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## Managing Health Outcomes through Local Governance

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# **Managing Health Outcomes through Local Governance\***

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## **Abstract**

Has the devolution of responsibilities and finances to local governments in India produced positive impacts on health status and incomes of men and women? Using a national data set with details on health, health seeking behavior and local governance, we estimate a system of simultaneous equations to analyze the incidence of illness via a health production function and show that health care expenditures at the household level, choice of health care provider by members, and the incidence of illness will jointly impact individual incomes. The incidence of illness is significantly reduced by better access to drinking water, clean surroundings and awareness about health campaigns. Discussions of health issues in the Gram Sabha reduce illnesses for both men and women and their private health expenditures. Reserving the position of the village head to women leads to greater participation in Gram Sabha meetings; better problem resolution in water supply, sanitation and health; greater village health expenditures; and greater satisfaction with access to health. The increased expenditures of Panchayats on health care reduce the incidence of illness three times more for women than for men, but reduce their private health care expenditures about equally. It also shifts the choice of health care providers from private to public facilities, more so for women than for men. Family inheritance increase the use of private health care for both genders, while a woman's individual land inheritance increases her use of both public and private health care. While women do not have lower access to health care or are discriminated within the household in terms of access to different providers, their earnings are adversely affected to a greater degree by illness compared to that of men. Women's private health expenditures tend to improve their incomes more compared to that of men.

**Keywords:** Political Agency, Gender, Health, India.

**JEL codes:** H41, I18, O15

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## 1. Introduction

India has relatively poor rural health indicators and one of the most privatized health care systems in the world. This high degree of privatization of health care in India can be attributed to inadequate access to and the poor quality of public health care available in urban and rural areas. Rural households are more likely to be vulnerable to incidence of ill health compared to urban households-and, poor health status results in absenteeism and consequent lower wages that adversely affects incomes, which in turn leads to a further worsening of health. It is therefore important to devise policies for improved provision of health care to rural households<sup>1</sup>.

India has been trying to improve both access to and quality of public health care by increasingly devolving more powers and responsibility for the management of health services onto local governments (henceforth Panchayats<sup>2</sup>. Of particular concern is the status of the vulnerable groups such as women, and members belonging to backward castes. Important questions that are therefore dealt with in this paper are: i) How does devolution affect the relative health status of men and women? ii) Will access to and choice of different health care providers be affected and if so how? iii) What are the income consequences of such access and choices and, are these outcomes gender variegated? iv) Will empowering women individually as well as politically produce different results with respect to access to health care, health status, private health expenditures and incomes? To answer these questions, we use the 1999 and 2006 rounds of the nationally representative Rural Economic and Demographic Survey (REDS) of the

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<sup>1</sup> Private sector has been able to provide better access to curative medicines to rural households than public sector, as shown by the 52nd round of National Sample Survey (NSS). Duraisamy (2001), using the NCAER Human Development Indicators survey of 1994, shows that with increased education levels, village infrastructure and household income, rural households are more likely to choose private health care.

<sup>2</sup> A Panchayat represents a set of villages (and in Kerala a set of wards). Responsibility for allocation of monies and other resources to individual villages rests with the Panchayat.

National Council of Applied Economic Research (NCAER), which contain detailed gender-specific data on illness, absence from work, health expenditures, incomes, as well as information on the quality of and access to health facilities and providers, variables related to village governance such as Gram Sabha meetings, participation in such meetings by members of the household, village level expenditures on health, and political and individual empowerment of women.

While certain results arrived at in the paper can be derived directly from descriptive statistics, others require a structure. Since political reservation of the position of the head of the Panchayat (Pradhan or Sarpanch) for women is decided by a random process, many impacts of reservations can be directly inferred from two-way tables. Incidence of illness is treated as a random variable, while health expenditures and the choice of providers of health care are individual choices of men and women in a bargaining process within the family. These choices are constrained by household wealth and the political variables associated with governance. While we do not construct an explicit bargaining model, the implications of such a bargaining model for health status, health expenditures, the choice of health care provider and for individual incomes are reflected in the respective reduced form equations that are estimated. This will define a simultaneous equations model in which the instruments that will predict the choice of health care provider and private health expenditures of men and women are identified.

In addition, these choices are influenced by the availability and costs of different health care providers and their perceived quality. The quality of public health facilities is in turn expected to be influenced by political decisions, public expenditures and, other actions and public decisions taken by the Panchayats. These public decisions can be influenced by participation in the Gram Sabha (the village assembly) by members of the households and by

political empowerment of women. Illness, choice of health care providers, and private expenditures on health will then impact individual incomes. We estimate the system of equations separately for men and women using cross sectional data of REDS 2006 round as well as with variables from REDS 1999 round.

The specific hypotheses tested in this paper are as follows. (1) The probability of men and women falling ill during the year is similar, and the number of days absent from work is the same. (2) The perceived quality of public and private health care providers does not differ. For a given perceived health care quality, men and women are likely to choose the same providers without any impact on their incomes. (3) Women are not particularly disadvantaged compared to men in their access to health care and to health care providers. (4) Devolution of financial resources, increased village expenditures on health, level of participation in Gram Sabha, and solving health problems by the Panchayat, have no impact on (i) the prevalence of illness of men and women, (ii) problem resolution, (iii) preference for and the use of public health care, and, (iv) on reductions in private health expenditures. (5) Individual empowerment of women through inheritance of land and political empowerment through reservation of the position of Pradhan have no impact on (i) the prevalence of illness of men and women, (ii) problem resolution, (iii) preference for and the use of public health care, and, (iv) on reductions in private health expenditures. Individual and political empowerments therefore are not complementary. (6) Increasing village health expenditures will have (i) an identical impact on the incidence of illness and (ii) on private health expenditures of men and women. While hypotheses 1, 2, 4, and 5, and the first part of hypothesis 6 are rejected, we are not able to reject hypothesis 3.

We begin by relating this paper to the extant literature followed by a brief discussion of the status of health care in rural India. In the subsequent section the data and descriptive statistics

are discussed. Next we discuss the reduced-from-simultaneous-equation models that we estimate and the instrumental variables that we use to identify the jointly endogenous variables. This is followed by a discussion of the results, and finally, the conclusions.

## 2. Literature and Background

### 2.1. Literature

Avdic and Johansson (2012) find that men and women's preventive health behaviors differ since absenteeism due to illness is greater for women compared to that for men. Gender differences in health-related behaviors—in particular, as women in general act less risky on matters related to health—have been examined by Stronegger *et al.* (1997) and Uitenbroek *et al.* (1996).

The literature relating local government actions on health access and expenditures is sparse. Bhalotra and Clots-Figueras (2011) show for India that political agency of women is significant in explaining problems related to health care. They find that a one standard deviation change in women's participation in the political process during the year in which they gave birth, or in any of the two years preceding this event, results in a 24% decline in neonatal mortality. This is consistent with our findings related to political empowerment of women, incidence of illness, and magnitude of private health expenditures.

The relationship of private health expenditures to income, first estimated by Grossman (1972), is referred to as the 'gradient'. Any estimation of the gradient has to deal with simultaneity. The literature suggests three channels of causality: (i) from income to health expenditure (Marmot 1999), (ii) from health status to earnings and earnings capacity (Smith 2004), and (iii) from factors such as ability/intelligence, parental background and incomes, education, and even genetics on health (Case *et al.* 2002, Dehejia and Lleras-Muney 2004, and Lleras-Muney 2005). In our paper we deal with the first and some of the third channels identified

by this literature, we also deal implicitly with the second channel via the endogenous choices of health providers and private health expenditures.<sup>3</sup>

Pritchett and, Summers (1996) derive the long-run income elasticity of infant and child mortalities by estimating their effects of incomes on health. A health production function approach has been adopted in Muennig (2008), Lavy and Quigley (1991), Ntembe (2009) and Lopez-Cevallos and Chi (2010). In this paper, we relate the incidence of illness to measures of individual empowerment such as inherited wealth and land by women, as well as other variables. The paper uses a health production function approach similar to the literature and is able to derive the income elasticity with respect to private health expenditures. The long run relationship between incomes and changes in health expenditures is therefore identifiable or identified??? in our paper<sup>4</sup>.

