Article

Universalisation versus targeting in maternal and child health care provisioning: Evidence from India

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A B S T R A C T

To eradicate the persistent inequality in utilisation of Maternal Health Care Services (MHCS), India's Government has adopted various programmes under the National Rural Health Mission (NRHM) in 2005. The Janani Suraksha Yojana (JSY), a demand-side intervention, is one of the flagship programmes under the NRHM. Using two rounds of the nationally representative National Family Health Survey (NFHS) data collected in 2005–06 and 2015–16, respectively, we attempt to map the extent to which inequality in MHCS utilisation has changed over time across states after the implementation of NRHM; analyse whether there are differences in the patterns of inequality prevalent in the universal and targeted states; and find evidence to decide whether universalisation is more effective than targeting in reducing inequality in MHCS utilisation. We measure relative inequality and use the difference in difference technique to answer the research questions. For analysis, we have considered five outcome variables spanning across three stages of the continuum of care in maternal health. We find that relative inequality in MHCS utilisation declined across states during the period 2006–16, though in varying degrees. Universal states experienced a higher level of inequality as compared to the targeted states. However, universal states observed a higher decline in inequality over time relative to the targeted states controlling for other state-level characteristics. The study establishes that the programme implementation strategy and conditional cash transfer programmes influence the reduction of inequality in MHCS utilisation. This study makes an important contribution to the literature on public health policy and inequality in health care utilisation by highlighting the differential impact of universalisation and targeting on reducing inequality in the use of MHCS.

Introduction

More than 40,000 women die every year in India due to preventable pregnancy-related causes (World Health Organization, 2010). The burden of mortality is borne more by poor women from socially backward groups living in rural areas (MoHFW 2005) than others. Evidence points to the abysmally low utilisation of Maternal Health Care Services (MHCS) among these women (IIPS 2007). Inequality in MHCS utilisation, which is an important contributing factor to maternal mortality in developing countries (Ruhago, Ngalesoni, & Norheim, 2012), is also alarmingly high in India (Barros et al., 2012). In this context, this paper studies the changing patterns of inequality in MHCS utilisation in India over the past decade and the way this inequality is addressed by public health intervention.

Demand-side intervention through programmes like the Janani

Suraksha Yojana (JSY) is one of the important instruments that have been considered for enhancing the coverage of MHCS, and the consequent reduction in inequality in child delivery and post-natal care. It is a conditional cash transfer programme adopted as a part of the National Rural Health Mission (NRHM) in 2005 (MoHFW 2005). The JSY provides centrally-sponsored financial support to pregnant women to encourage them to have institutional childbirth by enabling them to give birth in public health facilities or accredited private institutions in some states (Lim et al., 2010; MoHFW 2005). However, this programme does not provide any cash incentive for antenatal care checkups.

The implementation strategy of JSY varies across states. The states are divided into two groups called 'low performing' and 'high-performing' states based on past maternal and child health outcomes, and the availability of health infrastructure (MoHFW 2005). In the low-performing states (LPS), all women are universally eligible for

financial support, irrespective of their economic status while only the specific women, aged 19 years and above living below the poverty line (holding BPL certification), or belonging to Scheduled Castes (SCs) and Scheduled Tribes (STs) are targeted in the high-performing states (HPS). However, the minimum age criterion in HPSs was eventually removed in 2013 to include adolescent mothers (MoHFW 2013). We refer to these two types of states as 'universal' and 'targeted' states, respectively. We note that universal or targeted status is not exogenous and is confounded with different state-level characteristics.

Literature review

The universalisation of a programme guarantees free access to any goods or services for the entire population while the targeted approach prioritises certain vulnerable social groups (Titmuss, Morris, Alcock, 2001). There is an obvious decline in inequality under universalisation in a poor country since the benefits of universalisation are accessed by everyone in a society comprising a high proportion of poor people whereas a social welfare program usually targets poor people and consequently, the benefits of such programmes are enjoyed by this exclusive group, which helps in reducing inequality (Barros & Carvalho, 2004, p. 7). The decision as to whether a social welfare policy should opt for universalisation or a targeting strategy depends on the availability of resources and broad social objectives. Universalisation is an expensive option in a resource-constrained economy while targeting may be difficult to implement due to corruption, leakages, and faulty identification of the beneficiaries. Such imperfection in targeting may lead to higher administrative, incentive, social, and political cost (Coady, Grosh, & Hoddinott, 2004). Many of the social welfare policies in India related to food security and social protection follow a targeting strategy, which exposes them to criticism. For example, the effectiveness of targeting in food security programmes is often questioned due to the inherent corruption in the system and misidentification (Drèze & Khera, 2010; Ram, Mohanty, & Ram, 2009). Targeting error also continues to be high for social pension schemes (Asri, 2019). To the best of our knowledge, none of the studies indicates whether universalisation is a better programme strategy than targeting in addressing inequality in public health in the Indian context though global evidence suggests that it is (Lorenc, Petticrew, Welch, & Tugwell, 2013). The unique programme implementation strategy of the JSY, which follows a combination of both universalisation and targeted strategy, provides us an opportunity to analyse which of these two methods is more effective in reducing inequality.

The gap in MHCS utilisation between the rich and poor persists at the national level in India despite a significant increase in coverage over time (Paul, 2018). For example, the absolute gap in four or more antenatal care visit is 48% while it is 34% for institutional delivery in 2015–16. Evidence points to a wide variation in the utilisation and inequality of antenatal as well as childbirth care services across states over decades (Govindasamy & Ramesh, 1997). Randive, Diwan, and de Costa (2013) find that institutional delivery increased from 20 percent to 49 percent in the nine universal states—Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, Uttar Pradesh, and Assam—during the period 2005–10. Although the coverage improved, inequality in institutional delivery remains high. Another study focusing on Odisha and Jharkhand (Thongkong, Poel, Roy, Rath, & Houweling, 2017) showed that relative inequality (Concentration Index) in institutional delivery is 0.36 and 0.10 in Jharkhand and Orissa, respectively. They come to this conclusion by using data from a population surveillance system during 2009–10. Vellakkal (2017) find that inequality in antenatal care and institutional delivery decreased among the poor and middle classes as compared to their rich counterparts in some of the universal states after the adoption of the NRHM. However, the decline in inequality in institutional delivery is higher than the decrease in inequality in antenatal care (ANC) services. All the studies indicate that inequality in MHCS utilisation remains a concern in India.

However, most of this evidence is based on state-specific analysis, which focuses on either one or two states for analysing the scenario of a group of universal or targeted states. From the existing literature, we may not be able to infer how inequality in MHCS utilisation has changed over the past decade across all the states and whether such changes can be attributed to the nature of programme implementation or other state characteristics without a comprehensive analysis of all the states.

Research objective

We attempt to fill this gap in the literature by estimating the inequality in MHCS utilisation at the state level over time. Exploiting the variation in the programme instrument (universal versus targeted) and controlling for other time-variant characteristics at the state level, we aim to find evidence for determining whether implementation strategy is a significant determinant of the change in inequality.

The objectives of the paper are to (i) study the extent of inequality in MHCS utilisation across states over time; (ii) find out whether the pattern of inequality differs across universal and targeted states, and (iii) find any evidence that relates the programme instrument under JSY to the change in inequality. In other words, we attempt to find out whether universal states experience a higher or lower decline in inequality in MHCS utilisation as compared to the targeted states. To answer the research questions, we estimate the relative inequality in terms of the ratio measure and Concentration Index (CI) for 29 major states and Union Territories at two-time points, that is, 2005–06 (pre-NRHM) and 2015–16 (post-NRHM). Using these measures, we compare how inequality changes over time at the state level. We measure inequality in the MHCS utilisation variables covering three stages of the continuum of care in maternal health. We further study whether relative inequality changes in universal states in different ways as compared to the targeted ones during the period 2006–16 using the difference in difference technique.

