more or less similar (with slightly different magnitude) results particularly on the inpatient expenditure.

The main DID results on the effects of the scheme on the financial risk protection reflect that after the RSBY intervention, probability of incurring inpatient expenditure among the treatment households declined by 40 to 60 percentage points. The decline in the probability of incurring inpatient expenditure among the treatment groups during the post-intervention years may reflect increasing access to 'cashless' (no on the counter payments) facility under the scheme. However, the inflation adjusted absolute value of inpatient expenditure increased faster (to the extent of 6 to 10 per cent) among the treatment households as compared to that among the control households during the post-intervention period. The increase in the value of inpatient expenditure was more pronounced in the districts covered under the scheme later during 2010-12. Inpatient expenditure as share of household expenditure reflected a mixed trend, first increased faster by 0.5 percentage points during 2008-2010 then slower increase by -0.7 percentage points during 2010-12 in the districts started participating in the scheme during the first years. The results on changes in the inpatient expenditure as a share of household expenditure are mostly not large enough to stand the statistical significance and largely no major effects can be assumed. The two results (probability and intensity of inpatient expenditure) taken together essentially implies that after the RSBY intervention utilisation of the 'cashless' hospital services might have increased significantly but those who are paying for hospitalisation are doing so with greater intensity reflected by the faster increase in the per person monthly expenditure for the treated households. Sharper increase is reported in the non-drug component of the per-person, monthly inpatient expenditure by a margin of 20% to 30%.

Interesting facts emerge on the outpatient front. The non-drug components of the outpatient out-of-pocket increased faster for the treated households after the RSBY intervention by a margin of approximately 20 per cent. This is clear indication that either the price of non-drug health care services in the intervention districts has risen after the RSBY intervention or the utilisation of outpatient services has increased significantly. The results reflect at least 12 per cent increase in the probability of making outpatient expenditure in the intervention districts covered between 2008 and 2010, which is reflection of increased outpatient utilisation. We also found some adverse spill over effects of the scheme as per person monthly out-of-pocket increased faster for the non-poor population in the RSBY intervention districts compared to the control (non-poor in non-intervention districts).

In general, the effects of RSBY on the inpatient expenditure look very modest to negligible, particularly in terms of reducing the intensity of out-of-pocket expenditure either per-person value or inpatient expenditure as share of household expenditure. The question is: if RSBY cover inpatient expenses of the enrolled households up to INR 30,000, why the inpatient OOP burden did not decline for the those households? One obvious answer is certainly related very low utilisation rates in the scheme so far (Palacios, 2010; Das and Leino, 2011; Rajasekhara et al., 2011) and hence the scheme does not reflect any significant change even after approximately 4 years of its implementation.

The government spent INR 25.6 billion (approximately \$426 million) during the period of 2008-09 to 2012-13 mainly on account of premium paid to insurance companies. Although premium rate, to be paid to insurance companies, is decided through a competitive bidding process, government usually negotiate with insurance companies to keep the premium level low. The expenditure in 2012-13 was INR 10.6 billion, which comes to about INR 350 to 375 per enrolled family annually covering approximately 28-30 million families till 2012-13. Considering an average family size of 4 persons among the enrolled families, this comes to less than INR 90 per person per year. In addition, the enrolled families spent INR 30 per family annually as payment towards state level administrative costs and printing of smart cards. With this modest level of government expenditure on a scheme of RSBY scale, the actual impacts, particularly in terms of financial risk protection has been very limited. However various other possible explanations can be offered at this stage.

1. Because of very low coverage limit (INR 30,000), many households are utilizing the hospital services beyond the RSBY cap and hence ultimately end up with increased inpatient expenditure as compared to the situation when RSBY was not in operation and households were not using health care. The survey data indicates that out of all inpatient reporting households approximately 6 per cent in 2010 and 9 per cent in 2012 reported annual expenditure more than INR 30,000 with average annual expenditure being in the range of INR 75-80 thousand. These proportions and average are further higher in the RSBY intervention districts. Proportion of such households was in the range of 1 to 3 per cent in the pre-intervention years with an

average annual expenditure of INR 65,000 for those households. It is quite possible that if the present cap of expenditure continues, with increase in utilisation rates increasing proportion of families might report increased inpatient expenditure in coming years.

2. It is quite possible that many poor families who didn't have access to inpatient care earlier and resorted only to less expensive outpatient care are now moving to inpatient care even for the treatment of smaller and less acute diseases. This is also exemplified by the findings that probability of making outpatient expenditure for treated groups declined significantly in the range of 25% to 35% during the post intervention period. Such findings, widely known as substitution effects, are also available in other literature – for example, Yip and Hsiao, 2010.

3. Given very low utilisation rate within RSBY, it is quite possible that many enrollee of RSBY may still be using health services outside the RSBY empanelled hospitals and hence didn't realize reduction in the OOP burden. A couple of studies (Rajasekhara et al., 2011; Devadasan et al., 2013) particularly highlighted that many hospitals simply refused to admit RSBY patients because of variety of problems related administrative issues – such as delayed re-imburement to hospitals.

4. The families who utilised the services in the RSBY hospitals are also likely to face increased burden if all of their inpatient expenditure is not taken care of even within the allowed limit. Although RSBY provides cashless (no on the counter payments)

facilities to the enrollee, there is enough evidence from ground level information that families availing the RSBY services have been asked by providers to purchase expensive diagnostic (Devadasan et al., 2013). This also highlights lower level of awareness on the part of beneficiaries of RSBY and poor monetary mechanism.

5. Some parts of the inpatient expenses recorded in the database may be in reality immediate pre- and post hospitalisation expenses. RSBY covers only one day before and 5 days post-hospitalisation expenses. There are a number of health conditions when the RSBY beneficiaries may require long outpatient treatment (particularly purchase of drugs and diagnostic). If even a part of these expenses have been recorded by households as inpatient expenditure then the inpatient OOP burden on households may reflect increased burden.

Finally, a few early studies on health system in India (Peters et. al. 2002, 2003; Mahal et al. 2002, World Bank 2003) argued that hospitalisation is the major cause of impoverishment and indebtedness of households in India. However, later researches (NCMH, 2005; O'Donnell et al., 2005; Garg and Karan, 2009, Selvaraj and Karan, 2009; Berman, Ahuja and Bhandari, 2010; Shahrawat and Rao, 2011) clearly established that it is not inpatient but outpatient expenditure, and more specifically outpatient drug expenditure, which cause severe impoverishment and catastrophic payments in India. Ignoring all these facts, RSBY chose to cover the smaller part of the total out-of-pocket – i.e. only hospitalisation expenses. As a result, the contribution of RSBY to

the total financial risk protection in general and reducing health expenditure induced catastrophic payments remain very modest.

The results in this paper should be interpreted with several cautions. First, the financial burden presented in the paper is defined in a narrow sense of only OOP payments and its components. Ailing population also face many other types of indirect financial burden. Important among these indirect burden are income loss to the family because of illness, indebtedness, sales of assets etc. (Mahal et al., 2002). The paper does not address this issue and this remains an important area of research in future. Second, the approach on catastrophic headcount used in this paper has been a subject of intense debate among researchers. The study uses a simplistic approach to measure catastrophic impacts of OOP (although consistent with many existing literature (such as Xu et al., 2003, 2007; Van Doorslaer E. et al., 2007 etc.), while it is argued that poor and rich may have different thresholds of catastrophic payments. Third, there are also some data limitations. Household level data on RSBY enrolment and utilisation are not available in public domain. The paper uses district level data available through the RSBY website. However, the website data is available only on cumulative basis with passes of time. This restricted the study to factor-in (control) the enrolment and utilisation at different points of time of impacts analysis. Fourth, and probably one of the most important limitations of the study is its inability to control for any probable adverse selection. Since household level data on RSBY enrolment is not available, the study could not assess the extent of adverse-selection and hence didn't factor-in its role in impact assessments. Although it is

argued that since the scheme is open only for poor and no co-payments are required there is very less probability of adverse selection in the scheme at least in the beginning years of its implementation. However, this is certainly yet another area of future research.

There are also some data issues. The instruction manual for the investigators engaged in data collection of the NSSO, mentions that all the payments made by insurance companies directly to providers under the cashless scheme or as reimbursements to households should be reported as part of the out-of-pocket (OOP) payments made by households (Vellakal and Ebrahim, 2013). However, a careful reading of the instruction manual and observations from field shows that this did not affect our analyses seriously. The cashless facility under RSBY follows a smart-card based, electronic billing and payment system. All the hospital charges are debited electronically on the smart card by the concerned hospitals after the utilisation of services by patients. Under such scenario, it is highly unlikely that households will report all such expenses under one or other components of inpatient OOP expenditure (doctor's fee, hospital charges, purchase of drugs, expenses on tests and technology etc.) during the NSSO surveys. The inpatient expenditure for poor households in the NSSO data also confirms that the distribution of range of expenditure is not very different in the RSBY intervention and non-intervention districts before and after the RSBY intervention (Selvaraj and Karan, 2013).

Policy implications

Households who are using 'cashless' health services under RSBY may have realised some reduction in the burden related to their inpatient related expenditure, but given the overall low enrolment ratio and utilisation rate, the total impact of the scheme on reduction of out-of-pocket burden is very minimal for the poor households.

As a first step, there is urgent need to increase the enrolment ratio and utilisation rate. Increasing enrolment ratio is in the interest of probably all the stakeholder, insurers and providers get more business, government achieves the target of reducing out-of-pocket burden, and community improves financial conditions and health. However, presently excepting a couple of states such as Himachal Pradesh and Kerala enrolment ratio has been hovering around 50% of the eligible population even after 4-5 years of the implementation of the scheme in many states. States can take up intense information and education campaign (IEC), mobilise ground level workers such as ASHA, NGOs etc. to improve the enrolment ratio. On the utilisation front, there is urgent need to ensure two different steps: (i) through the IEC, households should be informed about the benefits of the scheme and (ii) intensify monitoring activities so that providers should not refuse RSBY cases.

The scheme may seriously consider three major steps to be taken up. Firstly, the benefit package under the scheme should be increased from present INR 30,000 to at least INR 100,000. Such benefit package is already in practice in different state level schemes. Secondly, outpatient services should be included in the benefit package.

And thirdly, insurance companies with the active help of SNA must identify the reasons of low enrolment ratio and evolve strategies to improve the same, at least in the range of 75-80%.

3.7. Figures and Tables

Figure 3.1: Cumulative number of districts and enrolment ratio (%) as on 31 March 2013

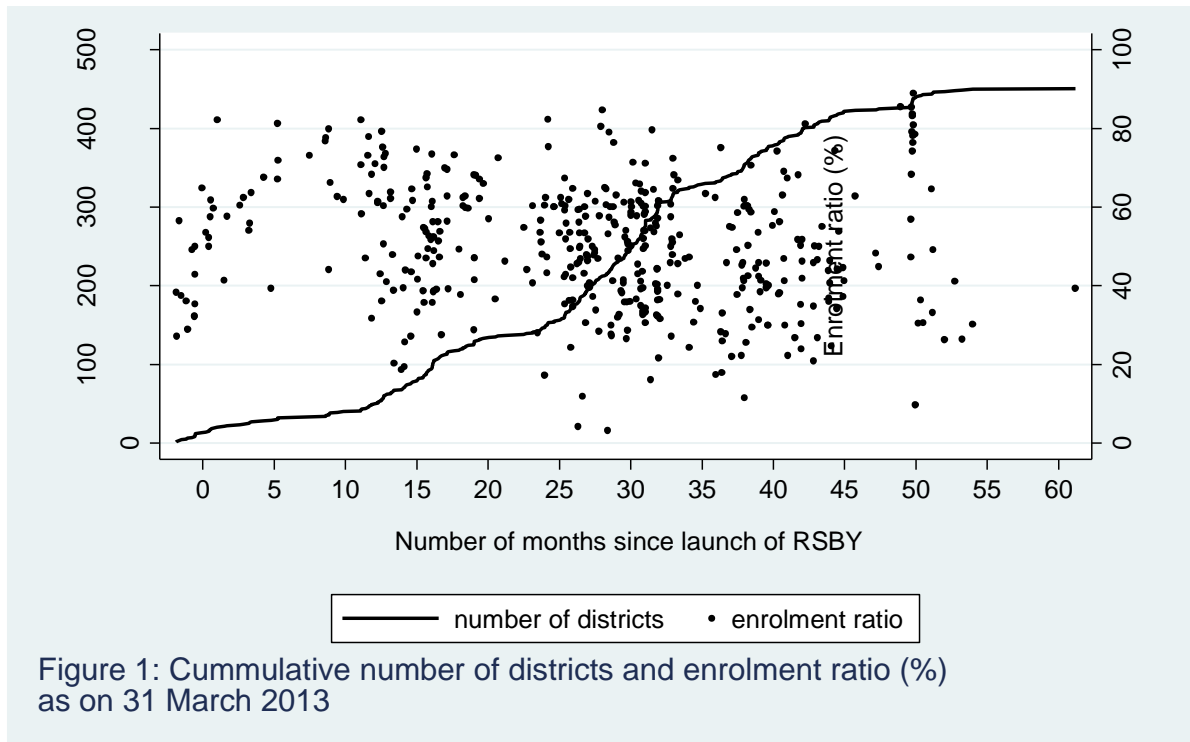


Figure 3.3a: Trends in inpatient expenditure as share (%) of total household expenditure

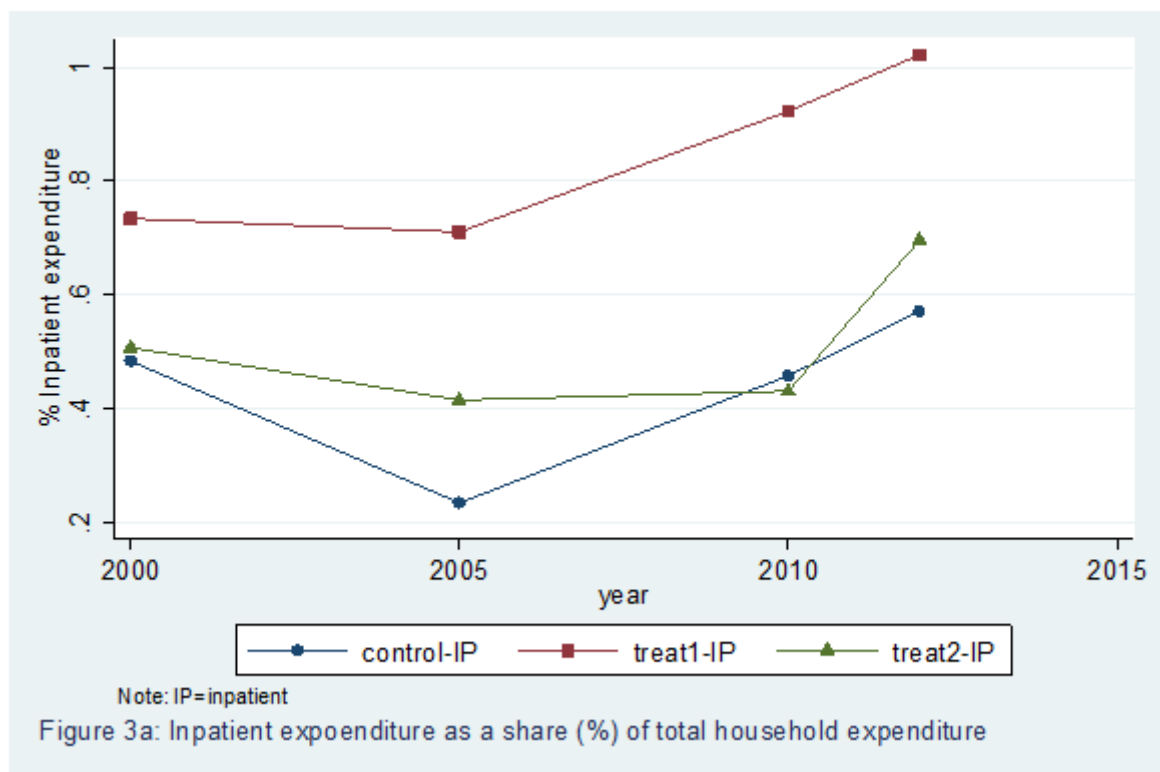


Figure 3.3b: Trends in outpatient expenditure as share (%) of total household expenditure

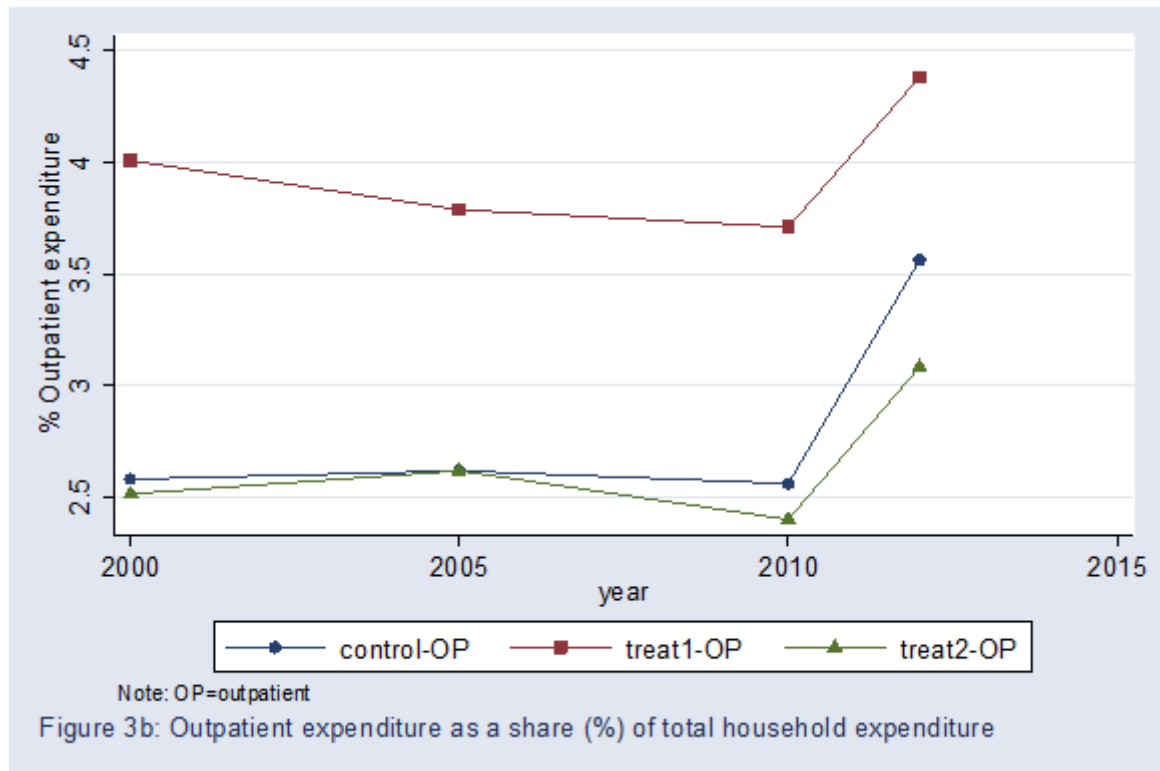


Table 3.1: Key Parameters of RSBY

Parameter	Description	Additional comments/caveats
Benefits covered	Cost of hospitalisation for 725+ procedures at empanelled hospitals up to INR 30,000 per annum per household	Pre-existing conditions are covered; minimal exclusions; day surgeries covered; outpatient expenditure is not covered
Eligibility criteria	<p>INR 100 per visit up to INR 1,000 for transport cost.</p> <p>Must be on the official state BPL list</p> <p>Limited to five members of the household including household head, spouse and three dependents</p>	All enrolled members must be present to be enrolled; infants are covered through mother
Premium and fees	INR 30 registration fee per household per annum paid by household	Average premium for active districts is around INR 560
Policy period	<p>Per household premium payment determined through competitive bidding process</p> <p>One year starting the month after first enrolment in a particular district</p>	Enrolment can take place over four months
Financing	75%/25% Government of India/state government	The ratio is 90%/10% in Northeast states and Jammu & Kashmir
Insurer	Both public and private insurance companies can bid to work in a district or more than a district recommended by state governments	In one district only one insurance company is finally selected
Service provider	Both public and private sector service providers can apply to join the network of providers empanelled under the scheme	Minimum eligibility criteria on quality of services to be provided have been laid down by the MoL&E

Source: Ministry of Labour and Employment 2008b.