Increased devolution of finances, functions and functionaries to Panchayats has been shown to empower households to influence both the provision and quality of health care services by Bhalotra and Clots-Figueras, (2011). It may also allow women to participate in decisions related to health expenditures and accountability processes. Even though increased health expenditures at the community level are important, it is the management of these allocations that will most likely lead to a reduction in illness and improvement in the quality of life. Therefore, reaction of the elected officials to problems in public goods and health care provision is of

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<sup>3</sup> Following Grossman (1972) many authors have related health expenditures to welfare outcomes, and investigated the intermediating effects on the health–welfare relationship of the presence and quality of institutions, shocks, non-income variables related to health care, and non-income variables (Smith 1999, Nixon and Ulmann 2006, Lynch *et al.* 1997, Bloom *et al.* 2004, Bhargava *et al.* 2001, Bloom and Canning 2000, Hamoudi and Sachs 1999, Sachs and Warner 1997, Adda *et al.* 2008, Leu 1986, Hitiris and Posnett 1992).

<sup>4</sup> There is not much extant work on the gradient in the Indian literature Sarma (2009) finds that the demand for healthcare was price and income-inelastic. Borah (2006) uses data from NSS to show that demand for health care in rural areas is price-inelastic and low income households are more sensitive to the price of health care.

significance. Hence in line with Munshi and Rosenzweig (2008), we posit that increased discussions on health care in Gram Sabha meetings signal greater commitment on the part of elected representatives towards quality health care as well as the ability of households to ensure that improved allocations towards health and improved management take place.

Gender based political reservations and the accompanying empowerment allows women to redress the imbalances in health care by effectively raising issues in the Gram Sabha meetings and ensuring accountability. Deininger *et al.* (2012a, b) have shown that political reservations empower women to hold elected officials to account and increase access to public goods, In addition, women in India have been empowered to inherit equal shares of land. This has a positive impact on spending patterns on child schooling and health care (Deininger *et al.* 2012c)<sup>5</sup>.

## *2.2. Health, Health Care, and Health Decentralization in India*

According to the United Nations, even though the mortality of children below five has dropped from 12.4 million to 8.1 million globally between 1990 and 2009, India, Nigeria and the Democratic Republic of Congo together account for 40%. Maternal mortality in India was 254 per 100,000 live births during 2004–2006 and declined marginally to 212 during 2007–2009 (Census of India Report). The Federation of Obstetrics and Gynecological Society of India however reports this to still be 250 in 2011<sup>6</sup>. There are other problems such as persistently low coverage of immunization (61% in 2009) due to which incidence of diseases like hepatitis-B; diphtheria and tuberculosis (TB) continue to be high.

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<sup>5</sup> We show that the Hindu Succession Act Amendment (HSSA), by enabling women to inherit household wealth (in particular land) more equally than before, allows them the freedom to allocate increased expenditures on health.

<sup>6</sup> The global ranking of India is 127 out of 181 countries as of 2008.

Communicable diseases such as diarrhea, cholera, malaria, encephalitis, kala-azar, dengue, and Leptospirosis form a significant part of the health care burden in India. There were approximately 1.5 to 2 million confirmed cases of and 1000 deaths annually due to malaria in 2009 but these figures have come down to 1.1 million cases and 430 deaths in 2011 (GoI 2012). There were 2.4 million confirmed cases of HIV AIDS in 2009 (UNAIDS 2010). Although improvements in sanitation and the development of vaccines have led to declines in infectious diseases, communicable diseases are still significant and only polio and smallpox have been eradicated. The reasons for these are (i) absence of a credible and adequate health care and prevention system, (ii) lack of significant new financial resources to enhance the system, (iii) a largely illiterate and poor population and, (iv) corruption.

India's healthcare system is among the most privatized in the world. In 2009, the per capita public expenditure on health was only \$44.80, while this figure is \$4590 in the world's richer countries (World Bank 2010). The total expenditure on health as a share of GDP in India is 4.1% and is composed of 2.9% contributed by private spending and 1.2% through public (government) spending. The latter magnitude is far below the levels prescribed by the WHO (i.e., 5% of GDP). Only five other countries in the world have lower public health care spending than India (Burundi, Myanmar, Pakistan, Sudan, and Cambodia) (WHO 2003).

In India much of finance and policy originate from the central government with responsibility for service delivery resting with the state governments. Presently the levels of devolution of service responsibility and accountability to the Panchayats are far from optimal.

To rectify these pathologies associated with health care system, the Government of India launched the National Rural Health Mission (NRHM) in 2005. It is designed to provide effective

health care to the rural population in general and to weaker sections such as women and children in particular. NRHM seeks to improve access to health facilities, enable community ownership of services, strengthen public health systems, enhance the equity and accountability of the providers, and most importantly, strengthen and deepen the levels of decentralization by increasing the resources available to the Panchayats. NRHM, in addition, addresses issues related to determinants of health, such as sanitation, nutrition, and clean drinking water. Implementation of this program has been vested with state governments. NRHM seeks to empower Panchayats to manage, control and be accountable for health services. Block level Panchayat Samitis will coordinate the work of Panchayats within their jurisdiction and serve as links to DHMs and DHFs (district level hospitals for males and females). These will be led by the Zilla Parishad and will control, guide and manage all public health institutions in the district. Our household-specific data refer primarily to 2007, when the NRMH had been in effect for only two years.

Junaid *et al.* (2005) have shown that decentralization of health care needs to be made part of the broader efforts at decentralization and devolution of powers. They suggest that disease-specific programs should be planned in a centralized manner and implemented through a decentralized health system. This will involve the participation of members of the community and various stakeholders, apart from specialists, leading to the provision of health services in an equitable manner thus reducing the scope for income and gender discrimination. Panchayats are also critical to the planning, implementation, and monitoring of NRHM. Success of NRHM depends on the inter-sectoral convergence, community ownership steered through village level health committees at the level of Panchayats, and a strong public sector health system with support from the private sector. Success is also dependent on well functioning village, block and district level Panchayats.

### 3. Data and Descriptive Statistics

The data for this paper are based on the ARIS and REDS surveys of NCAER. These surveys contain data at the village, household, and member levels from 241 rural villages across 17 states<sup>7</sup> collected over six rounds during 1969 to 2006.<sup>8</sup> For the 1999 and 2006 rounds, detailed demographic information on households is available. Participation in welfare schemes, governance, evaluation of governance by households and members of households, composite pattern of cultivation, infrastructure, availability of public goods, etc. are also available with community (i.e., the village) data. The last two rounds cover a period of considerable change in the rural economy of India, both in terms of structure as well as policy and allows tracing of the impact of changes in policy on to the households. In this paper we use data from the 1999 and 2006 rounds, because it is for these periods that we have consistent data on Panchayats, Gram Sabhas, health expenditures by households and at the village level, and the participation by households in village level decision making<sup>9</sup>. The 2006 round has surveyed 8,659 households, out of which 5,885 cover both the 2006 and 1999 rounds.<sup>10</sup> The data are in three parts, viz. listing, community, and household schedule (which were mostly collected in 2007). Descriptive statistics for the 1999 and 2006 rounds are reported in Table 1. Very important changes are the rapid rise in years of schooling income, consumption, non-farm employment, and access to toilets, and the rapid decline in land owned, average household size, number of children per household and the proportion of households reporting dirty surroundings.