Data and methodology

Data

The data on utilisation of MHCS as well as information on the socio-economic characteristics of eligible women have been taken from the third and fourth rounds of the NFHS (IIPS 2007; 2017), conducted in 2005–06 and 2015–16, respectively. The NFHS employs the same sampling methodology and survey instruments as those used in the international Demographic and Health Surveys (DHS). These nationally representative surveys follow a multi-stage stratified sampling technique; at the final stage, households are selected from all the states using the systematic sampling method. The NFHS data provide information on socio-economic and health characteristics, including income status, education, caste information, family welfare, maternal and child health, and nutrition. The NFHS-3 and NFHS-4 covered around 124,000 and 700,000 women, respectively. Our analyses focus on all ever-married women aged 15–49 years. We consider use vis-a-vis non-use of MHCS during the last birth in the five-year recall period. Thus, the final analytical sample size becomes 36,850 and 1,86,721 in 2005–06 and 2015–16, respectively.

As mentioned earlier, we have divided the 29 states under study into two groups—universal and targeted. There are 10 universal states,[1] including Assam, Bihar, Chhattisgarh, Jharkhand, Jammu and Kashmir, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, and Uttar Pradesh,

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[1] https://www.nhp.gov.in/janani-suraksha-yojana-jsy-_pg as accessed on 7th February 2019.

Table 1
Definition of outcome variables.

Indicator	Definition
Antenatal Care in the first trimester	Whether a woman had her first antenatal check-up in the first trimester of pregnancy
4+ Antenatal Care check-ups	Whether a woman received four or more antenatal check-ups during pregnancy
Comprehensive health check-ups during pregnancy	Whether a woman received comprehensive check-ups (at least once during pregnancy) comprising measurement of the weight and blood pressure, blood test, urine test, and an abdominal examination
Institutional delivery	Whether child delivery took place in a public or private health facility
Post-natal care	Whether a woman received a health check-up within 48 h of child delivery

Source: Definitions are used from NFHS 3 and NFHS 4.

Table 2
State-level average Characteristics across Universal and Targeted States in 2006.

State-level Characteristics	Universal (U)	Targeted (T)	Difference (U-T)
Uneducated women (in %)	53	30	23***
IMR	67	43	24***
Poverty ratio	44	31	13***
Per capita NSDP	14523	30817	−16294***
Per capita health expenditure	149	232	−83**
Wealth Gini	0.41	0.30	0.11***

Note: ***p < 0.01, **p < 0.05. Source: Author's calculation.

whereas there are 19 targeted states, including Arunachal Pradesh, Manipur, Mizoram, Meghalaya, Nagaland, Sikkim, Tripura, Kerala, Tamil Nadu, Andhra Pradesh,[2] Karnataka, Goa, West Bengal, Punjab, Haryana, Gujarat, Himachal Pradesh, Maharashtra, and Delhi.

We have collected information on different state-level characteristics from various sources. Data on Infant Mortality Rate (IMR) at the state level has been collected from the record of the Sample Registration System of India (SRS 2016). We have used the information on the proportion of the population residing below the poverty line or the poverty ratio from the Planning Commission of India (GoI 2007; 2013). Data on the poverty ratio is available for the years 2004–05 and 2011–12, that is, the years when the National Sample Surveys on consumption were conducted. Therefore, we use the poverty ratio figures of 2004–05 and 2011–12 corresponding to the NFHS 2005–06 and 2015–16, respectively. Information on the Net State Domestic Product (NSDP) at constant prices and state health expenditure has been collected from the Handbook of Statistics on Indian States (RBI 2015–16).

Key outcome variables

We consider five indicators of the MHCS spanning across three stages of the care continuum as the key outcome variables (described in Table 1).

We have created binary variables for each of the five outcome variables wherein a woman who receives the respective service is assigned the value 1, and the rest are assigned the value zero.[3]

Methodology

We estimate two measures of relative inequality in health care utilisation based on the wealth index[4]– the ratio of MHCS coverage between the richest and poorest quantile and concentration index (CI) with a 95 percent confidence interval. The CI quantifies the extent of inequality and has been conveniently used to compare inequality across regions or over time (Wagstaff, Paci, & van Doorslaer, 1991). CI is computed as twice the area between the concentration curve and the line of equality (45-degree line). Mathematically, concentration index

(CI) is defined as

$$C = 1 - 2 \int_0^1 L^h(p) dp$$

Where p is the cumulative percent of the sample ranked by economic status, L(p) is the corresponding concentration curve co-ordinate, and h is the number of socio-economic groups. The CI has been expressed on a scale of −1 to 1, where a value of 0 indicates perfect equality while a positive value indicates that the health service is availed of more by the rich, and a negative value indicates the disproportionate concentration of health services among the poor. A higher magnitude of CI signifies greater inequality. We have estimated these measures for each of the five outcome variables in 2006 and 2016 for the 29 states. We have used appropriate sample weights provided in the survey data for all estimations. We consider the CI to be a more appropriate dependent variable in our subsequent regression analysis since it accounts for the whole distribution of wealth unlike the ratio measure, which uses only the poorest and the richest quintiles.

Identification

A pooled Ordinary Least Square (OLS) model using the difference in difference (DID) technique has been applied for the estimation purpose.[5] The regression model is expressed as:

$$y_{it} = \beta_0 + \beta_1 Period_t + \beta_2 Universal_i + \beta_3 Period_t * Universal_i + X_{it}\gamma + \varepsilon_{it}$$

where y_{it} is the Concentration Index for state i and time t, *Period* is the dummy for the year 2016, and *Universal* is the dummy for universal states. The key variable of interest is the interaction term between the period and universal dummies capturing the difference in difference effect. In other words, the interaction term signifies whether the universal states observe a higher or lower decline in inequality as compared to the targeted ones during the period 2006–16. X_{it} is the vector of state-level characteristics at state *i* in period *t*. We assume that the error term (ε_{it}) is not correlated with the explanatory variables when we control for important state-level characteristics. Otherwise, it may be correlated with universal/targeted status.

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[2] The state of Andhra Pradesh was bifurcated between NFHS-3 and NFHS-4. We pooled data from Andhra Pradesh and Telangana in NFHS-4 to refer to the undivided state.

[3] For institutional delivery binary, it takes the value 1 if child delivery took place in public/private institution, and takes the value 0 if child delivery took place at home.

[4] The wealth index is a composite measure of the living standards of households, calculated by using data on a household's ownership of selected assets like television sets and bicycles, the materials used for housing construction, and the types of access to water and sanitation facilities enjoyed by the households, among other indicators.

