Equilibrium Effects of Incentivizing Public Services*

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Abstract

We study the equilibrium effects of subsidizing public services in the presence of vertically differentiated public and private suppliers. We evaluate one of India's largest welfare schemes, *Janani Suraksha Yojana* (JSY), which subsidized childbirth at public health institutions. JSY did not improve health outcomes despite a substantial increase in take-up of institutional care. We document three equilibrium responses that explain this policy failure. First, JSY led to a mismatch in patient risk across health facilities. High-risk mothers sorted out of the highest quality care at private facilities and into lower quality public facilities. Second, in response to congestion and deterioration of care at public hospitals, mothers with high socio-economic status sorted out of congested public facilities into more expensive private facilities. Third, private hospitals increased prices without improvements in healthcare quality in a specific subset of states, further crowding out high-risk and poor mothers. These findings point to the need for complementary public policies in addition to JSY, in particular, capacity improvements at public facilities and targeted vouchers for poor mothers to access healthcare at private facilities.

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1 Introduction

Effectively designing large-scale public policies is crucial given limited government funds. A growing literature has emphasized the importance of equilibrium considerations in the design of public policies at scale (Acemoglu 2010; Egger et al. 2022; Cunha, De Giorgi, and Jayachandran 2019; Khanna 2023). Studies have shown that equilibrium responses can either amplify (Barahona et al. 2020; Jiménez-Hernández and Seira 2021), attenuate (Andrew and Vera-Hernández 2022) or redistribute (Khanna 2023; Atal et al. 2022) the benefits of such policies. We study the equilibrium effects of large-scale subsidies for public services in the presence of vertically differentiated public and private suppliers. Theoretically, on the one hand, subsidies for the public option can discipline the market by restricting private suppliers' market power. On the other hand, they can induce distortions in demand due to incentives for lower-quality services. We offer an empirical investigation of these claims in the context of India's maternal healthcare system which features a lower-quality public option along with private providers.

We study India's *Janani Suraksha Yojana* (JSY), a program that offered subsidies to pregnant women conditional on adopting institutional care for deliveries at India's public facilities. Around the launch of JSY in 2005, over 70% of pregnant women in India gave birth at home, presumably under severely inadequate healthcare expertise and facilities. Concurrently, India accounted for almost a third of all neonatal deaths and a fifth of all maternal deaths around the world (Lim et al. 2010). The key objective of JSY was to reduce maternal and perinatal mortality by encouraging pregnant women to give birth in public healthcare facilities instead of delivering at home. Previous evaluations of JSY have documented that despite the fact that mothers sorted from home to institutional facilities, perinatal mortality did not decline (Powell-Jackson, Mazumdar, and Mills 2015; Andrew and Vera-Hernández 2022). First, We document that India's public and private healthcare systems are vertically differentiated. And second, we demonstrate that equilibrium interactions between public and private healthcare sectors contributed to the failure of JSY in reducing perinatal mortality.

JSY had two main components. First, pregnant women were offered significant cash incentives conditional on delivering at a public healthcare facility. And second, the government appointed personnel in each village to assist pregnant women with various stages of motherhood. These Accredited Social Health Workers (ASHA) were financially incentivized to encourage women to deliver at public healthcare facilities. Eligibility for benefits under JSY was determined based on prevailing rates of maternal and perinatal mortality across Indian states. The ten worst performing Indian states were designated low-performing states (LPS) and the remaining were designated high-performing states (HPS). All mothers in LPS were eligible to receive benefits under the scheme whereas only poor and/or socially backward groups were eligible in HPS. The scheme was rolled out rapidly starting in the second quarter of 2005 and was present in all Indian districts in our sample by 2009. Crucially, in its effort to reduce mortality, the Indian government neither subsidized births in private facilities nor prioritized investments in public sector capacity.

Two features of JSY enable us to make empirical progress on our research question. First, this policy provided a large demand stimulus in a market with public and private suppliers that was able to affect market equilibrium. And second, because JSY was a flagship policy under a larger healthcare agenda of the Indian government, special efforts were made to collect data on household choices, out-of-pocket costs, health infrastructure and health outcomes.

The data for this study come from three rounds of India's District-level Household Surveys (DLHS). This nationally representative dataset contains detailed retrospective information on the most recent childbirth for each woman in the household[1], including the outcome of delivery, place (private facility, public facility or home) and type of delivery, out-of-pocket costs for healthcare, receipt of government assistance, individual and household demographics, and socio-economic status. Importantly, the survey also asked women several questions about previous pregnancies (for example, previous birthing complications, still-births, and fertility) which helps us in assessing the ex-ante risk level of a mother before her last delivery, following Ash et al. (2012). Our data allow us to study women's choice of healthcare facility conditional on their socio-economic status and ex-ante risk level. We infer prices using

[1]Because DLHS surveyed women within the households, the data does not have information on the 0.25% mothers that suffered maternal mortality.

reported out-of-pocket costs of delivering at various facilities, and healthcare quality from information on perinatal mortality and health inputs. The DLHS also provides information on existing public sector capacity (doctors, nurses and beds) that allows us to compare outcomes across districts with different levels of capacity. Overall, the data provide uniquely rich information on several variables that together characterize the market equilibrium.

We begin by demonstrating that public and private healthcare facilities in India are vertically differentiated. First, private facilities are on average higher quality than public facilities, which in turn provide better quality care than delivering at home. We show: (i) controlling for a mother's pre-determined risk, likelihood of perinatal mortality is smallest at private facilities followed by public facilities, (ii) more educated and economically better-off mothers are on average more likely to deliver at private facilities, followed by public facilities, and are least likely to deliver at home and (iii) private facilities provide higher quantity and quality of health inputs (pre-natal check ups) relative to public facilities and home. Second, median out-of-pocket costs for deliveries at private facilities are approximately four times larger than median costs at public facilities.

To study the causal effects of JSY, we use a staggered difference-in-differences research design where we exploit the gradual roll-out of JSY across Indian districts. Borusyak, Jaravel, and Spiess (2022) show that, in cases with very few never-treated units, as in the case of JSY, the two-way fixed effects model suffers from multi-collinearity[2] and negative weighting. We therefore use the imputation method recommended by Borusyak, Jaravel, and Spiess (2022) as our primary specification. The identification assumption behind our results is the parallel trends assumption i.e., treated and untreated districts would have the same trends in outcome variables in the absence of JSY. We present evidence in support of this assumption using event studies with pre-trends.

Using a larger sample of rural as well as urban mothers, we confirm previous findings that JSY resulted in a significant increase in institutional births but failed to lower perinatal mortality. The average effect on the probability of institutional births was a sizable 8% increase in treated districts relative to untreated districts in quarters after the policy. Over

[2]Specifically, dynamic treatment effects are not point identified in cases with no or few never-treated units.

the following two years, the effect size grew to 27%. JSY was effective at targeting: poorer mothers were more likely to receive JSY incentives. We also show suggestive evidence that JSY achieved higher rates of institutional births by not only reducing costs but also by relaxing norms and information frictions around take-up of institutional care. However, despite a significant increase in institutional deliveries, we do not find any evidence of a decline in perinatal mortality as a result of JSY. This is surprising because our descriptive evidence showed that institutional facilities provided higher quality of care than home. Our interpretation of this result is that while mothers took-up institutional care, the average quality of healthcare received did not improve.

We present evidence on three equilibrium mechanisms that contribute to the failure of JSY in reducing perinatal mortality. First, we show JSY led to a mismatch of patient risk across facilities. From the perspective of reducing mortality, the ideal match would be where higher risk patients get treated at highest quality facilities (private facilities in the case of India). Although JSY resulted in fewer deliveries at home, we find evidence that financial incentives under JSY diverted high-risk mothers away from private facilities (highest-quality but costly care) into public facilities (lower-quality but subsidized care). While mothers saved money, they increased the risk of mortality by moving away from private facilities. Strikingly, we find that the primary intended targets of JSY, poor and high-risk mothers, experienced a 18.81% decline in likelihood of delivering at a private facility. Interestingly, sorting out of private facilities was almost entirely driven by high-risk mothers while low-risk mothers were more likely to sort out of home.

Second, we show that richer mothers adapted to increased congestion at public facilities by sorting into costly private facilities. Specifically, in districts with low public sector capacity, richer (particularly, those who were ineligible for incentives under JSY) sorted out of low-cost public facilities into high-cost private facilities as a response to JSY. This finding complements Andrew and Vera-Hernández (2022), which document that congestion from increased demand due to JSY resulted in an increase in perinatal mortality among high-risk rural mothers in districts with below median public sector capacity. We confirm their results using the entire population as opposed to a select sample of rural patients in low-performing states, and add that the quality and quantity of ante-natal checkups received by patients declined in low public capacity districts as a result of JSY.