Table 3.2: Total number of districts covered under the RSBY and the average enrolment ratios in the participating districts during March 2010 and March 2012.

Participating States	All districts	Up to March 2010		Up to March 2012		Up to March 2013	
		Number of participating districts	Average enrolment ratio (%)	Number of participating districts	Average enrolment ratio (%)	Number of participating districts	Average enrolment ratio (%)
Assam	27	4	43.61	5	43.62	16	43.72
Bihar	38	18	52.46	38	53.65	38	53.65
Chhattisgarh	16	16	49.43	18	62.72	27	50.19
Gujarat	25	9	64.70	26	51.94	26	41.97
Haryana	20	19	53.93	21	43.53	21	36.16
Himachal Pradesh	12	11	84.16	12	81.19	12	81.19
Jharkhand	22	7	52.17	24	48.33	24	45.21
Karnataka	30	Nil	Nil	30	36.25	30	41.23
Kerala	14	14	89.17	14	71.89	14	75.93
Maharashtra	34	29	43.64	31	46.09	31	52.79
Orissa	30	5	67.86	17	57.24	30	64.82
Punjab	22	17	45.04	20	50.99	22	46.28
Uttar Pradesh	75	67	46.84	74	38.62	75	43.78
Uttaranchal	15	5	54.31	13	54.99	13	38.15
West Bengal	19	5	63.85	17	56.04	18	58.21
Other NE states	59	8	55.37	38	62.43	52	50.27
UTs	12	1	50.82	1	50.82	1	62.65
Other	155	Nil	Nil	Nil	Nil	10	40.09
All participating districts	625	235	54.50	369	52.30	460	51.21

Notes: 1. Other 'NE' states include the North-East states of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura. 2. 'UTs' stands for Union Territories of **Pondicherry**.

Table 3.3: Reference treatment and control groups with number of districts* and households**

Alternative scenarios	Treatment group	Control group
	Only poor households in all participating districts between 2008 and 2010	Only poor households all non-participating districts
I. Treat1	(District - 220; Household- 13,163) Only poor households in all participating districts between 2008 and 2010	(District - 166; Household- 7,641) Only poor population in non-participating districts
II. Treat2	(District - 149; Household- 7,199)	(District - 166; Household- 7,641)

Note: * number of districts in March 2012; **number of households in the sample in year 2011-12.

Table 3.4: Effects of RSBY on probability of incurring OOP and catastrophic expenditure and given the positive health care expenditure intensity of per person monthly OOP and OOP as a share of household expenditure

	Probability of making any OOP (Part-I) and conditional per person monthly OOP expenditure (Part-II)						Probability of making catastrophic OOP (Part-I) and conditional OOP share to household expenditure (Part-II)					
	Inpatient		Outpatient		Total OOP		Inpatient		Outpatient		Total OOP	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
Districts covered up to March 2010												
t2_treat1	1.805***	0.0272	0.768***	0.0052	0.865*	-0.045	1.943**	0.0104**	0.88	0.001	0.9567	0.0020
	[0.232]	[0.1263]	[0.059]	[0.0439]	[0.067]	[0.0451]	[0.525]	[0.0052]	[0.115]	[0.0025]	[0.1141]	[0.0025]
t3_treat1	1.138	0.1022	0.754***	0.041	0.834*	-0.0204	1.787*	0.0156***	0.825	0.0015	0.9257	0.0025
	[0.162]	[0.1054]	[0.069]	[0.0505]	[0.078]	[0.0515]	[0.574]	[0.0047]	[0.136]	[0.0026]	[0.1346]	[0.0027]
t4_treat1	1.388*	0.0611	0.873	0.0142	0.96	-0.0246	1.076	0.0029	0.783*	-0.0026	0.816*	-0.0024
	[0.185]	[0.1113]	[0.080]	[0.0475]	[0.092]	[0.0489]	[0.291]	[0.0056]	[0.108]	[0.0025]	[0.1014]	[0.0026]
Districts covered between April 2010 and March 2012												
t2_treat2	1.129	0.4744***	0.84**	0.0867*	0.829**	0.08	1.808*	0.0154**	1.115	0.0041	1.1903	0.0060**
	[0.175]	[0.1397]	[0.075]	[0.0527]	[0.075]	[0.0545]	[0.621]	[0.0062]	[0.181]	[0.0028]	[0.1744]	[0.0028]
t3_treat2	0.552***	0.3465**	0.957	0.1183**	0.841	0.0764	1.081	0.0145**	0.735	0.0021	0.8753	0.0026
	[0.098]	[0.1403]	[0.105]	[0.0598]	[0.094]	[0.0617]	[0.475]	[0.0072]	[0.155]	[0.0027]	[0.1604]	[0.0029]
t4_treat2	1.031	0.4168***	0.872	0.0322	0.836*	0.0495	1.324	0.0112**	1.012	0.0003	1.0677	0.0014
	[0.169]	[0.1343]	[0.091]	[0.0564]	[0.090]	[0.0591]	[0.455]	[0.0064]	[0.178]	[0.0028]	[0.1656]	[0.0029]
Observations	124790	15409	124790	78220	124790	84460	124790	15409	124790	78220	124790	84460
Pseudo R ² /R ²	0.06	0.26	0.08	0.12	0.08	0.13		0.11		0.07		0.08

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-1' are odds ratios of the probabilities of incurring any OOP and catastrophic payments and under 'Part-II' are coefficients of per person monthly OOP and OOP expenditure as a share of households' total consumption expenditure. 4. Coefficients under Part II should be multiplied with 100 to read in percentage terms.

Table 3.5: Effects of RSBY on drug and non-drug expenditure: probability of incurring expenditure (Part-I) and conditional per person monthly expenditure (Part-II) separately for inpatient and outpatient

	Inpatient				Outpatient				Total OOP			
	Drug		Non-drug		Drug		Non-drug		Drug		Non-drug	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
Districts covered up to March 2010												
t2_treat1	1.858***	0.0106	1.845***	-0.1061	0.8098**	0.0116	0.743**	-0.1131	0.9152	-0.0519	0.9848	-0.174**
	[0.244]	[0.1227]	[0.268]	[0.1495]	[0.0619]	[0.0443]	[0.0815]	[0.0761]	[0.0705]	[0.0453]	[0.0951]	[0.0775]
t3_treat1	1.202	-0.0072	0.978	0.353**	0.8041**	0.0346	0.752**	-0.1295*	0.8897	-0.0316	0.838*	-0.0793
	[0.174]	[0.1080]	[0.152]	[0.1520]	[0.0736]	[0.0499]	[0.0901]	[0.0770]	[0.0830]	[0.0507]	[0.0893]	[0.0828]
t4_treat1	1.311**	0.0816	1.278*	0.1653	0.8264**	0.0183	0.74**	0.0934	0.8884	-0.0279	0.9454	-0.0146
	[0.178]	[0.1089]	[0.187]	[0.1713]	[0.0755]	[0.0470]	[0.0806]	[0.0743]	[0.0839]	[0.0478]	[0.0934]	[0.0800]
Districts covered between April 2010 and March 2012												
t2_treat2	1.227	0.5291***	1.226	0.2138	0.9186	0.1045**	0.784**	-0.028	0.9270	0.0978*	0.8700	0.0261
	[0.195]	[0.1366]	[0.218]	[0.1860]	[0.0819]	[0.0524]	[0.0971]	[0.0873]	[0.0840]	[0.0545]	[0.0977]	[0.0953]
t3_treat2	0.586**	0.1309	0.556***	0.5928***	1.0458	0.1273**	0.55***	0.0854	0.9300	0.0951	0.521***	0.1965*
	[0.106]	[0.1298]	[0.110]	[0.2105]	[0.1140]	[0.0586]	[0.0760]	[0.0937]	[0.1029]	[0.0601]	[0.0653]	[0.1081]
t4_treat2	1.053	0.5406***	1.045	0.3846*	0.9347	0.0435	0.48***	0.26***	0.8995	0.0712	0.572***	0.2528**
	[0.177]	[0.1367]	[0.193]	[0.2014]	[0.0974]	[0.0551]	[0.0607]	[0.0910]	[0.0964]	[0.0577]	[0.0676]	[0.1005]
Observations	124790	14520	124790	11138	124790	76369	124790	26229	124790	82425	124790	34029
R-squared		0.16		0.25		0.25		0.08		0.12		0.1

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-I' are odds ratios of the probabilities of incurring out-of-pocket expenditure and under 'Part-II' are coefficients of per person monthly out-of-pocket.

Table 3.6: Mean difference of DID estimates for immediate pre-intervention and post intervention years for different outcome indicators

Outcome indicators	Districts covered up to 2010 (treat1)			Districts covered after 2010 (treat2)
	Effects in 2010 t3_treat1- t2_treat1	Effects in 2012 t4_treat1- t2_treat1	Between 2010 and 2012 t4_treat1- t3_treat1	Effects in 2012 t4_treat2-t3_treat2
I. Inpatient				
Probability any expenditure	-0.667***	-0.417**	0.2499	0.479***
Per person monthly expenditure	0.075*	0.0339	-0.0411	0.0703*
Probability catastrophic payments	-0.1557	-0.8670**	-0.7113*	0.2425
OOP as share of household expenditure	0.0052	-0.0076	-0.0127**	-0.0032
Probability drug expenditure	-0.656***	-0.547**	0.109	0.467***
Per person monthly drug expenditure	-0.018	0.071	0.089	0.4097**
Probability non-drug expenditure	-0.867***	-0.567**	0.300*	0.489***
Per person monthly non-drug expenditure	0.459**	0.271*	-0.188	-0.2082
II. Outpatient				
Probability any expenditure	-0.0143	0.1049	0.1192*	-0.0847
Per person monthly expenditure	0.0358	0.009	-0.0269	-0.0861
Probability catastrophic payments	-0.0546	-0.0967	-0.0422	0.2769*
OOP as share of household expenditure	0.0005	-0.0036	-0.0041*	-0.0018
Probability drug expenditure	-0.006	0.017	0.022	-0.1111
Per person monthly drug expenditure	0.023	0.007	-0.016	-0.0838
Probability non-drug expenditure	0.009	-0.003	-0.012	-0.07
Per person monthly non-drug expenditure	-0.016	0.207**	0.223***	0.1746*
III. Total OOP				
Probability any expenditure	-0.0311	0.0946	0.1258	-0.0049
Per person monthly expenditure	0.0246	0.0204	-0.0042	-0.0269
Probability catastrophic payments	-0.031	-0.1408	-0.1098	0.1925
OOP as share of household expenditure	0.0005	-0.0044*	-0.0049*	-0.0012
Probability drug expenditure	-0.026	-0.027	-0.001	-0.0305
Per person monthly drug expenditure	0.020	0.024	0.004	-0.0239
Probability non-drug expenditure	-0.147	-0.039	0.107	0.051
Per person monthly non-drug expenditure	0.095	0.159**	0.065	0.0563

Table 3.7: Effects of RSBY on probability of OOP and catastrophic expenditure and given the positive expenditure intensity of per person monthly OOP and OOP as a share of household expenditure: two time period based results for BPL households and MPCE based poor households

	Probability of making any OOP (Part-I) and conditional per person monthly OOP expenditure (Part-II)						Probability of making catastrophic OOP (Part-I) and conditional OOP share to household expenditure (Part-II)					
	Inpatient		Outpatient		Total OOP		Inpatient		Outpatient		Total OOP	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
BPL households												
t2_treat1	0.924	-0.0432	0.992	-0.0381	0.95	-0.0245	0.745	0.0108	0.816	-0.0008	0.867	0.0068
	[0.135]	[0.1627]	[0.107]	[0.0709]	[0.106]	[0.0728]	[0.189]	[0.0271]	[0.111]	[0.0073]	[0.107]	[0.0092]
t2_treat2	0.965	-0.357*	0.867	-0.0871	0.849	-0.0997	0.596*	-0.0218	0.769	0.001	0.75**	-0.0049
	[0.165]	[0.1881]	[0.104]	[0.0783]	[0.105]	[0.0807]	[0.177]	[0.0315]	[0.127]	[0.0079]	[0.111]	[0.0098]
Observations	39278	5271	39278	26631	39278	28102	38222	5271	39278	26631	39278	28102
Pseudo R2/R2	0.06	0.16	0.09	0.11	0.10	0.12	0.06	0.15	0.05	0.09	0.09	0.09
Poor households (poorest two expenditure quintile)												
t2_treat1	0.78*	0.0201	1.137	0.0083	1.117	0.0185	0.55**	-0.0086	0.883	-0.0036	0.848	-0.004*
	[0.104]	[0.1393]	[0.101]	[0.0480]	[0.103]	[0.0485]	[0.155]	[0.0066]	[0.118]	[0.0024]	[0.102]	[0.0026]
t2_treat2	0.914	-0.0852	1.044	-0.0511	1.02	-0.0282	0.732	-0.0041	0.915	-0.0034	0.906	-0.0043
	[0.151]	[0.1537]	[0.104]	[0.0564]	[0.105]	[0.0578]	[0.255]	[0.0081]	[0.153]	[0.0027]	[0.135]	[0.0030]
Observations	64171	6477	64171	41549	64171	43672	64070	6477	64070	41549	64070	43672
Pseudo R2/R2	0.07	0.12	0.10	0.11	0.11	0.12	0.05	0.08	0.05	0.08	0.05	0.08

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-1' are odds ratios of the probabilities of incurring any OOP and catastrophic payments and under 'Part-II' are coefficients of per person monthly OOP and OOP expenditure as a share of households' total consumption expenditure. 4. # Part-II under catastrophic expenditure is percentage of out-of-pocket to total household expenditure.

Table 3.8: Effects of RSBY on drug and non-drug expenditure: probability of incurring expenditure (Part-I) and conditional per person monthly expenditure (Part-II) separately for inpatient and outpatient: two time period based results for BPL households

	Inpatient				Outpatient				Total OOP			
	Drug		Non-drug		Drug		Non-drug		Drug		Non-drug	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
BPL households												
t2_treat1	0.893	-0.0827	0.78*	0.2119	0.885	-0.0218	0.929	0.0609	0.848	-0.0115	0.883	0.0361
	[0.133]	[0.1560]	[0.124]	[0.2182]	[0.094]	[0.0680]	[0.106]	[0.1004]	[0.093]	[0.0686]	[0.095]	[0.1012]
t2_treat2	0.955	-0.459**	0.967	-0.2789	0.851	-0.0738	0.594***	0.1106	0.838	-0.0934	0.652***	-0.0041
	[0.167]	[0.1747]	[0.182]	[0.2577]	[0.101]	[0.0752]	[0.079]	[0.1147]	[0.102]	[0.0760]	[0.081]	[0.1168]
Observations	39278	4928	39278	4390	39278	26104	39278	10203	39278	27517	39278	13058
Pseudo R ² /R2	0.06	0.14	0.06	0.18	0.09	0.12	0.10	0.1	0.09	0.12	0.09	0.09
Poor households (poorest two expenditure quintile)												
t2_treat1	0.717**	0.0631	0.695**	0.2457	1.021	0.0062	0.992	0.193**	0.977	0.0219	0.947	0.152***
	[0.099]	[0.1351]	[0.103]	[0.1786]	[0.090]	[0.0468]	[0.103]	[0.0741]	[0.089]	[0.0466]	[0.092]	[0.0749]
t2_treat2	0.857	-0.0025	0.845	0.1398	1.026	-0.0563	0.619***	0.276***	0.982	-0.0233	0.656***	0.217***
	[0.146]	[0.1544]	[0.154]	[0.2116]	[0.102]	[0.0543]	[0.076]	[0.0878]	[0.100]	[0.0549]	[0.076]	[0.0896]
Observations	64171	6028	64171	5191	64171	40607	64171	14488	64171	42636	64171	18023
Pseudo R-squared	0.07	0.08	0.08	0.16	0.09	0.11	0.13	0.07	0.10	0.1	0.13	0.08

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-I' are odds ratios of the probabilities of incurring out-of-pocket expenditure and under 'Part-II' are coefficients of per person monthly OOP.

3.8. Appendix Tables

Appendix Table 3A-I: Percentage distribution of number of districts by ranges of enrolment ratios

Major states	Range of enrolment ratios							
	Up to March 2010				Up to March 2012			
	<25	>25 to 50	>50 to 75	>75	<25	>25 to 50	>50 to 75	>75
Assam	20.00	20.00	60.00	0.00	20.00	20.00	60.00	0.00
Bihar	10.00	36.67	53.33	0.00	2.63	34.21	60.53	2.63
Chhattisgarh	6.25	37.50	50.00	6.25	0.00	22.22	61.11	16.67
Gujarat	0.00	4.00	84.00	12.00	0.00	42.31	57.69	0.00
Haryana	5.26	47.37	26.32	21.05	4.76	66.67	28.57	0.00
Himachal	0.00	0.00	8.33	91.67	0.00	0.00	16.67	83.33
Jharkhand	6.67	20.00	73.33	0.00	8.33	45.83	37.50	8.33
Kerala	0.00	14.29	35.71	50.00	0.00	7.14	42.86	50.00
Maharashtra	13.79	41.38	44.83	0.00	9.68	41.94	48.39	0.00
Orissa	0.00	0.00	80.00	20.00	4.00	24.00	72.00	0.00
Punjab	5.88	58.82	29.41	5.88	0.00	50.00	45.00	5.00
Uttar Pradesh	20.29	23.19	55.07	1.45	11.27	69.01	18.31	1.41
Uttaranchal	0.00	41.67	58.33	0.00	0.00	15.38	76.92	7.69
West Bengal	0.00	16.67	58.33	25.00	16.67	11.11	44.44	27.78
Other NE states	23.53	23.53	17.65	35.29	2.50	25.00	40.00	32.50
UTs	0.00	0.00	100.00	0.00	0.00	0.00	100.00	0.00
All participating states	10.07	27.52	49.66	12.75	5.57	38.99	43.77	11.67

Source: <http://www.rsby.gov.in/Overview.aspx>. Accessed in July 2010 and July 2012.