[5] Before using regression difference-in-difference (DID) approach, we checked whether commonality trend assumption, the key assumption of DID estimation is fulfilled (pp172, Angrist, J. D., & Pischke, J. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton: Princeton University Press). We checked it graphically as well as using regression analysis. Visual presentation conveys that commonality trend assumption is maintained. We find clear evidence of the narrowing the gap in the trends between universal (treatment group) and targeted states (control group) in the post-intervention period for all the five outcome variables. While the trend in the pre-intervention period remains similar except for PPC2. We presented the graph of the common trend for five outcome variables using four rounds of NFHS data corresponding to the year 1992–93, 1998–99, 2005–06, and 2015-16 in the appendix. A detail regression analysis result further validates the assumption of common trend statistically. To be specific, we find that the interaction between the pre-treatment period dummy (1992-93 and 1998–99) with universal dummy remains insignificant. However, we did not present the detailed result of the regression analysis due to space limitation. It will be provided upon request.
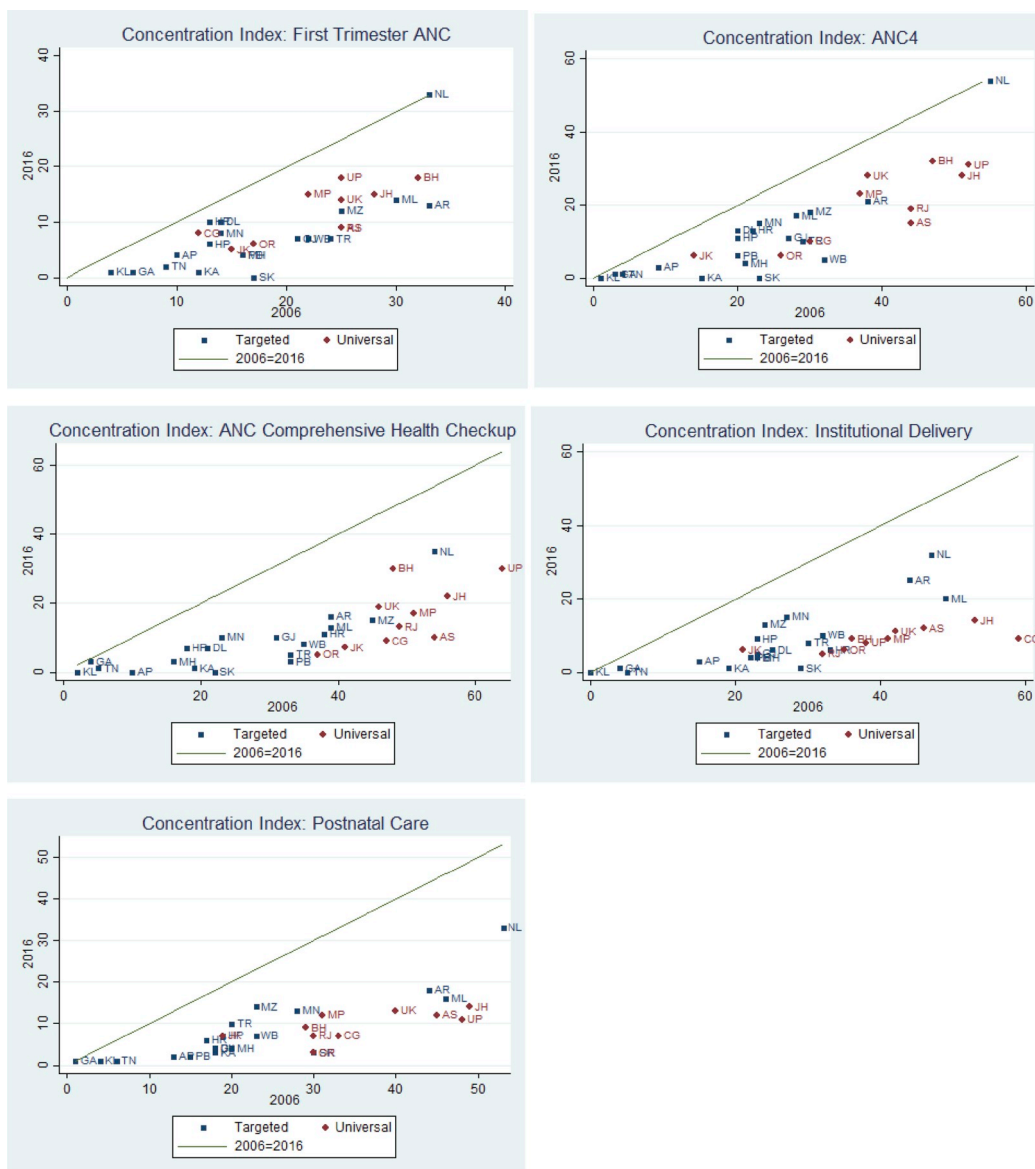
Note: Full name of states with state codes are mentioned in the Appendix. We have reported CI*100 for the year 2006 and 2016 in x and y axis

respectively. Source: Author's calculation.

Fig. 1. Scatter Plots of Relative Inequality (Concentration Index)
Note: Full name of states with state codes are mentioned in the Appendix. We have reported CI*100 for the year 2006 and 2016 in x and y axis respectively. Source: Author's calculation.

We have estimated the above regression for the following five dependent variables separately: the Concentration Index of the first ANC check-up in the first trimester, four or more ANC check-ups, comprehensive health check-ups during pregnancy, institutional delivery, and post-partum check-up within 24 h of child delivery. Each of these variables has been calculated for all states in 2006 and 2016.

Control variables
The selection of states for the cash incentive programme under JSY has not been done on a random basis but is based on their past public health performances and social features (MoHFW 2005). Therefore, it is important to control for state-level characteristics to avoid endogeneity. We have run two sets of regressions with each of the five outcome variables. First, we have controlled for demographic variables and the health performance indicator (base model). Second, we have further checked the robustness of our result by controlling the additional explanatory variables (full-blown model).

The social controls include percentages of illiterate, rural, and SC/ST women in each state. The IMR at the state level has been used as a proxy of the health outcome. We could not control for the Maternal Mortality Rate (MMR) because of the limitations of data. In the full-blown model, we have controlled for economic status, supply-side factors, and initial relative inequality in utilisation of health services. Economic status has been captured by the per capita NSDP and the poverty ratio. Inequality in health care utilisation is also closely linked to income inequality. We have proxied income inequality by wealth inequality measured by the Gini co-efficient of the wealth index using NFHS data. Since information on state-level health infrastructure is limited, per capita public health expenditure has been used as a proxy.[6] While social control variables are

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[6] We rescaled per capita NSDP (in 100000), poverty ratio (in 100) and per capital health expenditure (in 1000) in regression analysis since these variables take large values.

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from the same period as the outcome variables, the rest of the control variables are lagged in nature. We may not be able to deny the possibility of endogeneity caused by same period control variables like demographic factors. To check the robustness of the result, we conducted a regression analysis without demographic controls as well.

Changes in inequality due to the programme effect also depend on the initial level of inequality. States with better coverage during the initial period tend to have lower CI figures and may, therefore, exhibit a comparatively lower effect of the intervention on inequality. To check the robustness by separating the intervention effect from the baseline size effect, we have controlled the CI in 2006 in our full-blown regression. We have categorised the states into three groups—those with low, medium, and high levels of initial inequality.

Table 2 provides the difference in state-level characteristics between universal and targeted states before the implementation of JSY. The performance of the universal states is relatively lower than those of the targeted states in terms of all the indicators in 2006. We note that the difference is quite significant. The estimator, therefore, may suffer from a selection bias without controlling the initial CI.