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<sup>7</sup> The states include Tamil Nadu, Kerala, Karnataka, Maharashtra, Gujarat, Rajasthan, Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand, West Bengal, Orissa, Chhattisgarh, Madhya Pradesh, and Andhra Pradesh. The state reorganization that influenced Bihar, Madhya Pradesh, and Uttar Pradesh did not affect the selection of villages that have remained intact since 1969.

<sup>8</sup> The first three rounds included Assam and Jammu and Kashmir. However, the 1982 round did not include Assam, while the 1999 round excluded Jammu and Kashmir (both in view of the local law and order situation prevailing in these states at that time). The current round excludes both these states.

<sup>9</sup> For the purpose of estimating the impacts at the household level we use the 'panel' of households, that is, households surveyed in 1999 and 2006.

<sup>10</sup> The household sample has compensated for attrition through a random addition to the original sample since 1982. Ten households were randomly selected from the process of listing in each survey round.

**Table 1**  
***Descriptive Statistics***

Variables	2006	1999	% Change
<i>Individual Characteristics</i>			
Percentage of females (including children)	48.59	47.68	1.91
Percentage of males (including children)	51.41	52.32	-1.71
Percentage of married members	49.67	48.08	3.31
Percentage of unmarried members	50.33	51.92	-3.06
Average Age of the member	29.48	26.87	9.71
Average years of schooling	4.64	3.87	19.90
Weight of adult members (in kg)	52.86	-	-
Heights of adult members (in centimeters)	155.59	-	-
<i>Household Characteristics</i>			
Average household size	5.16	6.02	-14.29
Average income (in Indian Rupees)	86675.28	51297.69	68.965
Percentage of agricultural workers	30.33	25.08	20.93
Percentage of non agriculture workers	11.21	6.76	65.83
Land owned (in Acres)	2.80	3.97	-29.471
Number of children per household	1.51	1.98	-23.737
Average consumption expenditure (in Indian Rupees)	39822.13	32747.49	21.604
Percentage of households having toilets	40.30	29.68	35.78
Percentage of households reporting dirty surrounding	3.82	5.22	-26.82
Percentage of households reporting clean surrounding	37.01	34.41	7.56
Percentage of households aware of health campaign	81.23	80.60	0.78
Number of observations	8659.00	7474.00	-

Households access ten types of health facilities from the private, public and alternate sectors. Private clinics include those that cater to allopathic, Unani and Ayurvedic systems of medicine<sup>11</sup>. Government facilities include health sub centers, subsidiary health centers, primary health centers, hospitals, Anganwadi (focusing on child welfare), and family planning clinics<sup>12</sup> (Table 2).

<sup>11</sup> Unani is a system of medicine that came to India from the Middle East and Ayurvedic is a system of treatment evolved in India. Both are well-evolved systems of medicine and are recognized by the Government of India.

<sup>12</sup> Health sub-centers provide basic preventive health care services as well as act as referral centers. They cater to a population of 5000, and are mandated to provide basic medicines and nutrition supplements like folic acid, iron tablets and provide advice on pre-natal and ante-natal care. Primary and subsidiary health centers are also supposed to offer help during child birth. The primary health centers are hospitals with four beds and deal with both preventive and curative care. They cater to a population of 30,000 as well as manage five health sub-centers and are manned by a doctor. The other health centers are, however, manned by an auxiliary nurse. The Anganwadi is meant to help with child care, immunization, and growth monitoring. A secondary activity is maternal health care.

**Table 2**  
***Availability of Health Care for households in the Villages***

Health care centers	One way distance from the village in km	Number of patients treated per day	Number of days open per week	Number of hours open per day
Health sub-center	5.29 (5.68)	20.60 (29.37)	5.24 (1.93)	6.84 (3.77)
Subsidiary health center	10.41 (9.58)	39.35 (51.80)	6.23 (0.71)	8.95 (5.84)
Primary health center	7.99 (6.86)	55.87(58.00)	6.30(0.59)	8.75(6.67)
Hospital	25.87 (24.62)	205.05 (156.22)	6.52 (0.51)	13.74 (9.23)
Family planning clinic	11.15 (13.18)	18.41 (24.69)	5.92 (1.22)	8.99 (6.83)
Anganwadi	1.78 (1.11)	23.79 (63.64)	6.01 (0.44)	5.22 (2.51)
Allopathic doctor	8.64 (8.77)	37.32 (46.23)	6.75 (0.70)	11.27 (5.80)
Unani doctor	11.24 (8.15)	19.05 (32.59)	6.44 (0.66)	8.43 (2.04)
Ayurvedic doctor	10.78 (13.48)	19.42 (29.28)	6.48 (0.99)	8.44(2.90)
Traditional healer	6.24 (5.73)	8.09 (9.68)	6.67 (1.03)	11.68 (6.32)

*Notes:* Standard errors are in parenthesis

The data show that the private sector is on an average more accessible to rural households. Allopathic clinics (private clinics with doctors who follow the western system of medicine) have better density of doctors compared to primary or subsidiary health center or health sub-center compared to any of the formal institutions (except the larger hospitals). Given that government hospitals are, on an average, 26 km from the villages and private clinics less than 9 km, it is quite possible distance is a significant determinant of the choice of the health care provider. The survey also shows that on an average there is greater probability of the basic curative medicines being available with the private doctors compared to any of government run health centers located close to villages. We had noted earlier that diseases like malaria, diphtheria and hepatitis are significantly prevalent in rural India and the non-availability or expensive availability of such drugs pose significant problems for households. Details of the availability of doctors, and medicines as well as the number of beds are given in Table 3.

**Table 3**  
***Density of Doctors, Beds, and Medicines***

Health care centers	Number of male doctors	Number of female doctors	Number of beds available for maternal care and treatment	Availability of medicines(% of institutions)				
				Malaria	Diphtheria	Dengue	Hepatitis	Rehydration salt
Health sub-center	1.44 (0.95)	1.09 (0.29)	3.77 (6.82)	0.61 (0.49)	0.41 (0.49)	0.23 (0.42)	0.23 (0.42)	0.73 (0.45)
Subsidiary health center	1.84 (1.87)	1.37 (0.69)	10.16 (17.18)	0.63 (0.48)	0.49 (0.50)	0.26 (0.44)	0.23 (0.42)	0.66 (0.47)
Primary health center	1.58 (0.98)	1.34 (0.95)	8.12 (13.73)	0.96 (0.20)	0.53 (0.44)	0.30 (0.47)	0.35 (0.48)	0.87 (0.33)
Hospital	6.12 (4.72)	3.28 (1.81)	74.33 (69.30)	0.95 (0.23)	0.91 (0.29)	0.73 (0.45)	0.65 (0.48)	0.90 (0.30)
Family planning clinics	1.84 (2.15)	1.58 (1.19)	9.68 (15.59)					
Allopathic clinics (private doctor)	2.05 (1.86)	1.62 (1.08)	9.54 (11.62)	0.84 (0.37)	0.63 (0.57)	0.34 (0.48)	0.40 (0.49)	0.76 (0.43)
Unani	1.26 (0.56)	1.20 (0.36)	2.56 (1.62)	0.16 (0.37)	0.11 (0.32)	0.09 (0.28)	0.07 (0.26)	0.12 (0.32)
Ayurvedic	1.39 (1.09)	1.82 (1.13)	6.61 (25.42)	0.37 (0.48)	0.19 (0.39)	0.13 (0.34)	0.14 (0.35)	0.36 (0.48)
Traditional	1.73 (1.57)	1.11 (0.33)	1.63 (0.50)	0.13 (0.34)	0.10 (0.30)	0.08 (0.27)	0.11 (0.31)	0.12 (0.32)
Observations	238							

*Notes:* Standard errors in parenthesis

NRHM provides for an increase of *dais*, health guides, and health workers in villages. The survey shows that the density of such functionaries has improved<sup>13</sup>. These personnel perform a range of functions such as aiding in births and pre-and post-natal care, immunization, spreading awareness on polio, HIV/AIDS etc., help in malaria eradication campaign, chlorination of wells, spreading general awareness of health, and provision of food supplements.