Finally, we show that private facilities responded to increased competition from public facilities due to JSY by increasing prices (out-of-pocket costs) without improvements in quality (as measured by the likelihood of perinatal mortality). This further restricted access to highest quality healthcare in India. An important econometric challenge with this analysis is that JSY changed patient characteristics across public facilities, private facilities and home. We present our results using a range of specifications flexibly controlling for ex-ante patient risk and patients' socio-economic status. We show that despite an 18% decline in net prices at public facilities (due to subsidies under JSY), average private sector prices increased by a statistically insignificant 1%. Our dynamic specification shows that JSY led to a sharp decline in private sector prices in the first two quarters after treatment followed by a sharp reversion and significant increase thereafter. Consistent with the theoretical finding from Chen and Riordan (2008), we find that this increase in price was likely a result of a dominant *price sensitivity effect* (steeper residual demand) over *market share effect* (downward pressure on prices from loss of market share). Prices increased only in high-performing states by 4.6%, where women from high socio-economic groups were not incentivized under JSY to deliver at public facilities, implying that the incentive to lower prices due to loss in market share was weaker in high-performing states. Crucially, we find that prices increased by 3.72% for mothers from low socio-economic groups (*below poverty line*, abbreviated as BPL).[3]

Increase in prices might have been welfare improving if private facilities had simultaneously improved healthcare quality. However, we do not find any impact of JSY on private healthcare quality as proxied by perinatal mortality across our range of specifications, despite a less risky patient composition. Another possibility is that private facilities improved amenities. We find that the increase in prices at private facilities is at least partly driven by higher rates of c-sections even for BPL mothers. While we cannot rule out that this increase in c-sections for BPL mothers is demand driven, we provide back-of-the-envelope

[3] This was despite the ability to price discriminate based on mothers' socio-economic status. Our data suggests BPL mothers pay 16% lower average prices at private facilities than non-BPL mothers.

calculations that suggest it is unlikely for BPL mothers to demand higher rates of c-sections unless medically necessary. Specifically, our data suggest that BPL mothers would have to spend about 42% of their annual household income to afford a c-section at a private facility.

It is clear from our findings that policy-makers must consider equilibrium responses while designing large-scale public policies. In the case of JSY, despite being one of India's largest efforts to improve health outcomes, the intended reduction in perinatal mortality did not materialize. Our results suggest that unintended interactions between public and private facilities played an important role: high-risk patients moved from high quality private facilities to congested public facilities and the design of JSY led to an increase in prices at private facilities making them even harder to access. Our results suggest two potential avenues of complementary policy intervention: (i) investments in public sector capacity and (ii) improving access to private sector healthcare for India's poor, potentially via targeted vouchers.

Our paper contributes to several strands of economics literature. First, this paper reiterates the need to incorporate general equilibrium considerations in program evaluations (Acemoglu 2010). In this instance, simply measuring the effect of JSY on increase in take-up of institutional care without a deeper study of how JSY adversely affected the quality of care received (namely via mismatch of risk across health facilities, congestion at public facilities and higher prices at private facilities) would have been of little value to understand health outcomes. Existing literature in development economics has highlighted the importance of general equilibrium considerations in transfer programs (Cunha, De Giorgi, and Jayachandran 2019; Egger et al. 2022), large-scale education reforms (Khanna 2023), and public employment programs (Muralidharan, Niehaus, and Sukhtankar 2018). We add to this literature in the context of healthcare services in markets where public and private suppliers co-exist and are vertically differentiated.

Second, we contribute to the research on healthcare quality in developing country contexts. Previous research has emphasized the supply side of healthcare quality. Das et al. (2016) study India's primary healthcare context and show how quality of healthcare varies for public and informal private providers in rural India. Andrew and Vera-Hernández (2022) highlight the role of public sector capacity in deteriorating healthcare quality via congestion. Mohanan et al. (2021) study how input versus output based incentives for care providers affect patient outcomes in the presence of heterogeneity in doctors' skill levels. We contribute by studying the demand side: particularly, the role of incentives in accessing high quality care. Our finding that JSY led to high-risk and poorer mothers moving away from high quality private facilities into lower quality public facilities shows that demand for healthcare quality can be quite elastic. Moreover, our finding that richer ("ineligible") mothers adapted to congestion at public facilities by choosing private facilities despite high prices highlights inequities in access to high quality life-saving healthcare services. Complementary to our findings, Dupas and Jain (2023) show in the context of health insurance that patient-driven accountability can improve public service delivery.

The third strand of literature relates to the competitive effects of public sector firms. A small and recent empirical literature has explored consequences of entry of public firms on incumbent private firms. Jiménez-Hernández and Seira (2021) show that entry of public milk stores in Mexico lowered prices at private stores despite the government milk being perceived as lower quality. On the other hand, Atal et al. (2022) study competitive effects of public entry in pharmaceuticals market and show that entry of low quality government providers segmented the market, increasing prices at private firms. Our paper explores the price response for maternal healthcare services at private facilities in markets where the incumbent public provider lowers prices, a much subtler intervention. We find that prices at private facilities increased as a result of increased competition from public sector. The private price response in our setting is mediated by the extent to which the subsidy applied to the overall market, consistent with the theoretical findings in Chen and Riordan (2008). Cunha, De Giorgi, and Jayachandran (2019) is a somewhat related exception in studying public-private interaction in a developing country. They show that entry of public suppliers in the form of in-kind transfers reduced market prices as a result of increased supply of food.

The rest of the paper proceeds as follows. Section 2 briefly discusses our setting and important policy details. Section 3 presents details about the data, important definitions for analysis and descriptive facts. Section 4 and section 5 present empirical strategy for evaluation of JSY and results respectively. Finally, section 6 concludes.

2 Setting and Policy Details

2.1 Maternal healthcare system in India

Pregnant mothers in India can choose to receive maternal care at public facilities, private facilities or at home. Public sector provides two levels of care at low administratively set prices (Almeida et al. 2017). Primary public healthcare system provides basic health services via primary health centers (PHCs) which are ubiquitous but lack sophisticated infrastructure and trained doctors to deal with medical complications. The secondary public healthcare system provides advanced care through community health centers (CHCs) and large district hospitals (DHs) which are better quality but more remote. Both levels of the public system severely lack capacity.[4]

Private sector functions unregulated and is characterized by private practitioners that run for-profit health facilities. Private facilities are mostly situated in urban areas, are more remote than PHCs but less remote relative to secondary public healthcare facilities (CHCs and DHs), charge very high prices and vary widely in the level of care they provide (Das et al. 2016). To date, very little is known about private healthcare system in India; official data and balance sheets of private hospitals are plagued with widespread misreporting. In this study, we shall utilize objective information on patient-facility interaction as reported by mothers and illuminate the economics of India's private healthcare system.[5] Several statistics in our data (as demonstrated later) suggest that private facilities provide higher quality care than public facilities on average and home births receive the lowest quality of care.[6]

During the time period of this study, take-up of health insurance was extremely low in

[4] India has one of the lowest rates of investment in public healthcare. Only 1.3% GDP in recent years (Narain 2019). Further, public sector facilities are below capacity even in 2017.

[5] In on-going work, our structural analysis provides first estimates of average mark-ups at India's private hospitals, a recent policy focus in India.

[6] Note that it is conceivable that under certain circumstances, delivering at home may indeed be the highest quality option for a mother. For instance, sudden on-set of labor may make traveling to an institutional facility more unsafe than simply delivering at home.

India (close to 4% in 2005 (DLHS)). This meant that pregnant mothers faced a trade-off between receiving higher quality care and bearing the burden of out-of-pocket costs associated with the level of care. Accessing any institutional facility (public or private) required incurring significant additional expense on transport, lodging and other indirect healthcare costs all while navigating a difficult problem of matching with ideal health facilities.

Beyond financial concerns, several features of the Indian society prevented pregnant mothers from accessing institutional healthcare (over 70% of Indian mothers reported delivering at home (DLHS)). Figure 1 presents reasons for not going to a health facility as reported by mothers prior to JSY. Other than high costs, belief that delivering at a facility was not necessary, customs, lack of family permission to visit hospitals and lack of information were important reasons for delivering at home. Other (supply-side) reasons for delivering at home included mothers reporting poor quality service at health facilities, distance as well as inadequate infrastructure at government facilities including absence of doctors or lack of beds.

As a consequence of these frictions India suffered from a high fatality rate among mothers as well as off-springs. World Bank data in Figure A1 shows that India had among the highest rates of neonatal mortality among emerging and low-income countries.

2.2 Janani Suraksha Yojana (JSY) 2005

In 2005, neonatal mortality rate per 1,000 live births was 38 in India, compared to 33 in Nepal, 27 in Bhutan, and 6 in Sri Lanka[7]. India's maternal mortality ratio per 100,000 live births in that year was 286, eclipsing Pakistan's 237 and Sri Lanka's 45[8]. In absolute terms, the country accounted for almost a third of all neonatal deaths and a fifth of all maternal deaths around the world at the time (Lim et al. 2010). Against this backdrop, the central government launched the National Rural Health Mission (NRHM) in 2005, with the stated goal of providing accessible, affordable, and quality healthcare to Indian women, especially vulnerable socioeconomic and caste groups. The *Janani Suraksha Yojana* (JSY), or the "Safe Motherhood Scheme" is one of the flagship NRHM initiatives launched in April 2005.