Appendix Table 3A-II: Mean and standard deviations of households with different socio-economic characteristics

Variable	1999-2000		2004-05		2011-12	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
caste1 (ST)	0.0888	0.2845	0.0877	0.2829	0.0892	0.2851
caste2 (SC)	0.1925	0.3943	0.1970	0.3978	0.1902	0.3925
caste3 (OBC)	0.3522	0.4777	0.4015	0.4902	0.4308	0.4952
caste4 (Other)	0.3664	0.4818	0.3137	0.4640	0.2898	0.4537
edu1 (Illiterate)	0.3168	0.4652	0.2253	0.4178	0.1730	0.3782
edu2 (Primary)	0.1428	0.3499	0.1610	0.3675	0.1174	0.3219
edu3 (Middle)	0.1921	0.3940	0.2274	0.4192	0.1945	0.3958
edu4 (Higher secondary)	0.2408	0.4276	0.2666	0.4422	0.3534	0.4780
edu5 (Graduate and above)	0.1074	0.3097	0.1196	0.3245	0.1617	0.3682
religion1 (Hindu)	0.8335	0.3725	0.8338	0.3722	0.8317	0.3741
religion2 (Muslim)	0.1089	0.3115	0.1124	0.3158	0.1181	0.3228
religion 3 (Christian)	0.0272	0.1626	0.0240	0.1532	0.0245	0.1547
religion 4 (Other)	0.0304	0.1718	0.0298	0.1699	0.0256	0.1579
Household size<5	0.6634	0.4726	0.6913	0.4620	0.7433	0.4368
Proportion female	0.4761	0.2056	0.4791	0.2047	0.4767	0.2108
Proportion married	0.4659	0.2564	0.4751	0.2606	0.4903	0.2672
Age 0-4 years	0.0928	0.1395	0.0863	0.1379	0.0693	0.1274
Age 5-14 years	0.2130	0.2182	0.2027	0.2185	0.1816	0.2137
Age 15-29 years	0.2725	0.2539	0.2729	0.2559	0.2796	0.2657
Age 30-59 years	0.3341	0.2352	0.3474	0.2375	0.3700	0.2457
Age 60 years and above	0.0876	0.1981	0.0907	0.2051	0.0994	0.2181
Self-employed non-agriculture)	0.1898	0.3921	0.2166	0.4119	0.2180	0.4129
Self-employed agriculture)	0.2431	0.4289	0.2574	0.4372	0.2366	0.4250
Wage paid labour (regular)	0.1126	0.3161	0.1123	0.3158	0.1911	0.3932
Wage paid labour (casual)	0.3374	0.4728	0.3033	0.4597	0.2766	0.4473
Others	0.1172	0.3217	0.1104	0.3134	0.0777	0.2677
Rural	0.7279	0.4450	0.7250	0.4465	0.6875	0.4635
Number of observations	120297		124644		101662	

Source: NSSO various years.

Appendix Table 3A-III: Percentage distribution of BPL households by quintile groups of per capita total monthly household expenditure, 2004-05

	Quintile groups of per capita total household expenditure					
	Q1	Q2	Q3	Q4	Q5	Total
Major states						
Delhi	84.10	7.48	8.42	0	0	100
Haryana	37.34	26.42	22.84	10.27	3.13	100
Himachal	47.39	22.75	18.56	8.27	3.04	100
J&K	44.25	30.25	12.58	7.83	5.09	100
Punjab	42.06	32.59	13.77	6.95	4.62	100
Rajasthan	39.41	24.35	18.62	10.50	7.13	100
Uttaranchal	41.94	27.60	16.03	9.77	4.66	100
Assam	40.43	25.53	18.08	12.33	3.64	100
Chhattisgarh	30.30	20.28	22.69	17.78	8.95	100
Madhya Pradesh	34.48	25.43	21.57	13.53	4.99	100
Uttar Pradesh	36.78	21.25	19.45	12.97	9.56	100
Bihar	29.89	23.99	22.81	16.28	7.03	100
Jharkhand	29.49	27.38	19.05	16.55	7.53	100
West Bengal	33.00	28.99	19.08	15.10	3.82	100
Orissa	31.53	26.06	20.40	16.43	5.58	100
Maharashtra	40.74	29.50	18.64	8.72	2.40	100
Goa	52.49	26.00	10.23	4.90	6.37	100
Gujarat	38.92	28.48	23.18	8.23	1.18	100
Andhra Pradesh	26.61	26.24	21.37	17.06	8.72	100
Karnataka	34.96	25.91	21.60	14.07	3.46	100
Kerala	35.47	24.53	20.76	13.22	6.02	100
Tamilnadu	31.66	26.95	20.78	13.81	6.81	100
UTs	57.73	28.16	9.89	3.60	0.62	100
Other NE states	43.63	23.21	16.10	11.95	5.11	100
All India	34.03	26.04	20.45	13.69	5.80	100

Source: NSSO, 2004-05, CES

Appendix Table 3A-IV: Mean and standard deviation of outcome indicators for control and treatment groups during the survey years.

Outcome	groups	2000		2005		2010		2012	
		mean	sd	mean	sd	mean	sd	mean	sd
Percentage of households reporting OOP (%)									
Total OOP	control	57.51	49.44	53.60	49.87	63.70	48.09	73.61	44.07
	treat1	71.36	45.21	65.27	47.61	72.73	44.54	83.02	37.55
	treat2	64.87	47.74	58.03	49.35	66.95	47.04	77.30	41.89
Inpatient	control	15.20	35.91	4.41	20.53	10.58	30.75	8.79	28.32
	treat1	15.67	36.35	8.24	27.50	12.37	32.92	12.50	33.08
	treat2	17.94	38.38	5.97	23.69	7.44	26.25	10.78	31.01
Outpatient	control	47.71	49.95	51.62	49.98	59.87	49.02	70.79	45.48
	treat1	64.57	47.83	62.43	48.43	68.79	46.34	80.44	39.66
	treat2	54.79	49.77	55.71	49.68	65.22	47.63	74.75	43.45
Per person monthly OOP (INR) at constant 1999-2000 prices									
Total OOP	control	10.70	17.97	10.41	17.72	11.23	17.41	17.04	24.50
	treat1	16.98	23.51	16.60	25.36	17.83	27.31	24.62	33.11
	treat2	10.04	15.62	10.74	18.32	10.71	17.46	15.97	22.45
Inpatient	control	1.76	7.41	0.94	5.88	1.89	7.87	2.72	12.15
	treat1	2.62	10.94	2.73	12.77	3.84	15.61	4.97	18.25
	treat2	1.77	7.61	1.56	8.57	1.68	9.28	3.26	12.34
Outpatient	control	8.94	15.91	9.47	16.57	9.34	14.65	14.33	20.82
	treat1	14.36	20.18	13.88	20.99	13.99	21.02	19.65	26.41
	treat2	8.26	13.50	9.18	15.34	9.02	13.96	12.72	18.27
OOP as a share of household expenditure (%)									
Total OOP	control	3.06	5.04	2.85	4.99	3.01	4.53	4.13	5.57
	treat1	4.74	6.16	4.50	6.32	4.63	6.23	5.40	6.44
	treat2	3.02	4.47	3.03	4.92	2.83	4.38	3.78	5.18
Inpatient	control	0.48	1.95	0.23	1.55	0.46	1.90	0.57	2.53
	treat1	0.73	2.71	0.71	3.07	0.92	3.41	1.02	3.57
	treat2	0.51	1.91	0.42	2.11	0.43	2.31	0.70	2.74
Outpatient	control	2.58	4.57	2.61	4.72	2.56	3.96	3.56	4.95
	treat1	4.01	5.48	3.79	5.42	3.71	5.08	4.38	5.34
	treat2	2.51	4.04	2.61	4.35	2.40	3.56	3.08	4.38
Percentage household reporting OOP more than 10% of household expenditure (%)									
Total OOP	control	7.67	26.61	7.68	26.63	7.50	26.34	10.60	30.78
	treat1	13.54	34.22	12.67	33.27	12.22	32.76	15.27	35.97
	treat2	6.55	24.74	7.39	26.17	5.58	22.95	9.48	29.30
Inpatient	control	0.90	9.42	0.74	8.59	0.98	9.83	1.85	13.47
	treat1	1.38	11.68	2.07	14.23	2.46	15.49	2.86	16.68
	treat2	0.82	9.03	1.14	10.60	0.90	9.43	2.08	14.27
Outpatient	control	6.24	24.19	6.65	24.92	5.97	23.69	8.11	27.30
	treat1	10.65	30.85	9.79	29.72	8.51	27.90	10.91	31.18
	treat2	4.99	21.78	5.71	23.21	3.60	18.63	6.58	24.79

Appendix Table 3A-V: Effects of RSBY on probability of incurring OOP and catastrophic expenditure and given the positive health care expenditure intensity of per person monthly OOP and OOP as a share of household expenditure in high enrolment districts

	Probability of making any OOP (Part-I) and conditional per person monthly OOP expenditure (Part-II)						Probability of making catastrophic OOP (Part-I) and conditional OOP share to household expenditure (Part-II)					
	Inpatient		Outpatient		Total OOP		Inpatient		Outpatient		Total OOP	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
Districts covered up to March 2010												
t2_treat1	2.042***	-0.0012	0.729***	0.0755	0.753**	0.0578	1.726***	-0.0711	0.761***	0.0636	0.821***	0.0616
	[0.315]	[0.1478]	[0.072]	[0.0508]	[0.077]	[0.0514]	[0.165]	[0.0982]	[0.053]	[0.0403]	[0.060]	[0.0428]
t3_treat1	1.236	0.0078	0.672***	0.1292**	0.692***	0.0812	1.314***	0.1851*	0.644***	0.0653	0.705***	0.0588
	[0.215]	[0.1204]	[0.077]	[0.0608]	[0.082]	[0.0622]	[0.139]	[0.0910]	[0.051]	[0.0470]	[0.059]	[0.0494]
t4_treat1	1.241	-0.0304	0.841	0.1685***	0.882	0.1054*	1.438***	0.0402	0.829**	0.1499***	0.884	0.1406***
	[0.203]	[0.1229]	[0.098]	[0.0588]	[0.107]	[0.0595]	[0.146]	[0.0904]	[0.065]	[0.0461]	[0.074]	[0.0492]
Districts covered between April 2010 and March 2012												
t2_treat2	1.169	0.368**	0.937	0.017	0.87	0.0305	0.894	0.3401***	0.977	0.0611	0.907	0.0845
	[0.207]	[0.1549]	[0.096]	[0.0613]	[0.093]	[0.0632]	[0.100]	[0.1121]	[0.072]	[0.0486]	[0.071]	[0.0521]
t3_treat2	0.473***	0.1979	0.902	0.1107*	0.718*	0.0917	0.629***	0.4969***	0.829**	0.0294	0.711***	0.0646
	[0.100]	[0.1618]	[0.115]	[0.0690]	[0.094]	[0.0712]	[0.078]	[0.1207]	[0.072]	[0.0532]	[0.065]	[0.0571]
t4_treat2	1.048	0.4863***	1.005	0.0878	0.9	0.1517**	1.013	0.3405***	1.02	0.0208	0.934	0.112**
	[0.204]	[0.1485]	[0.123]	[0.0656]	[0.115]	[0.0692]	[0.122]	[0.1066]	[0.088]	[0.0501]	[0.085]	[0.0542]
Observations	75653	9825	75653	45427	75653	49639	221533	36322	221533	144310	221533	157092
Pseudo R ² /R ²		0.3		0.13		0.15		0.31		0.17		0.18

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-1' are odds ratios of the probabilities of incurring any OOP and catastrophic payments and under 'Part-II' are coefficients of per person monthly OOP and OOP expenditure as a share of households' total consumption expenditure.

Appendix Table 3A-VI: Effects of RSBY on probability of incurring OOP and catastrophic expenditure and given the positive health care expenditure intensity of per person monthly OOP and OOP as a share of household expenditure for non-poor households in high enrolment districts

	Probability of making any OOP (Part-I) and conditional per person monthly OOP expenditure (Part-II)						Probability of making catastrophic OOP (Part-I) and conditional OOP share to household expenditure (Part-II)					
	Inpatient		Outpatient		Total OOP		Inpatient		Outpatient		Total OOP	
	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II	Part-I	Part-II
Districts covered up to March 2010												
t2_treat1	1.559***	0.0171	0.804**	0.0976**	0.896	0.1289**	1.289*	-0.0168	1.009	-0.0012	1.127	0.0041
	[0.174]	[0.1137]	[0.075]	[0.0551]	[0.089]	[0.0580]	[0.197]	[0.0163]	[0.111]	[0.0075]	[0.110]	[0.0083]
t3_treat1	1.244*	0.2658**	0.593***	0.0076	0.676***	0.0346	1.16	0.0009	0.898	0.0034	0.968	0.0127
	[0.156]	[0.1270]	[0.064]	[0.0658]	[0.078]	[0.0685]	[0.197]	[0.0247]	[0.116]	[0.0074]	[0.107]	[0.0112]
t4_treat1	1.543***	0.1013	0.921	0.1326**	0.968	0.1948**	1.335*	0.0087	1.018	0.0001	1.161	0.0097
	[0.191]	[0.1187]	[0.105]	[0.0680]	[0.118]	[0.0735]	[0.220]	[0.0167]	[0.127]	[0.0071]	[0.127]	[0.0085]
Districts covered between April 2010 and March 2012												
t2_treat2	0.718**	0.428***	1.064	0.0672	0.934	0.1375**	0.932	0.0098	1.045	0.0081	1.015	0.0055
	[0.097]	[0.1309]	[0.110]	[0.0614]	[0.099]	[0.0662]	[0.175]	[0.0165]	[0.136]	[0.0079]	[0.119]	[0.0083]
t3_treat2	0.634***	0.664***	0.761**	-0.0338	0.651***	0.0814	1.06	0.0101	0.59***	-0.0049	0.734**	-0.0011
	[0.094]	[0.1568]	[0.091]	[0.0685]	[0.080]	[0.0748]	[0.228]	[0.0235]	[0.096]	[0.0064]	[0.099]	[0.0090]
t4_treat2	0.907	0.3303**	1.203	-0.0796	1.071	0.0875	1.091	0.0302*	0.814	0.0011	0.962	0.0062
	[0.129]	[0.1373]	[0.148]	[0.0682]	[0.135]	[0.0731]	[0.209]	[0.0174]	[0.119]	[0.0066]	[0.119]	[0.0077]
Observations	104097	19826	104097	71218	104097	77401	103732	19826	103732	71218	103732	77401
Pseudo R ² /R ²	0.06	0.27	0.08	0.13	0.09	0.15	0.07	0.12	0.08	0.1	0.08	0.09

Notes: 1. * significant at 10% level; ** significant at 5% level; *** significant at 1% level; 2. standard errors in brackets; 3. Values under 'Part-1' are odds ratios of the probabilities of incurring any OOP and catastrophic payments and under 'Part-II' are coefficients of per person monthly OOP and OOP expenditure as a share of households' total consumption expenditure. 4. Coefficients under Part II should be multiplied with 100 to read in percentage terms.

CHAPTER 4: LABOUR MARKET IMPACT OF SOCIAL HEALTH

INSURANCE IN INDIA: THE CASE OF *RASHTRIYA SWASTHYA BIMA*

YOJANA

4.1. Introduction

Health insurance schemes are typically intended to improve population health and protection against out of pocket payments through affordable access to healthcare (Phelps 2010). *World Health Report 2010* notes that, “The most effective way to deal with the financial risk of paying for health services is to share it, and the more people who share, the better the protection” (World Health Organization, 2010; p. 47). Nonetheless, impacts of health insurance on many other outcomes of interest have also been discussed in the theoretical and empirical literature. The most significant among these are effects of health insurance on investment and growth, non-medical non-health risks, such as school enrolment of children (Yip and Berman 2002) and labour markets (Currie and Madrian, 1999; Gruber and Madrian, 2002; Gertler and Gruber, 2002).

In the labour market context, a significant body of research has examined the likely distortions that might be associated with health coverage (such as job-lock and informalisation of the labour force), particularly in the US, where most health insurance schemes have tended to be employment linked (Buchmueller and Valleta, 1999; Gruber and Madrian, 1994, 1996, 2002; Boyle and Lahey, 2010). For instance,

Buchmueller and Valleta (1999) note that health insurance constitutes a lump-sum employment benefit that may induce a negative income effect on desired hours of labour supply. Empirical literature also indicated that many marginal workers such as children, married women, elderly etc. might reduce their overall labour supply if they are covered under health insurance available to the main adult male workers of their family (Gruber and Madrian, 2002). Researchers have sometimes referred to these distortions in the labour market as 'unintended' impacts of health insurance. For instance, Levy (2008) and Wagstaff and Manachotphong (2012) note that benefits and costs associated with health insurance coverage depend on the extent of the 'intended' and 'unintended' impacts of health-insurance schemes.

In contrast to the prominence accorded to existing work on the impact of health insurance on labour market in developed countries, more specifically the US economy, the literature on assessing similar impacts in developing countries is almost non-existent. Assessing the impacts of health insurance on labour market behaviour in developing countries is important because in most developing countries a large proportion of employment is in the informal sector with only a limited share of the workforce participating in employment-linked social security schemes associated with formal sector employment. Government-funded social health insurance (SHI) schemes in these countries, however, have a strong potential to affect labour market outcomes, such as labour supply, job mobility or job-lock and retirement plans of elderly workers (Boyle and Lahey, 2010). However, few studies on the impacts of health insurance programmes on labour market behaviour in

developing countries exist. The present chapter is intended to address this gap by assessing the impacts of RSBY, a publicly financed and fully subsidised health insurance scheme for the poor in India, on the labour supply and job mobility of different population groups. Using the information on RSBY roll-out in different districts of the country and multiple rounds of labour force survey data from the National Sample Survey Organisation (NSSO), this study estimates the effects of RSBY on labour force participation and work status among three different population groups in India: adults in the working age group, the elderly and married women. We also examine worker participation in different types of work as classified by the NSSO: self-employment, regular and casual/daily wage labour. Background details of the RSBY have been already presented in Chapter 3 of this dissertation.

Using a simple family labour supply framework (Buchmueller and Valleta, 1999; Blundell et al., 2007), this study hypothesized that a health insurance program such as RSBY will lower the cost of working and hence increase the aggregate labour force participation rate of a family. This should occur because healthier household members will likely expend less effort in work and also because of declines in caregiving responsibilities. In India, in particular, significant increases in the labour supply of women due to RSBY intervention can be expected. This is because one of the major reasons offered for the typically low female labour force participation rate in India has been their role as primary care giver to younger siblings and household members who are ill (Unni, 1989) and their involvement in variety of unpaid works (Mazumdar and Neetha, 2011).

On the flip side, the income effect arising from the availability of subsidised health care services under RSBY will negatively influence labour supply in the household. For instance, analysing the recent trends of decline in rural women's labour force participation rate in India, Neff et al. (2012) observed that with higher incomes, which help households escape poverty, there could be a tendency for women to withdraw from the labour force to attend to domestic duties. In fact, the income effect of health insurance may reduce the labour supply of many marginal workers, particularly elderly members of families. It may also lower any casual-wage work of adult male members who may undertake such jobs to support any health-related expenses of households. Finally, expanded health coverage under RSBY may influence job switching (or job-lock), as the availability of lower cost health care may mitigate the urgent need to work for cash wages and marginal wage-paid workers may shift to self-employment, particularly if (casual or daily) wage work is uncertain and less remunerative. It may also allow individuals to wait and look for more regular-paid jobs as the opportunity cost of job search falls.

The findings in this paper clearly indicated that women 'labour force participation rate' (LFPR) increased significantly after the RSBY intervention in the range of 6 to 7 per cent depending on the years of impact assessment and years of RSBY intervention. Also women increased their share of regular wage paid jobs and self-employment (by 0.9% and 4.4% respectively) at the cost of daily casual wage employment clearly indicating less urgent need of cash wages on daily basis for the

households covered under the RSBY scheme. Married women also reflected almost the similar scenario. However, adult male members seem to have increased their share in casual wage earnings at the cost of self-employed may be because female are now more available for self-employed jobs.