<sup>13</sup> Within the public health system in India, the Public Health Nurse, called the District Public Health Nurse (DPHN), is the senior health worker at the district level. She leads the work of the ANMs, now called Female Health Workers (FHWs). They are skilled birth attendants ensuring good quality maternal and child health services. For monitoring the work of FHW, each PHC has a Female Health Supervisor (FHS). The *dai* is a traditional birth attendant. According to WHO, Community Health Worker/Village Health Guide is chosen by the community and trained to deal with health problems of individuals and the community, and to work in close collaboration with the health services. They are either paid or voluntary workers.

While the survey finds that the female health workers and *dais* are present in most villages, others such as ASHA, ANM, and Anganwadi worker - also crucial to spreading awareness of health - are relatively scarce. Such scarcity is likely to induce households to access information about key health related problems from informal sources such as social networks (Table 4)<sup>14</sup>.

**Table 4**  
***Presence of Health Workers in Villages***

Health workers	2006	1999
Trained <i>dai</i> (traditional birth attendant)	0.735(0.521)	0.618 (0.487)
Health guide	0.458(0.499)	0.391 (0.489)
Trained male health worker	0.471(0.500)	0.424 (0.495)
Trained female health worker	0.819(0.446)	0.714 (0.480)
Number of observations	238	

*Note:* Standard errors in parenthesis

Table 5 shows that the incidence of illness among women is less than that for men. The proportion of women not treated for illness is slightly lower than for men, but there are no big differences in the location of treatment between men and women. However, men work many more days than women and despite this the women lost more days at work. The average period of females' absence was 16.28 days, or nearly 15% of working days. The corresponding figures for males were 11.4 days and 6.36%. The average agricultural wage rates for males and females during the reference period were Rs 63.26 and Rs 59.51, respectively. The male–female wage gap has considerably reduced<sup>15</sup>, and female wage rates have increased by up to 51 and 56%, respectively for farm and non-farm sectors (Footnote 16). This implies that absenteeism due to illness will have increasing income effects for the households. For instance, the average losses

<sup>14</sup> The percentage of females accessing information from friends and neighbors about HIV, birth control, pulse polio, dietary supplements for new born has gone up from 55% in 1999 to 68% during the current survey period.

<sup>15</sup> Growth in Male and Female Wage Rates

Category	1999		2006		% Change	
	Male	Female	Male	Female	Male	Female
Agricultural wage	51.25	39.41	63.26	59.51	23.43	51.00
Non-agricultural wage	67.17	57.08	93.45	89.38	39.12	56.59

through wages due to absenteeism, if a female member of the household is working in agriculture, will be Rs 970 per worker. This is Rs 250 more than the losses incurred if a male member was absent from work. The losses are greater if the female workers are in the non-farm sector in which case, the gap in losses increases to Rs 390.

**Table 5**  
***Incidence of Illness and Absenteeism***

Variables	Male	Female	All
Percentage of members ill during the year	55.16 (0.497)	53.45 (0.499)	54.31 (0.498)
Average number of days worked	179.27 (54.58)	109.45 (52.62)	144.36 (54.23)
Average no of days absent from work due to illness	11.405 (22.153)	16.278 (21.90)	13.84 (21.50)
Percentage of days absent due to illness	6.36 (25.78)	14.87 (28.56)	10.62 (27.84)
Percentages of members treated in government hospitals and health care centers	22.71 (0.424)	23.48 (0.419)	23.09 (0.421)
Percentages of members treated in private hospitals	25.45 (0.436)	25.06 (0.433)	25.26 (0.434)
Percentages of members treated in other hospitals	2.75 (0.164)	2.56 (0.158)	2.66 (0.161)
Percentage of members not treated for illness	8.48 (0.279)	7.51 (0.264)	7.99 (0.271)
Number of observations	15913	15752	31665

*Note:* Standard errors in parenthesis

#### 4. Governance and the Quality of Health Care

Bhalotra and Clots-Figueras (2011) show that political agency in general and of women in particular is significant for the provision of health care. For example the incidence of post natal mortality is significantly less if the child birth occurs during the period of agency of a woman in the local Panchayat. In India the 73rd Amendment includes responsibility for solving health related problems such as drinking water, sanitation, immunization, etc. NRHM has added complementary powers to Panchayats. To examine the role of Panchayats it is important to understand the status of the various dimensions of health care, viz. access, availability, and quality. In the REDS survey, each respondent (males and females) who accessed or attempted to access health facility, independently evaluated these facilities on the basis of functionality, presence of trained staff, waiting time, payment of bribes, and availability of recommended

medicines. Table 6 provides a summary of the survey findings. Both attributes of quality, viz. presence of trained staff and availability of recommended medicines, leave much to be desired.

**Table 6**  
***Evaluation of Medical Facilities***

Institution	All			Male			Female		
	Pub.	Pvt.	Other	Pub.	Pvt.	Other	Pub.	Pvt.	Other
<i>1. Was the facility functional when visited?</i>									
Always	63	76.2	62.1	63.3	75.9	63	62.6	76.5	61.2
Most of the time	30.3	21.7	27.3	29.6	21	26.8	31.1	22.3	27.8
Sometimes	5.6	1.6	8.9	5.9	2.6	8.8	5.4	0.7	8.9
Rarely	1.1	0.4	1.7	1.2	0.4	1.4	1	0.4	2.1
Never	0	0.1	0	0	0.1	0	0	0.1	0
<i>2. Availability of trained staff (doctor, nurses, dais etc.)</i>									
Always	47.05	72.35	62	47.60	73.4	59.4	46.5	71.3	64.6
Most of the times	43.7	25.5	27.1	44.20	24.8	28.7	43.2	26.2	25.5
Sometimes	6.9	1.5	7.5	4.70	1.3	9.1	9.1	1.7	5.9
Rarely	1.4	0.65	2.95	1.60	0.5	1.9	1.2	0.8	4
Never	0.95	0	0.45	1.90	0	0.9	0	0	0
<i>3. Waiting time during the visit (hours)</i>									
No waiting time	20.49	42.11	41.60	22.81	43.38	42.66	40.84	18.17	40.54
Less than 1/2	46.58	41.88	41.16	47.84	43.23	40.17	40.52	45.31	42.15
½–1	18.75	11.91	10.96	16.96	11.24	13.3	12.58	20.54	8.62
1—2	12.37	3.68	5.87	10.61	1.72	3.05	5.64	14.13	8.69
2—5	1.82	0.43	0.42	1.78	0.44	0.83	0.42	1.85	0
<i>4. Need for bribe for appointment, referral, and beds</i>									
Always	4.55	2.45	13.2	3.3	1.8	12.2	5.8	3.1	14.2
Most of the times	11.15	3.7	12.15	12.6	3.4	11.6	9.7	4	12.7
Sometimes	10.4	2.9	10.65	9.4	1.3	9.1	11.4	4.5	12.2
Rarely	5.9	0.65	4	6.3	0.7	4.4	5.5	0.6	3.6
Never	68	90.3	60	68.4	92.8	62.7	67.6	87.8	57.3
<i>5. Availability of recommended medicines</i>									
Always	34.45	45.55	39.55	41.2	47.3	40.1	27.7	43.8	39
Most of the times	43.8	35.35	32.1	39.9	40	35.7	47.7	30.7	28.5
Sometimes	14.65	15.1	19.75	12.3	10.6	18.5	17	19.6	21
Rarely	4.1	1.7	4.55	3.2	1.4	1.9	5	2	7.2
Never	3	2.3	4.05	3.4	0.7	3.8	2.6	3.9	4.3
Total	100	100	100	100	100	100	100	100	100

We evaluate the impact of political empowerment of women using simple two way tables for the following governance indicators: formulating the agenda for Gram Sabha meetings; attendance of villagers when these items were on the agenda (Table 7); problems experienced by villagers; and the satisfactory resolution of problems (Table 8). We present the two way tables for water, sanitation and health in these tables.