[7] See https://data.worldbank.org/indicator/SH.DYN.NMRT?

[8] See https://data.worldbank.org/indicator/SH.STA.MMRT?

The main objective of JSY was to reduce maternal and infant mortality by incentivizing institutional births. Specifically, implementation of JSY had two main components: first, eligible mothers were offered a substantial cash transfer conditional on delivering at public facilities [9] and second, the government appointed and incentivized Accredited Social Health Workers (ASHA workers) for every village with a population of at least 1,000 to encourage pregnant mothers to take-up institutional care. ASHA workers were trained female community health workers, preferably between 25 to 45 years of age, who were selected by community groups and public officials from the pool of literate women in a village. They underwent training to serve as promoters of good public health practices on issues ranging from nutrition to immunization in their village[10]. Importantly, under JSY, ASHA workers also received a financial incentive for every delivery they facilitated at a public facility.

In terms of targeting, the government identified a group of ten "low-performing" states (LPS), where rates of institutional deliveries were relatively lower.[11] All women in these states were eligible to receive cash payments under JSY. The rest of India's 18 states were designated as "High Performing" (HPS) where only women meeting certain criteria were eligible for cash assistance under JSY. Only mothers that belonged to the historically disadvantaged Scheduled Castes (SC) or Scheduled Tribes (ST), *or* were older than 18 years *and* possessed a "Below Poverty Line" (BPL) card were eligible to receive cash assistance in HPS.[12] Even after these criteria were met, the benefits in HPS can only be received by mothers for their first two live births. Figure 2 shows fraction of mothers that were eligible across *high* and low-performing states. In all cases, the policy mandated that the cash be disbursed to eligible women in a single installment at the health facility itself, no later than a week after delivery.

[9] While the policy guidelines allowed for JSY disbursal at accredited private hospitals too, a 2008 government assessment of the policy in rural parts of five states found that relatively little effort was made towards the accreditation of private practitioners. According to the report, just over 1% of surveyed mothers in these states had delivered in accredited private facilities, and less than 30% of women were aware of the JSY provision for accredited private hospitals (https://nhm.gov.in/WriteReadData/l892s/7861979062147487264 6.pdf). Therefore, our discussion of JSY eligibility and primary measure of policy coverage is restricted to births at public institutions.

[10] For information on ASHAs, see https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=150&lid=226.

[11] The LPS included Uttar Pradesh, Uttarakhand, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Assam, Rajasthan, Orissa, and Jammu and Kashmir.

[12] Ownership of a BPL card is the most important determinant of eligibility for welfare assistance in India.

Table 1 presents relevant details on cash incentives for pregnant mothers and ASHAs under JSY. As a benchmark, the cash incentive under JSY was roughly equal to the average reported out-of-cost for a normal (vaginal) birth at a public health facility.

Overall, the policy provided a significant demand stimulus by reducing out-of-pocket costs as well as by reducing information barriers and weakening norms against women's use of maternal healthcare through the work of ASHA workers. However, this large demand stimulus was largely unmatched from the supply side: public hospitals continued providing sub-standard quality of treatment and severely lacked capacity in terms of physical infrastructure (number of beds per 10,000 people) as well as medical expertise (number of obstetrician-gynecologists (OBGYNs) and nursing staff). Pandey and Sharma (2017) show that increasing experts at India's public facilities has been exceptionally difficult. Between 2005-2010, the number of OBGYNS at public facilities increased by just 2.7%. Section 3 presents evidence that no additional effort was made to enhance public infrastructure to accommodate increased demand. Consequently, as we shall demonstrate, the quality of overall healthcare services received at public facilities indeed declined. Lastly, JSY (and Indian government's larger healthcare agenda) largely ignored private healthcare sector despite a heavy concentration of skill and infrastructure at private facilities.

3 Data, definitions and descriptives

3.1 Data sources

Data for our analysis primarily comes from repeated cross-sections of the District Level Household Survey (DLHS), which is a nationally representative survey designed to provide indicators of maternal and child health, as well as access to public healthcare services, across India. We use data from the second, third, and fourth rounds of the DLHS, which were conducted in 2002-04, 2007-08, and 2012-14[13], respectively. In each round, women were surveyed about their overall birth history but detailed information was collected only for

[13] The fourth round of DLHS only collected data from *high-performing states*.

the last birth for each mother. We use detailed information on the last birth for our main analysis and utilize information on outcomes of previous births as supplemental information to assess the ex-ante riskiness of a mother. Note that, because DLHS surveyed mothers within households, we do not have information for 0.25% of the mothers that suffered maternal mortality in our period of analysis.

Crucially, for a mother's last birth, we have information on the outcome of birth (whether live birth, still birth or induced/spontaneous abortion), birth order, year and month of birth, place of birth (whether a public facility, private facility or home)[14], whether mother received JSY cash incentive or ASHA assistance, type of procedure (vaginal or cesarean section), quality of ante-natal and post-natal care, detailed information on pre and post labor birth related complications as well as whether a child is alive or dead (in case of death, we observe the age at death in number of days). Additionally, we observe socio-economic as well as demographic information (age, education status, religious group, and caste affiliation) for these households. We infer prices at facilities from reported out-of-pocket expenditure which we normalize to constant 2010 Indian rupees using IMF's consumer price index data. Our main measure of socio-economic status is whether a mother possessed a below poverty line (BPL) card[15]. Ownership of a BPL card is a major determinant of eligibility for social assistance in India.

To create our final sample, we first assign each mother in DLHS 3 and DLHS 4 to the district they would have been in if district boundaries had not changed over the years. Districts in our sample correspond to the boundaries as given in the 2001 census of India. Districts in DLHS 2 were found to be exactly the same as in the 2001 census of India. We

[14] We classify each institutional birth as either: (i) public facility birth that includes deliveries at anganwadis, sub centers (SCs), primary health centers (PHCs), community health centers (CHCs), urban health centers (UHCs), district hospitals, and public university medical centers, or (ii) private facility birth that includes deliveries at private clinics, private hospitals, and private university medical centers.

[15] The second round of DLHS does not ask whether respondents possessed a BPL card. For this round, we use housing quality as a proxy for socio-economic status. In DLHS 2, enumerators classify each respondent's dwelling as either *kaccha*, *semi-pucca*, or *pucca* (in increasing order of quality). This categorization takes into account the materials used to construct the roof, wall, and floor of the housing. Roughly, a *kaccha* dwelling is built using mud, clay, and straw/bamboo, *semi-pucca* places rely on wood and metal sheets, whereas *pucca* houses are constructed using concrete. Owing to our finding that kaccha household was most likely to possess a BPL card in later rounds of DLHS, we classify such households as BPL households and the rest as non-BPL households.

stack data from all rounds of the DLHS. This gives us a full sample of 289,544 “most recent births,” with each observation corresponding to a unique mother. This set of observations spans 592 unique districts across 34 states and union territories.

Each round of DLHS contains a survey of village characteristics that can be linked to the data on households and mothers. Specifically, we have information on distances to nearest town, railway station, bus station, and a variety of public and private health facilities. In addition, the survey records distance to the district headquarters and whether the village has access to an all-weather road.

DLHS also features information on the public healthcare infrastructure in each district. The information includes the number of beds, nursing staff and doctors on government health facilities at the district level in rounds 2 and 3 for a subset of the sample. We modify this information using district level population from the 2001 and 2011 census. We calculate interpolated population for years 2002 (DLHS 2) and 2008 (DLHS 3) for districts as in census 2001. We normalize each of our three capacity variables by 10,000 persons in each district.

Table 2 presents descriptive information on our final sample across Indian districts. Three observations are worth noting. First, public capacity is severely lacking. India’s median district in our sample has 16.5 beds, 0.1 OBGYN and only 2.1 nursing staffs per 100,000 persons. Second, average out-of-pocket cost at private facilities are about 4 times larger than average costs at public facilities and 12 times larger than delivering at home. Third, for the median district, district hospitals (highest level of public sector care) are twice as far from the nearest private facility. Acharya and McNamee (2009) show that a significant fraction of maternal deaths happened while in transit to far away district hospitals.

3.2 Definitions

For our analysis, we need to define three key variables that are not directly observed in our data. Using data-driven methods, we define a discrete treatment status at the level of a district-quarter, a pre-JSY capacity measure at the district level and an ex-ante risk level for each mother. We discuss each of our definitions in detail and suggest robustness checks where appropriate.

