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**Working Paper**

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Working Paper, No. 707

**Provided in Cooperation with:**

University of California Santa Cruz, Economics Department

*Suggested Citation:* Dongrea, Ambrish (2012) : Can conditional cash transfers impact institutional deliveries? Evidence from Janani Suraksha Yojana in India, Working Paper, No. 707, University of California, Economics Department, Santa Cruz, CA

This Version is available at:

<https://hdl.handle.net/10419/98637>

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**Can Conditional Cash Transfers Impact Institutional Deliveries? Evidence from Janani  
Suraksha Yojana in India\***

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This Version: December 28, 2012

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\* This is a revised version of one of the chapters in my doctoral thesis, submitted (and accepted) at University of California, Santa Cruz (USA) in July 2010. I thank my advisors, Joshua Aizenman and Nirvikar Singh for their help. I would like to especially thank Jon Robinson for his continuous support and encouragement. Discussions with Dr. Kaustubh Apte and Dr. Suhas Ranade on mechanics of the Janani Suraksha Yojana have been extremely helpful. I am also thankful to Aakash Wankhede at International Institute of Population Sciences, Mumbai (India) for making the dataset available promptly.

## **Abstract**

Conditional cash transfers (CCTs) are an increasingly popular tool for incentivizing behavior. This paper evaluates impact of one of the largest CCTs in the world, Janani Suraksha Yojana (JSY) in India, on institutional deliveries. Maternal mortality is high in India and JSY aims to reduce it by encouraging institutional deliveries through provision of monetary incentives to women if they deliver in medical facilities, and to local community health workers if they facilitate such deliveries. Exploiting key differences in program design between the 'low performing' and the 'high performing' States, and utilizing successive rounds of a large national sample survey, this paper shows that institutional deliveries increased rapidly in the low performing States after the launch of the program, albeit with a lag. Pre-existing trends in institutional deliveries or improvement in availability or access to medical facilities do not explain these results.

## **JEL Classification**

I18; O15

## **Keywords**

Janani Suraksha Yojana; maternal mortality; institutional delivery; conditional cash transfer; India; National Rural Health Mission (NRHM)

## Introduction

Despite tremendous medical advances, the instances of maternal and neo-natal mortality occur quite frequently, especially in developing countries. Each year, more than half a million women die from causes related to pregnancy and child-birth, 99% of which take place in developing countries (UNICEF, 2009). Nearly 4 million newborns die within 28 days of birth, 98% of which occur in the low and the middle income developing countries. Most of these deaths are the result of direct causes- 80% of maternal deaths are due to obstetric complications including post-partum haemorrhage, infections, eclampsia and prolonged or obstructed labor, while 86% of the newborn deaths are the direct results of the three main causes- severe infections, asphyxia and preterm births. Thus, a large number of maternal and neo-natal deaths can be avoided if skilled medical personnel are at hand, better care is provided during labor and delivery, and key drugs, equipments are available. Given that these resources are more easily available in a medical facility, delivering in a medical facility can make a significant dent in maternal and neo-natal deaths. Yet, proportion of women who deliver in medical facilities remains abysmally low in many developing countries.

This paper analyzes the short-term impact on institutional deliveries, of a novel conditional cash transfer (CCT) program in India, Janani Suraksha Yojana (Safe Motherhood Scheme, henceforth JSY). The program, initiated in April 2005, provides monetary incentive to women if they deliver in government medical facilities or accredited private medical facilities. The program also provides monetary incentives to local community health workers if they facilitate a delivery in government facilities. The eligibility criteria for women to avail monetary incentives and the magnitude of incentives were uniform across the nation in the first year and half of the program's operation. But in late 2006, the eligibility rules were relaxed and monetary incentive was doubled in the so called 'low performing States', the States (or regions) where proportion of institutional delivery was very low<sup>1</sup>. Thus, year of delivering the child and the State of delivery provide two sources of variation for my difference-in-difference estimation strategy.

I utilize data from independently conducted rounds of a large national survey, before and after the introduction of the scheme, to analyze the impact of the scheme on institutional deliveries. I find that in the initial period, there was a marginal increase in institutional deliveries in the high performing States. But beginning from 2007, the low performing States have shown much larger improvements, and gap in institutional deliveries between the low performing and the high

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<sup>1</sup> State is an administrative unit below the Federal/ Central government in India.

performing States has started narrowing. Importantly, the data indicates that the pre-treatment trends in institutional deliveries can't explain these results. Further, I also show that there has been no differential change in either availability or access to medical facilities in favor of the low performing States over this time period. In addition, I find that in the low performing States, proportion of women delivering in government medical facilities has gone up dramatically, while proportion of women delivering in private medical facilities has actually gone down. This is consistent with the eligibility criteria and magnitude of incentives. These findings increase our confidence that the changes in institutional deliveries are more likely to be driven by JSY. The evidence on whether women from disadvantaged households benefit is mixed though, and which women benefit differ between the low performing and the high performing States.

This paper provides yet another example of a CCT program, which have become a preferred policy tool to realize social-welfare objectives of the government, especially across the developing world. Researchers have extensively analyzed *Oportunidades* in Mexico (previously known as PROGRESA), *Red de Protección Social* in Nicaragua, *Bono de Desarrollo Humano* in Ecuador, *Program of Advancement through Health and Education* (PATH) in Jamaica, *Programa de Asignación Familiar* in Honduras, *Familias en Acción* in Colombia, *Bolsa Familia* (formerly *Bolsa Escola*) in Brazil, and *Chile Solidario* in Chile, and have identified their impacts on various education and health-related indicators (Fiszbein and Schady, 2009).

Almost every CCT mentioned above had significant impacts on school enrollment and attendance (See Schultz (2004) for Mexico; Attanasio et al. (2005) for Colombia; Maluccio and Flores (2005) for Nicaragua; Galasso (2006) for Chile; Schady and Araujo (2008) for Ecuador). The evidence from CCTs in Pakistan (Chaudhury and Parajulu, 2006) and Cambodia (Filmer and Schady, 2008) suggests that these effects can be very large. The program effects may not be identical for all students. Schultz (2004) shows that the effects of the Mexican CCT program on enrollment were significant only for the children who were enrolled in grade 6 at the baseline. This is not surprising given the fact that proceeding from grade 6 to grade 7 implies transition from primary to lower secondary school and that's where the bulk of the drop-outs occur<sup>2</sup>. The evidence also shows that the largest program effects are for the households which are more disadvantaged at the baseline (Filmer and Schady, 2008; Glewwe and Olinto, 2004; Behrman et al. 2005). But evidence on impact of CCTs on learning outcomes is disappointing (Ponce and Bedi, 2010; Behrman et al.; 2000), Filmer and Schady; 2009).

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<sup>2</sup> Also see Schady and Araujo (2008) for similar findings in the context of Ecuador.

As far as health indicators are concerned, the evidence shows that CCTs in Honduras (Morris et al., 2004), Colombia (Attanasio et al., 2005), Jamaica (Levy and Ohls, 2007) and Nicaragua (Macours et al., 2012) had positive and significant effects on health centre visits by children, while the CCTs in Mexico (Gertler, 2000), and Chile (Galasso, 2006) did not have much effect. Evidence on impact of vaccination and immunization is also mixed. Some programs have no effect (Barham, 2005), while some programs do (Barham and Maluccio, 2009). In some cases, effects are found only for specific age-groups and specific vaccinations (Morris et al., 2004; Barham and Maluccio, 2009). Gertler (2004) and Behrman & Hoddinott (2005) report increase in the height of children of *Oportunidades* beneficiaries while other Latin American CCTs don't show this effect. Gertler (2004) and Paxon and Schady (2010) also show positive effects of the CCTs on hemoglobin levels. Paxon and Schady (2010) and Macours et al. (2012) show that the CCTs can have positive effects on cognitive outcomes for children in the beneficiary households<sup>3</sup>.

The empirical work in recent years has attempted to understand the contribution of specific elements of the CCT program package to the outcome of interest. These studies indicate that changing the timing of receiving transfers can yield effects over and above the standard payment pattern (Barrera-Osorio et al., 2011); there is a possibility of sharply diminishing marginal response to the transfer size (Filmer and Schady, 2011); conditionalities do matter in the sense that they increase the desired outcome from the policymaker's point of view but in the process, may impose costs on non-compliers (de Brauw and Hoddinott, 2011; Baird et al., 2011); gender of the recipient may not matter when it comes to the cash transfers which are conditional (Akresh et al., 2012).

This paper contributes to this growing literature by analyzing a unique CCT program which incentivizes pregnant women to deliver in medical facilities. The program has become one of the largest CCT programs in the world but surprisingly, not much is known about its effect on institutional deliveries. The findings in this paper assume even more significance given the fact that India contributes one-fifth to the global maternal deaths. And hence, success of this program can have important implications for achieving the millennium development goal of reducing the maternal mortality ratio by three-quarters.