**Table 7**  
***Topics covered and reasons for participating in Gram Sabha meetings***

Agenda and Reasons for Attendance	Entire Sample	Reserved	Unreserved
<i>Agenda</i>			
<i>Percentage of meetings</i>			
Water	8.83 (0.284)	10.29 (0.303)	8.192 (0.274)
Sanitation	8.76 (0.283)	8.69 (0.281)	8.79 (0.283)
Provision of health	4.88 (0.215)	4.97 (0.217)	4.83 (0.214)
<i>Reasons for attendance</i>			
<i>Percentage of individuals</i>			
Attended GS meeting because water was agenda	6.3 (0.243)	8.49 (0.278)	5.34 (0.225)
Attended GS meeting because sanitation was agenda	5.61 (0.23)	7.73 (0.267)	4.68 (0.211)
Attended GS meeting because health was agenda	6.92 (0.254)	4.97 (0.217)	4.80 (0.214)

*Note:* Standard errors in parenthesis

**Table 8**  
***Existence of problems in health related public goods and their resolution***

Issues	<i>Reserved Panchayat</i>				<i>Unreserved Panchayat</i>			
	Existence of problems		Satisfactory resolution of problems		Existence of problems		Satisfactory resolution of problems	
	Male	Female	Male	Female	Male	Female	Male	Female
Drinking water	75.99 (0.43)	76.77 (0.42)	68.67 (0.46)	70.34 (0.46)	74.43 (0.44)	75.26 (0.43)	63.96 (0.48)	65.74 (0.48)
Sanitation	78.45 (0.41)	79.20 (0.41)	59.26 (0.49)	61.02 (0.49)	79.04 (0.41)	78.39 (0.41)	58.29 (0.49)	58.65 (0.49)
Functioning of health center	55.98 (0.50)	56.53 (0.50)	22.49 (0.42)	24.18 (0.42)	60.22 (0.49)	61.18 (0.49)	19.31 (0.39)	19.97 (0.40)

*Note:* Standard errors in parenthesis

Table 7 shows that issues related to water were more frequently on the agenda of the Gram Sabha meetings of reserved Panchayats, but this was not the case for sanitation and health

issues. More members of the village attended the Gram Sabha meetings when any of these items were on the agenda in Panchayats reserved for women than in unreserved ones. Table 8 shows that for these three sectors, the results related to existence of problems and their resolution across reserved and unreserved Panchayats are mixed. Problem resolution on health related issues (functioning of health centers) in both reserved and unreserved Panchayats is poor. However as we will see later (in table 9) the level of satisfaction with health services on the part of the members of the villages that were reserved in general and of women in particular is higher.

## 5. Health Care and Individual Incomes

We use the representation of a health production function to explain the relationships between choice of health provider, incidence of illness, private health expenditures, and incomes. This is done using a two-stage instrumental variables estimation strategy, primarily relying on the 2006 data and additional variables from 1999. We estimate the relationship separately for males and females. The principal regression for estimation is written as follows:

$$\ln y_{it} = \alpha_k X_{kit} + \delta_m M_{mit} + \gamma HE_{it-1} + \varepsilon_{it} \quad (\text{Where, } I = 1, 2, 3\dots) \quad (1)$$

$$X_{kit} = \beta_l Z_{lit} + v_{it} \quad (2)$$

In equation (1) the subscript  $i$  is the  $i$ th member of a household,  $t$  is the time period, and  $y$  is individual income,  $X_k$  is a vector of explanatory variables, including the following binary variables: health status (ill = 1; otherwise = 0), choice of health care provider (private, public, and others); and one continuous variable - the log of private health expenditures.  $M_{mit}$  is a vector of characteristics of household  $m$  in which member  $i$  lives. In line with the literature we condition the regression on the past health expenditures in the 1999 round shown here as  $HE_{mt-1}$ .

Equation (2) is used to predict the endogenous choice of health care provider, using the vector  $Z$  of instruments. It includes distance to health centers, losses due to village shocks, predicted village health expenditures, predicted health expenditures discussed in the Gram Sabha, individual awareness of health campaigns, adequate drinking water, clean surroundings, predicted household wealth, and inherited land by women. These instruments are chosen to enable us to test some of the stated hypotheses. We assume that (i)  $E(Z'X) \neq 0$  (i.e., all instruments are relevant to the vector  $X_{kit}$  and,  $Z_{lit}$  affects  $X_{kit}$ ) and, (ii)  $E(Z'\varepsilon) = 0$  (i.e., the instruments used are valid and uncorrelated with  $\varepsilon$ ). We compute the partial  $R^2$  of relevance of the instruments (also called the test for excluded instruments). If the value of  $R^2$  is high and standard error is low then the instruments are sufficiently relevant to explain the endogenous regressors. This test performs under the null hypothesis, i.e. the instruments lack the sufficient relevance to explain the endogenous regressor. If the null hypothesis is rejected, then there are no redundant instruments that have been included. We have also used the Anderson canonical correlation likelihood ratio test under the null hypothesis that equations are under identified (we expect the null to be rejected in our specification)<sup>16</sup>. If our specification is identified then we wish to test whether the identification is strong or weak using the Cragg–Donald’s F-statistic under the null of weak identification<sup>17</sup>. The Sargan test<sup>18</sup> has been used for over identification.

The first stage equations (2), in addition to the choices of health care providers, already include predicted village health expenditures, discussions in Gram Sabha, household wealth, and

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<sup>16</sup> The under-identification test is a Maximum Likelihood test of whether the equation is identified, i.e., if the excluded instruments are ‘relevant’, i.e., correlated with the endogenous regressors. The test of the rank of the matrix under the null hypothesis is that the equation is under identified. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.

<sup>17</sup> Cragg–Donald’s F-statistic tests whether the equation is weakly identified, i.e. if the F-statistic is greater than 10 then the instruments are not weak.

<sup>18</sup> The Sargan is a test of over-identifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e. uncorrelated with the error term.

inherited land that could be potentially endogenous to the outcomes. We describe below the way these are predicted and identified.

### *5.1. Predicting Village Health Expenditures*

If public expenditures jointly reflect the preferences of the elected representatives and households, then we can expect a positive relationship between village level expenditures on health and political agency of women. Therefore, if village expenditures rise, concomitantly, household level (or even member level) expenditures on health is expected to decline. This will then imply that both members and households perceive public (village level) expenditures to be substitutes for private (i.e., own) health expenditures as well as signaling an improvement in the health status. For low income households in particular any savings from their budget should enhance welfare. Village expenditures on health are estimated as follows:

$$\ln VH_{vt} = \pi_v P_{vt} + \mathcal{G}_{vt} \quad (3)$$

Where,  $VH_{vt}$  are village level health expenditures,  $P_{vt}$  is a vector of variables such as political reservations, controls such remoteness of the village (measured by its distance from district and block headquarters and, town). The regression is also conditioned by state level health expenditures to reduce upward bias in the estimated coefficient of  $VH_{vt}$  in equation (1) and to help identify the equation. Are any other P variables not appearing in any other equation.