Treatment status

To construct our primary treatment variable, we rely on responses to a question asking whether mothers received any financial assistance from the government for delivery care under JSY or an existing related state scheme. Following Andrew and Vera-Hernández (2022), we define the quarter of treatment for a district under JSY if the following criteria are met: at least 25% of eligible women[16] must report receiving financial assistance in the given quarter and the same fraction of women must report receiving financial assistance over the following year.[17] We force the latter requirement that 25% women must receive cash assistance over the following year in order to avoid falsely assigning treatment status to a district owing simply to sampling errors. Once the district meets this criteria, we consider that district treated under JSY for all following quarters. That is, the treatment status is absorbing. One advantage of this classification is that while JSY was announced in the second quarter of 2005, the actual roll-out happened overtime as necessary personnel and public frameworks were put in place. Our measure considers the ground-truth about the actual roll-out of JSY and is not affected by incentives to inflate measures of roll-out at the administrative level. Secondly, this classification provides us with discrete treatment status that allows for clean comparisons of treated and untreated districts overtime (Borusyak, Jaravel, and Spiess 2022; De Chaisemartin and d'Haultfoeuille 2020; Sun and Abraham 2021). Balance Table A1 shows statistical differences between districts that were treated early (among first 50% districts to be treated) vs. districts that were treated later. The statistics are largely balanced with some evidence that districts with lower education levels and higher fraction of BPL households were treated early.

We test robustness of our results by: (i) redefining treatment status by different cut-offs

[16] Eligibility only matters for high-performing States (HPS)

[17] For example, if 25% women in a district report receiving financial assistance in the fourth quarter after the official announcement of JSY, in order to be considered treated, at least 25% women must also report receiving cash incentive on average over quarters fifth through eighth.

(15%, 20% and 30%) and (ii) defining a continuous treatment variable, following Powell-Jackson, Mazumdar, and Mills (2015), called "JSY *intensity*" as the proportion of all *eligible* women delivering in public facilities in a district-year who reported receiving government cash assistance. Zero intensity implies that there were no JSY recipients in that district-year, while an intensity of one means that all eligible women who gave birth in a government facility in that district-year were beneficiaries of the policy. In order to isolate the effect of JSY specifically, we set the *intensity* measure to zero prior to the launch of JSY in the second quarter of 2005.

Figure A2 presents a visualization of rollout of JSY across Indian districts using our continuous intensity variable. Reassuringly, we find that our two measures, discrete and continuous, are very strongly correlated: a regression of our discrete treatment variable on the continuous measure gives a coefficient of 0.78^{***} (F-statistic: 4911).

District level public capacity

To assess the effects of JSY by district level public sector capacity, we use the three available measures in our data: number of OBGYNs, number of nurses and number of beds. Figure A3 from Andrew and Vera-Hernández (2022) shows that a large fraction of Indian districts fell short on the Indian Public Health Standards (IPHS) of public hospital capacity on all three of our measures. Since Andrew and Vera-Hernández (2022) show that effects of JSY varied only by the capacity at secondary health care facilities, we restrict our analysis to only the number of beds, doctors and nursing staff at secondary healthcare facilities normalized by 10,000 persons.

Our primary measure of pre-JSY secondary level public healthcare capacity in a district is the number of obstetrician gynecologists (OBGYNs) per 10,000 persons in a district in DLHS 2. Our choice is based on several facts. First, as mentioned earlier, India's public sector facilities severely lack medical experts: the median district has 0.1 OBGYNs for every 100,000 persons. Second, lack of medical expertise at public hospitals is a highly cited reason for lack of quality at public hospitals.[18]. Third, Pandey and Sharma (2017) show

[18]See, for example https://www.indiaspend.com/83-shortage-of-specialists-in-community-health-centres-

that increasing experts at India's public facilities has been exceptionally difficult. Between 2005-2010, while the number of CHCs (secondary level public health care facilities) increased by 35%, the number of OBGYNS at public facilities increased by just 2.7%. Reassuringly, all three of our variables on public hospital capacity (OBGYNs, beds and nurses) are highly correlated.

For our regression analysis, we discretize our continuous measure of public sector capacity (number of OBGYNs per 10,000 persons) based on whether a district has above (or below) median value of capacity as reported in DLHS 2. Balance Table A2 presents evidence on balance on observables in low-capacity vs. high-capacity districts. We see that high capacity districts have higher overall rates of institutional births overall (higher rates of public facility births along with lower rates of private facility and home births). High capacity districts also offer higher quantity (whether mother received at least 3 ANC tests) and quality (whether at least 6 out of 8 tests were conducted during ANC) of health inputs than low capacity districts.

For robustness checks, we use all three variables on capacity to create a district level capacity index based on the first principle component of the number of beds, number of doctors as well as nursing staff at secondary care facilities. Table A3 presents the factor loadings from our principle component analysis.

Lastly, we show evidence using our defined JSY treatment variable that there was no differential increase in public capacity for treated vs. control districts using our two cross-sections from the DLHS 2 and DLHS 3 (see Table A4). Using a simple difference-in-differences specification, we find that treated districts did not receive additional capacity improvements relative to untreated districts. Thus, it appears that the government essentially rolled out a large-scale incentive scheme without investing in healthcare capacity.

Ex-ante risk level

Presence of various kinds of healthcare facilities offering different quality of care makes it inevitable that heterogenous patients will sort into different facilities. An important factor

26127/

to consider in our context is an individual's ex-ante risk level. We build a measure of a mother's ex-ante risk levels. We extract detailed information about patient characteristics that are plausibly exogenously given by the time a patient decides to avail medical care for her most recent delivery. Specifically, we enlist 20 such health related variables including pre-labor complications [19], history of complications in previous deliveries[20] as well as age dummies and birth-order of the current pregnancy. In order to estimate the risk level of a patient, we run a linear regression of perinatal mortality on our health indicators and assign each patient a predicted mortality risk. Table 3 presents regression results. For our regression analysis, we define a high-risk patient as one with above median predicted mortality risk.

3.3 Descriptive facts

We present three descriptive patterns in our data that are most relevant to our analysis. In our presentation of the facts, we define four different types of patients based on their socio-economic status (as captured by whether a mother owns a *below poverty line* - BPL card) and ex-ante risk level (whether a mother is above or below the median level of risk). This gives us the following four types of patients: BPL/High-Risk, Non-BPL/High-Risk, BPL/Low-Risk and Non-BPL/Low-Risk.

Fact 1: mothers sort into institutional care by SES and risk level Figure 3 presents a snapshot of sorting patterns across healthcare facilities before and after JSY by patient types. Strikingly, over 70% mothers in India chose to deliver at home prior to JSY. This proportion fell precipitously after the introduction of JSY.[21] Moreover, we see that our classification of the sample into four types does appear to be relevant for patient sorting. We observe that conditional on socio-economic status, high-risk mothers are more likely to take-up institutional care and conditional on ex-ante risk, richer mothers are more likely to take up institutional care.

[19] For example, swelling, paleness, visual disturbance, fatigue, convulsion, abnormal position etc.

[20] For example, previous abortions or still-births.

[21] It is worth noting that this figure does not necessarily present treatment effect of JSY but likely a combination of time-trends and treatment effects.

Fact 2: Average quality of care is highest at private facilities followed by public facilities and home We first show that patients' choice of where to deliver matters for perinatal mortality. Columns (1)-(5) in Table A5 show results from a linear regression of a dummy for perinatal mortality on place of birth controlling for different sets of explanatory variables including pre-determined risk for a mother. The home option is the omitted category. Columns (1)-(3) show that controlling for pre-determined risk, likelihood of perinatal mortality is lowest at private facilities, followed by public facilities. Columns (4)-(5) show that this reduction in likelihood of perinatal death is coming from high-risk mothers.

Moreover, several statistics in our data suggest that average quality of treatment is highest at private facilities, followed by public facilities whereas home deliveries receive the lowest quality of care.[22] This is in line with the findings in Das et al. (2016). Table 4 presents raw statistics from our data that capture patient sorting across facilities. Firstly, richer, urban and higher educated households prefer private facilities, followed by public facilities and lastly home. Secondly, average quantity and quality of treatment also varies across facilities. We see that the likelihood of receiving at least three ante-natal checkups and the likelihood that at least six out of eight tests were conducted in each of the ante-natal checkups is highest for private facility births followed by public facility births and lastly followed by home births.

Fact 3: Median out-of-pocket costs are very high at private facilities Private healthcare sector in India is largely unregulated and consists of privately operated facilities that set prices and quality to maximize profit. In contrast, public sector quality and prices are set "administratively" and "outside the market" (see Almeida et al 2017). Given this market setup, we observe two main differences in prices across public and private sectors (shown in Figure 5). First, median out-of-pocket costs at private sector are about 4 times larger than public sector. Second, we see that out-of-pocket costs for private sector differ by patient type suggesting price discrimination[23], whereas this is not the case at public sector

[22] Unfortunately, we do not have healthcare quality indicators at individual hospitals therefore, we conduct our analysis in an environment where a patient can choose of one of the three broad buckets of facilities (private, public or home).

[23] Some of the difference in prices are driven by procedures. For instance, high-risk mothers are more likely to receive the more expensive c-section procedures.

hospitals.

4 Main econometric specification

The roll-out of JSY across Indian districts over-time naturally motivates a staggered difference-in-differences (DiD) research design. Several features of our setting require us to deviate from the usual two-way fixed effects specification estimated using OLS with some lags and leads of treatment. In addition to concerns about treatment effect heterogeneity (Borusyak, Jaravel, and Spiess 2022; De Chaisemartin and d'Haultfoeuille 2020; Sun and Abraham 2021), our setting also has no never-treated units (districts) leading to under-identification in the usual event study specification. Figure 6 shows cumulative density of treated districts over-time. We see that by 2009, all districts in our sample were treated under JSY.