Results

Using scatterplots in Fig. 1, we show graphically how relative inequality changes across universal and targeted states over the past decade. In each diagram, the x-axis measures the CI in 2005–06 while the y-axis measures the CI in 2015–16. The 45-degree line signifies the line of invariant inequality or inequality that remains constant over time. The red dots (in a diamond shape) indicate the universal states whereas the blue dots (in square shape) refer to the targeted states in the scatterplots. We have two major observations. First, all the states lie below the 45-degree line, which, therefore, indicates that inequality decreased after the policy intervention. A similar declining trend may be observed in terms of the ratio as well (with the detailed result presented in the Appendix). Second, the initial level of inequality was diverse. The states can be distinguished into three groups based on the initial level of CI; low, medium and high: (a) the three targeted states, that is, Kerala, Tamil Nadu and Goa, exhibit low initial inequality (with a CI < 0.10) for each of the five outcome variables; (b) a mixed group of targeted and universal states exhibit medium initial inequality (0.10 < CI < 0.25). The targeted states like West Bengal, Haryana, Gujarat, Punjab, and Maharashtra, among others, belong to this category; (c) in the high base inequality group (CI > 0.30), there are more universal than targeted states. A few targeted states like Nagaland, Arunachal Pradesh, and Meghalaya exhibited a high level of inequality before the implementation of the JSY.

There are a few other notable observations. Kerala (KL), historically a good performer and a targeted state, experienced a very small decline since the state had already achieved equality in the use of many of the maternal health care services even before the implementation of NRHM. On the other extreme, Nagaland (NL) situated in the hilly north-eastern region of India, a highly unequal state in terms of the initial CI and still considered for targeted benefits, remained unequal even in 2016. The magnitude of decline otherwise varies widely across states for all the five outcome variables. The universal states like Jharkhand (JH), Uttar Pradesh (UP) and Chhattisgarh (CG) experienced a high level of decline in inequality in institutional delivery and postnatal care whereas the targeted states like West Bengal (WB), Haryana (HR), and Punjab (PB), along with the universal ones like Rajasthan (RJ), Uttar Pradesh (UP), and Assam (AS) experienced a high level of reduction in inequality for four or more ANC check-ups and comprehensive ANC health check-ups. The detailed results on the state-level coverage and inequality have been provided in the Appendix.

The results from the base model regression analysis have been presented in Table 3. We find that the period dummy is significant, and hence, inequality in MHCS utilisation declines significantly over time. The CI is found to be significantly higher in universal states relative to

the targeted states. Our focus is on the interaction between the period and universal dummy, which captures the difference in difference effect. The negative coefficient of interaction terms signifies a higher decline in inequality in the universal states over time. The coefficient is statistically significant for variables like institutional delivery, postnatal care, and comprehensive ANC check-up. For institutional delivery, the CI has declined by 0.29 and 0.16 points in the universal states and targeted states, respectively. The universal states observed a decline in inequality by 0.26 points as against a corresponding decline of 0.15 points recorded in the targeted states for a postnatal check-up. For the variable of comprehensive ANC check-up, the CI declined by 0.32 and 0.19 points in the universal states and targeted states, respectively. It is interesting to note that the interaction dummy is not significant for the ANC check-up in the first trimester and for four or more ANC check-ups, which implies that both groups of states experienced a similar decline in inequality. We find that the signs and significance of the education and caste variables point in the expected directions. The higher the average level of education at the state level, the lower is the average level of CI in the utilisation of all the five maternal health care services. The states with a higher proportion of SC and ST women experienced a higher level of inequality.

Table 4 presents the results of the second regression specification (full-blown model) with added controls for economic and supply-side factors along with the initial level of inequality. The main findings remain robust.[7] The difference in difference estimate for four or more ANC check-ups becomes significant with a larger set of controls. The magnitude of interaction is higher for all the outcome variables as compared to the base model. The co-efficient of education becomes insignificant except for the ANC check-up in the first trimester. The proportion of SCs becomes insignificant, whereas the proportion of STs remains a significant factor in explaining the state-level inequality in health care utilisation. The higher the proportion of ST women at the state level, the higher is the extent of inequality. Wealth inequality or per capita NSDP do not play any significant role in determining inequality. However, a higher per capita health expenditure leads to lower inequality in antenatal care check-ups but remains insignificant for institutional delivery or post-natal care.[8]

Discussion

This study provides a comprehensive analysis of the change in inequality in the utilisation of maternal health care services across states over time in India. Following the national trends (Paul, 2018), a majority of the states have experienced a declining trend in inequality over the decade under study. However, we show that the magnitude of the decline varies widely across different services as also indicated by the

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[7] The main results (in basic as well as full blown model) remain robust when regression analysis is carried out with population weight. It is also robust when we conduct the regression analysis without social control variables.

[8] There may be selection bias due to the difference in characteristics between the two groups of states. Propensity score matching (PSM) method is commonly used to minimize selection bias. To check the robustness of our result, we carried out a supplementary regression analysis by combining PSM with DID estimation method. We use the weighted DID model, where multiple group propensity scores are used as weights. Under PSM, there are four groups – treatment pre-intervention (1), treatment post-intervention (2), comparison pre-intervention (3), and comparison post-intervention (4). The propensity score is defined as the probability of being in group 1 compared to be in groups 2, 3, or 4. To estimate the propensity scores, we used multinomial logistic regression predicting groups as a function of a set of observed state characteristics and then re-ran the weighted DID regressions for five outcome variables using PSM scores as weights. This helps us in obtaining a consistent estimate of the treatment effect, even with the selection bias. The main results remain robust. We could not provide detail result due to space limitation. It will be provided upon request.

Table 3

Regression Results of the Basic Model—Effect of Universalisation vis-à-vis Targeting on CI for MHCS.

	(1)	(2)	(3)	(4)	(5)
	ANC Check-up-First Trimester	4+ ANC Check-ups	Comprehensive ANC Health Check-ups	Institutional Delivery	Post-natal Care within 2 Days of Child Delivery
Period dummy (base: 2006)	−0.108***	−0.130***	−0.191***	−0.162***	−0.152***
	(0.0157)	(0.0305)	(0.0299)	(0.0303)	(0.0305)
Universal state dummy (base: Targeted)	0.0482*	0.157***	0.229***	0.127***	0.139***
	(0.0312)	(0.0563)	(0.0517)	(0.0478)	(0.0445)
Period dummy* Universal state dummy	0.00769	−0.0450	−0.126***	−0.129***	−0.107**
	(0.0317)	(0.0578)	(0.0491)	(0.0434)	(0.0434)
Social factors					
No education (Zero years of schooling)	0.269***	0.484***	0.359**	0.305**	0.268**
	(0.0839)	(0.139)	(0.133)	(0.128)	(0.129)
Scheduled Caste	0.359***	0.564**	0.561***	0.331*	0.269
	(0.116)	(0.208)	(0.193)	(0.151)	(0.156)
Scheduled Tribe	0.242***	0.357***	0.342***	0.312***	0.301***
	(0.0411)	(0.0796)	(0.0602)	(0.0615)	(0.0661)
Rural	0.00754	0.0274	0.00717	0.0879	0.0942
	(0.0356)	(0.0647)	(0.0476)	(0.0785)	(0.0627)
Health Outcome					
IMR	−0.00167*	−0.00337	−0.00204	−0.00120	−0.00211*
	(0.000658)	(0.00128)	(0.00122)	(0.000922)	(0.00100)
Constant	0.0543	0.0396	0.0742	0.0401	0.0608
	(0.0271)	(0.0550)	(0.0519)	(0.0648)	(0.0589)
Observations	58	58	58	58	58
Adjusted R-squared	0.721	0.667	0.815	0.813	0.782

Note: Robust standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1. Source: Author's calculation.

existing literature (Vellakkal, Gupta, Khan, Stuckler, Reeves, Ebrahim, 2017; Randive et al., 2013). We find a substantial reduction in inequality in institutional delivery as compared to inequality in the use of antenatal care.