4.2. Background: The Indian Labour Market

The Indian labour market is characterised by the overwhelmingly dominance of informal sector⁶ employment. Only about 6–8 per cent of the total workforce in the country is employed in formal government and large private sector enterprises. Ninety per cent of the total workforce is in the informal sector, having little or no access to income and job security (National Commission for Enterprises in the Unorganised Sector [NCEUS] 2007) nor do they enjoy the protection of any major social security schemes, such as unemployment insurance, disability insurance or pension coverage. The majority of these workers (approximately 60 per cent of the informally employed) are self-employed in agriculture and their own non-agricultural enterprises, with the remainder being casual and regular wage earners. Given the low daily wages/income and absence of social security among a sizeable portion of informal sector workers, many workers and their households tend to be poor.

⁶ The informal sector in India is defined as all unincorporated private enterprises owned by individuals or households engaged in the sale and production of goods and services operated on a proprietary or partnership basis and with less than 10 workers (NCEUS, 2007).

Labour and workforce (and also persons out of labour force) data in India is available from employment and unemployment surveys (EUS) conducted every five years⁷ by NSSO⁸. Although the methods used for constructing indicators of labour supply and work force participation has been described in detail in a later section, some understanding of the standard survey terminology at this stage helps both set the context and establish inter-linkages between the definitions used for labour force and workforce. The NSSO survey instrument focuses on two categories of individuals: those in the labour force and those out of labour force. The first category consists of those who are currently seeking work and those currently employed. The latter are defined as belonging to the workforce and the former being unemployed. The second major category – i.e. not in the labour force – consists of persons who are not seeking work for any reason, including pursuit of education, sickness, domestic work and disability. All of these alternate activities of individuals are recorded in the survey and are termed as the activity status of individuals.

Table 4.1 presents estimates of the labour market indicators in terms of distribution of all individuals by their broad activity statuses across 4 survey rounds, from 1999-2000 to 2011-12. The data suggest a decline in LFPR and workforce-participation rate (WPR) over time, particularly after 2004-05. The declines in the LFPR and WPR were sharper for females than their male counterparts. Female workers also reported

⁷ Annual surveys are also conducted in between two five-yearly surveys. However, sample sizes of the annual surveys are comparatively smaller and usually not supposed to be nationally representative at higher levels of disaggregation.

⁸ Another official source is the Directorate General of Employment and Training (DGET), but this focuses is only on the formal sector employment. There are other sources but they are largely anecdotal and are often in response to a specific issue/query (e. g., post-GFC employment data collected by the Ministry of Labour & Employment (MoLE)). More recently, (since 2010) MoLE has also started collecting data from annual surveys on employment and unemployment, but the methodology used is still to be standardized.

significant changes in their major work status: that is, moving from self-employment to wage-based employment, whether on regular or casual basis. Although this may reflect a shifting of job opportunities away from agriculture (and other self-employed petty business activities) to emerging manufacturing and construction sectors (Kundu, 2005; Kannan. 2012) the declines in employment in agriculture were much sharper than the increased employment in other sectors (Mazumdar and Neetha, 2011) resulting in a net decline in the female work force participation over time.

The declining LFPR among Indian women during the last decade has attracted significant attention (Chandrasekhar and Ghosh, 2011; Choudhury, 2011; Rangarajan et al., 2011; Kannan and Raveendran, 2012; Planning Commission, 2011). The dominant explanation for the decline in labour force participation rate is that India is (now) studying implying that the rapid economic growth and the rates of return to education have led to much greater participation of population in education skill acquiring activities (Planning Commission 2011; Rangarajan et al., 2011; Neff et al.; 2012). A second explanation focuses on discouraged-workers effects.

Chandrasekhar and Ghosh (2011), Himanshu (2011), and Kannan and Raveendran (2012) note that the 'jobless' growth of the Indian economy (economic growth in India was not accompanied by significant employment growth) during the last decade 'discouraged' Indian workers and consequently a large proportion of population withdrew themselves from the labour market to pursue non-economic activities.

The fact that the decline in LFPR among women during the last decade was much greater than the LFPR among men (the latter remained largely unchanged) has also led to a significant literature focused on the gender dimension of the labour market. Choudhury (2011) proposed that the decline in the LFPR among women, irrespective of age may have been due to a combination of a decline in overall employment opportunities and 'social orthodoxy' that may have played a role in pushing out women, rather than men, from the labour force. Rangarajan et al., (2011) also noted that a large numbers of women are withdrawing from the labour force to attend to domestic duties, and this is consistent with Choudhury's conclusions, although their explanation is that rising household incomes may have resulted in withdrawal of women from the labour market.

Other key labour force characteristics relate to the status (or type) of employment. Clearly, the proportion of workforce engaged in agriculture has declined sharply, from 64 per cent in 1999-2000 to less than 49 per cent 2011-12. However, again this shift of employment to the manufacturing and services sectors has been far greater among male workers than among female workers. More than one-half of the workers are self-employed (overwhelmingly in agriculture and in rural areas) with regular wage-based workers constituting only 18% of the total. Casual or daily wage earners constitute approximately 30% of all workers (NSSO 2013). Proportions of regular and casual wage earners are approximately 9 per cent and 35 per cent respectively. Kannan (2012) on the estimated population of workers for respective NSSO survey

years note that men lost some of their self-employment activities leading to a greater number of women losing their status as unpaid family labour since many self-employment activities of men in rural areas are assisted by women as unpaid family labour. The loss of employment as casual labour in agriculture in rural areas also affected the women, pushing them back to the household. Men in self-employment in agriculture and related activities seem to have sought work as casual labour in the expanding construction sector. Since much of this construction took place in urban areas this could have led to migration of such men from rural areas.

4.3. Theoretical Predictions and Review of Empirical Studies on Health

Insurance and Labour Market Behaviour

In Grossman's human capital (Grossman, 1972), the demand for health care is derived from an inter-temporal utility maximization exercise in the process of investment in health capital and health is valued because poor health adversely affects both market (work) and non-market activities (such as leisure). The Grossman model can be used to derive a conditional labour supply function in which labour supply depends on an endogenous health variable (Currie and Madrian, 1999). In this setting, investments in health lead to increased labour productivity and earnings. Exogenous changes in employment or wages affect the opportunity costs of investments in health capital and returns to health, and thereby influence health outcomes (e.g. by affecting the likelihood of workplace injury, stress and risk-taking behaviours)

The basic theoretical predictions of the impacts of health insurance follow from the idea that health insurance acts as an income transfer to individuals. With unchanged wage rate and labour hours (i.e. with no reduction in wage rate and no increase in working hours), availability of health insurance will increase consumption of leisure (and lower total labour supply). However, this simple leisure-work trade off is influenced by the perceived risk about their health by the individuals. People may enjoy leisure more if they are healthier but risk-averse consumers will enjoy leisure less if leisure brings with it more uncertainty about health care expenditures (Currie and Madrian, 1999). Hence, theory suggests two divergent influences on labour supply due to individuals' access to health insurance and improved health. First, improved health due to better insurance coverage reduces loss of labour time due to ill health and enhances labour productivity. Second, individuals may increase their leisure time because of a 'virtual' income transfer effect of health insurance schemes (Currie and Madrian, 1999; Phelps, 2010). In addition, when health insurance is linked to employment, labour force participation is likely to increase.

A substantial literature has investigated the impacts of health insurance on overall employment, spousal employment, job mobility (or 'job-lock'), earnings, and hours of work. However, most of these studies were related to the US economy. For instance, 'job-lock' (i.e. reduced job mobility) has been one of the main concerns of early literature on the impacts of employment linked health insurance schemes on the US labour market (Mitchell, 1982; Madrian, 1994, Cooper and Monheit, 1993, Holtz-Eakin, 1994, Penrod, 1993, Buchmueller and Valletta, 1996; Gruber, 2000).

Some studies have also investigated the impact of health insurance on the labour supply of spouses (Gruber, 1994; Olson, 1995; Wellington and Cobb-Clark, 1996; Buchmueller and Valletta, 1999; Blau and Gilleskie, 2006). Buchmueller and Valletta (1999) used a reduced-form labour supply function (correcting for the endogeneity of a wife's decision to join the labour market) and a family labour supply model and found a strong negative effect of husbands' health insurance on wives' work hours, particularly in families with children. Another topic that has attracted significant attention has been the impact of health insurance on the retirement decisions of older workers. Most of the literature points to health insurance inducing retirement among older workers (Gruber and Madrian, 1995; Karoly and Rogowski, 1994; Rust and Phelan, 1997; Blau and Gilleskie, 2001) and reduces the age of retirement (Madrian 1994a; Blau and Gilleskie 2008). A few studies did not find any effects but this is likely due to their focus on employment-linked health insurance that may have ameliorated any positive retirement effects (Madrian and Beaulieu, 1998; Blau and Gilleskie, 2001, 2008; French and Jones. 2001). In this context, a recent study examining the impacts of a non-employment linked health programme (services offered and the population covered by the Department of Veterans Affairs' health care system Boyle and Lahey (2012)) found that older workers are significantly more likely to decrease work after receiving access to non-employer based insurance. They also find a significant positive 'income effect' from receiving public insurance, which dominates the 'job-lock' effect for older workers. However, they also note positive 'health effects' of health care access or decreased work disincentives for relatively less educated sub-populations.

Based on a review of over 50 studies conducted during the 1990s, Gruber and Madrian (2002) summarise four key findings. First, health insurance is a central determinant of retirement decisions. Second, health insurance is not a major determinant of the overall labour supply and welfare exit decisions of 'low income mothers'. Third, health insurance is an important factor in the labour supply decisions of 'secondary earners'. Fourth, health insurance plays an important role in job mobility decisions. Furthermore, they concluded that labour force participation is not always a discrete choice. Labour supply can change in terms of hours and nature of employment. Some workers may move from full to part-time work because they no longer need the income to pay for insurance premiums or out-of-pocket medical costs, and thus substitute leisure for work. Similarly, in response to the income transfer, workers may drop out of the labour force entirely, either temporarily or permanently (i.e. take earlier retirement). Finally, the income transfer could lower self-employment, as individuals who were previously working in order to pay for out-of-pocket health costs will no longer need to do so (Boyle and Lahey 2010).

In contrast to the large US-based literature on the implications of health insurance for labour markets, limited evidence is available for developing countries. Gruber and Madrian (2002; p. 21) note that 'in one of the few studies of health insurance and the labour market using non-U.S. data (Taiwan) Chou and Staiger (2001) are able to identify the effect of health insurance on employment'. In a recent study, using an informal expected-utility framework, Wagstaff and Manachotphong (2012) find that universal coverage in Thailand appears to have reduced employment in the formal

sector among married men and increased informal sector employment especially among married women. They locate the largest positive informal sector employment effects in the agricultural sector. Overall, they find that universal coverage in Thailand increased informal sector employment by 2 percentage points. Other studies (Chou and Staiger, 2001; Levy, 2008; Wagstaff and Moreno-Serra, 2009; Bosch and Campos-Vázquez, 2010; Aterido et al., 2011) have highlighted the labour market distortion effects of health insurance in different countries.

However, the emerging empirical evidences clearly indicate the need for more detailed studies on the likely impacts of health insurance schemes on the labour market in many developing countries that have launched several health insurance schemes in recent years. The issue assumes added importance in a country like India where the bulk of the employment (more than 90%) is in the informal sector with practically no employment linked social security scheme for the majority of the workforce. Also, in India no study exists which assesses the impacts of health insurance schemes on labour market behaviour, particularly since the introduction of large-scale publicly financed SHI schemes by the Central government and several state (provincial) governments.

Theoretical predictions for impacts of RSBY

The basic utility function outlined above (1) can be extended to include the consumption of 'leisure' (L) along with stock of health and consumption of other goods (x) as follows:

$$\text{Max } U = u(H, L, x) \dots \dots \dots (1);$$

Where, $H = g(q_1, q_2)$; and q_1 and q_2 represent inpatient care and outpatient care respectively. The budget/income constraint is given by:

$$I = P_1 * q_1 + P_2 * q_2 + x \dots \dots \dots (2);$$

Since health insurance changes utility associated with leisure and income trade-off, there are two different ways RSBY can impact labour supply behaviour of households. One, if households increase inpatient services due to lowering of inpatient price after RSBY intervention, increased health of household members will increase productivity and income of households. Two, since households will save on inpatient care expenses, there is also a 'virtual income transfer' to the households leading to have implications for the labour supply decision in the family. The improvement in health outcome of family members is likely to have positive effect on labour supply (also known as 'Added worker effect') mainly because of the reduced necessity of care giving by other family members. However, enhanced income of households either through increased productivity (wages) or through 'virtual income transfer', may lead to reduction in labour supply in favour of leisure.

Further, since in a joint family model, husband and wife together decide about the quantum of labour supply, a family's allocation of time and goods can be analyzed as if a single utility function. More precisely we assume that total consumption and the leisure times of each member of the household, is maximized jointly by all members subject to a budget constraint in which all earnings are pooled.

$$S_m = s_m(w_m, S_f, \lambda + w_f S_f) \dots \dots \dots (3a)$$

$$S_f = s_f(w_f, S_m, \lambda + w_m S_m) \dots \dots \dots (3b)$$

Where S_i 's represent hours worked by the husband (male) and wife (female), the w_i 's are their respective wage rates, and Y is family non-labour income. Consumers maximises the equation (2) subject to the following constraint:

$$I = (w_m * S_m + w_f * S_f) + \lambda \dots \dots \dots (4)$$

Where w_m and w_f are wage rates for male and female and λ is income from other sources including non-labour income.

Motivated by the above mentioned theoretical joint family model of labour supply, the regression specification for assessing the impact of RSBY on male and female labour supply can be worked out which includes the female's labour supply in males' labour supply equation, and vice versa at the household level.

Since RSBY is likely to increase the use of inpatient care by eligible households through lowering of inpatient prices, the covered population is likely to have improved health leading to increased labour supply. However, the increase in the labour supply will necessarily depend on the quantum of health increased. Further, since households will also have increased income, through 'virtual' income transfer, labour supply of households will have two different effects: Firstly, elderly and other part time workers will withdraw from the labour market because of the increased household income and secondly, reduced care giving responsibilities for any ailing family members will encourage women to join the labour market.

4.4. Methods

4.4.1. Data

The data for this study is drawn from two main sources: (i) 4 waves of the nationally representative Employment and Unemployment Surveys (EUSs) conducted by the NSSO, and (ii) district level administrative data from the RSBY website on enrolment of households in the scheme. The EUSs used in the study are quinquennial rounds for the years 1999–2000, 2004–05, 2009–10 and 2011–12. The total number of households surveyed in the NSSO has been more than 100 thousand households consisting of 450 to 500 thousand individuals. The EUS of the NSSO collects detailed information on household characteristics, including the demographic structure of households, educational status, labour force and workforce participation and follow up questions on the employment and unemployment situation of each individual in the sample. Information on the ‘activity status’ of each family member of the households provides details about family members participating in a range of economic and non-economic activities such as whether self-employed, employed for wages on regular and/or casual basis, unemployed, student, involved in household work, etc.

Individual’s status as part of labour force, worker or out of labour force can be determined on the basis of the activity/activities being pursued by the individual during a reference period of one year (and alternatively one week) preceding the survey. The information is collected for more than 20 different activities to determine the activity status of each individual in the survey (Box I). On the basis of these

activities (Box 4.1), all the individuals currently employed are labelled as worker (or workforce) and workers and unemployed taken together constitute labour force.

Box 4.1: Activity status of individuals in the NSSO data base

1. *Working or being engaged in economic activity (employed or worker) includes following categories:*

- (a) worked in household enterprise (self-employed) as an own-account worker
- (b) worked in household enterprise (self-employed) as an employer
- (c) worked in household enterprise (self-employed) as 'helper'
- (d) worked as regular wage/ salaried employee
- (e) worked as casual wage labour in public works other than Mahatma Gandhi National Rural Employment Guarantee (MGNREG) works
- (f) worked as casual wage labour in MGNREG works
- (g) worked as casual wage labour in other types of works
- (h) did not work due to sickness though there was work in household enterprise (self-employed)
- (i) did not work due to other reasons though there was work in household enterprise (self-employed)
- (j) did not work due to sickness but had regular wage/ salaried employment
- (k) did not work due to other reasons but had regular wage/ salaried employment

2. *Not working but seeking or available for work (unemployed) :*

- i. sought work but did not work
- ii. did not seek but was available for work

3. *Not working and also not available for work (not in labour force) :*

- (a) attended educational institution
- (b) attended domestic duties only
- (c) attended domestic duties and was also engaged in free collection of goods,
- (d) tailoring, weaving, etc., for household use
- (e) recipients of rent, pension, remittance, etc.
- (f) not able to work due to disability
- (g) others
- (h) did not work due to sickness (for casual workers only).

Source: NSSO 2013, Page A13-14

Further, one person may report more than one activity. For example, self-employment (worker) and household activities (non-worker) both may be reported by women; similarly student (non-worker) and household activities (non-worker) both may be reported by adolescent boys/girls. The two activities of the individuals can be either both economic activities, or one economic and another non-economic

The data base does not record the second activity of the individual if the reported second activity falls in the non-worker category.

All these labour market related information are collected on two different recall reference periods: i) annual recall basis (known as usual status) and ii) last one week recall basis (known as current status) (NSSO 2011, p. 12). Within the usual status approach, NSSO categorises the two activities of each individual as principal and subsidiary statuses on the basis of the time disposition criterion in a reference year. The main activity performed by individual for majority part of the year is recorded as principal status and the activity performed for minor part of the year is recorded as subsidiary status. These are also known as usual principal status (UPS) and usual subsidiary status (USS) respectively.

The UPS includes both economic and non-economic activities while the USS includes information only on the economic activities. The USS information obviously becomes relevant to estimate the upper bound of labour supply as many individuals principally engaging in non-economic activities (such as students, household works, etc.) may report some subsidiary status (USS) economic activities. The upper bound of labour supply hence is estimated by taking both UPS and USS together of each individual, also known as 'usual principal and subsidiary status' (UPSS) (NSSO 2011, p. 17). Accordingly, the estimate of labour force based on UPS is the lower bound of annual labour supply.

The second source of data for the study is the district level information on the enrolment progress available at the RSBY website (<http://www.rsby.gov.in/Overview.aspx>). Since the website presents the data only on a cumulative basis of enrolment, the progress in number of districts participating in the scheme and number of households enrolled at different points of time were estimated by accessing district level enrolment data at three different discrete points of time - on 1 April 2010, 1 April 2012 and 1 April 2013.