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<sup>3</sup> The Mexican CCT program remains the most analyzed program as far as the effects of CCTs on health indicators are concerned. In addition to the references mentioned above, also see Barber and Gertler, 2008; Fernald et al., 2008; Barber, 2009; Barber and Gertler, 2009; Barber and Gertler, 2010;

The rest of the paper is organized as follows. Section I provides the background and the description of the JSY program. Section II describes data, while section III discusses the empirical strategy. Section IV has the key results, and section V provides robustness checks. Section VI concludes.

## 1. Background & the Program

### 1.1 Background

Despite India's rapid economic progress and rising expenditure on public health, the health-related indicators have not shown much progress<sup>4</sup>. This has prompted many to believe that India's public health system has failed to deliver (Banerjee & Duflo, 2009)<sup>5</sup>. Maternal health-care is not an exception to this.

Maternal mortality in India constitutes 22% of the worldwide maternal deaths. Though there has been steady decline in MMR in the last decade (table 1), it is much higher compared to the other developing countries, such as China, Philippines, Thailand, Sri Lanka, which have MMR less than 100 (Unicef, 2009). Further, there is wide disparity in MMR among the States in India. As per 2004-06 figures, all the States in top panel of table 1 had MMR in excess of 300. In fact, about two-thirds of maternal deaths in India are concentrated in these States. The States in lower panel of table 1 had MMR less than 200 (with the exception of Karnataka). The table also indicates that the States with a high MMR also have a relatively lower fraction of deliveries taking place in a medical institution<sup>6</sup>.

It was on this backdrop that the 'National Rural Health Mission' (henceforth, NRHM) was launched by the Government of India (GoI) in April 2005<sup>7</sup>. One of the major objectives of the NRHM has been

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<sup>4</sup> As per the 2002-04 and 2007-08 waves of a large national sample survey (details later), proportion of women receiving complete pre-natal check-up increased from 16.5% to 18%. Proportion of women delivering in a health facility went up from 40% to 47%. Finally, proportion of children in the age- group 12-23 months and fully immunized, increased from 46% to 54% (IIPS, 2010). In the meanwhile, public expenditure on health (Center and State combined) increased by 214% between 2000-01 and 2009-10 (See Economic Survey of India, Ministry of Finance, Government of India for 2005-06 and 2011-12).

<sup>5</sup> See Chaudhury et al. (2006), Das et. al (2007), Das and Hammer (2007), and Muralidharan et al. (2011), for discussion on problems afflicting Indian public health system.

<sup>6</sup> Figures for MMR of the States have been obtained from various reports and bulletins published by the Office of Register General of India.

<sup>7</sup> <http://www.mohfw.nic.in/NRHM.htm>

to reduce the maternal mortality to 100 per 100 thousand and reduce infant mortality to 30 per thousand live births by the year 2012<sup>8</sup>. This ambitious target was sought to be achieved through the 'Janani Suraksha Yojana' (henceforth JSY) i.e. Safe Motherhood Scheme, launched in April 2005.

### *1.2 Janani Suraksha Yojana (JSY)*

JSY is a conditional cash transfer scheme- a woman is paid money if she delivers her baby in a medical facility- in government health facilities, like Sub-centers (SCs), Primary health centers (PHCs), Community health centers (CHCs) or general wards of district or State hospitals, government medical colleges or accredited private institutions<sup>9,10</sup>. For the purpose of this scheme, the States have been divided into two categories- the low performing States (indicated as LPS in the tables) and the high performing States (indicated as HPS), depending upon the level of institutional deliveries in pre-2005 period. The low performing States are the ones where the proportion of the institutional deliveries is very low<sup>11</sup>.

Initially, the eligibility rules to obtain monetary incentives under the JSY were uniform across the low performing and the high performing States. According to these rules, only those women who were of 19 years of age or above, and belonged to the below poverty line (henceforth, BPL) families, were eligible for the benefit<sup>12</sup>. The benefit was restricted to the first two live births. In the low performing States, women were eligible for benefit for third birth as well, provided the beneficiary opts for sterilization immediately after delivery. The monetary incentives were also identical in the low performing and the high performing States as far as rural areas were concerned. Details are described in table 2.

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<sup>8</sup> see (NRHM, 2009) for details about the goals and objectives, administration, and funding pattern of the NRHM.

<sup>9</sup> District is an administrative unit below the State. Larger districts are divided into sub-divisions. A block is an administrative unit below the district/ district sub-division.

<sup>10</sup> A SC is the most peripheral health facility and first point of contact between the primary health care system and the community. A PHC is above the SC. It acts as a referral unit for 6 SCs. It is the first point of contact between the community and a medical officer. A CHC serves as a referral for 4 PHCs. It is manned by medical specialists and paramedics. The District hospitals are at the highest level within a district. See appendix 1 for more details.

<sup>11</sup> These States are the ones indicated in top panel of table 1.

<sup>12</sup> 'Below Poverty Line' (BPL) households are identified by local governments through periodic census of households, under the directions from the Ministry of Rural development. The census has been carried out in 1992, 1997, 2002 and 2011. The households identified as 'BPL' households are supposed to get the 'BPL' card which entitles them to benefit from plethora of welfare schemes.



These eligibility rules were deemed to be too strict, especially in the low performing States, and hence, new guidelines were issued in late 2006<sup>13</sup>. According to these new guidelines, in the low performing States,

- 1) all pregnant women, irrespective of age, poverty status and number of births, are eligible for benefit under the JSY if they deliver in a *government medical facility*;
- 2) only the women from the BPL households and women from the Scheduled Castes (SC) /Scheduled Tribes (ST) households (whether above or below the BPL) are eligible for the benefit under the JSY if they deliver in an *accredited private medical facility*.

In case of the high performing States,

- 1) only those pregnant women who are aged 19 years and above, and belong to the BPL households, are eligible for cash assistance;
- 2) in case of the SC or ST households, all women irrespective of their poverty status, are eligible for cash assistance, provided they are above the age of 19. Cash assistance is limited to only two live births, even for the women belonging to the SC and ST.

Thus, these revised guidelines meant that any pregnant woman in a low performing State is eligible for the benefit under the JSY, while age, poverty status and number of births still matter in the high performing States. In addition, the amount of financial assistance was also modified (table 2). The beneficiaries in the low performing States are now given Rs. 1400 if the woman lives in rural area, and Rs. 1000 if the woman lives in urban area (\$25.45 and \$18.18 using Rs. 55/\$ as exchange rate). For the beneficiaries in the high performing States, the corresponding amounts are Rs. 700 and Rs. 600 (\$12.73 and \$10.91). The modified monetary incentive in a low performing State is quite substantial- around 63% of the poverty line expenditure cut-off, and 68% of average delivery cost in a government medical facility<sup>14</sup>.

### *1.3 Role of Accredited Social Health Activist (ASHA) in JSY<sup>15</sup>*

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<sup>13</sup> The exact month could not be confirmed.

<sup>14</sup> Poverty line estimates have been taken from Tendulkar Committee report (Radhakrishna et al, 2009). Delivery cost has been taken from the national report of the third round of District Level Health Survey i.e. DLHS 3 (IIPS, 2010).

<sup>15</sup> <http://www.mohfw.nic.in/NRHM/asha.htm>

Appointment of Accredited Social Health Activists, ASHAs (which literally means hope in Hindi) is an important element of NRHM. An ASHA is envisaged as a link between the public health system and the local community, and a first port of call for health-related demands of the disadvantaged sections of the populations. An ASHA is selected among the women residents of the village in the age-group of 25-45 years and who have been educated at least up to class 8. As per the norms, there should be one ASHA for every 1000 population. An ASHA has been assigned important responsibilities in the context of maternal and child health- identifying pregnant women in the community, making sure that these women receive complete prenatal care through Auxiliary Nurse Midwife (ANM), escort the woman to the health center when the woman is in labor or faces complications, facilitate delivery in a medical facility, and ensure post-natal care for the woman and the new-born, including immunization<sup>16</sup>.

As per the NRHM, the ASHAs were initially appointed only in the low performing States<sup>17</sup>. Further, the ASHAs don't receive a fixed salary but instead receive performance-based payments. An ASHA in rural area can get maximum of Rs. 600 (\$10.91 using Rs. 55/\$ as exchange rate) per delivery, which includes Rs. 150 if she escorts the woman to the facility, Rs. 250 for transport, and Rs. 200 as an incentive<sup>18</sup>. If the ASHA doesn't arrange the transport, she won't receive Rs. 250 meant for transport. An ASHA in urban area gets only Rs. 200, the incentive amount. Further, the incentive payment for an ASHA is available only in case of deliveries in government facilities, and not in case of accredited private facilities.