Owing to these, we follow the imputation based estimation procedure proposed by Borusyak, Jaravel, and Spiess (2022). We begin our analysis with the following (assumed) true causal model for our outcomes of interest:

$$Y_{ibdt} = \alpha_d + \beta_b + \gamma_t + \tau_{it}.JSY_{dt} + \epsilon_{ibdt} \tag{1}$$

Here, Y_{ibdt} represents the outcome variable of interest that varies at the level of an individual i, birth order b, district d and quarter of birth t. α_d and γ_t represent district and quarter of birth fixed effects respectively. Since our data only has detailed information for a mother's last birth, we also include a birth order fixed effect, represented by β_b, to account for unobservables specific to the birth order. JSY_{dt} is an indicator variable that takes a value 1 if a district is treated (adopts JSY) and 0 otherwise. Once a district is treated, it remains treated for all the following periods. That is, treatment is an absorbing state. Our model shall compare treated districts with yet-to-be treated districts, before and after JSY. τ_{it} captures the heterogenous treatment effect of JSY that can vary by individual and quarter. Finally, ϵ_{ibdt} captures idiosyncratic error that satisfies: $E[\epsilon_{ibdt}|\alpha_d, \beta_b, \gamma_t, JSY_{dt}] = 0$. We cluster standard errors at the district level, our unit of treatment.

We construct the 'imputation estimator' in three steps. First, we estimate Equation 1 using OLS on the untreated sample, that is, those with $JSY_{dt} = 0$. This gives us the estimates of expected counterfactual outcome in the absence of treatment, conditional on the birth order, $E[Y_{ibdt}(0)|\beta_b]$, given by $\hat{\alpha}_d + \hat{\gamma}_t + \hat{\beta}_b$. Second, for all treated observations, we build an estimate of τ_{it} given by: $\hat{\tau}_{it} = Y_{ibdt} - (\hat{\alpha}_d + \hat{\gamma}_t + \hat{\beta}_b)$. Finally, we average these unbiased estimates of heterogenous treatment effects following Borusyak, Jaravel, and Spiess (2022). This final step gives us consistent estimates of the average treatment effect. We present average treatment effect over the entire sample as well as over horizons (quarters) weighting each observation equally. For dynamic effects of JSY over different horizons (h) after treatment, we compare treated districts against untreated districts in a given h relative to periods before treatment and present averages across all observations in h weighted equally.

The interpretation of our results relies on the parallel trends assumption: absent JSY, treated and un-treated districts have the same trends in outcome variables. We provide support for this assumption by testing pre-trends as recommended in Borusyak, Jaravel, and Spiess (2022). We estimate the following regression on all untreated observations for five quarters before the roll-out of JSY:

$$Y_{ibdt} = \alpha_d + \beta_b + \gamma_t + \sum_{h=-5}^{-1} \tau_h.1[t = E_d + h] + \epsilon_{ibdt} \tag{2}$$

Here, E_d represents the quarter of treatment for district d and $1[t = E_d + h]$ represents dummy variables that takes a value 1 for districts h periods after treatment. The comparison group includes all quarters before five quarters to the treatment. Finally, a joint-test of all $\tau_h = 0$ suggests absence of differential pre-trends across treated and untreated districts.

5 Reduced-form results

5.1 Impact of JSY on healthcare take up and mortality

We begin by first presenting evidence on take-up of institutional care and perinatal mortality. To study the effect of JSY on take-up of institutional care, we use a dummy variable that takes value 1 if mother i delivered at an institutional facility (either public or private): $Y_{ibdt} = 1[\text{Institutional Delivery}]$ as our dependent variable in Equation 1. In Table 5, we present the average treatment effect of JSY. We find that overall, JSY led to an 8.1% increase in the probability of delivering at a medical facility (Column 1 in Panel A of Table 5).

Figure 7 shows dynamic effects of JSY on take-up of institutional care over twelve quarters post roll-out. We find that the effect of JSY gradually increased overtime and by the end of two years, mothers in treated districts were nearly 10 percentage points (27% higher than pre-JSY) more likely to deliver at an institutional facility relative to mothers in yet-to-be-treated districts. Our estimated effect is slightly smaller than other evaluations of JSY (Powell-Jackson, Mazumdar, and Mills 2015; Andrew and Vera-Hernández 2022) primarily because these papers limit their sample to only rural mothers whereas our results are average effects over the entire population, since we are interested in equilibrium effects. We find suggestive evidence that in addition to lowering costs, JSY achieved the increase in institutional births by relaxing customs, norms, family restrictions and knowledge gaps against accessing institutional healthcare. Figure A4 presents results from difference-in-differences regressions using several reported reasons for delivering at home as dependent variables on a district's treatment status under JSY for a sub-sample of women that delivered at home. We find that in treated districts, women delivering at home were less likely to report high costs, restrictive customs, lack of knowledge or lack of family permission as reasons for delivering at home.

We also find evidence that JSY was able to effectively target mothers with lower socio-economic status. Columns (2)-(3) in Panel A of Table 5 show that the average effect of JSY for BPL and non-BPL mothers was 16% and 4% respectively. Event studies in Figure 8 confirm this heterogeneity. Among BPL households, the effect was larger for high-risk mothers relative to low-risk mothers (columns (1)-(2) of Table A6 and panels (a) and (b) in Figure A5) suggesting that high-risk BPL mothers responded to the subsidy more than low-risk BPL mothers. The story is different for non-BPL mothers where low-risk mothers responded to JSY more than high-risk mothers who were already significantly more likely to give birth at a health facility (columns (3)-(4) of Table A6 and panels (c) and (d) in Figure A5).

Next, we present results on perinatal mortality. We use a dummy variable that takes value 1 if mother i experienced perinatal mortality: $Y_{ibdt} = 1[Perinatal\ Mortality]$ as our dependent variable in Equation 1. In line with the literature, we find that JSY did not significantly affect likelihood of perinatal mortality (column (1) in Panel B of Table 5). Figure 9 presents dynamic effects of JSY on perinatal mortality: all quarterly coefficients are statistically indistinguishable from zero. We find no effect of JSY on either the BPL or non-BPL sub-samples (columns (2)-(3) in Panel B of Table 5 and Figure A6). We also find no effect of JSY on either the high-risk or low-risk sub-samples (columns (4)-(5) and Panel B of Table 5 and Figure A7).

Finally, we study the effects of JSY on out-of-pocket (OOP) costs across our sample. We use reported OOP costs in constant Indian rupees as our dependent variable in Equation 1. Intuitively, the effect of JSY on OOP costs depends on the overall sorting of patients across our three groups of facilities. Recall, our descriptive statistics in Table 2 showed that, on average, private facilities charged the highest prices followed by public facilities and finally followed by home. Since JSY incentivized deliveries at public facilities, moving from home to a public facility would, on average, imply higher net prices whereas moving out of private facilities and staying at public facilities would imply lower prices as a result of the substantial subsidy under JSY.[24] Panel C of Table 5 presents our results on average OOP costs paid by patients. Column (1) shows that, on average, JSY did not have a significant effect on average out of pocket costs for consumers. Figure 10 presents results from our dynamic specification and confirms our null result. Splitting the sample by BPL status reveals that out-of-pocket costs remained unchanged for both BPL and non-BPL households (Columns (2)-(3) in panel C of Table 5 and Figure A8).

[24] We later show that JSY did not induce a substantial price reduction at private facilities despite increased competition.

Overall, our results suggest that while JSY was effective in targeting and inducing pregnant mothers to take-up institutional healthcare, it failed to lower the incidence of perinatal mortality. It is worth emphasising that JSY increased take-up of institutional care without increasing average OOP costs. Recall, Table A5 shows that likelihood of perinatal mortality is lower for institutional births despite higher levels of average patient risk. In light of this, our null result on perinatal mortality suggests an overall worsening of healthcare quality received by mothers at institutional facilities.

5.2 Equilibrium responses that explain the failure of JSY

Given that JSY was one of the largest public health schemes around 2005, its failure presents a policy conundrum for Indian policy-makers. We next propose three equilibrium responses that contribute to this failure. We show that JSY: (1) resulted in a mis-match of patient risk across facilities, (2) in response to congestion and deterioration of care at public facilities (Andrew and Vera-Hernández (2022)), only mothers with high socio-economic status sorted out of congested public facilities into more expensive private facilities and (3) induced price increase at private facilities without quality improvements despite a substantial increase in competition from public hospitals. This increase in price made private facilities even less accessible.

5.2.1 JSY resulted in mismatch of risk across facilities

Presumably, an ideal match would be where higher risk patients get treated at highest quality facilities (private facilities in the case of India). We find evidence that financial incentives under JSY diverted high-risk mothers out of private facilities (highest quality care) into public facilities (lower quality care).