4.4.2. Variables

We utilise three sets of information from the EUS, NSSO: (i) activity status of family members such as self-employed, regular and casual workers, unemployed, student, non-economic household activities, etc.; (ii) demographic structure in terms of proportion of family members in different age groups, marital status, proportion of female members in the family and educational achievements of family members; and (iii) household characteristics such as living status, religion, caste, and geographical location of residence;

4.4.2a. Outcome indicators

The main outcome indicators in the present study are annual estimates of labour force participation rates and the employment status of workforce. Labour force and workforce were estimated at the household level for adult male, adult female, married women and elderly male and elderly female separately. On the basis of the information on the activity status of individuals, LFPR and employment status based WPR were estimated as follows:

$$LFPR = \frac{LF}{population};$$

Where labour force (LF)= all workers + unemployed; and workforce = self-employed + casual wage earners + regular wage earners (see Box 4.1 for explanation of each of these category)

$$WPR = \frac{workers}{population}$$

Further, based on the principal and subsidiary activity statuses of individuals, two measures of LFPR were constructed. These are LFPR_UPS and LFPR_UPSS representing LFR on the basis of UPS and UPSS respectively. For the employment status of workers only the UPSS measure was considered and WPR_UPSS separately for: (i) self-employed, (ii) wage paid regular workers, and (iii) wage paid casual workers (or daily wage earners), three measures, were estimated.

The final set of the outcome indicators were generated by interacting these five measures of labour supply and workers' employment status with gender and different age groups of family members – adult (age 15 years and above) males and females; and elderly (aged 60 years and above) males and females. The outcome indicators also included LFPR and WPR separately for married women. The overall labour supply is measured by the LFPR of all the family members taken together (excluding children age below 15 years). Summary statistics (mean and standard deviation) of these final set of outcome indicators for the four years under reference are presented in Table 4.2a and 4.2b.

4.4.2b. Control variables/confounders

Among the independent variables, two sets of indicators were considered: (i) the variables which may be correlated simultaneously with labour market outcomes and health insurance, and (ii) an array of observed socio-economic and individual characteristics confounding directly or indirectly with labour market behaviour.

For the first set, two relevant pieces of information are available in the NSSO database. One is related to the availability, to the members of households, of other social security schemes such as employment linked health insurance, retirement benefits in terms of pension, gratuity and provident fund, old age pension, maternity benefits, etc. Second, the Ministry of Rural Development runs an all India social employment scheme which guarantees a minimum of 100 days of wage paid employment to poor households living in rural areas. This flagship programme, the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA), was launched in the year 2005-06 and hence this information is available in the 2009-10 and 2011-12 data. Accordingly, two different variables: (i) dummy for access to social security schemes and (ii) dummy for households with MNREGA card were used as the control to estimate the unbiased effects of RSBY on different labour market indicators.

For the second set, i.e. for the socio-economic and demographic correlates, a large number of socio-economic-demographic variables were considered. These variables are related to caste (SCs, STs, and OBCs), religion (Hindu and Muslims), main source

of livelihood (main employment status) of household, geographical location of households (rural or urban) and demographic patterns such as family size, proportion of persons in different age groups and educational achievements of the members of the family.

4.4.3. Identification strategy

As described in Chapter 3, the study uses the information on staggered rollout of RSBY in different districts of the country and uses difference-in-differences (DID) methods to identify the impacts of the scheme on the labour market outcomes. Since the NSSO database identifies all eligible households for the scheme and not exactly the enrolled households, the study estimated 'intention to treat' (ITT), and not the average treatment effect on the treated (ATT) (Imbens and Wooldridge, 2009). Parallel estimates are also generated only for those districts of the RSBY intervention where percentage of enrolled to eligible households (enrolment ratio) was more than 50 per cent (call it high enrolment districts).

Again as described in Chapter 3, the effects of RSBY were estimated at two points of time (2010 and 2012) for households living in the districts, which participated in the scheme during the first two years of 2008-10. The effect of the scheme was also separately estimated in the year 2012 for the households living the districts which participated later during 2010-12.

4.4.3a. Econometric specification

In the basic DID framework, outcome indicators of interest are compared across the *treatment* and *control* groups using data for at least two points of time, the pre- and

post-intervention periods (Abadie, 2008). The basic regression specification of the DID estimators with two time periods (pre- and post-intervention) and two population groups (treatment and control) can be written as follows:

$$y_{it} = \alpha + \beta_1 d_G + \beta_2 d_{post} + \beta_3 d_{post} \cdot d_G + \varepsilon_{it} \dots\dots\dots (4.1)$$

Where: y_{it} is the outcome of interest for household i in time period t , d_G is a dummy for a population group with treatment and d_{post} is the dummy representing post-intervention time period. The term ' $d_{post} \cdot d_G$ ' stands for the dummy for an interaction term between treatment and post-intervention dummies. ' α ' and ' ε_{it} ' are constant and usual error terms respectively. Accordingly, the value of ' β_3 ' (i.e. coefficient of the interaction term ' $d_{post} \cdot d_G$ ') provides the DID estimates of any outcome variables.

In general, a basic DID estimation is typically based on common trend assumption implying that treated and untreated do not differ in the distribution of 'observable' and unobservable characteristics (Abadie 2008) over time. The effects of any such differences in the trends in outcomes can be minimised by expanding the time period of study on the both sides (pre and post) of programme implementation (Wagstaff, 2010; Fan et al.' 2012). This study uses data at four points of time (two during pre-intervention and two after the first introduction of the RSBY scheme) as means to control the trends in changes in outcome indicators. For this purpose, the basic regression equation (4.1) is modified as follows:

$$y_{it} = \alpha + \delta_t + \beta_1 treat + \sum_{t=2}^4 \delta_t \cdot treat \cdot \gamma_t + \varepsilon_i \dots\dots\dots (4.2)$$

In equation (4.2), δ_t stand for the time dummies for the three later points of time, with 't' varying from 2 to 4 (say, t2, t3 and t4 against the baseline year of t1). The three interaction terms are '*t2.treat*', '*t3.treat*' and '*t4.treat*', that is interaction between dummies for the three time periods (immediate pre-intervention and two post-intervention periods) and treatment dummies. The common trend assumption can be taken as satisfied if γ_2 in equation (4.2) equals '0' (i.e. the coefficient of the first interaction term '*t2.treat*' is not statistically significant). In that case the values of γ_3 and γ_4 directly provides estimate of the effects of RSBY for the years 2010 and 2012 respectively. However, if γ_2 is not equal to '0', the common trend assumption is not satisfied and the actual effects of RSBY will be represented by the difference between γ_2 and γ_3 for the year 2010 and between γ_2 and γ_4 for the year 2012..

Further, the treatment groups were also distinguished on the basis of the years exposure to of RSBY intervention and the effects of RSBY were estimated at the two separate points of time for two differently placed treatment groups living in districts first covered in the scheme up to 2010 (*treat1*) and continuing and the districts covered after March 2010 and continuing (*treat2*). Hence, equation (4.2) was further modified as follows to separately specify these two differently placed districts.

$$y_{it} = \alpha + \delta_t + \beta 1.treat1 + \sum_{t=2}^4 \delta_t.treat1.\beta_t + \lambda 1.treat2 + \sum_{t=2}^4 \delta_t.treat2.\lambda_t + \varepsilon_{it} \dots\dots\dots (4.3)$$

In equation (4.3) the treatment groups are divided into two parts *treat1* and *treat2*. Hence, six different interaction terms represent a virtual DID during the immediate pre-intervention and the actual DID estimates during the post-intervention years.

The RSBY effects for any outcome indicators are represented by the estimates of the interaction terms during the post-intervention period as depicted in Chart 4.2.

Chart 4.2: DID estimators from Equation 4.3 and RSBY effects				
	Pre-intervention period		Post intervention	
Participating districts	Pre-intervention (2004-05)	Pre-intervention (2009-10)	Post-intervention (2009-10)	Post-intervention (2011-12)
2010 districts (treat1)	β_2		$\beta_3 - \beta_2$	$\beta_4 - \beta_2$
2012 districts (treat2)	λ_2	λ_3		$\lambda_4 - \lambda_3$

The important point to be noted from Chart 4.2 is that since RSBY was first launched in April 2008, the year of 2009-10 is the immediate post-intervention year for the households living in the districts covered under RSBY up to March 2010 but the same year is actually a pre-intervention year for the treatment group living in the districts participating in the scheme after March 2010.

Next, while estimating the impacts of health insurance on labour market outcomes, distinguishing the effects of health insurance from those of other closely related factors is considered very crucial (Currie and Madrian, 1999; Angrist and Pischke, 2009; Wagstaff and Manachotphong, 2012). A few examples of these associated confounding factors are individuals' ability to earn higher wages, preference for employment and retirement, availability of other social security schemes, etc. This issue has been addressed by researchers in the past in different ways by using methods such as: (i) conducting a social experiment in which participants are randomly assigned to 'treatment' and 'control' groups, (ii) including an exhaustive set of controls, particularly information on other social benefit schemes, (iii)

differencing out the effects of any unobserved variables by considering multiple observations on individuals, and (iv) making assumptions based on the variations across individuals in the availability of health insurance (Currie and Madrian 1999).

We identified two important variables that are likely to be highly correlated with the labour market outcomes in India. These are, as discussed above in the data (variable) section, (i) employer provided social benefits such as health insurance, pension, gratuity, maternity benefits, etc., and (ii) access by rural households to social employment programme mainly MGNREGA. Further, controlling household socio-economic and individual demographic characteristics also helped address observed heterogeneity.

Finally, state-level, fixed effects were introduced to control for geographical variations in the outcome variables. The study opted to control for the state level effects mainly because the state level policy such as decision on which district will participate in the scheme is likely to have impacts on the outcome indicators. The final specification of DID after controlling for the two main confounders, socio-economic characteristics and state fixed effects is as follows:

$$y_{ijt} = \alpha + \delta_t + \beta 1.treat1 + \sum_{t=2}^4 \delta_t.treat1.\beta_t + \lambda 1.treat2 + \sum_{t=2}^4 \delta_t.treat2.\lambda_t + \omega Z_{ijt} + \gamma X_{ijt} + \eta_j + \varepsilon_{it} .(4.4)$$

In equation (4.4) ' Z_{ijt} ' represents a set of confounders having a direct strong relationship with health insurance and labour market outcomes, and X_{ijt} stands for a set of socio-economic covariates for households ' i ' living in state ' j ' in period ' t '. The

two error terms ' η_j ' and ' ε_{it} ' represent state level fixed effects and the usual error term respectively.

4.5. Results

4.5.1. Simple difference in the LFPR

To start with, the descriptive statistics of the outcome indicators across the two treatment groups (treat1 and treat2 representing districts first covered in RSBY during April 2008 to March 2012 and April 2010 to March 2012 respectively) and the control groups are presented in the Appendix Table 4A-Ia and 4A-Ib. The mean LFPR in the treatment districts, in general, reflect decline up to year 2010 both for adult male and female, and thereafter increase in the female LFPR. Elderly male reflect a divergent trend across treat1 and treat2 districts. Elderly male LFPR in treat1 districts first increased marginally between 2000 and 2005 then decreased in 2010 and again increased in 2012. In the treat2 districts however, the same increased continuously up to 2010 and then declined after the RSBY intervention since 2010. The trends in the LFPR_UPSS for adult male, adult female, elderly male and elderly female is also presented in Figure 4.1. Figure 4.1 suggests that expect elderly male (Figure 4.1B) the trends in changes in LFPR followed a parallel path before intervention for adult male and female and elderly female. The trends in WPR for adult male and female and elderly male and female, presented in Figure 4.2 and Figure 4.3 respectively, again reflect largely consistent trends across control and treatment before the RSBY intervention except in case of wage paid regular employment for adult women and to some extent in case of self-employed adult women. Elderly male reflect very contrasting trends in case of self-employment in

the treat1 districts and regular employment in both treat1 and treat2 districts. Trend of elderly casual wage earners was also divergent in both the districts compared to that in the control districts. Elderly women reflect divergent trends in self-employment, to some extent in the treat2 districts and in casual employment in both the sets of districts of intervention compared to the control.

4.5.2. Effects of RSBY on LFPR

Based on equation (4.4), the results on effects of RSBY on the labour force participation rates of adult male, adult female, married women, elderly male and elderly female are presented Table 4.4. The results are presented mainly for the DID estimators (coefficient estimates of interaction terms) for the immediate pre-intervention and the post-intervention years for treat1 and treat2 districts separately for all the intervention (upper panel of the table) and the high enrolment districts (lower panel of the Table).

The results in Table 4.4 indicate that after the RSBY intervention the changes in LFPR in 2010 (t3_treat1) and 2012 (t4_treat1) for the treat1 districts and in 2012 (t3_treat2) for the 'treat2 districts compared to the control in 2000 have been more or less insignificant for all the population groups in the usual principal status (UPS) category. However, when considered the usual principal and subsidiary statuses taken together, adult female and married women reflected statistically significant positive change both in all intervention and high enrolment districts. These changes need to be interpreted in the light of the overall trends in the LFPR as presented in the Appendix Table 4A-I and Figure 4.1. Since the LFPR for all the population groups

under consideration, declined over the years and the post RSBY intervention LFPR has been lower to that in the base year 2000, the DID estimates in Table 4.4 mainly reflects slower (positive coefficient) or faster (negative coefficient) decline in the LFPR for the treatment groups compared to that in the control.

In the treat1 districts adult and married women reflected respectively 9% and 8% slower decline in LFPR in the year 2012 compared to that among the control in 2000. The treat2 districts also reflected 6% and 5% slower decline in the UPSS LFPR for the same groups compared to that in control. Elderly male and female both experienced largely faster decline in the UPSS LFPR but remain statistically insignificant. The results in the high enrolment districts are more or less the same with slightly higher intensity of changes. However, there is one exception in results in the high enrolment districts. Adult female in the high enrolment district covered in RSBY after 2010 realised slower decline in their principal status (UPS) LFPR too, by a margin of approximately 5 per cent (significant at 10%) than among control in 2000. Moreover elderly women also reflected positive change (i.e. slower decline) in the UPSS LFPR, although statistically insignificant, in the high enrolment districts.

As discussed earlier, the DID estimates presented in table 4.4 may not represent exactly the effects of RSBY as the base line for these estimates are the year earlier than the immediate pre-intervention year. The exact effects of RSBY, hence, are represented by the difference in DID estimates between the immediate pre-intervention year and the post intervention years (also known as the 'third

difference' (Wagstaff, 2010). These differences in the DID estimates, presented in Table 4.5, again confirms that RSBY caused an increase in the female and married women LFPR in the range of 5% to 7% with slightly higher estimates for the UPSS category. Adult male has no significant effects of RSBY except approximately 2% increase in UPS LFPR in the treat2 districts. Elderly male reflected marginally positive effect in the treat1 districts but strong negative effects in the range of 11-12 per cent in the treat2 districts. The positive change in the elderly LFPR in treat1 districts and negative change in the treat2 districts are more pronounced in the high enrolment districts. The effects of elderly female remain more or less negative or marginally positive but statistically insignificant.

4.5.3. Effects of RSBY on work status

Table 4.6 contains DID estimates (based on equation 4.4) on the changes in the WPR (switching job status) across the three broad employment statuses (self-employed, regular and casual wage workers) of the workers. The results are presented only for the UPSS employment status.

Results in Table 4.6 indicate that the change in the employment status of adult male workers are more or less not significant except approximately 4 per cent positive change in casual wage work in 2010 in the treat1 district (significant at 10%). Adult female and married women instead increased their share in self-employment (2% in 2010 in treat1 districts, 4% in 2012 in treat1 districts and 8% in 2012 in the treat2 districts) and wage paid regular work by approximately 1 per cent, largely at the cost of casual wage paid works. The changes in the regular wage paid employment may

look small but given the fact that female concentration in regular works is just below 3 per cent, approximately 1 per cent change after the RSBY intervention is certainly a significant change. Most prominent among these changes are female workers, both adult female and married women, in districts covered after March 2010 increased their share in self-employment by more than 7 per cent at the cost of reduction by approximately 2 per cent in casual wage works. Elderly male workers reflected 7 to 10 per cent faster decline in their share in self-employment while their share in wage paid casual works declined slower in the range of 3 to 5 per cent. For elderly female workers no conclusive evidence emerged on changing work statuses.

Again, for estimating the exact effects of RSBY on the changes in the WPR across the employment statuses the mean differences in the coefficients between pre-and post intervention periods are presented in Table 4.7. The results indicated very small and largely insignificant differences in the changes in employment status of adult male but significant changes in adult female. Female workers increased their WPR in self-employment higher to that in casual works. Elderly male first increased their WPR in casual works by 3.5 per cent at the cost of 4 per cent decline in self-employment during the post-intervention year of 2008-10 but then increased their share in self-employment by more than 2 per cent at the cost of casual and regular wage paid works between 2010 and 2012. Female elderly worker largely reflected insignificant changes in the WPR across the employment status although there were some sign of increasing their participation in self-employment category at the cost of casual.

Here it is important to note that the coefficients of the two confounders, i) access to any other social security schemes and ii) MNREGA, reflected positive changes and are statistically significant (not presented in the table). The coefficient estimates on these two confounders are on the expected lines as access to social security scheme for households and MNREGA increased their LFPR in the range of 3% to 9% for poor households. The effects of these two variables are statistically not significant for male LFPR. This also confirmed the initial hypothesis that these factors have strong bearing on the LFPR in general and need to be controlled while estimating the effects of RSBY on LFPR.

4.6. Discussion and Conclusions

Health insurance in any country is aimed at improving health of population through lowering the effective price of health care services. In many developing countries government funded health insurance schemes (and also many micro level community based health insurance) have helped in reducing health related financial burden and improvement in health of population. However, there is little evidence on how have these health insurance programmes affected labour market in developing countries. Most of the existing literature related impacts of health insurance on labour market are limited to developed countries in general and US economy in particular.

The present study estimated effects of RSBY on a range of labour market indicators for different population groups in India. Using a family labour supply framework and applying the difference-in-difference method, the study estimated effects of

RSBY on labour force participation rate and employment status of workers separately for adult male and female, married women and elderly male and female. The findings suggest that RSBY has affected the labour market outcome in India in more ways than one.

The results indicated significant impacts of RSBY on the labour supply and employment status of female workers. First of all, poor households living in RSBY intervention districts increased their overall LFPR by 2.7% compared with the control. However, the increase has been prominent in the female LFPR in the subsidiary status (available in labour market for only smaller part of the year) instead their principal status (available in labour market for majority part of the year). What is important to note here is that although there has been a general decline in LFPR over the years, more so in the female LFPR, RSBY seems to have increased the female LFPR at least in the subsidiary status. This implies that after the access to health insurance, adult female have been able to increase their labour market activity at least for a shorter time period in a reference year. It seems that because of access to RSBY the care-giving roles of women in family is a less required and increased number of women could join the labour market instead. The changes in the adult male LFPR remained more or less insignificant. This may be because the adult male LFPR in India are already very high, in the range of 80-85 per cent, and access to health insurance may have very little incremental effect on the adult male LFPR.

For married women, the present study didn't conduct a typical husband-wife family labour supply analysis (for example, Buchmueller and Valletta, 1996; Olson, 1998; Schone and Vistnes, 2000; Cobb-Clark, 2000). Instead, the impacts of RSBY on all adult married women were estimated irrespective of their husbands' position in the labour market. This is mainly because RSBY benefits are available to all members of the family (up to five members) and there is no scope of estimating the impacts of the husband's health insurance on the uninsured wife's labour supply and vice versa. The findings in this study are in contrast to mainline literature on changes in married women's labour supply as a result of their access to health insurance. Gruber and Madrian (2002; p. 19-20) notes that, "the potential impact (of health insurance) in terms of aggregate effects on total hours worked may very well be largest for prime-aged workers, particularly married women who are typically estimated to have a large labor supply elasticity". Most of the literature reviewed in Gruber and Madrian (2002) suggests a reduction in the labour supply of married women as result of coverage through their husbands' plan. Chou and Staiger (2001) estimated that the LFPR of women married to government employees (also private sector employees in another study) declined by about 3 per cent after they were able to obtain coverage as spousal dependents, relative to the LFPR of women married to private sector workers. The present study, however, recorded an increase in the LFPR of married women in the range of 3 per cent in their principal status activity and 8% in their subsidiary status. Again the explanation could be the access to a social health insurance scheme like RSBY saved family time of married women particularly care-

giving to ailing members of the family and hence they could increase their LFPR more so on subsidiary basis.