#### *1.4 Disbursement of Cash Incentive to the Mothers*

According to the guidelines, the financial assistance to the mother should be disbursed at the medical facility itself, in one installment before her discharge from the medical facility. The amount would be paid only to the mother and not to any other person. The disbursement should be done either by an ANM or an ASHA. If a woman goes to her mother's place for delivery or to a district / State hospital, the amount of assistance would be based on the place of residency. The expectant

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<sup>16</sup> An Auxiliary Nurse Midwife (ANM) is a key functionary in rural health system. Her main responsibilities include maternal and child health, with special focus on antenatal care and delivery care. Over time, other functions, such as family planning, immunization, sanitation, infectious disease prevention etc. have been added to her tasks (See Mavalankar & Vora, 2008). ANMs are stationed at SCs and PHCs.

<sup>17</sup> Due to pressure from the high performing States, the scheme was extended to these States in 2008 i.e. beyond the period covered in our sample.

<sup>18</sup> The exact break-up differs marginally across States.

mothers are supposed to carry a referral slip from ANM, which would indicate their place of residency.

In order to receive benefits, 'Below Poverty Line' (BPL) or caste certificates (for women belonging to SC/ST categories) are required (wherever applicable). If the BPL certification is not available through a legally constituted process, the beneficiary can still avail the benefit on certification by the local council (such as village council), elected representatives, revenue authorities, provided the delivery takes place in a government institution. But the benefit available under the JSY, when a BPL woman delivers in an *accredited private hospital*, can be obtained only by producing a regular BPL card whose number etc. has to be quoted in the discharge card issued by the private institution<sup>19</sup>.

## 2. Data

Our empirical analysis uses 1998-99, 2002-04 and 2007-08 waves of the Reproductive and Child Health- District Level Health Survey (henceforth, DLHS). These surveys were initiated to assess the 'Reproductive and Child Health Programme' (RCH) of the GoI, launched in 1996-97, wherein a need was felt to generate district level data on various health-related aspects. These nationwide surveys are conducted on behalf of the Ministry of Health & Family Welfare, GoI and the International Institute of Population Sciences (IIPS), Mumbai is the nodal agency<sup>20</sup>.

The survey covers all districts in the country. A systematic, multi-stage stratified sampling design is adopted, and primary sampling units (villages in rural areas/ wards in urban areas) are selected with probability proportion to size (PPS) sampling. The data is collected through structured questionnaires to obtain relevant information about the sampled household, married women in the age group of 15-44 years in the sampled household, husbands of these women, and the sampled villages. The types of questionnaires canvassed are not uniform across the survey rounds- village questionnaire was not canvassed in the 1998-99 wave, while questionnaire for husbands was canvassed only in the 2002-04 wave (table 3).

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<sup>19</sup> The SC / ST women don't need to show BPL certificate but only the caste certificate.

<sup>20</sup> <http://www.rchiips.org/>

The questionnaire for women is canvassed to those women who have given birth to a child within a period of 3-4 years before the survey. For 2007-08 wave, this time period is from January 1, 2004 to the date of survey. For 2002-04 wave, time period is from January 1, 1999 to the date of survey for phase 1, and from January 1, 2002 to the date of survey for phase 2. For 1998-99 wave, time period is from January 1, 1995 to the date of survey for phase 1, and from January 1, 1996 to the date of survey for phase 2. Thus, combining the three rounds gives a relatively large sample of women who have given birth to children between 1995 to early 2008 (table 4).

The focus of questionnaire for women is to obtain information about maternal and child health care, family planning and use of contraceptives, and awareness about sexually transmitted diseases and HIV/AIDS. Specific questions about maternal and child health pertain to the receipt of antenatal care, problems during pregnancy, receipt of iron folic acid tablets/ syrup, tetanus injections during pregnancy, place of delivery (whether home or medical facility- government or private), breastfeeding practices, immunization and vaccinations, prevalence and awareness about diarrhea, pneumonia etc. If the woman has given birth to more than one child within the time period under consideration, the information is asked about the last pregnancy. The household questionnaire obtains information about household level variables such as size of the household, religion, caste, age and education of family members, marriages, deaths and births in the family, water and sanitation facilities, consumer durables and other assets. The village questionnaire obtains information about health, schooling and other facilities in the village.

My main variable of interest is whether the delivery takes place in a medical institution. I define a delivery as 'institutional delivery' if it takes place in a medical facility, whether owned by public or private sector or by NGO/ charitable trusts. The public / government medical facilities include SCs, PHCs, CHCs, rural hospitals, district hospitals, municipal and State hospitals etc.

The sample include the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Bihar, Orissa, Jharkhand, Madhya Pradesh, Chhattisgarh and Rajasthan, classified as the 'Low Performing States', and Delhi, Punjab, Haryana, West Bengal, Gujarat, Maharashtra, Goa, Karnataka, Kerala, Andhra Pradesh and Tamil Nadu, classified as the 'High Performing States'. These States constitute 95% of India's population as per Census 2011<sup>21</sup>.

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<sup>21</sup> I drop States in North-East India and the Union Territories. The North-Eastern states are Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura. The Union Territories include

### 3. Empirical Strategy

#### 3.1 Analyzing Impact of the JSY on Institutional Deliveries

The discussion so far reveals that JSY was introduced throughout the entire country simultaneously. But the eligibility criteria was substantially relaxed and monetary incentive was hiked considerably in the low performing States towards the end of 2006, while keeping them unchanged in the high performing States. Similarly, the ASHAs were appointed only in the low performing States, which would potentially reduce the anxiety and hassles for the woman and her family associated with approaching a medical facility and receiving incentive payment post-delivery. Hence, I hypothesize that, other things being equal, the low performing States should witness a larger increase in the institutional deliveries as compared to the high performing States. Thus, our empirical strategy compares changes in the proportion of institutional deliveries between the low performing and the high performing States before and after JSY was launched.

I consider the following regression specification,

$$Y = \beta_0 + \beta_1*LPS + \beta_2*Y2005 + \beta_3*Y2006 + \beta_4*Y2007 + \beta_5*Y2008 + \beta_6*(LPS*Y2005) + \beta_7*(LPS*Y2006) + \beta_8*(LPS*Y2007) + \beta_9*(LPS*Y2008) + \mathbf{X}'\boldsymbol{\alpha} + \varepsilon, \quad (I)$$

where the dependent variable  $Y$  is a dummy variable which equals 1 if the woman has delivered the child in a medical facility, zero otherwise. The baseline is the pre-program level of institutional delivery in the low performing States. 'LPS' is a dummy variable indicating if the woman is resident of a low performing State. It captures the pre-existing differences between the low performing and the high performing States. I expect its coefficient to be negative. 'Y2005' to 'Y2008' are dummy variables for the births that have taken place in 2005 (after the launch of the JSY), 2006, 2007 and 2008 respectively. They capture increase in the institutional deliveries in the high performing States relative to the pre-program level. I expect the coefficients on these variables to be positive. The coefficients on the interaction terms ' $LPS*year$ ' indicate differential change in institutional deliveries in the low performing States relative to the change in the high performing States in that particular year, relative to the baseline. If institutional deliveries have increased more in the low

performing States relative to the high performing States, these coefficients would be positive. If the effect of the scheme grows over a period of time, the coefficients on the interaction terms for later years would be higher.  $X$  captures other woman and household level controls. The controls for women include whether the woman and her husband are literate, total number of pregnancies the woman had, age at the time of last pregnancy, whether the woman received any prenatal care, whether the woman had any problem during pregnancy. The controls at the household level include caste, religion, measure of standard of living, and whether the household is in rural area (if applicable).

### *3.2 Deliveries in Public vs. Private Medical Facilities*

JSY incentives for women are available for deliveries in government facilities and only accredited private medical facilities. No benefits are available for delivery in the private medical facilities which are not accredited. Further, the ASHAs are not supposed to receive any incentives in case of delivery in a private facility, accredited or not. Low number and limited geographical spread of accredited private facilities, combined with the above-mentioned JSY conditionalities suggest that the JSY would reduce the proportion of deliveries conducted in private facilities, and increase the same in government facilities<sup>22</sup>. I test this hypothesis using the identical regression specification as above with the exception of dependent variables, which in this case, would be (1) delivery in government facilities, and (2) delivery in private facilities. As before, the coefficients on the interaction terms, *'year\*LPS dummy'* indicate differential change in the government/ private institutional deliveries in the low performing States compared to the changes in the high performing States in that particular year, relative to the baseline.