### *5.2. Predicting Discussions of Health in Gram Sabhas*

If members of households are dissatisfied with the status of health care, we expect them to participate in Gram Sabha meetings and raise issues germane to health care provision. These could include discussions on quality of health, financial allocations, quality of health care institutions and location of health centers, increasing the awareness of health campaigns,

provision of drinking water and, cleanliness of streets. Participation in Gram Sabha (GS) meetings related to health is, therefore, predicted as follows:

$$\ln GS_{vit} = \alpha_v HS_{vit} + \delta_m V_t + \phi_{it} \text{ (Where, } i=1, 2, 3\dots) \quad (4)$$

$$HS_{vit} = \beta_s Z_{sit} + \omega_{it} \quad (5)$$

Where,  $HS_{vit}$  is the composite health satisfaction index attributed to member  $i$  in village  $v$ ;  $v_t$  are village level controls, and  $Z_{sit}$  are the instruments for predicting health satisfaction index and includes political reservations for women. What are the variables that specifically identify the system 4 and 5. The composite health access index which combines elements of access, availability, and quality is constructed using the responses of individual respondents as follows:

$$f(h_i) = \log\left(h_i + \sqrt{(h_i + 1)}\right) \quad (6)$$

Where,  $h_i$  is the score of individuals with respect to all the five attributes (shown on table 6). The response to each attribute is a categorical variable ranging from 1 to 5. These scores are added across attributes to arrive at an index  $h_i$  for each respondent  $i$  that takes on a value between five and 25. If the index takes on a value between 5 and 10 then the access to and/or quality of health care is poor/low. A value between 11 and 18 implies medium levels of access and quality. A value between 19 and 25 refers to high quality and/or excellent access<sup>19</sup>. The index in equation (1) is a parallel translation of the log function.

### 5.3. Inheritance of Wealth by the Household

Inheritance of wealth will affect the intra household dynamics and affect outcomes. Wealthier households could choose private care over public health care. It is important to include inherited

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<sup>19</sup> All categories are equally weighted, i.e. availability of medicines is given the same weight as waiting time. The attribute related to cleanliness of the buildings, facilities, etc. was dropped since that was evaluated on a two-point scale.

wealth as one of the controls. Since inherited wealth is endogenous, we control for this by predicting it using the framework suggested in Foster and Rosenzweig (2002) as follows:

$$\ln W_{ht} = \kappa_h L_{ht} + \eta_{ht} \quad (7)$$

The vector  $L_{ht}$  includes all variables that will lead to household splits such as variance of education within the household, household size, age of the current head, inherited wealth, presence of non-co-resident father, non-co-resident brother and, non-co-resident sister, in the previous survey period.

#### 5.4. Land Inheritance by Women

Inheritance of land by women will enhance their financial independence. It also is a significant source of individual empowerment of women. It has been shown that such empowerment enhances women's health, and health of the girl child (Deininger *et al.* 2012a) We expect that inheritance will widen the choice of health providers for women. The Hindu Succession Act (HSA) Amendment passed in 1994 has provided that the male and female children are treated as coparceners in inheritance. The predicted inheritance equation is written as follows:

$$I_{gkj} = \alpha_1 + \alpha_2 F_{gk} + \alpha_3 F_{gk} * D_j + \alpha_4 X_{gkj} * F_{gk} * D_j + \gamma_j + \mu_{gk} + \varepsilon_{gkj} \quad (8)$$

Where,  $I_{gkj}$  is an indicator variable for whether individual of gender  $g$ , born in year  $k$ , in household  $j$  inherited any land;  $F_{gk}$  and  $D_j$  are indicator variables for females and whether or not the father died after 1994 when the HSA was amended, and these help identify the equation.

$X_{gkj}$  is a vector of parental and household characteristics that include education, caste and land holding; and  $\gamma_j$  are household fixed effects to control for time invariant household characteristics. We include a complete set of gender-specific year of birth fixed effects ( $\mu_{gk}$ ) to

control time varying aggregate factors that might independently affect relative inheritance patterns by males and females. The coefficient of primary interest is  $\alpha_3$ , the estimate of the amendment induced increase in females' likelihood to inherit land.

The estimates from equations 3, 4, 7, and 8 are used in the vector  $X_{kit}$  of equation (1).

## 6. Results

### 6.1. Health Satisfaction, Village Governance and Village Health Expenditures

We begin by explaining the relationship between the levels of the household's satisfaction with health care and process of governance. Decentralization and devolution of powers to the Panchayats will work if members of households are able to effectively participate in the process of governance related to health care. We would expect that members that are not satisfied with health care provision will raise this in the gram Sabha meetings. The tests for poor identification are all rejected in table 9. Panel (a) shows that the overall health satisfaction index across all types of providers is larger for older individuals in smaller households whose land holdings are larger and education levels are higher. Both current and past reservations increase health satisfaction significantly, and the interaction of reservations with female indicate that the impact of reservations is larger for females than for males.<sup>20</sup> Panel (b) also shows that villagers participate less in Gram Sabha meetings that discuss health when they are more satisfied with their access to health care.

**Table 9**

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<sup>20</sup> Chattopadhyay and Duflo (2004) found that of all public goods water is the most effectively provided by women leaders. They also suggest that there could be women-centric and non-women-centric public goods. Deininger *et al* (2011b) found that there is no evidence of clear-cut gender differences of reservations for females: both men and women benefit from political reservations of the position of the Pradhan for women.

***Health Satisfaction Index and Participation in Gram Sabha Meetings***

Panel (a) Variables	Health satisfaction index (first stage)
Current reserved	0.0962** (0.0376)
Current reserved*female	0.155*** (0.0130)
Previous reserved	0.0926*** (0.0347)
Previous reserved*female	0.1214*** (0.0292)
Age	0.0194*** (0.000763)
Household size	-0.0676*** (0.00384)
Land holdings	0.0316*** (0.00226)
Years of schooling	0.0419*** (0.00268)
Constant	1.623*** (0.0605)
Panel (b) Variables	Participation in Gram Sabha meeting (second stage)
Health satisfaction index	-0.156*** (0.035)
Constant	2.963*** (0.726)
F-statistics	267.68***
Wu-Hausmann F test	327.40***
Durbin-Wu-Hausmann chi-sq test	319.91***
Village fixed effect	Yes
Observations	21,953

*Note:* Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 10 reveals that village health expenditures are higher wherever the state governments make larger allocations. They are also higher in villages that are more distant from the district and block headquarters, and towns. This is consistent with policy that makes larger allocations to remote villages. Remote villages receive higher allocations for health care than better located ones. Panchayat allocations to health care are also higher in villages which have had fewer conflicts. Health expenditures are also higher in villages that are currently reserved or have been reserved in the past, suggesting a strong political empowerment impact. As for health satisfaction, the impact of reservations is higher for women than for men.

**Table 10**

### *Village Health Expenditure*

Variables	Ln(Change in village health expenditure)
Current reserved Panchayat	0.376*** (0.071)
Previous reserved Panchayat	0.208*** (0.053)
Ln (Change in population in the village)	0.276*** (0.067)
Ln (Distance to district)	0.421*** (0.0657)
Ln (Distance to block headquarters)	0.402*** (0.0214)
Ln (Distance to town)	0.572*** (0.0338)
Ln (Number of conflicts during the period)	-0.123*** (0.0357)
Ln (State health expenditure)	0.731*** (0.087)
Constant	5.061*** (0.193)
Observations	238
F-test	177.42***

*Note:* Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## *6.2. The Systems Estimates*

The joint estimates of illness, the choice of health care provider, private expenditures, and impact on incomes due to choice of health care provider and growth in private health expenditures are discussed in Tables 11a and b, and table 12 separately for men and women<sup>21</sup>. The results from the various tests viz. (a) excluded instruments, (b) the Anderson canonical correlation likelihood ratio test under the null hypothesis that equations are under identified, (c) the Cragg–Donald F-statistic under the null of weak identification and (d) the Sargan test of over-identification—suggest that (1) there are no redundant instruments that have been used, (2) the equations are not under identified, (3) there are no weak instruments, and (4) the over-identification tests are rejected. The Wu–Hausmann F test<sup>22</sup> suggest that the regressors are endogenous and the two-stage approach used here is the preferred method of estimation. Similarly, the Durbin–Wu–Hausmann chi square test shows that only the two-stage instrumental variable estimation is consistent (compared to GLM)<sup>23</sup>.