Elderly persons largely reduced their LFPR in the range of 3 to 10 per cent after their access to RSBY. This may be because of positive income effects (virtual income transfer to family) the elderly may not be required to work in the labour market to pay for health care. Moreover, the decline in the LFPR has been far greater for elderly male than for elderly female. This is again because the elderly female LFPR has been at a very low level and any further reduction in the same is not significant.

RSBY has also caused considerable job mobility across different population groups. Male workers increased their casual WPR at the cost of self-employment and regular jobs while female workers' behaviour was the reverse. Adult female workers increased their participation in regular wage paid employment by approximately 1 per cent and in self-employment in the range of 5% to 7%. Why do men and women behave differently in the labour market as a result of income transfer and improved health conditions?

The probable answer may be two fold. First, employment status (self-employment or wage paid) of a person is strongly determined by the preference (choice) of a person for a particular status (and thresholds of hours of work) and family decision (Gruber and Madrian, 2002). Since male family members are moving to cash wage paid casual work after their health improves, women may be required back in the family to take care of family enterprises such as agriculture or other family based home enterprises.

In response, women may also prefer to move to self-employment, as casual work in the open labour market for women is generally less remunerative. Second, the Indian labour market is highly segmented⁹ and entry of new workers into the regular job market is extremely difficult in a short period of time. Even for male workers (more so than for women workers) obtaining a regular job requires considerable education and skill. Given the fact that education and skill cannot be improved in a short period, men and women resort to casual work and self-employment respectively, depending on their preference for jobs. However, a small fraction of female workers (more specifically married women) also entered into regular wage paid labour market. This is small better educated and higher skilled female workers who were earlier not able to reach out to the job market in the absence of health insurance. The extent of female work participation in regular wage paid employment and self-employment also depends on their educational and skill achievements (Klasen and Pieters, 2012). It is quite possible that after access to health insurance low educated and low skilled female workers moved to self-employment while better educated and skilled female workers moved to regular wage at the cost of casual wage employment.

There has not been significant job mobility among elderly workers after the RSBY intervention. However, what is evident is that the decline in the elderly labour force after the RSBY intervention has been largely concentrated among the self-employed

⁹ Labour market segmentation arises because of various prevailing dualisms in the labour market. In India, the labour market dualism has been documented widely in terms of formal–informal, employment status of workers, occupation types, sectors of employment, states–regions, etc. (Sen and Ghosh, 1993; Sen, 1994; Unni, 2001; Tendulkar 2003; Das 2003).

workers. In the casual wage paid category, there has been marginal increase in the WPR of the elderly workers, both male and female workers, particularly in the high enrolment districts. Again it seems possible that after improvement in health part of elderly workers, who are better educated and skilled, may be interested in shifting their jobs from self-employment to wage paid work, although this proportion is very small and statistically insignificant.

Lastly, the results in this study should be interpreted with several cautions. First of all, the study follows a very generic definition of labour supply, which is based on the annual recall of activity status of individuals in the database. Most of the previous studies have estimated labour supply in terms of days of employment and also hourly labour supply, particularly in developed countries. The present study is constrained by availability of such data in the labour market. Although NSSO collects information on person-days of employment of the employed persons for a reference period of one week in a year, such data was not found fit for the RSBY impacts analysis for several reasons: i) recall base of the data is too small (one week); ii) there is very little variation recorded in the data on person-days of employment for the self-employed workers; iii) no hourly information is available. However, it is quite possible that RABY may have affected the person-days of employment as well and the effects of RSBY could be even stronger on the intensity of labour supply (in terms of days of employment) than just on the incidence of the labour supply (measured in the terms of annual LFPR).

The effects of health insurance also have been discussed in relation with wages and earnings of workers. In fact, wage rate is an important determinant of labour supply in general. Currie and Madrian (1999) noted that in a labour supply function, investment in health leads to increased labour productivity and wages while exogenous changes in employment or wages can influence health of workers. The present study could not address such issues related to endogeneity in the labour supply function. In fact, the database used in this study does not provide information on levels of earnings of the self-employed who constitute more than 60% of the total in employment. Although, in the absence of controlling for the wages and earnings of the workers there is a possibility of overestimating the effects of RSBY on labour supply, such possibilities are more likely in case of employment linked health insurance scheme rather than a social health insurance scheme like RSBY, which is in no ways related to prevailing wages and earnings levels in the labour market.

4.7. Figures and Tables

Figure 4.1: Trend in labour Force Participation rates (UPSS) among treatment and control over years

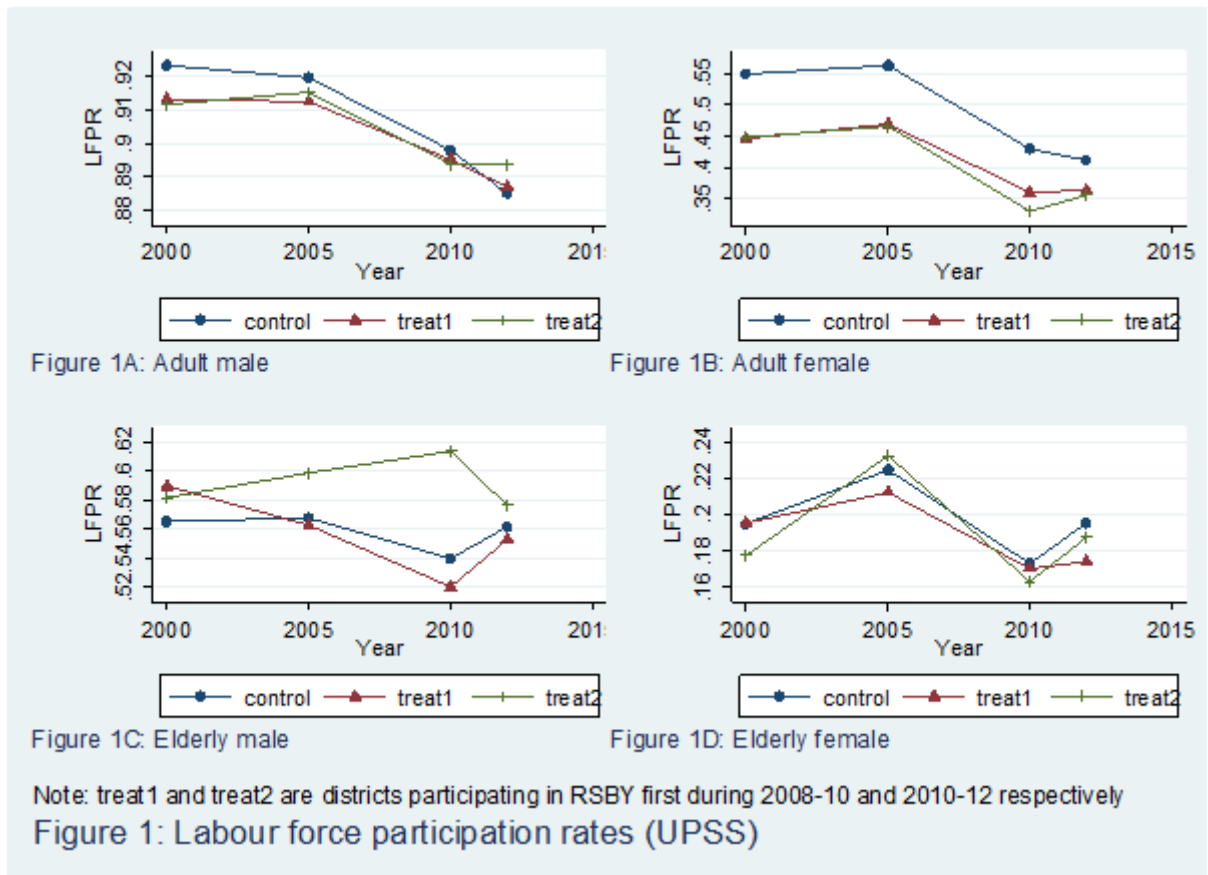


Figure 4.2: Trend in Workers participation rates (UPSS) for adult male and female by Self-employed, regular and casual wage earners by treatment and control

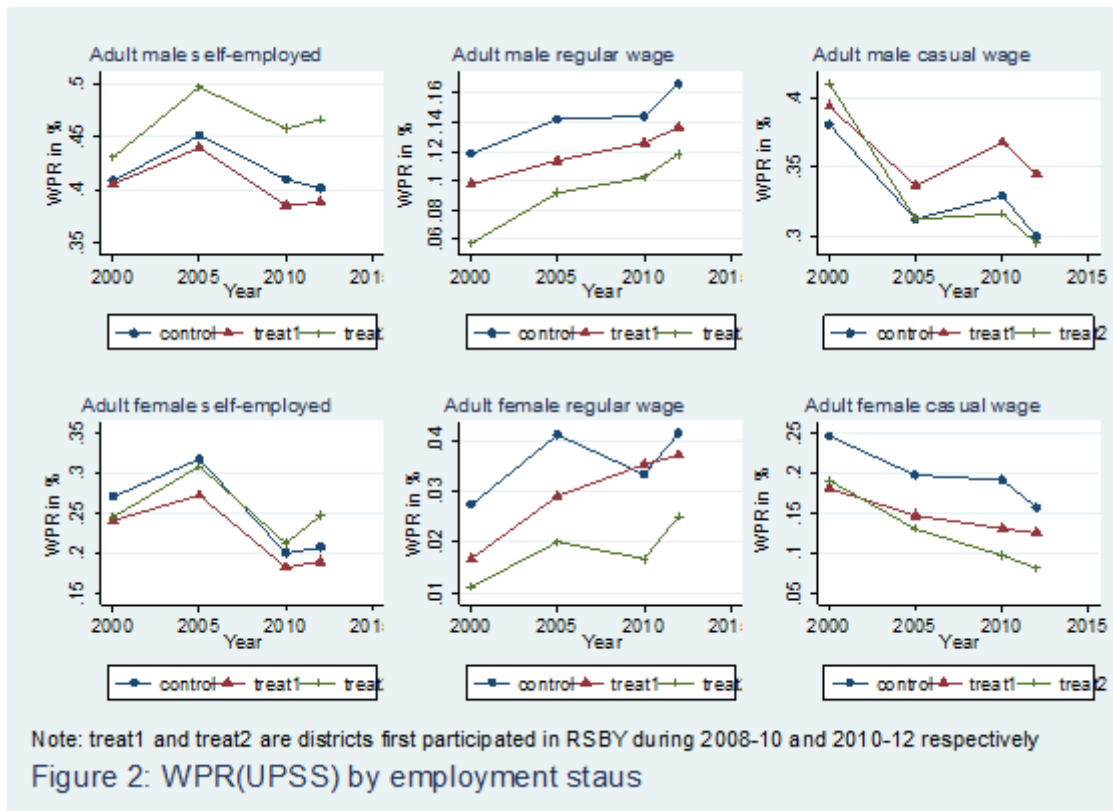


Figure 4.3: Trend in Workers participation rates (UPSS) for elderly male and female by Self-employed, regular and casual wage earners by treatment and control

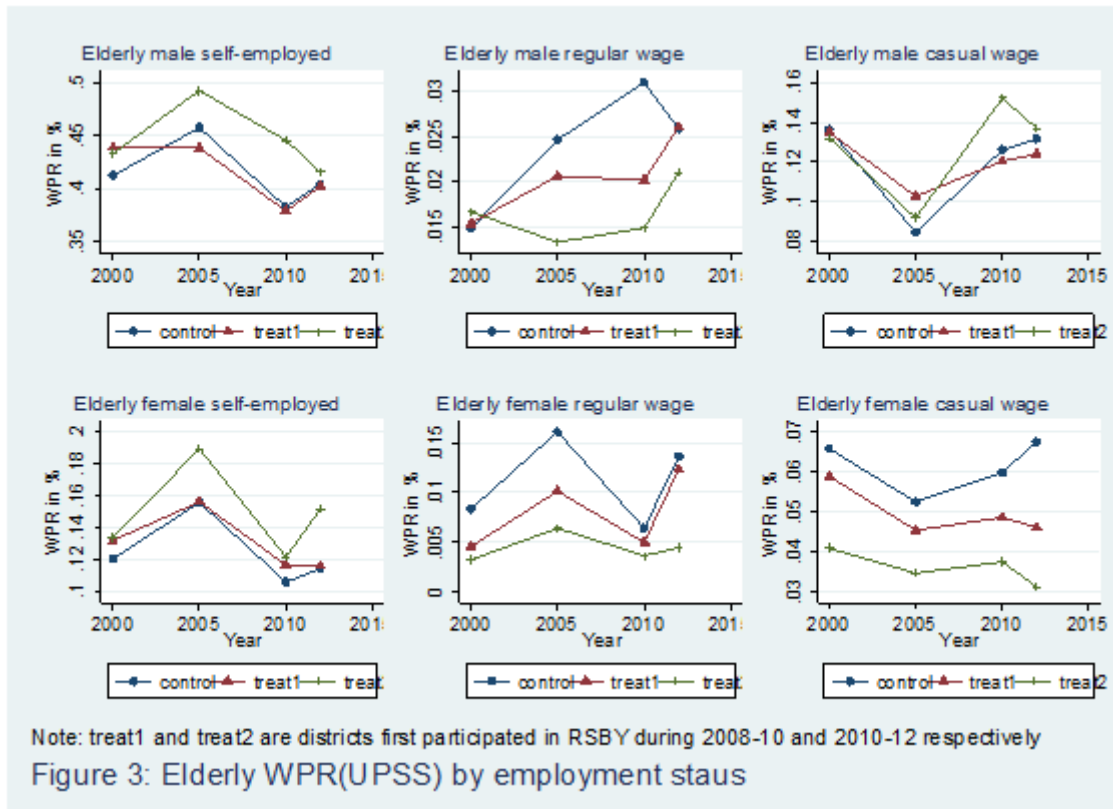


Table 4.1: Activity status of total population in rural, urban and rural + urban areas in different years

	1999-2000			2004-05			2009-10			2011-12		
	Male	Female	Person	Male	Female	Person	Male	Female	Person	Male	Female	Person
Rural												
1. Labour force as % of total population	54.0	30.0	42.3	55.5	33.3	44.6	55.6	26.5	41.5	55.3	25.3	40.6
2. Employed as % of total population	53.1	29.9	41.7	54.6	32.7	43.9	54.7	26.1	40.8	54.3	24.8	39.9
3. As % of employed												
3a. Self-employed	54.9	57.4	55.8	58.1	63.7	60.2	53.5	55.7	54.2	54.5	59.3	55.9
3b. Wage paid regular employee	8.9	3.1	6.8	9.0	3.7	7.1	8.5	4.4	7.3	10.0	5.6	8.7
3c. Wage paid casual workers	36.3	39.6	37.4	32.9	32.6	32.8	38.0	39.9	38.6	35.5	35.1	35.4
4. Unemployed as % labour force	1.7	1.0	1.5	1.6	1.8	1.7	1.6	1.6	1.6	2.1	2.9	2.3
5. Out of labour force	46.0	69.8	57.7	44.5	66.7	55.4	44.4	73.1	58.5	44.7	74.7	59.1
Urban												
1. Labour force as % of total population	54.3	14.8	35.4	57.0	17.8	38.3	55.9	14.6	36.2	56.3	15.5	36.7
2. Employed as % of total population	51.8	13.9	33.7	54.9	16.6	36.5	54.3	13.8	35.0	54.6	14.7	35.5
3. As % of employed												
3a. Self-employed	41.5	45.4	42.2	44.8	47.7	45.4	41.1	41.1	41.1	41.7	42.8	41.9
3b. Wage paid regular employee	41.7	33.3	40.0	40.6	35.6	39.5	41.9	39.3	41.4	43.4	42.8	41.9
3c. Wage paid casual workers	16.9	21.4	17.7	14.6	16.7	15.1	17.0	19.6	17.5	14.9	14.4	16.2
4. Unemployed as % labour force	4.5	5.7	4.8	3.8	6.9	4.5	2.8	5.7	3.4	3.2	6.6	3.8
5. Out of labour force	45.8	85.3	64.7	43.0	82.2	61.7	44.1	85.4	63.8	43.7	84.5	63.3
Rural+ Urban												
1. Labour force as % of total population	54.1	26.20	40.56	55.9	29.4	43.0	55.7	23.3	40.0	55.61	22.48	39.50
2. Employed as % of total population	52.7	25.9	39.7	54.7	28.7	42.0	54.6	22.8	39.2	54.4	21.9	38.6
3. As % of employed												
3a. Self-employed	51.5	55.8	52.8	54.7	61.4	56.9	50.1	53.3	51.0	50.7	56.1	52.2
3b. Wage paid regular employee	17.2	7.1	14.0	17.2	8.3	14.3	17.7	10.1	15.6	19.8	12.7	17.9
3c. Wage paid casual workers	31.3	37.1	33.2	28.1	30.3	28.9	32.2	36.6	33.5	29.5	31.2	29.9
4. Unemployed as % labour force	2.4	1.7	2.2	2.2	2.6	2.3	2.0	2.3	2.1	2.4	3.7	2.7
5. Out of labour force	45.9	73.7	59.4	44.1	70.6	57.0	44.3	76.7	60.0	49.3	74.3	60.3

Note: 1. Distribution of individuals by the activity status is based on the 'usual status' (principal and subsidiary statuses taken together); 2. LFPR and WPR stand for labour force participation rate and workers population ratio respectively; Unemployed on the basis of the usual status (also known as open unemployment rate) is essentially the part of labour force who are seeking employment but did not report as employed during the recall period of one year.