### *3.3 Differential Effect of the Program*

The JSY is also expected to benefit more to relatively disadvantaged households. The direct and indirect costs associated with institutional deliveries are likely to be more binding for the disadvantaged households. Further, the eligibility criteria and incentive amount favor relatively disadvantaged households. For example, magnitude of JSY incentives is higher in rural area

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<sup>22</sup> There were only 658 accredited private institutions as on June 30, 2012 across Bihar, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand. Bihar, Himachal Pradesh, Jammu & Kashmir and Uttar Pradesh have no accredited private medical facilities. Madhya Pradesh has 41, Odisha has 17 and Uttarakhand has only 2 accredited facilities (See *National Rural Health Mission: State wise Progress as on June 30, 2012*, published on September 25, 2012).

compared to urban area in both, the low performing and the high performing States. In the high performing States, only SC/ST women and BPL women are eligible for JSY benefits. Similarly, in the low performing States, women from SC/ST households and BPL households are eligible for monetary incentives even when they deliver in accredited private medical facilities, while other women are not<sup>23</sup>. Thus, one would expect that proportion of institutional deliveries would grow faster among women from rural households, SC/ST households and BPL households in both, the low performing and the high performing States.

The following regression specification compares changes in proportion of institutional deliveries among women from disadvantaged households relative to the women in other households, separately for the low performing and the high performing States:

$$Y = \beta_0 + \beta_1*Z + \beta_2*Y2005 + \beta_3*Y2006 + \beta_4*Y2007 + \beta_5*Y2008 + \beta_6*(Z*Y2005) + \beta_7*(Z*Y2006) + \beta_8*(Z*Y2007) + \beta_9*(Z*Y2008) + \mathbf{X}'*\boldsymbol{\alpha} + \varepsilon, \quad (II)$$

where 'Z' indicates whether household belongs to the disadvantaged category (i.e. it resides in rural area or it belongs to SC/ST communities or it is 'poor' or the woman has never attended school). The survey does not identify poor or BPL households. Hence, I use wealth index as the proxy for relative poverty of the household, i.e. households with 'low' and 'medium' wealth index are poorer than the households with 'high' wealth index<sup>24</sup>. The coefficients on the interaction terms, '*year\*Z*' indicate differential change in the institutional deliveries among disadvantaged households relative to the changes in rest of the households in that particular year, relative to the baseline. If the disadvantaged women benefit more, then the coefficient on these interaction terms would be positive and statistically significant.

### *3.4 Pre-program Trends in Institutional Deliveries*

Even if I find that there is differential increase in institutional deliveries in the low performing States after the launch of the JSY, it may or may not be attributed to the JSY. The possibility of convergence suggests that even in the absence of the program, the low performing States might

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<sup>23</sup> Discussion in 3.2 suggests that this channel may not be very important.

<sup>24</sup> The 2007-08 wave asks whether the household has the BPL card. But it is well-known that a significant fraction of non-poor households possess BPL cards (Ram et al., 2009). Hence, using BPL card to identify poor households is not appropriate.

have experienced faster increase in institutional deliveries, because the level of institutional deliveries was quite low in these States before the launch of the program. In order to alleviate this concern, I look at the trends in institutional deliveries before the launch of the JSY, in the low performing and the high performing States. If the trends are indeed uniform, then the differential trends after the launch of the program can more confidently be attributed to the program.

To check whether the trends were uniform, I consider the following regression specification, where 1995 is the omitted year (baseline):

$$\begin{aligned}
 Y = & \beta_0 + \beta_1 * LPS + \beta_2 * Y1996 + \beta_3 * Y1997 + \beta_4 * Y1998 + \beta_5 * Y1999 + \beta_6 * Y2000 + \beta_7 * Y2001 + \\
 & \beta_8 * Y2002 + \beta_9 * Y2003 + \beta_{10} * Y2004 + \beta_{11} * (LPS * Y1996) + \beta_{11} * (LPS * Y1997) + \\
 & \beta_{11} * (LPS * Y1998) + \beta_{12} * (LPS * Y1999) + \beta_{13} * (LPS * Y2000) + \beta_{14} * (LPS * Y2001) + \\
 & \beta_{16} * (LPS * Y2002) + \beta_{17} * (LPS * Y2003) + \beta_{18} * (LPS * Y2004) + \mathbf{X}' * \boldsymbol{\alpha} + \varepsilon, \tag{III}
 \end{aligned}$$

In the above specification, I use data from the survey rounds conducted before the JSY was launched, i.e. 1998-99 and 2002-04 waves. If the trends in institutional deliveries were indeed uniform across the two groups, the coefficients on the interaction terms would be zero.

### *3.5 Availability & Access to Medical Facilities*

As mentioned previously, JSY is a part of the NRHM, which is a broad program with special focus on the low performing States. Creation of medical facilities is an important element of the NRHM. Since it is the low performing States where infrastructure gaps are more severe, more facilities would be created in the low performing States. This would mean that availability and access to medical facilities might change differentially in the low performing States, which would result in more institutional deliveries even in the absence of any monetary incentive. I use village level data obtained through village questionnaires from 2002-04 and 2007-08 waves to assess whether there have been any such differential change across the two rounds<sup>25</sup>. The village questionnaire in both the surveys seeks information about the availability and the access to various medical facilities such as child development center (Anganwadi), Sub-center, Primary health center, Government dispensary, and finally, mobile health clinic. Availability means whether the village has a particular

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<sup>25</sup> Village level data is available only for the rural areas.



type of medical facility, while accessibility means whether the facility is accessible throughout the year. I estimate the following difference-in-difference regression,

$$Y = \beta_0 + \beta_1 * LPS + \beta_2 * POST + \beta_3 * (LPS * POST) + \varepsilon, \quad (IV)$$

where the dependent variable  $Y$  is a dummy variable which equals 1 if a) the village has a particular medical facility, and b) if the village has access to these medical facilities. 'LPS' is a dummy variables indicating if the village is in a low performing State. It captures the pre-existing differences between the low performing and the high performing State. I expect it's coefficient to be negative. 'POST' equals 1 for villages covered in 2007-08 round. It captures the change in availability and access to medical facilities in the high performing States relative to the baseline. The variable of interest is the interaction term ' $LPS * POST$ ', which captures differential trends in the dependent variable in the low performing states. Presence of a differential change will make it difficult to disentangle the effect of monetary incentive from easier access to medical facilities, on institutional deliveries.

## 4. Results

### 4.1 Annual Treatment Effects

Table 5 presents the results from estimating specification I for the all India sample, and then separately for the rural and the urban sample. First column in each case presents the results without any controls other than the variables displayed, while the second column presents the results with additional controls as mentioned at the bottom of the table.

Let's consider the results for all India sample. The result indicates that 60% women in the high performing States delivered in medical facilities at the baseline, while the proportion was barely 26% in the low performing States<sup>26</sup>. The coefficients on year dummies indicate positive growth in proportion of institutional deliveries in the high performing States. The coefficients on the interaction terms are of our main interest. The negative and significant coefficient estimates on ' $LPS*2005$ ' and ' $LPS*2006$ ' indicate that the increase in institutional deliveries was greater in the high performing States in the initial period after the launch of JSY, i.e. the gap in proportion of institutional deliveries between the two groups widened marginally in 2005 and 2006. But the

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<sup>26</sup> The baseline is the proportion of institutional deliveries in the period 1999- 2004.

signs of the coefficient estimates change for the interaction terms '*LPS\*2007*' and '*LPS\*2008*'. They are positive, significant and large in magnitude which suggests that the proportion of institutional deliveries increased at a higher rate in the low performing States and as a result, gap between the two groups started declining. For example, the estimates of '*LPS\*2007*' and '*LPS\*2008*' in column (1b) imply that the increase in the proportion of institutional deliveries was higher in the low performing States by 3.7 and 6.9 percentage points respectively, relative to the high performing States.

The trends in the rural sample are similar to that of all-India sample. The urban sample displays slightly different pattern. Coefficient estimates on '*LPS\*2005*' and '*LPS\*2006*' indicate that the increase in institutional deliveries in 2005 and 2006 was identical in the low performing and the high performing States. But the signs of the coefficient estimates are positive and statistically significant for '*LPS\*2007*' and '*LPS\*2008*', indicating higher rate of growth in institutional deliveries in the low performing States.

#### *4.2 Deliveries in Public vs. Private Medical Facilities*

As discussed in section 3.2, the JSY is likely to have different consequences for deliveries in public and private medical facilities. Table 6 presents the corresponding results. Column (1b) indicates that deliveries in public facilities increased at a higher rate in the low performing States in 2007 and 2008, while column (2b) shows that deliveries in private facilities actually declined in the low performing States in 2007 and 2008. Thus, overall increase in institutional deliveries is actually a combination of increase in institutional deliveries in public medical facilities and decline in institutional deliveries in private medical facilities.