<sup>21</sup> We have split the first stage results into two Tables to better explain the outcomes related to choice of health care provider and the determinants of illness and private health care expenditures.

<sup>22</sup> This is the test of endogeneity and performs under the null that the regressors are exogenous.

<sup>23</sup> This test balances the consistency of instrumental variables estimation against efficiency of the least squares estimation. It tests under the null that instrumental variables estimation and least squares estimation are both consistent.

### *6.2.1. Incidence of Illness and Private Health Expenditures*

The first stage results are reported in Tables 12a and b. The main findings are discussed below.

- a. Men and women are more likely to fall sick in villages distant from health centers, with the impact being more severe on women. Village shocks impact negatively on health, again more on women than men. Since these variables predict a greater likelihood of falling ill for both males and females, they also increase total private health expenditures of men and women.
- b. Adequate drinking water, awareness on health campaigns, and clean surroundings reduce probabilities of illness for men and women as well as private health expenditures. There is no significant gender difference in the magnitude of impact of these variables on the incidence of illness, except for clean surroundings that is much larger for men.
- c. Village health expenditures reduce the incidence of illness of women three times more than for men, suggesting sharp gender differences in the impact of these expenditures. On the other hand they reduce the private expenditures of men and women about equally.
- d. Discussions by both men and women in the Gram Sabha of health issues lead to a reduction in their probability of falling ill about equally. The same holds for the impact on private health expenditures.
- e. Inherited wealth of the family reduces the incidence of illness more or less by the same magnitudes for both men and women. However, the reduction in private health expenditures is slightly less for men than for women. This could be indicative of improved intra household bargaining in favor of women. This finding is again consistent with the literature on this dynamic.

- f. A woman's own land inheritance has an additional impact on reducing her likelihood of falling ill, perhaps because it also increases her health expenditures. These effects get magnified if the village also spends more on health care.
- g. There are thus complementarities between a woman's inheritance and the village health expenditures. This suggests a significant individual empowerment effect on choice of health care and the level of private health expenditures. The individual empowerment effect is enhanced by the previously discussed positive impact of female reservations on village health expenditures – a political empowerment effect. In health care, individual and political empowerments are complements.

**Table 11a**  
***Determinants of Illness and Health Expenditures (First Stage)***

Variables	Male		Female	
	Illness	Ln(private health expenditure)	Illness	Ln(private health expenditure)
Distance to health centre	0.00136** (0.000636)	0.0343** (0.0138)	0.00225*** (0.000620)	0.0562*** (0.0137)
Losses due to village shocks	0.00227** (0.000917)	0.0362*** (0.0020)	0.00313*** (0.0001)	0.0308*** (0.0204)
Predicted village health expenditure	-0.00508*** (0.00108)	-0.107*** (0.0235)	-0.01530*** (0.00107)	-0.120*** (0.0235)
Predicted health related issues discussed in GS	-0.290*** (0.00225)	-0.320*** (0.0489)	-0.345*** (0.00224)	-0.414*** (0.0494)
Aware about health campaign	-0.0682*** (0.00726)	-0.851*** (0.158)	-0.0712*** (0.00723)	-0.882*** (0.159)
Adequate drinking water	-0.0323*** (0.00923)	-0.695*** (0.201)	-0.0258*** (0.00922)	-0.609*** (0.203)
Clean surroundings	-0.0432*** (0.00621)	-0.954*** (0.135)	-0.0302*** (0.00618)	-0.679*** (0.136)
Predicted household wealth	-0.0197*** (0.00324)	0.247*** (0.0704)	-0.0242*** (0.00324)	0.361*** (0.0714)
Land inherited by woman			-0.0599*** (0.00155)	0.119*** (0.0342)
Land inherited by woman*village health expenditure			-0.00857** (0.00342)	0.0155** (0.00754)
Constant	2.371*** (0.0413)	32.58*** (0.899)	2.445*** (0.0413)	34.34*** (0.911)
Test of excluded instruments	1908.39***	1889.73***	1684.80***	1623.4***
Anderson canon. Corr. LR stat	26.09***		23.39***	
Crag-Donald F-stat	21.34***		19.87***	
Village fixed effect	Yes		Yes	
Observations	11,013	11,013	10,940	10,940

Note: Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

### *6.2.2. Choice of Health Care Provider*

Table 11b shows the determinants of choice of health care provider. The results are explained in the following paragraphs.

- a. Distance reduces the access to all three forms of health care providers by roughly the same magnitudes for both genders. However, the negative impact of increasing distance is greater on the use of public health care facilities. Village shocks will lead to a greater preference for both private and public health care providers with impacts being slightly larger on women.
- b. Adequate drinking water, awareness of health campaigns, and clean surroundings reduce the use of both private and public health care for men and women. The magnitudes of impact of increased provision of such public services and increased information campaign are not gender variegated.
- c. Even though village health expenditures increase the use of public health care, the impact is especially larger for women. Discussions on health issues in the Gram Sabha increase the use of both private and public health facilities, but reduce use of other facilities. This suggest that discussions in public for a increase the awareness and widen the choice of health care facilities being accessed.
- d. Inherited wealth by the family shifts the choice of health providers to private facilities with a slightly larger effect on men.
- e. A woman's own land inheritance increases her use of both private and public health care. The impact on private health care is larger. However if the village level expenditures are larger than before, then the choice of public health facilities by women increases. This

reinforces our previous conclusions about the possible complementarities of individual and political empowerment<sup>24</sup>.

**Table 11b**  
*Determinants of Choice of Provider (First Stage)*

Variables	Male			Female		
	Private	Public	Other	Private	Public	Other
Distance to health centre	-0.00325*** (0.000785)	-0.00472*** (0.000755)	-0.00117*** (0.000352)	-0.00348*** (0.000761)	-0.00404*** (0.000727)	-0.00147*** (0.000353)
Losses due to village shoc	0.00313*** (0.00113)	0.00633*** (0.00109)	-0.00276*** (0.000508)	0.00595*** (0.00114)	0.00776*** (0.00108)	-0.00249*** (0.000527)
Predicted village health expenditure	0.00654*** (0.00133)	0.0257*** (0.00128)	-0.00131** (0.000598)	0.00725*** (0.00131)	0.0370*** (0.0012)	-0.00119** (0.000607)
Predicted health related issues discussed in GS	0.166*** (0.00277)	0.185*** (0.00266)	-0.0143*** (0.00124)	0.166*** (0.00275)	0.216*** (0.00263)	-0.0120*** (0.00128)
Aware about health campaign	-0.0363*** (0.00896)	-0.0833*** (0.00861)	-0.0329*** (0.00402)	-0.0521*** (0.00887)	-0.102*** (0.00848)	-0.0451*** (0.00412)
Adequate drinking water	-0.00607 (0.0114)	-0.0308*** (0.0109)	-0.00416 (0.00511)	-0.0123 (0.0113)	-0.0303*** (0.0108)	-0.0119** (0.00525)
Cleaned surroundings	0.00120 (0.00766)	-0.0469*** (0.00736)	-0.000693 (0.00344)	-0.00517 (0.00759)	-0.0426*** (0.00725)	-0.00177 (0.00352)
Predicted household wealth	0.0328*** (0.00399)	-0.0460*** (0.00384)	-0.00301* (0.00179)	0.0239*** (0.00397)	-0.0358*** (0.00380)	-0.00554*** (0.00185)
Land inherited by woman				0.0512*** (0.00190)	0.00501*** (0.00182)	-0.00150* (0.000883)
Land inherited by woman *village health exp.				0.0299*** (0.00420)	0.0109*** (0.00401)	0.00224 (0.00195)
Constant	0.688*** (0.0510)	1.646*** (0.0490)	0.173*** (0.0229)	0.796*** (0.0507)	1.540*** (0.0485)	0.197*** (0.0236)
Test of excluded instruments	383.31***	368.71*** 26.09***	32.32***	341.45***	337.45*** 23.39***	25.71***
Anderson canon. Corr. LR stat		21.34*** Yes			19.87*** Yes	
Crag-Donald F-stat						
Village fixed effect						
Observations	11,013	11,013	11,013	10,940	10,940	10,940

Note: Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

<sup>24</sup> The village health expenditures could be influenced by both political agency and mobilizing of women during arm Sabha meeting-hence the conclusion about complementarities between individual and political empowerment.