In our exposition, we use three dummy variables as our dependent variables that take value 1 if mother i delivered at either of the three choices available: $Y_{ibdt} = 1[Choice = c]$ where $c \in (Private, Public, Home)$ in Equation 1.[25] Since in this context patients necessarily

[25]Note that our results for $c = Home$ are mirror images for our results on institutional deliveries presented earlier (see Figure A5a).

substitute from one choice to another, our results should be interpreted as relative changes in equilibrium choices.

We begin by presenting patient sorting across private facilities, public facilities and home (presented in Figure 11). Overall we find that as a result of JSY, public facilities gained market share at the expense of private facilities and home. Public facilities received a net increase in market share i.e., a 22% increase over the baseline 18% market share (see column (1) of Table 6) while the market share of home and private facility births fell by 4.5% and 6.7%, respectively, over their respective baseline shares of 64% (see column (1) of Table 6) and 17% (see column (1) of Table 6).

Our interpretation of this finding is that while sorting out of the home choice improves healthcare quality on average, a significant fraction of mothers that sorted out of private facilities which on average provide highest quality of care, received worse quality of care.

Next, we explore the characteristics of patients that sorted out of private facilities due to JSY. Intuitively, if low-risk mothers who anyway did not require high quality private sector services sorted out of private facilities, their reallocation might not adversely affect health outcomes. Instead, upon splitting our sample between high and low-risk mothers, we find that decline in private facility births was driven by high-risk mothers: 6.4% for high-risk mothers compared to 1.7% for low-risk mothers (see Figure 12 and columns (4)-(5) in panel B of Table 6)

Finally, we explore the socio-economic characteristics of the high-risk patients that switched out of private facilities. Column (2) in Table 7 shows that BPL and high-risk mothers were most likely (nearly 19% over baseline mean) to move out of private facilities among our four types of patients. This confirms that the primary intended targets of JSY, poor and high-risk mothers, lost out on highest quality private healthcare.

One caveat with the discussion of quality is that private sector healthcare quality varies wildly across private facilities (Das et al. 2016) and we cannot confirm that the private facilities accessed by BPL mothers were indeed better quality than the public facilities they moved to as a response to JSY. One reassuring fact in our data is that BPL mothers' choice of private facilities were much more expensive than public facilities. This suggests an intent to find higher quality care by paying more for private facilities (see Figure 5).

5.2.2 JSY caused congestion at public facilities

Next, we present evidence that quality of treatment at public facilities deteriorated as a result of congestion using revealed-preference from mothers' sorting behaviour. Andrew and Vera-Hernández (2022) specifically highlight the role of congestion in the failure of JSY to reduce perinatal mortality. They show that JSY led to an increase in perinatal mortality among high-risk rural mothers in districts with below median public sector capacity in low-performing states (LPS). Our paper complements the findings from Andrew and Vera-Hernández (2022). First, we replicate their evidence of congestion (declining healthcare quality) using the entire population as opposed to a select sample of rural patients in LPS. Secondly, we show that richer mothers were able to adapt to worsening public sector quality by sorting out of public facilities and into more expensive private facilities in districts with low public sector capacity.

We start by first showing that public sector capacity was consequential for the impact of JSY on institutional births. Figure 13 shows that JSY led to a higher dynamic increase in institutional births in high capacity districts relative to low capacity districts. Columns (1)-(2) of Table 8 presents average treatment effects. We see that JSY lead to a 14% and 4% increase in the likelihood of institutional births in high and low capacity districts respectively.

Next, we replicate the results from Andrew and Vera-Hernández (2022) using our larger sample. Columns (1)-(2) of Table 9 show the effect on mortality for the high-risk mothers across low and high public capacity districts. We see that high-risk mothers in low capacity district experienced a statistically significant increase in the likelihood of perinatal mortality, while the likelihood of perinatal death remained unchanged in high capacity districts. Moreover, columns (3)-(8) of Table 9 present evidence that mothers in low capacity districts received worse level of care. Specifically, mothers in low capacity districts experienced a statistically significant decline in the quality of ante-natal checkups as measured by a dummy variable that takes a value 1 if a mother received at least 6 out of 8 tests reported in DLHS during each ante-natal check-up (see columns (7)-(8) of Table 9).

Finally, we present evidence that richer mothers in low capacity districts adapted to declining quality in public facilities by opting out of less-expensive public facilities in favor of more expensive private facilities. We begin by pointing out pertinent facts that suggest that sorting across facilities reflects a mother's (demand-side) trade-off between perceived quality (or utility) of treatment at a given facility and the cost of treatment, rather than a supply-side phenomena where facilities turn down patients. First, there are no hard quantity cut-offs at public facilities. In our data, only 0.5% of women not delivering at public hospitals reported being referred (DLHS 2). Second, anecdotal evidence shows that patients often wait in long lines at public facilities but are not refused treatment.

To present clean results on adaptation behaviour of richer mothers, we use the eligibility criteria as a measure of SES instead of whether a mother was above or below the poverty line (BPL status). This is because, even non-BPL mothers were incentivized under JSY in low-performing states whereas "ineligible" mothers (only in HPS) were not incentivized under JSY. First, we find that JSY led to an increase in public facility births for the "eligible" mothers by 33% and a decrease in public facility births among richer "ineligible" mothers by 7.5% (columns (1)-(2) of Table 10 and panels (a)-(b) in Figure 14). Second, majority (63%) of the "ineligible" mothers displaced from public facilities sorted into private facilities (column (4) of Table 10) while almost all the decline in private sector's market share was driven by "eligible" mothers (see panels (c)-(d) in Figure 14). Finally, columns (5)-(6) of Table 10 and Figure 15 show that the movement out of public facilities by "ineligible" mothers was driven by districts with low public sector capacity. This confirms that ineligible mothers experienced a dis-utility from delivering at public facilities post JSY especially in districts with low public sector capacity. This *crowding-out* could either imply a behavioural response to JSY by "ineligible" mothers[26] or a response to declining quality at public facilities. Our data provides support for the latter in two ways: first, our previous results from Table 9 show that mothers received worse quality of care in low public capacity districts and second, we show in Figure 16 and columns (7)-(8) in Table 10 that "ineligible" mothers that sorted out of public facilities were more likely to be high-risk mothers.

[26]For example, dis-utility from being surrounded by poor mothers

5.2.3 Private sector quality and prices

Next, we evaluate the private sector's response to JSY. Private sector plays a crucial role in India's healthcare infrastructure for two reasons: first, private hospitals provide the highest quality of care on average and second, anecdotally, private hospitals comprise a large fraction of OBGYNs and maternity beds in India.[27]

We evaluate the private sector's response on prices (out-of-pocket costs in Constant INR), and quality as measured by the likelihood of perinatal mortality and several health inputs in our data. One important challenge with this analysis is that JSY changed patient characteristics across facilities. Unlike the case of goods (for instance, milk in Jiménez-Hernández and Seira (2021)), delivery of (medical) services can be heterogenous across patients thereby making patient-patient comparison difficult in the presence of selection. To overcome selection concerns, we present regression results for a range of specifications increasingly and flexibly controlling for ex-ante patient risk and mother's socio-economic status. Moreover, we augment our main difference-in-differences specification laid out in section 4 with a third difference taken over the home option (the outside option) to capture relative changes in prices and quality.

We start by presenting our triple difference results on prices as measured by reported out-of-pocket costs expressed in constant Indian rupees. Table 11 presents our results on the effect of JSY on prices while increasingly and flexibly controlling for patient's ex-ante risk and BPL status. As expected, we find a sharp and stable decline in out-of-pocket costs at public facilities. As columns (2),(4) and (6) in Panel A of Table 11 show, JSY reduced prices at public facilities on average by 18%. This finding is confirmed in our event studies shown in panel (b) in Figure 17. Our results on consumer sorting from subsubsection 5.2.1 showed that incentives under JSY reduced demand for private facilities. These two combined, suggest that private hospitals faced significant competitive pressure from public facilities. If this increase in competitive pressure could successfully lower private sector prices while maintaining quality of treatment at private facilities, JSY would have indirectly improved

[27]No official figures are available for the time period of this study. Recent surveys claim that about 60% OBGYNs in India have a private practice.

access to high quality care. On the contrary, columns (1),(3) and (5) in Panel A of Table 11 consistently show JSY led to a statistically insignificant increase in private hospital prices by approximately 1% on average. To explore the dynamics of private sector's response to JSY, we present event studies of our triple difference estimates in panel (a) in Figure 17. We find a significant price decline in the initial two quarters after the roll-out of JSY (6%), but a sharp reversion and increase in prices thereafter.

We test whether JSY affected quality of service at private hospitals. Using perinatal mortality as a measure of quality, we show our triple difference estimates in Table 12. We see that JSY did not have a significant effect on perinatal mortality at private facilities. Event studies in Figure 21 provide visual support for this finding. Note that this result is interesting in light of our finding that JSY led to high-risk patients leaving the private option.[28] We further probe healthcare inputs (quantity and quality of ANC checkups) at private facilities in columns (4)-(6) in Table 12. We find mixed evidence: while number of ANC checkups increased, the quality of these ANC checkups (measured by whether the patient received at least 6 out of 8 tests during ANC) declined. Overall, we see no clear evidence of an improvement in healthcare quality at private facilities.