#### *4.3 Differential Effects of JSY*

Tables 7 and 8 present the results from estimating specification II for the low performing States, and for the high performing States respectively. In both the tables, column 1 focuses on wealth status, column 2 on rural households, and column 3 on SC/ST households. First, we discuss results in table 7.

The results indicate that proportion of institutional deliveries among women belonging to the disadvantaged households was less compared to the other households before 2005. Column 1 shows that institutional deliveries have grown at an increasing rate among the women from the households with 'high' wealth. In fact, gap between women from the households with 'high' wealth and others has increased, as indicated by interaction terms for years 2005 and 2006. This is especially true for women from the households with 'low' wealth. But the trend reversed post-2006 with institutional deliveries growing at a higher rate among women from the households with 'low' and 'medium' wealth (indicated by interaction terms for the years 2007 and 2008). Column 2 shows that institutional deliveries have gone up at similar rates for women from the rural and the urban households. Similar trend can be seen in column 3 where institutional deliveries have grown at similar pace for women from SC/ST and non-SC/ST households.

What does table 8 indicate? Pre-existing differences between relatively advantaged and disadvantaged households are quite high. An interesting point to note is that the difference between SC/ST and non-SC/ST households is higher in case of the high performing States than those in low performing States. Column 1 indicates institutional deliveries have grown for women from households with 'high' wealth but they have grown even faster for women from households with 'medium' wealth, and to some extent for households with 'low' wealth. Column 2 shows that proportion of institutional deliveries has been almost constant in urban areas, while it has grown in rural areas. As a result, the gap between rural and urban areas has narrowed down. Column 3 suggests similar trends- institutional deliveries growing at the same rate for SC/ST and non-SC/ST households, and as a consequence, the gap in institutional deliveries between the two groups has remained more or less constant.

## **5. Threats to Validity**

### *5.1 Pre-treatment Trends*

The key question is: Can the trends observed in institutional deliveries be attributed to JSY? The results for specification III are presented in table 9, with year 1995 as the base period. I only present the coefficients corresponding to the interaction terms.

The trends are almost identical up to 1999 for the all India and the rural sample. Year 2000 onward, the trends diverge marginally. The trends diverge even more for the rural sample, with the low performing States performing worse. The trends remain more or less parallel for the urban sample. Thus, these results clearly indicate that our annual treatment effects, especially for the all India sample and the rural sample, are not driven by convergence, which is reassuring.

I also combine all the three rounds giving us a sample of women who have given birth between 1995 and 2008. Then I estimate a specification similar to that of specification (III) with the exception of the time-period which now extends till 2008, separately for the entire sample, and for the rural and the urban sample. Figure 1 plots the coefficients on the interaction terms based on the entire sample, figure 2 plots the coefficients on the interaction terms based on the rural sample, and figure 3 plots the coefficients on the interaction terms based on the urban sample. I have also drawn vertical lines at year 2005 to indicate beginning of the program, and at 2006 to indicate the timing of modification in the program (late 2006). These figures aptly summarize the regression results in tables 5 and 9.

### *5.2 Availability and Access to Medical Facilities*

As mentioned in section 3.5, another potential concern is the differential change in availability and access to the medical facilities in favor of the low performing States in the time period under consideration. The results for specification IV are presented in table 10. Panel A shows the results for the dependent variable, 'whether a particular medical facility is in the village?', while panel B shows the results for the dependent variable, 'whether a particular medical facility is accessible throughout the year?'.

The variable of interest is the interaction term ' $LPS * POST$ ', which captures differential trends in the dependent variable in the low performing states. The results indicate that except for the child development centre (anganwadi), there has been no differential change in the availability and the access of any other medical facility. This suggests that the differential increase in the proportion of institutional deliveries is unlikely to be driven by increased availability and access of medical facilities.

To summarize, our empirical analysis shows that institutional deliveries have increased more in the low performing States compared to the high performing States after JSY was modified. This increase is not driven by pre-existing trends in institutional deliveries or by differential changes in availability or access to medical facilities. Interestingly, the overall increase in institutional deliveries consists of increase in deliveries in public facilities and decline in deliveries in private facilities.

## **6. Conclusion**

Instances of maternal and neo-natal mortality occur quite frequently, especially in developing countries. It is suggested that delivering a child in a medical facility can reduce such occurrences substantially. This paper analyzes a unique conditional cash transfer (CCT) program, Janani Suraksha Yojana (JSY) in India, which provides cash incentives to women if they deliver in a government or an accredited private medical facility, and to the local community health workers if they facilitate delivery in government facilities. I exploit the fact that the eligibility criteria were relaxed and magnitude of cash incentives were hiked only in the 'low performing' States, and not in the 'high performing' States. Further, the community health workers who received incentives for facilitating deliveries were appointed only in the low performing States. Results show that after the launch of JSY, the gap between the low performing and the high performing States widened marginally. But trend reversed after the modification in program design, with the low performing States showing much higher increase in the institutional deliveries than the high performing States. These trends are neither driven by trends in institutional deliveries before the JSY was initiated nor by differential change in availability or access to medical facilities in the low performing States. This increases our confidence that these trends are driven by monetary incentives under the JSY. These results are encouraging given the fact that India alone contributes one-fifth to the tally of global maternal deaths.

The overall increase in institutional deliveries in the low performing States masks the divergent trends in public and private health facilities. I find that institutional deliveries in public facilities have increased while the private medical facilities have seen their share going down. Further, women from relatively disadvantaged households have not necessarily done better. Women from households with low and medium levels of wealth are doing better than their counterparts in households with 'high' wealth levels, in both, the low performing and the high performing States

post-2006. But women from the rural areas are doing better than the ones in urban areas only in the high performing States and not in the low performing States. Moreover, women from the SC/ST households have not experienced higher increase in institutional deliveries relative to the non-SC/ST households in both the groups despite being more disadvantaged. This suggests that more efforts would be needed to make sure that this innovative CCT reaches to the disadvantaged households.

More work need to be done to assess this program further. Its effects on final outcomes- maternal and neo-natal or infant mortality remain to be analyzed. Further, as discussed, the effect of JSY is a combination of effect of providing incentives to women, and effect of providing incentives to the community health workers. It would be instructive know the contribution of each of the two types of incentives to the changes in intermediate and final outcomes, especially from the point of view of designing a program which delivers and is also cost effective.

## Appendix 1: Public Health Facilities in India

### Sub-center (SC):

SC is the most peripheral and first contact point between the primary health care system and the community. The norm suggests that there should be one SC for every 5000 population in plain areas, and for every 3000 population in hilly/ tribal/ difficult areas. Each SC is manned by one Auxiliary Nurse Midwife (ANM) and one Male Health Worker. SCs are assigned tasks relating to interpersonal communication in order to bring about behavioral change and provide services in relation to maternal and child health, family welfare, nutrition, immunization, diarrhea control and control of communicable diseases programs. The SCs are provided with basic drugs for minor ailments needed for taking care of essential health needs of men, women and children.

### Primary health center (PHC):

PHC is the first contact point between village community and the Medical Officer. As per the norms, there should be one PHC for every 30,000 population in plain areas and for every 20,000 population in hilly/ difficult areas. The PHCs were envisaged to provide an integrated curative and preventive health care to the rural population with emphasis on preventive and promotive aspects of health care. At present, a PHC is manned by a Medical Officer supported by 14 paramedical and other staff. It acts as a referral unit for 6 SCs. It has 4-6 beds for patients. The activities of PHCs involve curative, preventive, primitive and Family Welfare Services.

### Community health center (CHC):

As per the norms, there should be one CHC for every 120,000 population in case of plain areas and for every 80,000 population in case of difficult terrain. A CHC is at the block level. It is manned by four medical specialists i.e. Surgeon, Physician, Gynecologist and Pediatrician supported by 21 paramedical and other staff. It has 30 beds with one OT, X-ray, Labor Room and Laboratory facilities. It serves as a referral centre for 4 PHCs and also provides facilities for obstetric care and specialist consultations.

### Sub-district hospitals:

Sub-district (Sub-divisional) hospitals are below the district-level hospital and above the block level (CHC) hospitals, and act as First Referral Units (FRU) for the block population in which they are geographically located. They receive referred cases from neighboring CHCs, PHCs and SCs. They form an important link between SCs, PHCs and CHCs on one end, and District Hospitals on other end. The bed-strength of these hospitals can vary from 31 to 100.

District Hospital:

District Hospital is a hospital at the secondary referral level responsible for a district. Every district is expected to have a district hospital. As the population of a district is variable, the bed strength also varies from 75 to 500 beds depending on the size, terrain and population of the district.