The success of JSY in reducing inequality in the utilisation of maternal health care services, as pointed out by our study, reiterates the success of conditional cash transfer programmes in improving health care-seeking behaviour from pioneering countries like Mexico (Gertler, 2000), Nicaragua (Maluccio & Flores, 2004), Malawi (Thornton, 2008), Honduras (Morris, Flores, Olinto, & Medina, 2004), and Colombia (Attanasio, Battistin, Fitzsimons, Mesnard, & Vera-Hernandez, 2005). The programme implementation strategy of JSY follows a mixed approach; that is, it incorporates both universalisation and targeting, which is unique for any public policy. However, policies, otherwise, follow either of the two methods. We have made an important contribution to the literature by exploiting the state-level variation between the universal and targeted states in examining the effect of the JSY. Our results show that the decline in inequality is higher in the universal states for institutional delivery and postnatal care relative to the targeted states, controlling for other state-level characteristics. We also find a significant difference in the change in inequality for two important indicators of antenatal care services between two groups of states, even if cash incentivisation is not directly linked to ANC. The universal states experienced a higher decline in inequality for four or more ANC visits and comprehensive health check-ups as compared to the targeted states, indicating a positive spillover effect of the JSY on the ANC. Also, the active involvement of Accredited Social Health Activists (ASHAs), another important component of NRHM, may play a significant role. It may thus be summarised that cash incentivisation (JSY) as well as programme strategy help in reducing inequality successfully.

The success of universalisation to check for inequality in institutional delivery encourages the adoption of this technique to further reduce inequality in MHCS utilisation in India. The idea of targeting instead of universalisation gained popularity in social welfare programmes in developing countries, including India in the 1970s. This trend is based on the argument that it is better to target the "deserving poor" in the

presence of limited fiscal resources (Mkandawire, 2005) in poor countries. However, earlier evidence suggests that India does not inspire much hope in targeting the right people because of the incidence of high exclusion errors, that is, many poor people who should be covered in the programme are left out. Poor implementation of programmes and weak governance are the major factors that account for the failure of welfare schemes using a targeted approach (Srivastava, 2004).

We cannot deny that universalisation in maternal health care provisioning would be an expensive option given the budget constraints of the government and the fact that a low proportion of the Gross Domestic Product (GDP) is set aside for redistributive social welfare schemes. However, recent evidence from food security programmes suggests that targeting is also not very cheap due to the prevalence of corruption, leakage, and red tape (Drèze & Khera, 2015). In contrast, universalisation has the potential to reduce cost relative to targeting by reducing administration costs by simplifying the bureaucracy of redistribution. There would be a lesser incidence of "leakage" or the incentive to divert resources from the system under universalisation. Targeting can be beneficial in health care programmes only if the right beneficiaries are identified through the application of targeting criteria specific to maternal and child health requirements at the local level instead of a selection of beneficiaries based on the state-level poverty line cut-off. Albeit that would be a colossal task.

Although cash transfer programmes have a positive spillover effect on antenatal care at the overall state level, states like Uttar Pradesh and Bihar still experience a high level of inequality in ANC. In such a scenario, linking the cash incentivisation programme across three phases of the continuum of care (Lahariya, 2009) could be another option for reducing inequality. However, such programmes add a huge cost burden to the government while cash transfer programmes have the potential to eradicate inequality only partially. Hence, demand-side interventions alone cannot solve the problem. This highlights the importance of the supply of adequate, effective, and quality health services as well.

The supply side delivery mechanism beyond the cash transfer programme still plays a significant role in persistent inequality in the utilisation of maternal health care services. One limitation of our study is

Table 4
Regression Results from the Full-Blown Model—Effect of Universalisation vis-à-vis Targeting on CI for MHCS.

	(1)	(2)	(3)	(4)	(5)
	ANC Check-up-First Trimester	4+ ANC Check-ups	Comprehensive ANC Health Check-ups	Institutional Delivery	Post-natal Care-within 2 Days of Child Delivery
Period dummy (base: 2006)	−0.103***	−0.0801**	−0.164***	−0.139***	−0.123***
	(0.0227)	(0.0335)	(0.0371)	(0.0314)	(0.0273)
Universal state dummy (base: Targeted)	0.0405*	0.0374	0.125**	0.0732**	0.0803**
	(0.0200)	(0.0436)	(0.0536)	(0.0387)	(0.0359)
Period dummy* Universal state dummy	−0.0146	−0.0770**	−0.146***	−0.136***	−0.122***
	(0.0251)	(0.0393)	(0.0451)	(0.0362)	(0.0341)
Social Factors					
No education (Zero years of schooling)	0.187**	−0.00108	0.235	0.115	0.0949
	(0.0820)	(0.126)	(0.144)	(0.0859)	(0.101)
Scheduled Caste	0.169	0.169	0.220	0.122	−0.00164
	(0.0926)	(0.155)	(0.196)	(0.130)	(0.120)
Scheduled Tribe	0.164***	0.175***	0.169**	0.118*	0.0986*
	(0.0532)	(0.0593)	(0.0626)	(0.0575)	(0.0572)
Rural	0.0229	−0.0156	0.0548	0.0477	0.0535
	(0.0414)	(0.0560)	(0.0662)	(0.0732)	(0.0558)
Health Outcome					
IMR	−0.00135	−0.00120	−0.00144	−0.00143	−0.00242
	(0.000496)	(0.000948)	(0.00104)	(0.000742)	(0.000753)
Economic and Economic Inequality Factors					
Per capita NSDP	0.0528	0.0431	0.0134	0.0142	−0.0180
	(0.0480)	(0.0646)	(0.0867)	(0.0801)	(0.0647)
Poverty ratio	0.0661	0.0666	−0.194	−0.0111	−0.182*
	(0.0768)	(0.117)	(0.116)	(0.105)	(0.115)
Wealth Gini	−0.199	0.182	0.212	0.332	0.422
	(0.181)	(0.314)	(0.281)	(0.197)	(0.208)
Supply Side Factor					
Per capita health expenditure	−0.0176**	−0.0237*	−0.0106	−0.00148	−0.00322
	(0.00819)	(0.0148)	(0.0120)	(0.0102)	(0.0106)
Initial Level Relative Inequality					
Medium level initial inequality (Ref: Low initial inequality)	0.0343	0.117***	0.0992**	0.119***	0.113***
	(0.0190)	(0.0272)	(0.0380)	(0.0363)	(0.0302)
High level initial inequality (Ref: Low initial inequality)	0.110***	0.310***	0.226***	0.216***	0.223***
	(0.0233)	(0.0362)	(0.0419)	(0.0388)	(0.0356)
Constant	0.0699	0.0269	0.0417	−0.0102	0.0567
	(0.0580)	(0.0703)	(0.0841)	(0.101)	(0.0761)
Observations	58	58	58	58	58
R-squared	0.852	0.872	0.876	0.902	0.893

Note: Robust standard errors in parentheses; ***p < 0.01, **p < 0.05, *p < 0.1. Source: Author's calculation.

that we could not control for the structural quality of facilities in our analysis as NFHS data, like other DHS surveys, does not permit easy linkage to facility-level data. We have proxied it by the per capita public health expenditure and shown that the lower the per capita health expenditure, the higher is the inequality in ANC care. In this context, the literature from lower-middle-income countries including India shows that poor women access the local facilities for ANC, which are neither well equipped nor able to maintain a set standard of structural quality (Sharma, Leslie, Kundu, & Kruk, 2017; Victora et al., 2010). Basic laboratory facilities are also missing in the poor states. The high out-of-pocket expenditures incurred on booking appointments, medicines, laboratory tests, and ultrasound scans, among others, also act as important barriers in accessing care (Aikins, Aryeetey, Dako-Gyeke, Adongo, & McGough, 2015; Dhar et al., 2009; Goli, MoradhvaiRammohan, Shruti, & Pradhan, 2016). Unlike curative care, ANC does not offer immediate benefits, and consequently, low-income families are less likely to pay for such services upfront. This results in a higher risk of financial shocks in the case of any obstetric complications (Arsenault et al., 2018). Disadvantaged women are treated differentially in accessing maternal care due to their poverty, low educational attainments, and ethnic background. Such hindrances, therefore, call for a

stringent revision, monitoring, and quality control of health care policies under the NRHM.