Next, we present evidence on forces that explain this increase in price. Theoretically, Chen and Riordan (2008) (see Appendix C for a discussion) show that increased competition can lead to an increase in price if the *price sensitivity effect* (steeper residual demand) dominates the *market share effect* (downward pressure on prices from loss of market share). This is consistent with our findings. There are two features of JSY that can potentially give rise to *price sensitivity effect* dominating *market share effect.* First, variation in the coverage of incentives across markets. Specifically, the fact that high SES mothers in high-performing states were not offered cash incentives. And second, quality deterioration due to congestion at public facilities.

While we do not find any evidence of a differential price increase in low capacity districts

[28]Therefore, if quality of service remained unchanged at private facilities, perinatal mortality should have declined simply as a result of a safer patient composition. Our finding that perinatal mortality remained unchanged at private facilities could either mean a decline in healthcare quality at private facilities or that the decline in overall level of risk was not enough to change perinatal mortality.

compared to high capacity districts (see columns (1)-(2) of Table 13 and Figure 18), we find that the increase in price is largely driven by high-performing states (see columns (3)-(4) of Table 13 and Figure 19). Mothers in high-performing states experienced a 4.6% increase in price at the private option. This is consistent with a dominant *price sensitivity effect* for private facilities in high-performing states as a result of weak *market share effect* due to lack of incentives for high SES mothers under JSY. We also find that private facilities increased prices for BPL mothers in high-performing states by 3.72% despite an ability to price discriminate based on mothers' socio-economic status. [29]. As far as providing access to high quality healthcare is concerned, this could potentially further deter poorer women from accessing private facilities.

Prices at private facilities could increase as a result of improvements in amenities. In Table 14, we show that price increase at private facilities is at least in-part driven by an increase in c-sections even for BPL mothers. Our data suggests that increase in c-sections for BPL mothers, while possible, is unlikely to be driven by demand as opposed to medical necessity: BPL mothers will have to spend 42% of their annual household income to pay for a c-section at a private facility on average.

Overall, we find that JSY led to an increase in out-of-pocket costs at private facilities without improving healthcare quality at private facilities, ultimately reducing welfare for mothers choosing the private option but also deterring access to the highest quality of care.

5.3 Robustness of our results

Appendix B presents extensive evidence that our main results are robust to several alternate definitions of a district's treatment status and a district's public sector capacity. For a district's treatment status, we use two kinds of alternate definitions: (i) we define three discrete treatment variables for JSY (as in subsection 3.2) using cutoff values of 15%, 20% and 30% and (ii) we construct a continuous variable called *JSY intensity* (following Powell-Jackson, Mazumdar, and Mills (2015)) defined as the fraction of all *eligible* mothers who

[29] Our data suggests BPL mothers pay 16% lower average prices at private facilities than non-BPL mothers.

reported receiving government assistance under JSY. For a district's public sector capacity, we use a measure of public facility capacity index created using first principal components of the three capacity variables observed in our data (OBGYNs, nurses and beds), each normalized by 10,000 persons. We show that across all our definitions JSY increased the likelihood of institutional births but failed to lower likelihood of perinatal death. We then present evidence of robustness of results for our three equilibrium mechanisms that lowered quality of healthcare that mothers received at institutional facilities.

6 Conclusion and policy implications

In this paper, we study the equilibrium effects of incentivizing public services in the presence of both, public and private suppliers. We study one of India's largest welfare schemes, *Janani Suraksha Yojana* (JSY), which offered subsidies to pregnant women in India to avail themselves of institutional healthcare at public facilities with a goal to lower maternal and perinatal mortality. Using staggered roll-out of JSY across Indian districts, we confirm the prior findings that despite a large increase in a mother's probability of delivering at an institutional facility (almost 27% increase two years after roll-out), JSY was unable to lower perinatal mortality.

Given the scale of this policy, its failure poses a conundrum for Indian policymakers. This paper highlights the role of interactions between public and private suppliers in shaping important economics outcomes with an aim to improve our understanding of effectively designing public policies at-scale. We provide evidence of three equilibrium responses that contribute to this policy failure. First, we show that JSY resulted in a mismatch between patient risk and healthcare facilities. We use several statistics in our data to argue, first, that private facilities offered the highest quality healthcare. We then show that JSY induced high-risk mothers to sort away from private facilities into lower-quality options.

Second, we show that the Indian government's negligence towards improving public sector healthcare capacity alongside the roll-out of JSY resulted in lower healthcare quality due to congestion at public facilities. We complement the findings in Andrew and Vera-Hernández

(2022). First, we replicate their finding that perinatal mortality increased in low public capacity districts using a larger sample. Second, we show that high SES mothers (i.e who were not eligible for JSY) in high-performing states adapted to worsening quality care at public facilities in low capacity districts by moving towards private facilities. This is revealed-preference evidence for deteriorating public sector quality.

Finally, private facilities increased prices without any evidence of improvement in quality of healthcare despite increased competition from public facilities. This reduced access to high-quality healthcare for Indian mothers. Furthermore, we find that the price increase was primarily driven by high-performing states where high SES mothers were not incentivized under JSY. This finding is consistent with Chen and Riordan (2008) where the *price sensitivity effect* (steeper residual demand resulting in higher prices) dominates the *market share effect* (loss of market share putting downward pressure on prices) as high SES mothers did not receive incentives to choose public facilities.

Overall, we see that the success of large-scale public policies crucially depends on equilibrium responses in the market. More research is needed in exploring potential channels that can steer outcomes of public policies in the direction of intended outcomes. Ultimately, policymakers will need to foresee equilibrium responses and incorporate complementary mechanisms while designing public policies to improve important development outcomes. In ongoing work, we develop a structural model of demand and supply of maternal healthcare in India and evaluate two counterfactual policies that could complement JSY with a goal to reduce perinatal mortality: (i) improvement in public healthcare capacity and (ii) targeted vouchers to low SES mothers to access private facilities.

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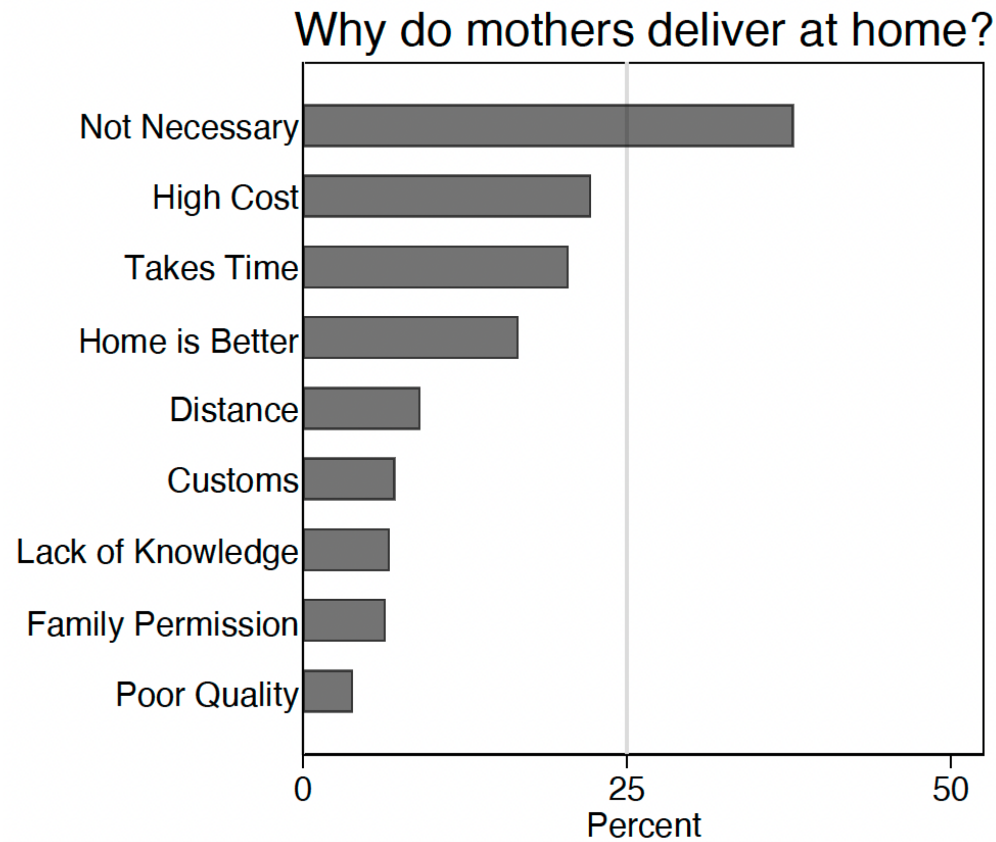
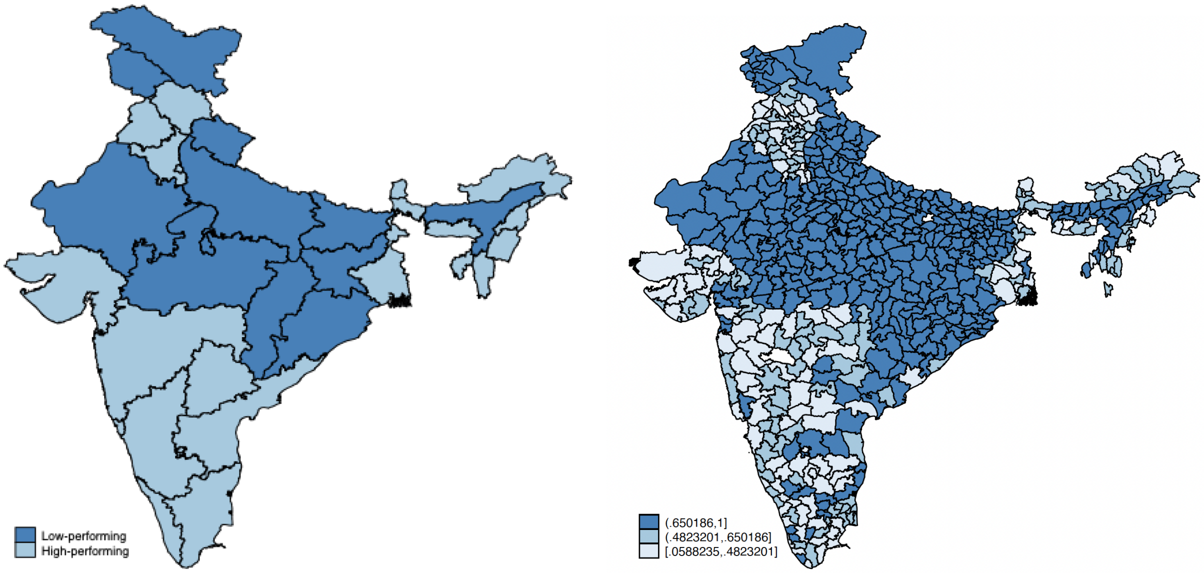