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Table 1: Maternal Mortality Ratio (MMR) & Proportion of Institutional Deliveries in India

		MMR			Proportion of Institutional Deliveries	
		2001-03	2004-06	2007-09	1998-99	2002-04
	India	301	254	212	34	40.5
Low Performing States	Assam	490	480	390	23.8	26.8
	Bihar/ Jharkhand	371	312	261	14.9	23
	Madhya Pradesh/ Chhatisgarh	379	335	269	21.5	28.2
	Orissa	358	303	258	23.4	34.4
	Rajasthan	445	388	318	22.5	31.4
	Uttar Pradesh/ Uttaranchal	517	440	359	16.2	22.4
High Performing States	Andhra Pradesh	195	154	134	50.6	60.9
	Gujarat	172	160	148	46.1	52.2
	Haryana	162	186	153	25.7	35.1
	Karnataka	228	213	178	50	58
	Kerala	110	95	81	97	97.8
	Maharashtra	149	130	104	57.1	57.9
	Punjab	178	192	172	40.5	48.9
	Tamil Nadu	134	111	97	78.8	86.1
	West Bengal	194	141	145	38.9	46.3
	Other	235	206	160	XX	XX

*Note:* Figures for MMR have been obtained through various documents published by the Office of Register General of India. Figures for the proportion of institutional deliveries have been obtained from national reports of the District Level Household Survey (DLHS).

Table 2: Monetary Incentives under JSY (Rs.)

<b><i>Initial Incentives</i></b>	<b><i>Rural</i></b>	<b><i>Urban</i></b>
Low Performing State	700	600
High Performing State	700	nil
<b><i>Revised Incentives</i></b>	<b><i>Rural</i></b>	<b><i>Urban</i></b>
Low Performing State	1400	1000
High Performing State	700	600

*Note:* Rs. 1400 = \$25.45; Rs. 1000 = \$18.18; Rs. 700 = \$12.73; Rs. 600 = \$10.91;

Table 3: District Level Household Surveys

Round	Year	Questionnaires Canvassed
1998-99	May-November 1998 (Phase 1)	Household; Currently Married Women (age 15-44 years);
	October 1999 (Phase 2)	
2002-04	March-December 2002 (Phase 1)	Household; Husband; Village; Currently Married Women (age 15- 44 years);
	January-October 2004 (Phase 2)	
2007-08	November 2007-May 2008	Household; Village; Never Married Women (age 15-24 years); Ever Married Women (age 15-44 years);

Table 4: Number of Women who have given Birth (Live/ Still) between 1995 to early 2008

Round	Year	Number of Women
1998-99	1995	12655
	1996	35556
	1997	50880
	1998	49539
	1999	14725
2002-04	1999	15162
	2000	21723
	2001	46043
	2002	41695
	2003	29440
	2004	14407
2007-08	2004	22089
	2005	36037
	2006	51133
	2007	63519
	2008	14823

Table 5: Effect of JSY on Institutional Deliveries- Annual Treatment Effect

	Rural+Urban		Rural		Urban	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
LPS	-0.336	-0.164	-0.313	-0.164	-0.289	-0.159
	(0.004)***	(0.003)***	(0.004)***	(0.004)***	(0.007)***	(0.005)***
Y 2005	0.04	0.011	0.054	0.018	0.034	0.002
	(0.006)***	(0.005)**	(0.008)***	(0.007)***	(0.009)***	-0.008
Y 2006	0.061	0.04	0.087	0.054	0.041	0.013
	(0.005)***	(0.004)***	(0.006)***	(0.005)***	(0.007)***	(0.006)**
Y 2007	0.077	0.057	0.112	0.074	0.048	0.021
	(0.005)***	(0.004)***	(0.006)***	(0.005)***	(0.007)***	(0.006)***
Y 2008	0.061	0.052	0.097	0.073	0.026	0.007
	(0.007)***	(0.006)***	(0.008)***	(0.007)***	(0.010)**	(0.01)
LPS * Y 2005	-0.036	-0.019	-0.025	-0.025	0.007	0.001
	(0.007)***	(0.006)***	(0.009)***	(0.008)***	(0.01)	(0.01)
LPS * Y 2006	-0.033	-0.034	-0.027	-0.045	0.003	-0.007
	(0.006)***	(0.005)***	(0.007)***	(0.006)***	(0.01)	(0.01)
LPS * Y 2007	0.044	0.037	0.047	0.027	0.063	0.047
	(0.006)***	(0.005)***	(0.006)***	(0.006)***	(0.011)***	(0.009)***
LPS * Y 2008	0.109	0.069	0.108	0.054	0.144	0.095
	(0.009)***	(0.008)***	(0.010)***	(0.009)***	(0.018)***	(0.016)***
Constant	0.598	0.45	0.504	0.363	0.782	0.295
	(0.003)***	(0.006)***	(0.004)***	(0.007)***	(0.004)***	(0.012)***
Observations	356071	352251	273033	270027	83038	82224
R-squared	0.11	0.31	0.1	0.24	0.09	0.3
Individual Controls	N	Y	N	Y	N	Y
Household Controls	N	Y	N	Y	N	Y
Village Controls	N	N	N	N	N	N

*Note:* All columns are estimated using OLS; Robust standard errors in parentheses (clustered at village level); Columns 1a, 1b use the entire sample; columns 2a, 2b use the rural sample; columns 3a, 3b use the urban sample.

Dependent Variable: Whether the child was delivered at a medical facility?

Individual Controls: Whether woman and her husband are literate; total pregnancies; age of the woman at the time of last birth; whether she received antenatal care; if she had any problem during pregnancy;

Household Controls: Caste; religion; standard of living index; whether the household is in rural area (for 1a, 1b);

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%



Table 6: Effect of JSY on Deliveries in Public and Private Medical Facilities

	Public Facilities		Private Facilities	
	(1a)	(1b)	(2a)	(2b)
LPS	-0.117	-0.041	-0.219	-0.123
	(0.003)***	(0.003)***	(0.003)***	(0.003)***
Y 2005	0.034	0.029	0.005	-0.018
	(0.006)***	(0.005)***	(0.01)	(0.005)***
Y 2006	0.05	0.043	0.011	-0.003
	(0.004)***	(0.004)***	(0.005)**	-0.004
Y 2007	0.056	0.047	0.021	0.01
	(0.004)***	(0.004)***	(0.004)***	(0.004)**
Y 2008	0.038	0.037	0.023	0.015
	(0.006)***	(0.006)***	(0.007)***	(0.006)**
LPS * Y 2005	-0.033	-0.035	-0.004	0.016
	(0.006)***	(0.006)***	(0.01)	(0.006)***
LPS * Y 2006	-0.029	-0.037	-0.004	0.004
	(0.005)***	(0.005)***	(0.01)	(0.01)
LPS * Y 2007	0.067	0.057	-0.022	-0.019
	(0.005)***	(0.005)***	(0.005)***	(0.004)***
LPS * Y 2008	0.161	0.13	-0.052	-0.062
	(0.008)***	(0.008)***	(0.008)***	(0.007)***
Constant	0.256	0.098	0.342	0.351
	(0.002)***	(0.005)***	(0.003)***	(0.005)***
Observations	356071	352251	356071	352251
R-squared	0.03	0.08	0.07	0.21
Individual Controls	N	Y	N	Y
Household Controls	N	Y	N	Y
Village Controls	N	N	N	N

*Note:* All columns are estimated using OLS; Robust standard errors in parentheses (clustered at village level);

Dependent Variables: Column (1) Whether the child was delivered at a public medical facility? (1a, 1b); Column (2) Whether the child was delivered at a private medical facility? (2a, 2b);

Individual Controls: Whether woman and her husband are literate; total pregnancies; age of the woman at the time of last birth; whether she received antenatal care; if she had any problem during pregnancy;

Household Controls: Caste; religion; standard of living index; whether the household is in rural area

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 7: Differential Effects of JSY in the Low Performing States

	Wealth		Rural-Urban		Caste
	(1)		(2)		(3)
Y 2005	0.027	Y 2005	0.017	Y 2005	0.004
	(0.010)***		(0.009)*		(0.00)
Y 2006	0.035	Y 2006	0.024	Y 2006	0.016
	(0.008)***		(0.007)***		(0.003)***
Y 2007	0.073	Y 2007	0.088	Y 2007	0.099
	(0.007)***		(0.007)***		(0.003)***
Y 2008	0.081	Y 2008	0.125	Y 2008	0.121
	(0.014)***		(0.013)***		(0.007)***
Low	-0.251	Rural	-0.112	SC/ST	-0.034
	(0.005)***		(0.004)***		(0.003)***
Medium	-0.175	Rural * 2005	-0.02	SC/ST * 2005	-0.022
	(0.005)***		(0.010)**		(0.007)***
Low * 2005	-0.045	Rural * 2006	-0.01	SC/ST * 2006	-0.008
	(0.011)***		(0.01)		(0.01)
Low * 2006	-0.033	Rural * 2007	0.019	SC/ST * 2007	0.009
	(0.008)***		(0.008)**		(0.005)*
Low * 2007	0.027	Rural * 2008	0.005	SC/ST * 2008	0.021
	(0.008)***		(0.01)		(0.011)*
Low * 2008	0.051				
	(0.015)***				
Medium * 2005	0.006				
	(0.01)				
Medium * 2006	0.01				
	(0.01)				
Medium * 2007	0.058				
	(0.009)***				
Medium * 2008	0.066				
	(0.017)***				
Constant	0.413		0.411		0.37
	(0.007)***		(0.007)***		(0.007)***
Observations	231793		231793		231793
R-squared	0.23		0.23		0.22
Individual Controls	Y		Y		Y

Household Controls	Y		Y		Y
Village Controls	N		N		N

*Note:* All columns are estimated using OLS; Robust standard errors in parentheses (clustered at village level); Only observations from the low performing States have been used.