Conclusion

Using nationally representative data from India, this study provides evidence that inequality in the use of maternal health care services in public facilities declines in varying scale across states among different services. The Conditional cash transfer programme, the JSY, is more successful in reducing inequality in universal states as compared to the targeted states. However, the demand-side intervention will only be optimally effective in the presence of a well-functioning health system. Therefore, health policies should focus on strengthening the supply side along with revisiting the programme implementation strategy under the JSY.

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Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2019.100502.

APPENDIX

A1
List of state abbreviations

State/UT	Abbreviation	State/UT	Abbreviation
Andhra Pradesh	AP	Manipur	MN
Arunachal Pradesh	AR	Meghalaya	ML
Assam	AS	Mizoram	MZ
Bihar	BR	Nagaland	NL
Chhattisgarh	CG	Odisha	OR
Goa	GA	Punjab	PB
Gujarat	GJ	Rajasthan	RJ
Haryana	HR	Tripura	TR
Himachal Pradesh	HP	Uttarakhand	UK
Jammu and Kashmir	JK	Uttar Pradesh	UP
Jharkhand	JH	West Bengal	WB
Karnataka	KA	Tamil Nadu	TN
Kerala	KL	Tripura	TR
Madhya Pradesh	MP	Delhi	DL
Maharashtra	MH		

A2
Measure of relative inequality in terms of ratio across states during 2006-16

| States	First trimester ANC		ANC4		Comp coverage ANC		Institutional Delivery		PPC -2days	
	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
Jammu and Kashmir	**2.29**	**1.35**	**1.76**	**1.14**	**8.97**	**1.48**	**3.38**	**1.39**	**3.04**	**1.52**
Himachal Pradesh	**2.17**	**1.37**	**2.04**	**1.24**	**2.82**	**1.52**	**3.79**	**1.72**	**3.00**	**1.44**
Punjab	**2.93**	**1.22**	**2.59**	**0.88**	**8.00**	**1.17**	**3.46**	**1.21**	**2.23**	**1.12**
Uttaranchal	**3.57**	**2.14**	**1.20**	**0.67**	**14.34**	**2.76**	**9.88**	**1.88**	**8.31**	**1.98**
Haryana	**1.92**	**1.71**	**1.36**	**0.93**	**9.86**	**1.83**	**6.82**	**1.43**	**2.41**	**1.41**
Delhi	**1.91**	**1.57**	**1.31**	**0.96**	**3.46**	**1.40**	**3.88**	**1.36**	**2.23**	**1.21**
Rajasthan	**3.47**	**1.63**	**3.33**	**0.90**	**14.55**	**1.98**	**6.64**	**1.30**	**5.55**	**1.43**
Uttar Pradesh	**3.92**	**2.63**	**4.17**	**1.51**	**44.87**	**5.08**	**6.79**	**1.56**	**19.05**	**1.75**
Bihar	**5.37**	**2.55**	**2.29**	**0.92**	**11.79**	**4.67**	**7.14**	**1.62**	**5.22**	**1.62**
Sikkim	**2.41**	**0.95**	**2.32**	**0.83**	**3.34**	**0.98**	**4.32**	**1.09**	**4.14**	**1.18**
Arunachal Pradesh	**6.43**	**1.96**	**2.00**	**0.70**	**9.72**	**2.27**	**10.00**	**4.09**	**12.61**	**2.79**
Nagaland	**5.17**	**6.14**	**1.00**	**1.07**	**17.89**	**7.53**	**17.20**	**5.31**	**18.89**	**5.27**
Manipur	**2.26**	**1.64**	**1.40**	**1.04**	**3.29**	**1.78**	**4.29**	**2.38**	**4.67**	**2.13**
Mizoram	**4.00**	**1.95**	**1.59**	**1.00**	**26.52**	**2.47**	**3.84**	**2.27**	**3.52**	**2.37**
Tripura	**4.10**	**1.41**	**2.61**	**0.86**	**6.45**	**1.40**	**6.79**	**1.58**	**3.62**	**1.73**
Meghalaya	**5.69**	**2.05**	**2.00**	**0.97**	**8.20**	**1.87**	**28.39**	**2.81**	**20.86**	**2.22**
Assam	**4.16**	**1.60**	**7.21**	**0.99**	**45.00**	**1.67**	**16.89**	**1.90**	**13.79**	**1.85**
West Bengal	**3.35**	**1.42**	**4.33**	**1.04**	**6.21**	**1.50**	**5.11**	**1.63**	**3.29**	**1.43**
Jharkhand	**4.60**	**2.29**	**3.33**	**1.02**	**55.91**	**3.46**	**21.88**	**2.20**	**12.13**	**2.09**
Odisha	**2.40**	**1.35**	**3.47**	**1.01**	**9.84**	**1.29**	**7.60**	**1.41**	**5.33**	**1.17**
Chhattisgarh	**1.95**	**1.49**	**3.14**	**1.14**	**13.33**	**1.62**	**18.13**	**1.65**	**6.30**	**1.54**
Madhya Pradesh	**2.77**	**2.18**	**2.34**	**1.03**	**18.82**	**2.43**	**8.15**	**1.59**	**4.92**	**1.87**
Gujarat	**2.90**	**1.50**	**2.35**	**1.00**	**6.67**	**1.75**	**3.07**	**1.29**	**2.29**	**1.22**
Maharashtra	**2.41**	**1.32**	**2.38**	**0.86**	**2.45**	**1.24**	**3.67**	**1.29**	**3.23**	**1.22**
Andhra Pradesh	**1.81**	**1.21**	**1.24**	**0.90**	**1.81**	**1.05**	**2.24**	**1.19**	**2.08**	**1.12**
Karnataka	**1.94**	**1.02**	**1.60**	**0.74**	**2.74**	**1.04**	**2.67**	**1.07**	**2.52**	**1.17**
Goa	**1.50**	**1.11**	**1.08**	**0.95**	**1.23**	**1.14**	**1.25**	**1.05**	**1.10**	**1.01**
Kerala	**1.21**	**1.02**	**0.99**	**0.96**	**1.14**	**1.01**	**1.01**	**1.00**	**1.24**	**1.05**
Tamil Nadu	**1.58**	**1.12**	**1.04**	**0.83**	**1.25**	**1.04**	**1.36**	**1.01**	**1.38**	**1.04**

Note: All figures in bold are statistically significant.