### 6.2.3. Impact of Choice of Providers and Individual Health Expenditures on Individual Income

Table 12 shows the second stage results on income impacts. We estimate the regressions for male and female members separately. The results of both the Sargan and F tests show that the instruments included in the regressions are uncorrelated with the residuals and the equations are well specified.

**Table 12**  
**Impact on Incomes (second stage)**

Variables	Ln (Income)	
	Male	Female
Illness	-0.430*** (0.0543)	-0.559*** (0.0863)
Private	0.171*** (0.0237)	0.123** (0.0355)
Public	0.0678*** (0.0116)	0.0967*** (0.0154)
Other	-0.117*** (0.0348)	-0.159*** (0.050)
Ln (Health exp, 2006)	0.0322*** (0.0024)	0.0453*** (0.0038)
Ln (Health exp, 1999)	0.0208*** (0.0024)	0.0318*** (0.0036)
Constant	2.266*** (0.596)	2.283** (0.963)
Observations	11,013	10,940
Sargan statistic	352.24***	851.23***
F-test	35.75***	17.17***
Wu-Hausmann F test	64.03***	151.56***
Durbin-Wu-Hausmann chi-sq test	311.62***	709.84***
Village fixed effect	Yes	Yes

Note: Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Being ill has a larger negative income on women's own income (-0.56) than on men's own income (-0.43), but the standard errors of the coefficients are such that it is unlikely that the difference is significant. On the other hand, own health expenditures tend to increase women's incomes more (0.045) than men's income (0.032), both estimated with small standard errors, suggesting that the 'gradient' is larger for males than for females. It therefore makes sense to create avenues by which women are able to spend more on their health. The impact of private and public health care are positive for the income of both men and women. But they are negative and highly significant for the use of other health care providers, suggesting that such use may retard appropriate health care with a negative ultimate outcome on income.

Private health care does more for the earnings of both men and women than public health care but, only slightly for women, who in terms of earnings seem to benefit almost as much from public health care as from private health care. This suggests that the objective and subjective quality differential between private and public health care has significant consequences for incomes. In the case of private health care the impact is greater on male income than on female income, while the reverse is true for public health care.

The choice of other health care providers (Unani doctors, Ayurvedic Doctors and Traditional Healers) reduces incomes for both men and women, perhaps because it retards access to allopathic health services where these are needed. These coefficients say little about the potential health impacts of the different systems because they are not analyzed separately and because the informal practitioners visited may include poorly trained providers.

## 7. Conclusions

Our systems analysis of the quality of health care providers; the impact of local governance on them and on health satisfaction; choice of providers and health expenditures; and the resulting income impacts have led to a large number of insights. They reveal significance positive impacts of local governance, of empowerment of women, and complex and sometimes surprising similarities and differences in illness and treatment impacts between men and women.

We find that private clinics are doing better than public facilities on a number of quality indicators. When these data are aggregated over indicators, they show higher quality scores for private clinics than public facilities.

Sickness is significantly reduced by better access to drinking water, clean surroundings, and awareness about health campaigns. These factors reduce the use of public and private health care, as well as private health expenditures.

Women have a slightly lower probability of having been ill than men, but lose more days at work from being ill. Since they also work fewer days in a year, they lose almost 15% of their work days to illness, while for men it is only 6%. Being ill, therefore, has a larger impact on a woman's own income than that of a male. On the other hand, her own health expenditures tend to increase her income more than for men.

Private expenditures on health have grown less than income for both males and females. Private health care does more for the earnings of men than public health care, but for women this difference is not that large. This result is encouraging for women only, and may be because public health care puts much emphasis on maternal and child health care instead of routine health care.

Inherited wealth by the family reduces the incidence of illness more or less by the same magnitudes for men and women, and reduces the private health expenditures slightly more for women than for men. This is suggestive of insignificant discrimination within families' with respect to accessing health care. Individual empowerment via female inheritance of land has an overall positive impact on a woman's health and her use of health care. We also find that there are complementarities between family inheritance and a woman's own inheritance of land on health and health expenditures. The model of family resource allocation to female health care is, therefore, responsive to both increases in family wealth and individual female empowerment.

We now turn to the impacts of village governance on incidence of illness, health care, private expenditures and individual incomes. An important finding is that higher village health expenditures reduce sickness of women three times more than that of men. Village health expenditures increase the use of public health care by both genders, but especially by women.

While in terms of access to health facilities women are not at a disadvantage, they benefit significantly in terms of health from individual empowerment via land inheritance. But we also find significant positive impacts on both men and women due to political empowerment of women via reserving the position of Pradhan for a woman. In reserved Panchayats (i) more people attend Gram Sabha meetings when water supply, sanitation, or health issues are on the agenda; (ii) the resolution of problems in these sectors is better; (iii) village health expenditures are higher; and (iv) the satisfaction index with access to health care is higher, especially for women. These outcomes persist even after a woman has completed her term and the position is again occupied by a man. Reservations therefore bring about permanent changes in the political system related to health.

We also find that there is a positive interaction between a woman's inheritance of land and village health expenditures (that we have seen to be higher in reserved Panchayats). There are, therefore, complementarities between individual and political empowerment of women.

A number of policy implications emerge from the preceding discussion:

- Devolution of responsibilities and resources to Panchayats has produced positive results for health and individual health spending. A number of recent additional devolution measures have been put in place but had only started to take effect in 2007 when most of the household data collection of the REDS surveys took place. Our conclusions,

therefore, suggests that we should look to further improvements of rural health care in the future.

- Both the survey and empirical results suggest that women are not particularly disadvantaged in terms of their access to health care or in terms of intra-family discrimination against health access. They benefit more from improvements in public health care brought about by Panchayat expenditures than men. Nevertheless, women's earnings are more adversely affected from illness than those for men, while at the same time their own health expenses tend to improve their incomes more than those for men.
- Women's health and health care can be improved both by individual and political empowerment, which are complements.

The results amplify the many policies and channels by which health care and health outcomes can be improved. Villagers' participation in governance is a very powerful one, as it allows them to articulate preferences, raise issues as well as hold elected officials and providers to account. The consequences include improved health status in the village owing to improved governance of public health facilities, reduced reliance on private health provider, and reduction in private health expenditures. The public provision of health care is significant since it improves not only health outcomes, but also allows members of the low income households to use the surplus income on other activities or to increase savings. Providing incentives to individuals to increase their private health expenditures is also an option to improving health care but benefits and costs will have to be compared to the improvements of public health care.

Increases in financial allocations, improvements in health facilities and governance all matter for the provision and outcome of health care. But budget allocations and facilities are also

improved when governance is improved, so governance appears to be an overridingly important policy variable for health care. Political and individual empowerment of women, are important elements for improving the health status in general, and of women in particular. We have not been able to investigate the impact of empowerment of vulnerable groups such as SC/ST on health care, and figuring out these pathways remains an important research issue.

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