Dependent Variable: Whether the child was delivered at a medical facility?

Individual Controls: Whether woman and her husband are literate; total pregnancies; age of the woman at the time of last birth; whether she received antenatal care; if she had any problem during pregnancy;

Household Controls: Caste; religion; standard of living index; whether the household is in rural area (for 1a, 1b)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 8: Differential Effects of JSY in the High Performing States

	Wealth		Rural-Urban		Caste
	(1)		(2)		(3)
Y 2005	0.013	Y 2005	-0.003	Y 2005	0.003
	(0.007)*		(0.01)		(0.01)
Y 2006	0.02	Y 2006	0.007	Y 2006	0.033
	(0.006)***		(0.01)		(0.005)***
Y 2007	0.027	Y 2007	0.011	Y 2007	0.044
	(0.005)***		(0.006)**		(0.004)***
Y 2008	0.037	Y 2008	0.007	Y 2008	0.045
	(0.009)***		(0.01)		(0.007)***
Low	-0.154	Rural	-0.128	SC/ST	-0.078
	(0.006)***		(0.005)***		(0.005)***
Medium	-0.083	Rural * 2005	0.013	SC/ST * 2005	0.009
	(0.004)***		(0.01)		(0.01)
Low * 2005	-0.022	Rural * 2006	0.037	SC/ST * 2006	0
	(0.012)*		(0.008)***		(0.01)
Low * 2006	0.004	Rural * 2007	0.048	SC/ST * 2007	0.008
	(0.01)		(0.007)***		(0.01)
Low * 2007	0.011	Rural * 2008	0.064	SC/ST * 2008	0.01
	(0.01)		(0.012)***		(0.01)
Low * 2008	0.043				
	(0.014)***				
Medium * 2005	-0.003				
	(0.01)				
Medium * 2006	0.028				
	(0.008)***				
Medium * 2007	0.039				
	(0.008)***				
Medium * 2008	0.005				
	(0.01)				
Constant	0.225		0.231		0.249
	(0.010)***		(0.010)***		(0.010)***
Observations	120458		120458		120458
R-squared	0.26		0.26		0.26
Individual Controls	Y		Y		Y

Household Controls	Y		Y		Y
Village Controls	N		N		N

*Note:* All columns are estimated using OLS; Robust standard errors in parentheses (clustered at village level); Only observations from the high performing States have been used.

Dependent Variable: Whether the child was delivered at a medical facility?

Individual Controls: Whether woman and her husband are literate; total pregnancies; age of the woman at the time of last birth; whether she received antenatal care; if she had any problem during pregnancy;

Household Controls: Caste; religion; standard of living index; whether the household is in rural area (for 1a, 1b)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Table 9: Pre-treatment Trends in Institutional Deliveries

	Rural+Urban		Rural		Urban	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
LPS * Y 1996	0	0	-0.01	-0.008	0.035	0.027
	(0.008)	(0.007)	(0.009)	(0.008)	(0.018)**	(0.016)*
LPS * Y 1997	-0.001	-0.002	-0.01	-0.01	0.01	0.007
	(0.008)	(0.007)	(0.008)	(0.008)	(0.017)	(0.015)
LPS * Y 1998	-0.002	-0.001	-0.009	-0.006	0.01	0
	(0.008)	(0.007)	(0.009)	(0.008)	(0.018)	(0.015)
LPS * Y 1999	0.009	0.002	-0.027	-0.017	0.107	0.053
	(0.012)	(0.010)	(0.014)**	(0.012)	(0.023)***	(0.019)***
LPS * Y 2000	-0.017	-0.018	-0.049	-0.038	0.076	0.036
	(0.011)	(0.009)**	(0.013)***	(0.011)***	(0.021)***	(0.017)**
LPS * Y 2001	-0.007	-0.011	-0.035	-0.025	0.065	0.03
	(0.010)	(0.008)	(0.011)***	(0.009)***	(0.019)***	(0.015)**
LPS * Y 2002	-0.006	-0.013	-0.032	-0.021	0.045	0.012
	(0.010)	(0.008)*	(0.011)***	(0.009)**	(0.019)**	(0.015)
LPS * Y 2003	-0.008	-0.015	-0.033	-0.02	0.028	0.008
	(0.011)	(0.009)*	(0.012)***	(0.010)**	(0.020)	(0.017)
LPS * Y 2004	-0.029	-0.025	-0.055	-0.034	-0.002	0.003
	(0.013)**	(0.010)**	(0.014)***	(0.013)***	(0.023)	(0.019)
Observations	331825	327720	256431	253220	75400	74500
R-squared	0.11	0.31	0.1	0.22	0.1	0.3
Individual Controls	N	Y	N	Y	N	Y
Household Controls	N	Y	N	Y	N	Y
Village Controls	N	N	N	N	N	N

*Note:* All columns are estimated using OLS; Robust standard errors in parentheses (clustered at village level); Columns 1a, 1b use the entire sample; columns 2a, 2b use the rural sample; columns 3a, 3b use the urban sample.

Dependent Variable: Whether the child was delivered at a medical facility?

Individual Controls: Whether woman and her husband are literate; total pregnancies; age of the woman at the time of last birth; whether she received antenatal care; if she had any problem during pregnancy;

Household Controls: Caste; religion; standard of living index; whether the household is in rural area (for 1a, 1b)

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

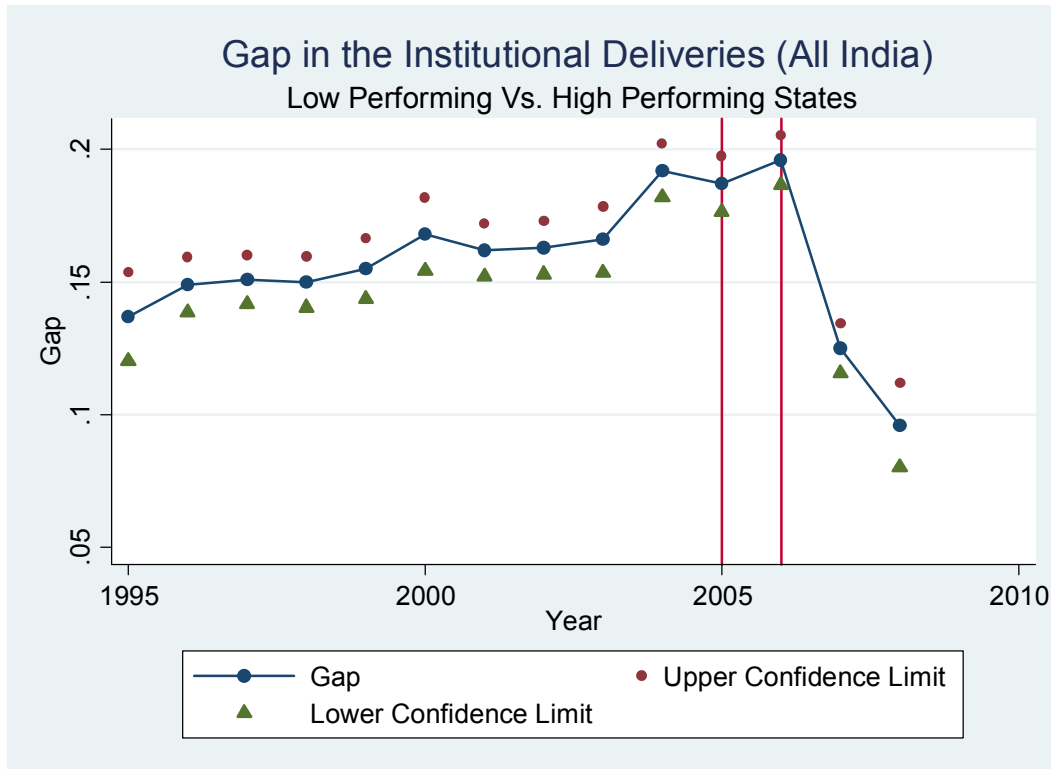
Table 10: Availability and Access to Medical Facilities