A3

Measure of relative inequality in terms of concentration index across states during 2006-16

States	First trimester ANC		ANC4		Comp coverage ANC		Institutional Delivery		PPC -2days	
	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
Jammu and Kashmir	**0.15**	**0.05**	**0.14**	**0.06**	**0.41**	**0.07**	**0.21**	**0.06**	**0.19**	**0.07**
Himachal Pradesh	**0.13**	**0.06**	**0.2**	**0.11**	**0.18**	**0.07**	**0.23**	**0.09**	**0.19**	**0.07**
Punjab	**0.16**	**0.04**	**0.2**	**0.06**	**0.33**	**0.03**	**0.22**	**0.04**	**0.15**	**0.02**
Uttaranchal	**0.25**	**0.14**	**0.38**	**0.28**	**0.46**	**0.19**	**0.42**	**0.11**	**0.4**	**0.13**
Haryana	**0.13**	**0.1**	**0.22**	**0.13**	**0.38**	**0.11**	**0.33**	**0.06**	**0.17**	**0.06**
Delhi	**0.14**	**0.1**	**0.2**	**0.13**	**0.21**	**0.07**	**0.25**	**0.06**	**0.18**	0.04
Rajasthan	**0.25**	**0.09**	**0.44**	**0.19**	**0.49**	**0.13**	**0.32**	**0.05**	**0.3**	0.07
Uttar Pradesh	**0.25**	**0.18**	**0.52**	**0.31**	**0.64**	**0.3**	**0.38**	**0.08**	**0.48**	**0.11**
Bihar	**0.32**	**0.18**	**0.47**	**0.32**	**0.48**	**0.3**	**0.36**	**0.09**	**0.29**	**0.09**
Sikkim	**0.17**	0	**0.23**	0	**0.22**	0	**0.29**	0.01	**0.3**	**0.03**
Arunachal Pradesh	**0.33**	**0.13**	**0.38**	**0.21**	**0.39**	**0.16**	**0.44**	**0.25**	**0.44**	**0.18**
Nagaland	**0.33**	**0.33**	**0.55**	**0.54**	**0.54**	**0.35**	**0.47**	**0.32**	**0.53**	**0.33**
Manipur	**0.14**	**0.08**	**0.23**	**0.15**	**0.23**	**0.1**	**0.27**	**0.15**	**0.28**	**0.13**
Mizoram	**0.25**	**0.12**	**0.3**	**0.18**	**0.45**	**0.15**	**0.24**	**0.13**	**0.23**	**0.14**
Tripura	**0.24**	**0.07**	**0.29**	**0.1**	**0.33**	**0.05**	**0.3**	**0.08**	**0.2**	**0.1**
Meghalaya	**0.3**	**0.14**	**0.28**	**0.17**	**0.39**	**0.13**	**0.49**	**0.2**	**0.46**	**0.16**
Assam	**0.25**	**0.09**	**0.44**	**0.15**	**0.54**	**0.1**	**0.46**	**0.12**	**0.45**	**0.12**
West Bengal	**0.22**	**0.07**	**0.32**	**0.05**	**0.35**	**0.08**	**0.32**	**0.1**	**0.23**	**0.07**
Jharkhand	**0.28**	**0.15**	**0.51**	**0.28**	**0.56**	**0.22**	**0.53**	**0.14**	**0.49**	**0.14**
Odisha	**0.17**	**0.06**	**0.26**	**0.06**	**0.37**	**0.05**	**0.35**	**0.06**	**0.3**	**0.03**
Chhattisgarh	**0.12**	**0.08**	**0.3**	**0.1**	**0.47**	**0.09**	**0.59**	**0.09**	**0.33**	**0.07**
Madhya Pradesh	**0.22**	**0.15**	**0.37**	**0.23**	**0.51**	**0.17**	**0.41**	**0.09**	**0.31**	**0.12**
Gujarat	**0.21**	**0.07**	**0.27**	**0.11**	**0.31**	**0.1**	**0.23**	**0.05**	**0.18**	**0.04**
Maharashtra	**0.16**	**0.04**	**0.21**	**0.04**	**0.16**	**0.03**	**0.23**	**0.04**	**0.2**	**0.04**
Andhra Pradesh	**0.1**	**0.04**	**0.09**	**0.03**	**0.1**	0	**0.15**	**0.03**	**0.13**	**0.02**
Karnataka	**0.12**	**0.01**	**0.15**	0	**0.19**	**0.01**	**0.19**	**0.01**	**0.18**	**0.03**
Goa	**0.06**	**0.01**	**0.03**	**0.01**	**0.04**	**0.03**	**0.04**	**0.01**	0.01	0.01
Kerala	**0.04**	**0.01**	0.01	0	**0.02**	0	0	0	**0.04**	0.01
Tamil Nadu	**0.09**	**0.02**	**0.04**	**0.01**	**0.05**	**0.01**	0.05	0	**0.06**	**0.01**

Note: All figures in bold are statistically significant.
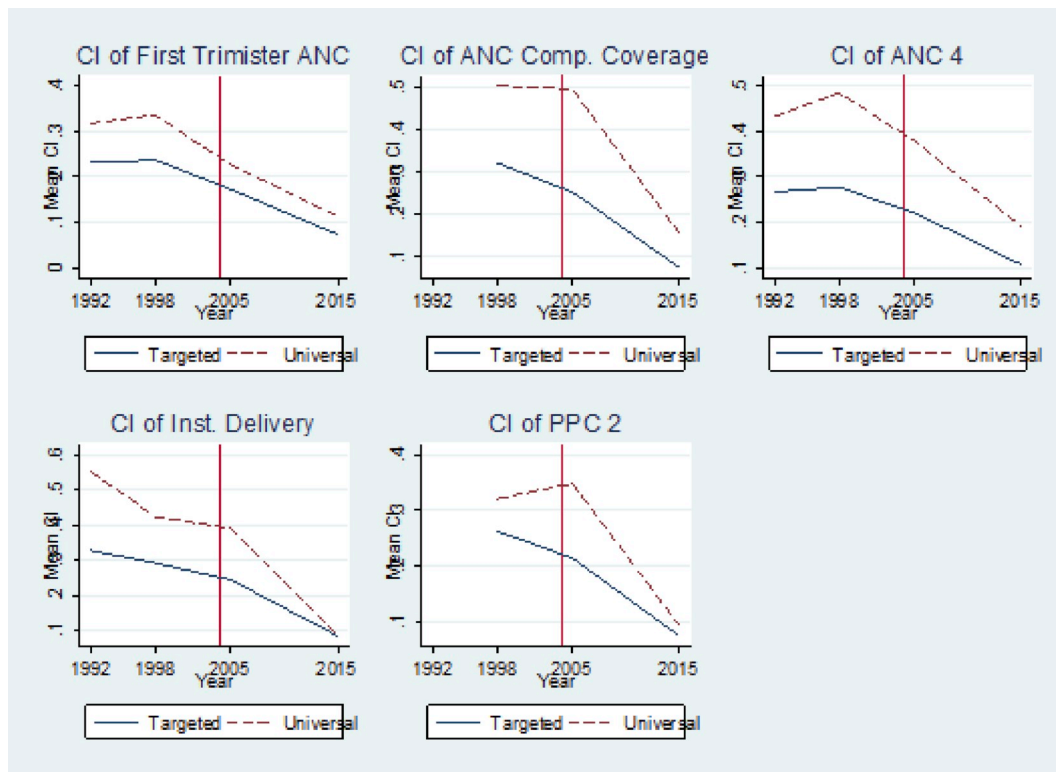
A4. The difference in Difference Approach: Common trend between universal and targeted states.

References

Aikins, M., Aryeetey, R., Dako-Gyeke, P., Adongo, P. B., & McGough, L. (2015). Socio-economic differences in cost of pregnancy-related health services in the peri-urban Accra, Ghana. *Journal of Public Health, 37*, 540–546.

Angrist, J. D., & Pischke, J. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton: Princeton University Press.

Arsenault, C., Jordan, K., Lee, D., Dinsa, G., Manzi, F., Marchant, T., et al. (2018). Equity in antenatal care quality: An analysis of 91 national household surveys. *The Lancet Global Health, 6*(11), e1186–e1195.