Table 4.2a: Mean and standard deviation of LFPR (UPS and UPSS) for different population groups in the four NSSO survey years

Population group	LFPR-Usual principal status (UPS)				LFPR-Usual principal and subsidiary status (UPSS)			
	2000	2005	2010	2012	2000	2005	2010	2012
All person	0.3754	0.3918	0.3741	0.3643	0.4056	0.4300	0.4002	0.3950
	0.2164	0.2207	0.2158	0.2099	0.2237	0.2288	0.2238	0.2200
All male	0.5355	0.5513	0.5500	0.5504	0.5415	0.5590	0.5568	0.5561
	0.2728	0.2755	0.2775	0.2780	0.2730	0.2761	0.2781	0.2784
All female	0.2062	0.2241	0.1863	0.1677	0.2620	0.2943	0.2330	0.2248
	0.2974	0.3063	0.2937	0.2800	0.3171	0.3266	0.3145	0.3076
Adult person	0.5975	0.6085	0.5586	0.5387	0.6443	0.6662	0.5960	0.5835
	0.2631	0.2616	0.2546	0.2487	0.2716	0.2698	0.2653	0.2631
Adult male	0.8586	0.8623	0.8295	0.8204	0.8654	0.8714	0.8365	0.8274
	0.2485	0.2460	0.2666	0.2714	0.2428	0.2388	0.2620	0.2673
Adult female	0.3257	0.3460	0.2758	0.2472	0.4144	0.4540	0.3449	0.3311
	0.4201	0.4220	0.3957	0.3782	0.4428	0.4431	0.4223	0.4145
Married women	0.3434	0.3657	0.2969	0.2657	0.4407	0.4821	0.3740	0.3612
	0.4471	0.4534	0.4328	0.4175	0.4683	0.4711	0.4589	0.4554
Elderly person	0.3594	0.3646	0.3541	0.3448	0.3857	0.3939	0.3726	0.3706
	0.4305	0.4310	0.4266	0.4188	0.4401	0.4433	0.4349	0.4319
Elderly male	0.5713	0.5648	0.5560	0.5606	0.5870	0.5777	0.5652	0.5700
	0.4917	0.4932	0.4947	0.4937	0.4894	0.4913	0.4936	0.4924
Elderly female	0.1497	0.1704	0.1546	0.1322	0.1865	0.2154	0.1823	0.1742
	0.3542	0.3738	0.3597	0.3366	0.3865	0.4085	0.3840	0.3772

Source: EUS, NSSO respective years;

Notes: 1. For each population group first row is mean and second row is standard deviation; 2. Adult implies age 15 years and above; Married women stands for currently married irrespective of age; Elderly implies age 60 years and above

Table 4.2b: Mean and standard deviation of WPR (UPSS) across three employment statuses for different population groups

	2000		2005		2010		2012	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Adult person								
Self-employed	0.3209	0.3392	0.3588	0.3480	0.2866	0.3176	0.2887	0.3114
Wage paid regular	0.0947	0.1970	0.0985	0.2021	0.0971	0.2016	0.1086	0.2150
Wage paid casual	0.2131	0.3316	0.1926	0.3183	0.1993	0.3107	0.1727	0.2851
Adult male								
Self-employed	0.4150	0.4364	0.4473	0.4374	0.3923	0.4297	0.3942	0.4258
Wage paid regular	0.1558	0.3142	0.1565	0.3147	0.1556	0.3178	0.1717	0.3336
Wage paid casual	0.2712	0.4121	0.2476	0.3995	0.2711	0.4087	0.2428	0.3918
Adult female								
Self-employed	0.2230	0.3797	0.2674	0.4010	0.1762	0.3442	0.1795	0.3443
Wage paid regular	0.0311	0.1493	0.0386	0.1669	0.0360	0.1587	0.0433	0.1751
Wage paid casual	0.1527	0.3362	0.1357	0.3200	0.1242	0.3052	0.1000	0.2757
Married women								
Self-employed	0.2419	0.4057	0.2908	0.4314	0.1971	0.3788	0.2027	0.3831
Wage paid regular	0.0298	0.1601	0.0368	0.1775	0.0337	0.1694	0.0408	0.1862
Wage paid casual	0.1661	0.3579	0.1472	0.3418	0.1391	0.3344	0.1139	0.3062
Elderly person								
Self-employed	0.2832	0.4080	0.3058	0.4191	0.2638	0.4000	0.2588	0.3912
Wage paid regular	0.0134	0.1066	0.0154	0.1141	0.0149	0.1096	0.0175	0.1190
Wage paid casual	0.0888	0.2688	0.0721	0.2443	0.0939	0.2722	0.0941	0.2729
Elderly male								
Self-employed	0.4453	0.4944	0.4621	0.4963	0.4158	0.4915	0.4129	0.4900
Wage paid regular	0.0213	0.1437	0.0229	0.1490	0.0238	0.1518	0.0268	0.1612
Wage paid casual	0.1197	0.3239	0.0922	0.2888	0.1255	0.3302	0.1297	0.3354
Elderly female								
Self-employed	0.1228	0.3257	0.1540	0.3584	0.1135	0.3157	0.1069	0.3080

Wage paid regular	0.0055	0.0728	0.0081	0.0890	0.0061	0.0753	0.0082	0.0884
Wage paid casual	0.0582	0.2329	0.0526	0.2227	0.0626	0.2412	0.0590	0.2336

Source and Notes: same as in Table 2a

Table 4.3: Reference treatment and control groups with number of districts* and households**

Alternative scenarios	Treatment group	Control group
	Only poor households in all participating districts between 2008 and 2010	Only poor households all non-participating districts
III. Treat1	(District - 220; Household- 13,163) Only poor households in all participating districts between 2008 and 2010	(District - 166; Household- 7,641) Only poor population in non-participating districts
IV. Treat2	(District - 149; Household- 7,199)	(District - 166; Household- 7,641)

Note: * number of districts in March 2012; **number of households in the sample in year 2011-12.

Table 4.4: Effects of RSBY on labour force participation rates: Adult male and female, married women, elderly male and female

	Usual principal status (UPS)					Usual principal and subsidiary status (UPSS)				
	Adult male	Adult female	Married women	Elderly male	Elderly female	Adult male	Adult female	Married women	Elderly male	Elderly female
All intervention districts										
t2_treat1	0.008 [0.0070]	0.0107 [0.0248]	0.0064 [0.0272]	-0.0203 [0.0291]	0.0013 [0.0284]	0.0057 [0.0071]	0.026 [0.0232]	0.0182 [0.0247]	-0.0188 [0.0287]	0.0156 [0.0334]
t3_treat1	-0.0005 [0.0087]	-0.0151 [0.0281]	-0.0291 [0.0306]	-0.0384 [0.0381]	0.0043 [0.0304]	0.0032 [0.0088]	0.0262 [0.0279]	0.0165 [0.0304]	-0.0531 [0.0374]	0.0129 [0.0358]
t4_treat1	0.01 [0.0096]	0.0371 [0.0263]	0.0311 [0.0293]	-0.0169 [0.0336]	-0.027 [0.0299]	0.008 [0.0093]	0.0879*** [0.0284]	0.082** [0.0315]	-0.0183 [0.0336]	-0.0298 [0.0387]
t3_treat2	-0.018 [0.0121]	-0.0269 [0.0323]	-0.0468 [0.0347]	0.0986** [0.0435]	-0.0183 [0.0321]	-0.0162 [0.0121]	-0.0028 [0.0327]	-0.029 [0.0353]	0.0787* [0.0428]	-0.021 [0.0382]
t4_treat2	0.0019 [0.0114]	0.0297 [0.0294]	0.0137 [0.0313]	-0.0212 [0.0456]	-0.0185 [0.0337]	-0.0017 [0.0111]	0.0646** [0.0320]	0.0477* [0.0346]	-0.0306 [0.0455]	-0.0259 [0.0425]
Observations	116788	121400	119875	22742	24393	116788	121400	119875	22742	24393
R-squared	0.21	0.22	0.24	0.08	0.1	0.21	0.22	0.23	0.07	0.1
High enrolment districts										
t2_treat1	0.0088 [0.0098]	0.0095 [0.0365]	0.0066 [0.0403]	-0.0354 [0.0351]	0.0242 [0.0318]	0.0057 [0.0097]	0.0284 [0.0336]	0.0197 [0.0365]	-0.0298 [0.0338]	0.0209 [0.0380]
t3_treat1	0.0094 [0.0102]	-0.0067 [0.0378]	-0.0219 [0.0398]	-0.0551 [0.0455]	0.0382 [0.0394]	0.0133 [0.0104]	0.0375 [0.0383]	0.0187 [0.0416]	-0.0724 [0.0453]	0.0553 [0.0455]
t4_treat1	0.0138 [0.0133]	0.031 [0.0388]	0.0291 [0.0441]	-0.0017 [0.0418]	0.0359 [0.0372]	0.0127 [0.0120]	0.082** [0.0382]	0.0813* [0.0436]	0.0035 [0.0420]	0.0358 [0.0470]
t3_treat2	-0.0108 [0.0141]	-0.0155 [0.0415]	-0.0399 [0.0433]	0.0591 [0.0531]	-0.0035 [0.0351]	-0.0132 [0.0141]	0.0198 [0.0409]	-0.0077 [0.0434]	0.0352 [0.0519]	-0.0011 [0.0416]
t4_treat2	0.0027 [0.0131]	0.0486* [0.0362]	0.0324 [0.0378]	-0.0311 [0.0522]	0.0143 [0.0372]	-0.0043 [0.0126]	0.0878** [0.0398]	0.0731* [0.0423]	-0.0384 [0.0517]	0.011 [0.0480]
Observations	71072	73941	72900	13876	14868	71072	73941	72900	13876	14868
R-squared	0.22	0.2	0.21	0.08	0.11	0.22	0.22	0.23	0.08	0.12

Table 4.5: Mean differences in DID estimates of the labour force participation rates during the post RSBY intervention

	Usual principal status (UPS)					Usual principal and subsidiary status (UPSS)				
	Adult male	Adult female	Married women	Elderly male	Elderly female	Adult male	Adult female	Married women	Elderly male	Elderly female
All intervention districts										
t3_treat1- t2_treat1	-0.0084	-0.0258	-0.0355	-0.0180	0.0030	-0.0025	0.0001	-0.0017	-0.0343	-0.0027
t4_treat1- t2_treat1	0.0020	0.0263	0.0247	0.0034	-0.0283	0.0023	0.0618**	0.0639**	0.0005	-0.0454
t4_treat1- t3_treat1	0.0105	0.0522**	0.0602**	0.0214	-0.0313	0.0047	0.0617**	0.0655**	0.0348	-0.0427
t4_treat2- t2_treat2	0.0199*	0.0566**	0.0605**	-0.1198**	-0.0003	0.0145	0.0673**	0.0767**	-0.1092**	-0.0048
High enrolment districts										
t3_treat1- t2_treat1	0.0006	-0.0161	-0.0284	-0.0198	0.0140	0.0076	0.0091	-0.0011	-0.0426	0.0343
t4_treat1- t2_treat1	0.0050	0.0216	0.0225	0.0336	0.0117	0.0070	0.0536*	0.0615*	0.0333	0.0149
t4_treat1- t3_treat1	0.0044	0.0377	0.0510*	0.0534	-0.0023	-0.0006	0.0445*	0.0626*	0.0758*	-0.0194
t4_treat2- t2_treat2	0.0135	0.0641*	0.0723*	-0.0902*	0.0179	0.0089	0.0680*	0.0808**	-0.0735*	0.0121

Table 4.6: Effects of RSBY on employment status, usual principal and subsidiary status (UPSS)

	t2_treat1		t3_treat1		t4_treat1		t3_treat2		t4_treat2		Observations	R-squared
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.		
Adult male												
self employed	-0.0064	[0.0179]	-0.0373	[0.0237]	-0.0275	[0.0246]	-0.0538	[0.0270]	-0.0154	[0.0283]	116788	0.12
regular wage	0.0097	[0.0082]	-0.0004	[0.0074]	0.0092	[0.0080]	0.0059	[0.0083]	0.0152	[0.0096]	116788	0.19
casual wage	0.0073	[0.0167]	0.0434*	[0.0233]	0.0334	[0.0237]	0.0259	[0.0264]	-0.0016	[0.0262]	116788	0.17
Adult female												
self employed	0.0045	[0.0233]	0.0242	[0.0273]	0.048*	[0.0271]	0.0307	[0.0304]	0.076**	[0.0274]	121400	0.12
regular wage	0.0021	[0.0061]	0.0095**	[0.0045]	0.011***	[0.0039]	0.0025	[0.0046]	0.0081*	[0.0042]	121400	0.05
casual wage	0.0097	[0.0154]	-0.0114	[0.0230]	0.0248	[0.0196]	-0.0418	[0.0264]	-0.024	[0.0232]	121400	0.17
Married women												
self employed	-0.0027	[0.0243]	0.0279	[0.0291]	0.0465	[0.0291]	0.029	[0.0329]	0.0701**	[0.0296]	119875	0.12
regular wage	0.0013	[0.0059]	0.0075*	[0.0044]	0.011**	[0.0038]	0.0004	[0.0047]	0.0059	[0.0042]	119875	0.04
casual wage	0.0146	[0.0158]	-0.0195	[0.0242]	0.0244	[0.0206]	-0.0588	[0.0273]	-0.028	[0.0238]	119875	0.17
Elderly male												
self employed	-0.0544	[0.0296]	-0.1***	[0.0358]	-0.0332	[0.0382]	-0.0527	[0.0432]	-0.0747*	[0.0457]	22742	0.09
regular wage	0.016	[0.0077]	-0.0089	[0.0134]	0.0046	[0.0084]	-0.0073	[0.0136]	0.0074	[0.0090]	22742	0.02
casual wage	0.0194	[0.0202]	0.054**	[0.0272]	0.0081	[0.0310]	0.1368	[0.0376]	0.0304	[0.0389]	22742	0.1
Elderly female												
self employed	0.0106	[0.0266]	0.0163	[0.0330]	-0.025	[0.0307]	-0.0297	[0.0344]	-0.0358	[0.0329]	24393	0.06
regular wage	-0.0007	[0.0040]	-0.0089	[0.0067]	-0.0008	[0.0033]	-0.0096	[0.0068]	-0.0053*	[0.0031]	24393	0.01
casual wage	0.0053	[0.0188]	0.0053	[0.0196]	-0.0038	[0.0218]	0.0182	[0.0223]	0.0154	[0.0264]	24393	0.1

Table 4.7: Mean differences in DID estimates of the workforce participation rates by employment status during the post RSBY intervention

	All intervention districts				High enrolment districts			
	t3_treat1- t2_treat1	t4_treat1- t2_treat1	t4_treat1- t3_treat1	t4_treat2- t2_treat2	t3_treat1- t2_treat1	t4_treat1- t2_treat1	t4_treat1- t3_treat1	t4_treat2- t2_treat2
Adult male								
self employed	-0.0309*	-0.0211	0.0098	0.0384	-0.0073	-0.0126	-0.0053	0.0624**
regular wage	-0.0101	-0.0005	0.0096	0.0093	-0.0096	0.0045	0.0141	0.0067
casual wage	0.0361*	0.0261	-0.01	-0.0275	0.0257	0.0226	-0.0031	-0.0522*
Adult female								
self employed	0.0197	0.0435*	0.0238	0.0453**	0.0433*	0.0335	-0.0098	0.0481*
regular wage	0.0074	0.0089*	0.0015	0.0056	0.0148**	0.0089	-0.0059	0.0027
casual wage	-0.0211	0.0151	0.0362*	0.0178	-0.0373*	0.0249	0.0622**	0.0162
Married women								
self employed	0.0306	0.0492*	0.0186	0.0411	0.0539*	0.044	-0.0099	0.044
regular wage	0.0062	0.0097*	0.0035	0.0055	0.0108*	0.0086	-0.0022	0.0009
casual wage	-0.0341*	0.0098	0.0439**	0.0308	-0.0566**	0.0207	0.0773***	0.0357
Elderly male								
self employed	-0.0456	0.0212	0.0668*	-0.022	-0.0143	0.0261	0.0404	-0.0243
regular wage	-0.0249*	-0.0114*	0.0135	0.0147	-0.0227*	-0.0145*	0.0082	0.0163
casual wage	0.0346	-0.0113	-0.0459	-0.1064*	-0.0076	0.0199	0.0275	-0.0672
Elderly female								
self employed	0.0057	-0.0356	-0.0413	-0.0061	0.0673*	0.0069	-0.0604	-0.0096
regular wage	-0.0082	-0.0001	0.0081	0.0043	-0.0087	-0.0019	0.0068	0.0065
casual wage	0	-0.0091	-0.0091	-0.0028	-0.0229	0.0113	0.0342	0.0155

4.8 Appendix Table

Appendix Table 4A-I: Mean and standard deviation of labour force participation rate (UPSS) for control and treatment groups during the four survey years.

	2000		2005		2010		2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Adult male								
control	0.9234	0.1930	0.9258	0.1893	0.8991	0.2161	0.8828	0.2262
treat1	0.9062	0.2119	0.9125	0.2018	0.8930	0.2152	0.8735	0.2390
treat2	0.9276	0.1860	0.9332	0.1775	0.8883	0.2211	0.8823	0.2321
Adult female								
control	0.6111	0.4442	0.6379	0.4318	0.5089	0.4477	0.4563	0.4435
treat1	0.4784	0.4551	0.5072	0.4492	0.3761	0.4400	0.3834	0.4381
treat2	0.4268	0.4569	0.4751	0.4591	0.3123	0.4260	0.3189	0.4239
Married women								
control	0.6219	0.4493	0.6557	0.4394	0.5378	0.4662	0.4946	0.4675
treat1	0.4976	0.4640	0.5300	0.4624	0.4007	0.4606	0.4065	0.4605
treat2	0.4405	0.4671	0.4723	0.4667	0.3161	0.4428	0.3260	0.4436
Elderly male								
control	0.5667	0.4926	0.5497	0.4967	0.5694	0.4931	0.6090	0.4858
treat1	0.6025	0.4857	0.5898	0.4890	0.5674	0.4918	0.6070	0.4836
treat2	0.5755	0.4928	0.6088	0.4862	0.6758	0.4673	0.5570	0.4961
Elderly female								
control	0.2273	0.4162	0.2508	0.4319	0.2172	0.4104	0.2491	0.4286
treat1	0.2099	0.4052	0.2533	0.4321	0.2045	0.4005	0.1763	0.3796
treat2	0.1647	0.3657	0.2034	0.3999	0.1389	0.3442	0.1520	0.3587

Appendix Table 4A-II: Mean and standard deviation of workforce participation rate (UPSS) as self-employed, regular and casual workers for control and treatment groups during the four survey years.