Panel A: Does the village have the following health facilities?						
	ICDS	Sub-center	Primary Health Center	Government Dispensary	Private Clinic	Mobile Health Clinic
LPS	-0.192	-0.13	-0.071	-0.029	-0.103	-0.03
	(0.046)***	(0.046)**	(0.044)	(0.053)	(0.057)*	(0.028)
POST	0.004	-0.019	-0.054	-0.072	-0.061	0.007
	(0.010)	(0.028)	(0.015)***	(0.035)*	(0.028)**	(0.014)
LPS * POST	0.145	0.015	0.008	0.038	-0.035	-0.049
	(0.042)***	(0.043)	(0.048)	(0.055)	(0.062)	(0.024)*
Constant	0.953	0.49	0.219	0.141	0.351	0.127
	(0.011)***	(0.032)***	(0.040)***	(0.043)***	(0.043)***	(0.022)***
Observations	33103	32974	33104	33103	33077	33101
R-squared	0.06	0.01	0.01	0.01	0.03	0.01
Panel B: Are the following health facilities accessible throughout the year?						
	ICDS	Sub-center	Primary Health Center	Community Hospital	District Hospital	Private Hospital
LPS	-0.105	-0.065	-0.046	-0.018	-0.029	-0.037
	(0.034)***	(0.032)*	(0.037)	(0.043)	(0.043)	(0.044)
POST	0.003	0.017	0.012	0.025	-0.025	0.023
	(0.002)	(0.016)	(0.030)	(0.033)	(0.042)	(0.025)
LPS * POST	0.089	0.007	-0.009	-0.032	0.014	-0.024
	(0.034)**	(0.034)	(0.045)	(0.054)	(0.061)	(0.038)
Constant	0.989	0.903	0.866	0.807	0.823	0.84
	(0.002)***	(0.020)***	(0.026)***	(0.028)***	(0.032)***	(0.033)***
Observations	33102	32933	32784	32693	32736	32729
R-squared	0.05	0.01	0	0	0	0

*Note:* Dependent variable in panel A is whether a particular medical facility exist/ available in the village?;  
 Dependent variable in panel B is whether a particular medical facility is accessible throughout the year?

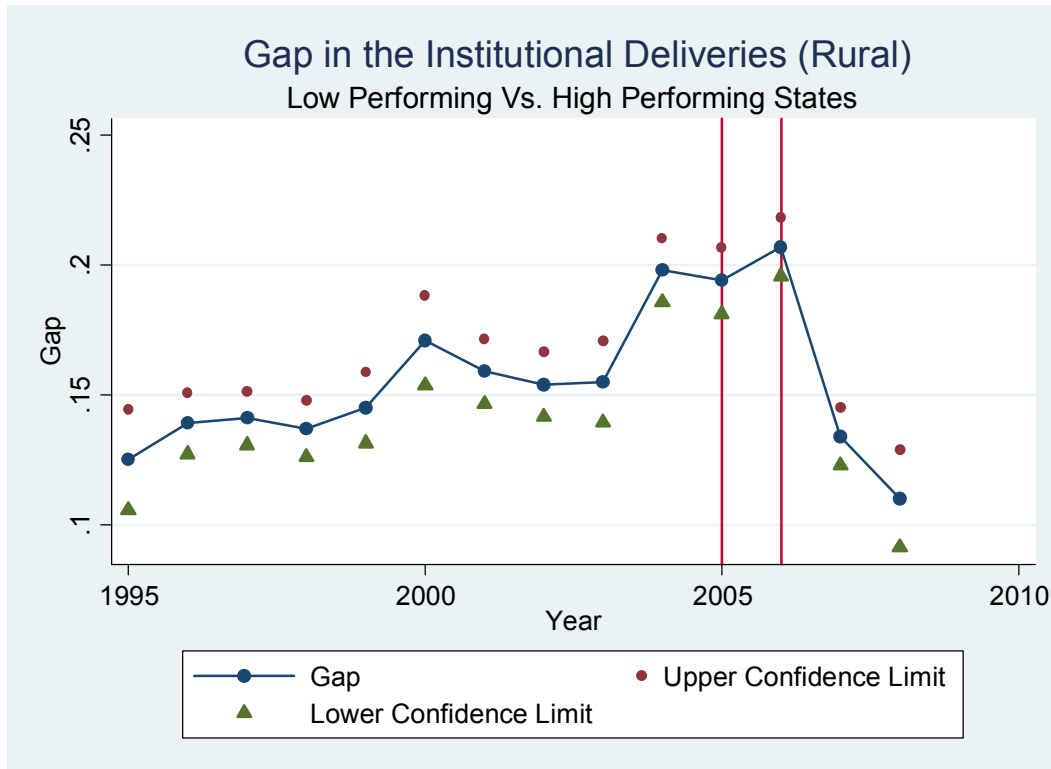


Figure 1: Gap in Institutional Deliveries between the low performing and the high performing States (All India Sample)



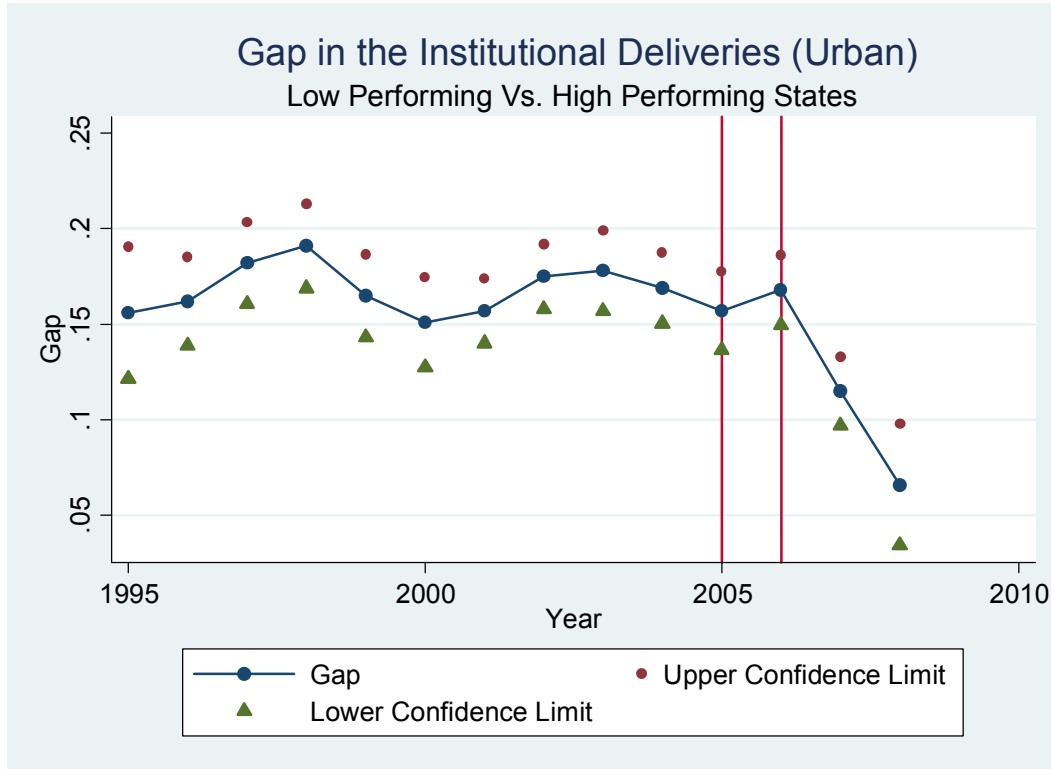
Note: The figure is based on the regression of a dummy variable for institutional delivery, on year dummies from 1996 to 2008, a dummy for the low performing States, and the interaction variables between year dummies and dummy for the low performing States. The regression also includes controls for women and households. 1995 is the baseline year. The estimation includes all observations.

Figure 2: Gap in Institutional Deliveries between the low performing and the high performing States (Rural Sample)



Note: The figure is based on the regression of a dummy variable for institutional delivery, on year dummies from 1996 to 2008, a dummy for the low performing States, and the interaction variables between year dummies and dummy for the low performing States. The regression also includes controls for women and households. 1995 is the baseline year. The estimation includes only rural observations.

Figure 3: Gap in Institutional Deliveries between the low performing and the high performing States (Urban Sample)



Note: The figure is based on the regression of a dummy variable for institutional delivery, on year dummies from 1996 to 2008, a dummy for the low performing States, and the interaction variables between year dummies and dummy for the low performing States. The regression also includes controls for women and households. 1995 is the baseline year. The estimation includes only urban observations.