Asri, V. (2019). Targeting of social transfers: Are India's poor older people left behind. *World Development, 115*, 46–63.

Attanasio, O., Battistin, E., Fitzsimons, E., Mesnard, A., & Vera-Hernandez, M. (2005). *How effective are conditional cash transfers? Evidence from Colombia*. London, England: Institute for Fiscal Studies, Briefing Notes.

Barros, R., & Carvalho, M. (2004). *Targeting and universalization as instruments for the reduction of inequalities*. Inter-American Development Bank, Poverty and Inequality Unit.

Barros, A. J. D., Rosman's, C., Axelson, H., Loaiza, E., Bertoldi, A. D., Franca, G. V. A., et al. (2012). Equity in maternal, newborn, and child health interventions in countdown to 2015: A retrospective review of survey data from 54 countries. *The Lancet, 379*, 1225–1233.

Coady, D., Grosh, M., & Hoddinott, J. (2004). *Targeting of transfers in developing countries: Review of lessons and experience*. The World Bank. http://documents.worldbank.org/curated/en/464231468779449856/pdf/302300PAPER0Targeting0of0transfers.pdf. (Accessed 24 May 2019).

Dhar, R. S., Nagpal, J., Sinha, S., Bhargava, V. L., Sachdeva, A., & Bhartia, A. (2009). Direct cost of maternity-care services in South Delhi: A community survey. *Journal of Health, Population and Nutrition, 27*, 368–378.

Drèze, J., & Khera, R. (2010). The BPL census and a possible alternative. *Economic and Political Weekly, XLV*(09), 54–63.

Drèze, J., & Khera, R. (2015). Development review: Recent social security initiatives in India. *World Development, 98*, 555–572.

Gertler, P. (2000). *The impact of Progresa on health*. International Food Policy Research Institute. http://www.ifpri.org/themes/progresa/pdf/Gertler_health.pdf. (Accessed 12 December 2018).

Goli, S., Moradhvai, Rammohan, A., Shruti, & Pradhan, J. (2016). High spending on maternity care in India: What are the factors explaining it? *PLoS One, 11*, e0156437.

Government of India. (2007). *Press note on poverty estimates for 2004–05*. New Delhi: Planning Commission. http://www.planningcommission.gov.in/news/prmar07.pdf. (Accessed 12 October 2018).

Government of India. (2013). *Press note on poverty estimates for 2011–12*. New Delhi: Planning Commission. http://planningcommission.nic.in/news/press_pov2307.pdf. (Accessed 10 October 2018).

Govindasamy, P., & Ramesh, B. M. (1997). *Maternal education and utilization of maternal and child health services in India*. Mumbai: International Institute for Population Sciences. NFHS Survey Subject Report No. 5.

International Institute for Population Sciences. (2007). *National family health survey (NFHS-3), 2005–06: India*. Mumbai, India: International Institute for Population Sciences.

International Institute for Population Sciences. (2017). *National family health survey (NFHS-4), 2015-16: India*. Mumbai, India: International Institute for Population Sciences.

Lahariya, C. (2009). Cash incentives for institutional delivery: Linking with antenatal and post-natal care may ensure 'continuum of care' in India. *Indian Journal of Community Medicine, 34*(1), 15–18.

Lim, S. S., Dandona, L., Hoisington, J. A., James, S. L., Hogan, M. C., & Gakidou, E. (2010). India's Janani Suraksha Yojana, a conditional cash transfer programme to increase births in health facilities: An impact evaluation. *The Lancet, 375*, 2009–2023.

Lorenc, T., Petticrew, M., Welch, V., & Tugwell, P. (2013). What types of interventions generate inequalities? Evidence from systematic reviews. *Journal of Epidemiology & Community Health, 67*, 190–193.

Maluccio, J. A., & Flores, R. (2004). *Impact evaluation of a conditional cash transfer program: The Nicaraguan Red de Proteccion Social*. Washington, D.C: International Food Policy Research Institute, 10.2499/0896291464RR141.

Ministry of Health and Family Welfare (MoHFW). (2005). *National rural health mission (2005–12), mission document*. New Delhi: Ministry of Health and Family Welfare, Government of India.

Mkandawire, T. (2005). *Targeting and universalism in poverty reduction*. Geneva, Switzerland: United Nations Research Institute for Social Development. Social Policy and Development Programme Paper Number 23.

Morris, S. S., Flores, R., Olinto, P., & Medina, J. M. (2004). Monetary incentives in primary health care and effects on use and coverage of preventive health care interventions in rural Honduras: Cluster randomised trial. *The Lancet, 364*(9450), 2030–2037.

Paul, S. (2018). *Are the poor catching up with the rich in utilizing maternal health services? Evidence from India*. New Delhi: Population Council. Working Paper.

Ram, F., Mohanty, S. K., & Ram, U. (2009). Understanding the distribution of BPL cards: All India and selected states. *Economic and Political Weekly, XLIV*(7), 66–71.

Randive, B., Diwan, V., & de Costa, A. (2013). India's conditional cash transfer programme (the JSY) to promote institutional birth: Is there an association between institutional birth proportion and maternal mortality? *PLoS One, 8*, e67452.

Reserve Bank of India. (2015-16). *Handbook of Statistics on Indian states*. Mumbai, India: Reserve Bank of India.

Ruhago, G. M., Ngalesoni, F. N., & Norheim, O. F. (2012). Addressing inequity to achieve the maternal and child health millennium development goals: Looking beyond averages. *BMC Public Health, 12*, 1119. https://doi.org/10.1186/1471-2458-12-1119.

Sample Registration System. (2016). *SRS bulletin, census of India*. India.

Sharma, J., Leslie, H. H., Kundu, F., & Kruk, M. E. (2017). Poor quality for poor women? Inequities in the quality of antenatal and delivery care in Kenya. *PLoS One, 12*, e0171236.

Srivastava, P. (2004). *Poverty targeting in Asia: Country experience of India*. Tokyo, Japan: Asian Development Bank Institute. Discussion Paper No. 5.

Thongkong, N., Poel, D. E., Roy, S. S., Rath, S., & Houweling, T. A. (2017). How equitable is the uptake of conditional cash transfers for maternity care in India? Evidence from the Janani Suraksha Yojana scheme in Odisha and Jharkhand. *International Journal for Equity in Health, 16*(1), 48.

Thornton, R. L. (2008). The demand for, and impact of, learning HIV status. *The American Economic Review, 98*(5), 1829–1863.

Titmuss, R. M., Morris, R., & Alcock, P. (1951-2001). *Welfare and well-being: Richard Titmuss's contribution to social policy*. Bristol, England: Policy Press.

Vellakkal, S., Gupta, A., Khan, Z., Stuckler, D., Reeves, A., Ebrahim, S., et al. (2017). Has India's national rural health mission reduced inequities in maternal health services? A pre-post repeated cross-sectional study. *Health Policy and Planning, 32*, 79–90.

Victora, C. G., Matijasevich, A., Silveira, M., Santos, I., Barros, A., & Barros, F. (2010). Socio-economic and ethnic group inequities in antenatal care quality in the public and private sector in Brazil. *Health Policy and Planning, 25*, 253–261.

Wagstaff, A., Paci, P., & van Doorslaer, E. (1991). On the measurement of inequalities in health. *Social Science & Medicine, 33*(5), 545–557.

World Health Organization. (2010). *Trends in maternal mortality: 1990 to 2010*. https://www.unfpa.org/sites/default/files/pub-pdf/Trends_in_maternal_mortality_A4-1.pdf As. (Accessed 1 March 2019).