	2000		2005		2010		2012	
Adult male self employed								
control	0.3985	0.4516	0.4199	0.4537	0.3824	0.4467	0.3938	0.4454
treat1	0.4247	0.4528	0.4533	0.4516	0.3978	0.4446	0.4068	0.4421
treat2	0.4143	0.4545	0.4259	0.4552	0.3629	0.4383	0.4062	0.4478
Adult male regular workers								
control	0.0914	0.2587	0.0930	0.2603	0.0933	0.2637	0.1077	0.2786
treat1	0.0748	0.2329	0.0791	0.2353	0.0781	0.2366	0.0871	0.2518
treat2	0.0507	0.1922	0.0565	0.2053	0.0573	0.2038	0.0703	0.2312
Adult male casual workers								
control	0.4204	0.4629	0.4027	0.4588	0.4139	0.4604	0.3692	0.4495
treat1	0.3901	0.4545	0.3647	0.4474	0.4031	0.4537	0.3669	0.4422
treat2	0.4486	0.4670	0.4384	0.4651	0.4515	0.4567	0.3917	0.4512
Adult female self employed								
control	0.2769	0.4201	0.3242	0.4336	0.2155	0.3799	0.2080	0.3693
treat1	0.2652	0.4067	0.3028	0.4197	0.1991	0.3673	0.2151	0.3754
treat2	0.2177	0.3860	0.2646	0.4109	0.1602	0.3414	0.2016	0.3725
Adult female regular workers								
control	0.0223	0.1326	0.0293	0.1496	0.0242	0.1356	0.0281	0.1429
treat1	0.0107	0.0893	0.0164	0.1121	0.0187	0.1184	0.0225	0.1310
treat2	0.0104	0.0871	0.0123	0.0997	0.0095	0.0846	0.0172	0.1115
Adult female casual workers								
control	0.3094	0.4363	0.2814	0.4227	0.2660	0.4084	0.2165	0.3814
treat1	0.1972	0.3742	0.1755	0.3581	0.1511	0.3348	0.1391	0.3212
treat2	0.1970	0.3729	0.1917	0.3694	0.1381	0.3203	0.0964	0.2709
Married women self employed								
control	0.2780	0.4245	0.3317	0.4447	0.2199	0.3925	0.2237	0.3923
treat1	0.2718	0.4149	0.3097	0.4331	0.2088	0.3843	0.2227	0.3912
treat2	0.2216	0.3919	0.2638	0.4159	0.1665	0.3546	0.2049	0.3860
Married women regular workers								
control	0.0219	0.1363	0.0284	0.1566	0.0221	0.1364	0.0267	0.1523
treat1	0.0105	0.0927	0.0172	0.1215	0.0195	0.1284	0.0232	0.1388
treat2	0.0107	0.0945	0.0135	0.1080	0.0099	0.0907	0.0169	0.1191
Married women casual workers								
control	0.3215	0.4449	0.2947	0.4358	0.2948	0.4339	0.2426	0.4086
treat1	0.2112	0.3896	0.1933	0.3794	0.1669	0.3598	0.1555	0.3474
treat2	0.2079	0.3861	0.1900	0.3720	0.1388	0.3327	0.1037	0.2909
Elderly male self employed								
control	0.3767	0.4824	0.4155	0.4920	0.3568	0.4785	0.4021	0.4885
treat1	0.4353	0.4929	0.4440	0.4948	0.3911	0.4859	0.4270	0.4915
treat2	0.3965	0.4882	0.4350	0.4949	0.3946	0.4881	0.3302	0.4695
Elderly male regular workers								
control	0.0139	0.1171	0.0139	0.1169	0.0238	0.1522	0.0171	0.1293
treat1	0.0130	0.1125	0.0174	0.1306	0.0147	0.1202	0.0144	0.1191

treat2	0.0101	0.1000	0.0085	0.0919	0.0124	0.1105	0.0152	0.1223
Elderly male casual workers								
control	0.1732	0.3774	0.1194	0.3241	0.1886	0.3894	0.1898	0.3920
treat1	0.1542	0.3599	0.1279	0.3328	0.1615	0.3658	0.1654	0.3694
treat2	0.1689	0.3742	0.1652	0.3702	0.2688	0.4435	0.2074	0.4055
Elderly female self employed								
control	0.1258	0.3295	0.1546	0.3598	0.1050	0.3042	0.1225	0.3260
treat1	0.1293	0.3346	0.1764	0.3785	0.1356	0.3406	0.1171	0.3210
treat2	0.1150	0.3134	0.1421	0.3468	0.0803	0.2708	0.0920	0.2888
Elderly female regular workers								
control	0.0064	0.0792	0.0091	0.0947	0.0049	0.0694	0.0111	0.1020
treat1	0.0045	0.0666	0.0086	0.0921	0.0036	0.0601	0.0069	0.0811
treat2	0.0027	0.0517	0.0027	0.0519	0.0015	0.0283	0.0011	0.0335
Elderly female casual workers								
control	0.0951	0.2917	0.0872	0.2818	0.1071	0.3075	0.1155	0.3141
treat1	0.0761	0.2625	0.0679	0.2505	0.0650	0.2442	0.0523	0.2216
treat2	0.0470	0.2111	0.0557	0.2284	0.0571	0.2321	0.0589	0.2353

CHAPTER 5: SUMMARY AND CONCLUSIONS

5.1 Background

High out-of-pocket expenditure for health care in India restricts poor households to seek health care, on the one hand, and on the other, causes severe disruption in the living status of those who buy even the bare essentials of health care. Inequity in access to health care services and the associated financial burden on households has been one of the central policy concerns of Indian health system (MoHW 2011). One of the challenges is to do with reducing the financial burden of health care on the poor and enhancing their access to quality health care. During the last decade or so, the Government of India introduced a series of health sector reforms with a primary focus to enhance access to health care for poor and less advantaged population and reduce the financial burden of accessing such care. Two major policy initiatives, NRHM), which began in the year 2005-06 and RSBY, which has had a staggered rolling out in different districts since April 2008, are expected to help achieve universal health coverage (UHC) in the country through strengthening the Indian health system with a focus on equity in health care utilisation and finance.

The present study is an attempt to estimate the impact of these reform initiatives on the extent of out-of-pocket burden on Indian population, and changes in out-of-pocket (OOP) burden during the last one decade. The study assessed the relative changes in OOP burden for less advantaged population groups *vis-a-vis* better off population groups. The study particularly focused on the role of the largest ever publicly funded health insurance scheme, RSBY, in reducing the burden of OOP

expenditure on poor population. Further, given the potential roles of large scale health insurance schemes in affecting other welfare dimensions of population through improvement in health and a virtual income transfer, the study also examined the role of RSBY on a range of labour market outcomes in India.

This research contributes to the existing literature on health related financial burden on poor and other less advantaged population by estimating inter-temporal changes in OOP burden and impact of a national level publicly-funded health insurance scheme on households in a developing country. The present work also fills the gap in the literature related to assessing impact of health insurance on labour market outcomes in developing countries. In addition, the findings of the study are of crucial importance for the on-going health sector reforms aiming to achieve universal coverage in India.

The specific objectives of the study are three folds: i) to assess the changes in the financial burden of health care on the poor population; ii) to estimate the role of health insurance (RSBY) scheme in reducing the OOP burden; and iii) to examine the impacts of RSBY on labour market outcome of the poor.

This research is based on data obtained from secondary sources: the CES and the EUS, both quinquennial nationally representative household surveys conducted by NSSO and district-level RSBY back-end (administrative) data on enrolment of households in RSBY. The study uses a mix of regression and differencing techniques

to assess the changing pattern of OOP for different socio-economic population groups. Causal effects of RSBY on financial risk protection and labour markets in India were estimated using the DID method that takes into account time-based unobserved heterogeneity and 'omitted' variables problems. Since the NSSO surveys identify only eligible population for the RSBY enrolment, the study estimated 'intention to treat' (ITT), and not the average treatment effect on the treated (ATT).

5.2 Summing Up Chapters

This study consists of three papers included as core chapters (Chapters 2, 3 and 4) in the dissertation. The summary and key findings of the dissertation are outlined in the next few paragraphs:

Chapter 2 dealt with changing socio-economic correlates of OOP payments in India. The chapter presented a detailed account of the magnitude and direction of changes in OOP and catastrophic payments for different population sub-groups: household expenditure based quintile groups; caste and religion. Utilising the data from the three rounds of the consumer expenditure surveys of the National Sample Survey Organization (1999-2000, 2004-05 and 2011-12), the study used a three time period based pooled cross-section regression analysis to estimate relative trend for a range of OOP related outcome indicators among poor and other less advantaged population groups *vis-a-vis* their better-off counterparts.

The key results in Chapter 2 demonstrated that during 2000-2012, the overall share of OOP health spending in total household spending rose by 1.5% and catastrophic

spending by between 0.8% and 3.6%, depending on the indicator. The poorest 20% households experienced a slower increase in OOP as a share of overall household expenditure and catastrophic OOP payment compared to the richest 20%. However, the percentage of households reporting any OOP increased by 8.4% points for the poorest 20% households compared to the richest 20% during 2000-2012. This suggests that during 2000 to 2012, the poorest 20% reduced their financial burden relative to the richest 20% and improved access. SC/ST and Muslim households experienced small change in the proportion of households reporting any OOP during this period relative to non-SC/ST and non-Muslim households, respectively. SC/ST and Muslim households also experienced increases - 0.5% points and 1.0% points, respectively - in their share of OOP spending to total household spending, relative to non-SC/ST and non-Muslim categories during 2000-2012. Trends in indicators of catastrophic spending for the three groups follow a similar pattern - lower for the poorest 20% households (relative to the richest 20%) and higher for SC/ST (versus non-SC/ST) and Muslim (versus non-Muslim) households.

The third chapter utilises the 4 waves (1999-2000, 2004-05, 2009-10 and 2011-12) of the NSSO data and district level RSBY administrative data on enrolment of households, presented causal effects of RSBY on a range of outcome indicators related to OOP expenditure. The methods used two-part-model and DID and estimated ITT effects of the scheme after controlling the pre-intervention trends in the outcome indicators. The findings show significant reduction in the probability of incurring any and catastrophic inpatient expenditure but marginal rise in the 'per person monthly

inpatient expenditure' and 'inpatient expenditure as a share of households' total consumption expenditure' among treated poor households. The effects of the scheme on the overall out-of-pocket are negligible and non-drug expenditure reflected significant increase after the scheme intervention. On the whole, the scheme reflected very modest to no effects on the reduction of OOP payments incurred by poor households. There is also evidence of substituting outpatient with inpatient care by the poor households living in the RSBY intervention districts. The findings also highlighted approximately 30 per cent rise in per person monthly inpatient expenditure, primarily contributed by increased non-drug expenses, for non-poor (non-eligible) households in the RSBY intervention districts.

Finally, Chapter 4 assessed the potential effect of RSBY on labour force participation rates and job mobility status of workers in India. The study applied difference-in-difference methods by using 4 waves of the household level 'employment and unemployment surveys', (1999-2000, 2004-05, 2009-10 and 2011-12) of the NSSO. The methods especially controlled the effects of large number of confounders including the factors, which are simultaneously associated with labour market outcomes and health insurance in Indian conditions. The findings further show that the aggregate labour force participation rate (LFPR) increased by 2.7%, primarily due to a rise in the annual LFPR of adult women, which increased in the range of 3% to 7%, depending on the empirical specification such as all RSBY intervention districts or only high enrolment districts. Increase in the LFPR was higher for married women compared to that for unmarried women. Moreover, the increase in LFPR was

recorded only in 'subsidiary status' (working only smaller part of the year) workers as against the 'principal status' (reporting to have worked major part of the year) workers. Elderly, in general, saw a reduction in LFPR, although elderly women saw comparatively smaller decline. The analyses also point to impacts of RSBY on mobility in type of work performed, with male workers moving to casual wage-based work from self-employment, and women increased their participation in self-employment (by 3 to 7 percent) and regular wage work (by approximately 1%) from casual wage work.

5.3 Policy Suggestions

The key results in Chapter 2 indicated that during the period of the recent health sector reforms in India, SC/ST and Muslim population groups faced increased OOP burden, although the poorest reported to have slowed down the growth in the OOP burden over the years. The results clearly highlight the need to improve the effectiveness of existing public insurance programs and public sector health services for less-advantaged castes and religious minorities.

As far as RSBY is concerned, the crucial issues to be addressed effectively are related to enhancing the enrolment (take-up) and utilisation rates. So far, the scheme has demonstrated low enrolment and utilisation rates. Unless the present levels of enrolment and utilisation improves significantly, no major impacts at the ground level can be expected. This requires effective and active participation of state level monitoring agencies. More specifically, the state level monitoring agencies need to focus on left-out villages, difficult geographical terrain and villages with adverse

socio-economic and demographic parameters. Insurers need to be monitored and evaluated to find out if villages of certain social and demographic characteristics are being systematically being neglected. For enhancing the utilisation rates, strong monitoring process is required at the service provider levels. In addition, enrolled households (poor and other less advantaged households) need to be educated and encouraged to enrol in the scheme and take the benefit of the same in need.

As major policy recommendations, the study recommends expanding the benefit package and including outpatient services under the scheme. Expanding the benefit package will certainly help in addressing tertiary-level care for poor. The study highlighted that nearly two-thirds of the overall out-of-pocket expenditure in India is borne on account of outpatient services. Including outpatient services in RSBY has the potential of effectively reducing the financial burden on households and enhancing an overall financial risk protection. Expanding benefit package and including outpatient in the scheme may also have strong positive bearing on the overall enrolment ratio (take-up rates) under the scheme. This is also likely to have implications for labour markets in India. While increased number of elderly population may prefer leisure to work in labour market, women LFPR may increase significantly if more comprehensive benefit package is offered in the scheme particularly by including tertiary level care.

Enhancing enrolment and expanding the benefit package are likely to have severe budgetary implications for government. However, given the fact that government of

India intends to substantially increase expenditure in health sector up to a level of 2% to 2.5% of GDP in coming years from a present level of approximately 1% of GDP, there seems immense scope for government to finance any increase in the present enrolment rates and expanded benefit package. In the past, a few provincial governments (state governments) have already demonstrated financing of significantly higher enrolment (to the extent of 80% of all the population in Andhra Pradesh) with fairly liberal benefit packages (in Andhra Pradesh, Karnataka and Tamilnadu).

5.4 Limitations of the study

The study has several obvious limitations. Firstly, the financial burden estimated in the study is defined in a narrow sense of only direct OOP expenses and its components incurred by households. Households with ailing family members also face several other types of indirect financial burden. Studies in the past have highlighted that payments to medical needs can often lead to sales of assets, dis-savings and borrowing by households and decline in non-medical consumption levels of households having a long term adverse impacts on health of one or other family members. This dissertation does not address this issue and this remains an important area of research in future. Secondly, the approach on catastrophic headcount used in this research has been a subject of intense debate among researchers. The study uses a simplistic approach to measure catastrophic impacts of OOP, while it is argued that poor and rich may have different thresholds of catastrophic payments. However, in the present study this concern has been partially addressed by specifying two different thresholds of catastrophic payments.

Thirdly, the disease burden, utilisation pattern and access to insurance are considered the most important determinants of out-of-pocket expenses in any geographic setting. However, the socio-economic attributes of out-of-pocket payments, examined in Chapter 2, do not consider these factors primarily because of two reasons. Firstly, the primary objective in Chapter 2 was to assess socio-economic correlates of out-of-pocket and changes therein with given state of health status and medical needs of different population groups. Although the health status and medical needs of different groups of population may vary significantly, the analysis in Chapter 2 by socio-economic status helped in understanding relative position of different groups of population in terms of changing OOP burden over the years. Secondly, the NSSO data on consumer expenditure survey used for the analysis does not provide any information on morbidity and utilisation pattern. The study preferred this data set for the analysis because this is the latest nationally representative data set available with wide range of information on socio-economic factors at the household level.

Fourthly, one of the major limitations of the impact assessment analysis in Chapter 3 was the lack of the detailed household level data on RSBY enrolment and utilisation in public domain. The analysis uses district level enrolment data available in the the RSBY website. Further, the web-site data is available only on cumulative basis with passes of time. This restricted the study to factor-in (control) the enrolment and utilisation at different points of time of impact analysis. In order to partially address

this concern, separate analysis was carried on only for those districts where the enrolment ratio is higher to 50%. Fifthly, one of the most important limitations of the impact analyses both in the Chapter 3 and Chapter 4 has been the inability to control for any probable 'adverse selection'. Since household level data on RSBY enrolment is not available, the study could not assess the extent of 'adverse-selection' and hence didn't factor-in its role in impact assessments. Although it is argued that since the scheme is open only for poor and no co-payments are required (except INR 30 as registration fee) there is very low probability of 'adverse selection' in the scheme at least in the beginning years of its implementation. However, this is certainly yet another area of research in future.

Sixthly, in Chapter 4, which examined the effect of RSBY on labour market outcome, the study follows a very generic definition of labour supply, which is based on the annual recall of activity status of individuals in the database. Most of the previous studies have estimated labour supply in terms of days of employment and also hourly labour supply, particularly in developed countries. The present study is constrained by the availability of such data in the Indian labour market. Although NSSO collects information on person-days of employment of the employed persons for a reference period of one week in a year, such data was not found fit for the RSBY impacts analysis for several reasons: i) recall base of the data is too small (one week); ii) there is very little variation recorded in the data on person-days of employment for the self-employed workers; iii) no hourly information is available. However, it is likely that RSBY may have affected the person-days of employment as well and the

effects of RSBY could be stronger on the intensity of labour supply (days of employment) than just on the incidence of the labour supply (measured in the terms of annual LFPR).

Finally, the effects of health insurance were discussed in relation to wages and earnings of workers. Wage rate is an important determinant of labour supply in general. In fact, the database used in this study does not provide information on levels of earnings of the self-employed persons who constitute more than 50 per cent of the total labour/work force. Although, in the absence of controlling for the wages and earnings of the workers there is a possibility of overestimating the effects of RSBY on labour supply, such possibilities are more likely in case of employment linked health insurance scheme rather than a social health insurance scheme like RSBY, which is in no way related to prevailing wages and earnings levels in the labour market.

5.5 Agenda for future research

Results on changing socio-economic correlates of OOP payments indicated that poor enhanced access to at least outpatient care during the post-reform era. Selvaraj and Karan (2009) finds that approximately a quarter of all non-treated ailment in rural India is attributed to financial reasons. In a recent paper, Moreno-Serra et al. (2011) cited an Indonesian study, and highlighted that Indonesian poor tend to consume both less outpatient and inpatient care because of an inability to pay. It is quite possible that in the post-reform period in India such financial barriers might have decreased to some extent. However, exploring this issue in details requires more

detailed and rigorous analysis. I think, I can handle this more efficiently once the utilisation data from the NSSO becomes available.

The RSBY is one of the largest health insurance schemes in the world that is likely to have significant potential for improving health system in India and eventually population health. There are several important dimensions of the actual impact of the scheme that need to be studied in greater details. This study attempted to highlight the impact of the scheme on reduction in OOP payments of household and labour market behaviour. However, other important dimensions such as impacts on the health seeking behaviour of population, utilisation of health care services, broader dimensions of financial risk protection (such as borrowing, sale of assets, loss of income etc. by households) remains an important area of exploration. Substitution between inpatient and outpatient utilisation as a result of RSBY intervention is also an important issue to explore in great details. Present analysis provides some indication that there is substitution going on between inpatient and outpatient utilisation after the RSBY intervention.

However, detailed exploration of this issue is constrained by the unavailability of detailed utilisation data. I hope to take further studies on these dimensions during the next couple of years. NSSO usually conducts health surveys once in 10 years. The next such survey is due in 2014 and the detailed household level data is likely to be available by 2015. A detailed impact assessment of RSBY on utilisation pattern can be conducted once the health survey data becomes available.

One important area of exploration in future would be intra-household differences in using RSBY. Since the scheme is available to only 5 members of a family, in case of larger number of members in a family, it will be interesting to assess differential use of RSBY by family members and assess the impacts on different family members, particularly disaggregated by gender, age groups etc. Moreover, smaller and larger families may reflect different impacts of the scheme on different family members. However, this analysis again can be carried on only if individual member level information on enrolment is available.

There are also issues related to adverse selection and moral hazard. Both add to the market failures in health insurance markets. Although the issue of adverse selection may not be serious because RSBY is open only for poor with clear identification strategy, which is based on the state level BPL list. Past studies have highlighted large-scale inclusion and exclusion errors in such lists. Given such contamination in the BPL list it is possible that the relatively better-off BPL households may be more enthusiastic in getting enrolled and availing the benefits under the scheme than those who are worse-off in the BPL list. Although this is not a typical case of 'adverse selection', it is possible that the utilisation rate may be higher among those who are better-off in the BPL list. Since the insurers under the RSBY have no discretion to identify and exclude such households, a higher level of contamination in the BPL list may lead to higher utilisation rates in different districts. One of my future research agenda includes this issue to be explored in greater details. In the present study the

exact beneficiary (enrolled) household were not identified and hence the issue of adverse selection could not be addressed.

One of the least explored areas in the field of impact assessment in general has been to ascertain the impact of the health insurance scheme on health status of population. Moreno and Smith (2012) finds that broader health coverage through insurance generally leads improved population health, particularly for poor people by to improving access to necessary healthcare. Again the present study could not take up this issue chiefly because detailed post-intervention data on health status of population is not available in public domain. The upcoming NSSO surveys would serve to facilitate such studies.

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