Figure 1: Reported Reasons for Home Births

Notes: This figure displays the share of mothers reporting various reasons for delivering at home in DLHS 2 (2002-03). The reported set of reasons is listed on the vertical axis on the left.



(a) Low Performing States

(b) Eligibility

Figure 2: Low Performing States and Eligibility across Districts

Notes: This figure displays low and high-performing states (left) and fraction of mothers eligible for JSY incentives in a district (right) as defined by the authors. Note, all mothers in low performing states were eligible for JSY incentives.

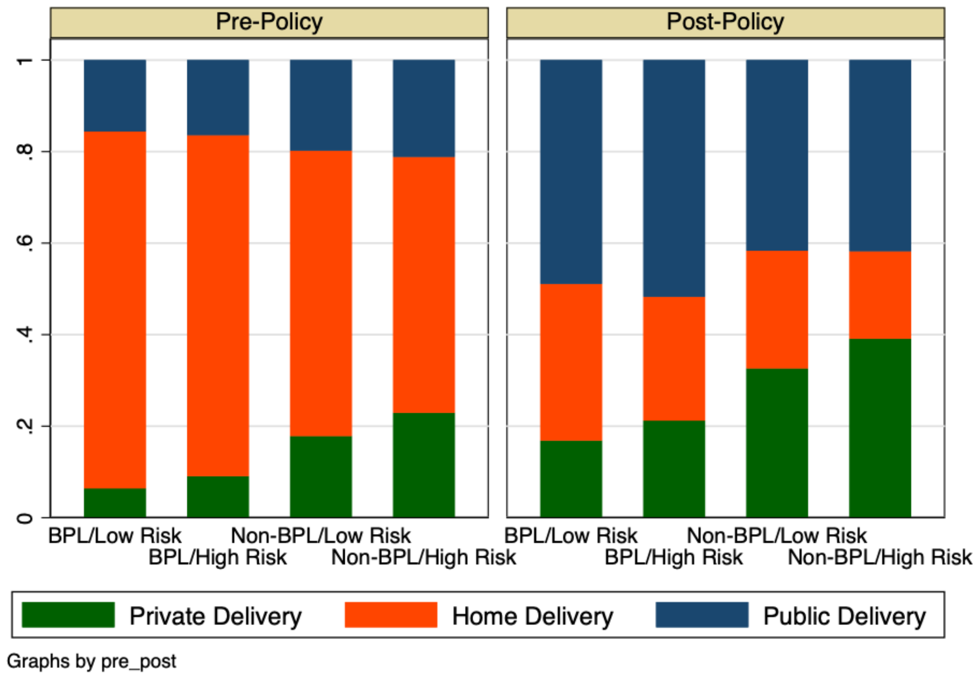


Figure 3: Patient sorting by types

Notes: Figure displays sorting of mothers across private facilities, public facilities and home by types (combinations of SES and ex-ante risk). The left (right) figure shows snapshot of patient sorting before (after) the announcement of JSY. Pre-policy period captures births before March 2005 and post-policy period captures births after March 2008 in districts that have had JSY for at least 6 months.

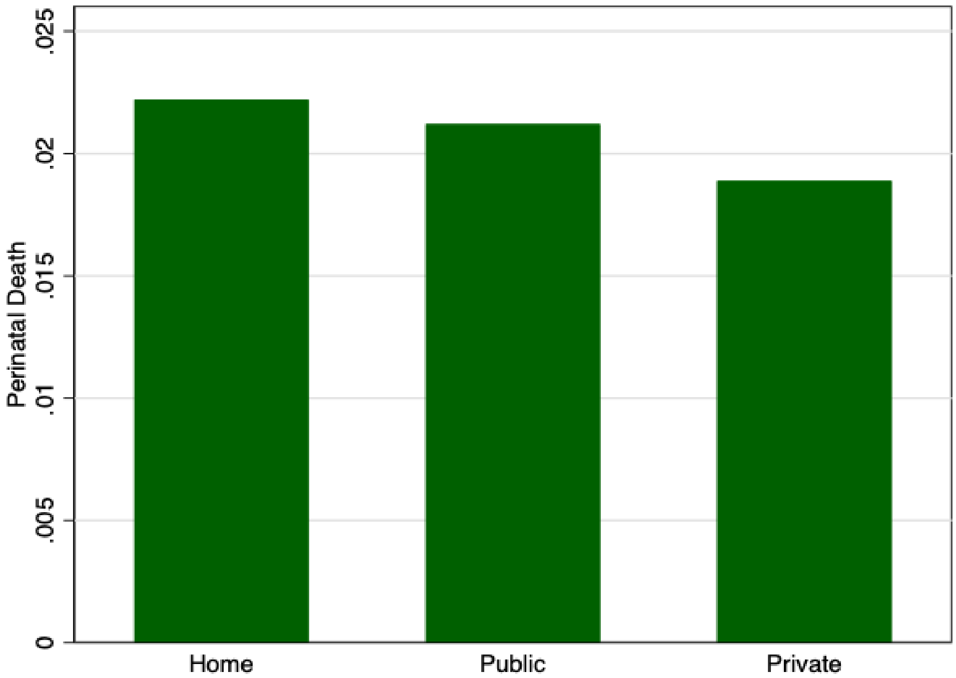
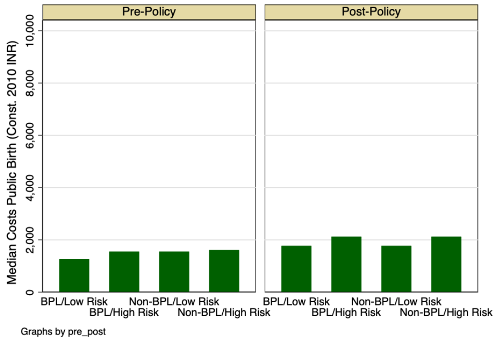
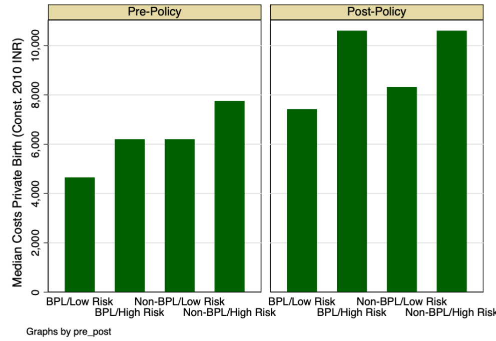


Figure 4: Perinatal Death by facility

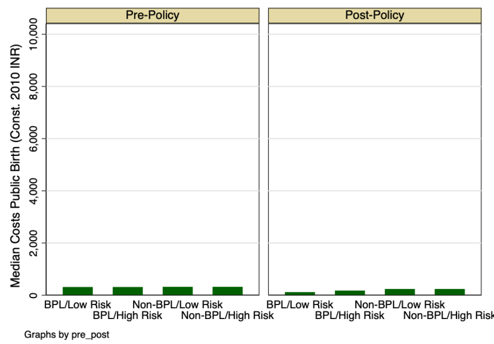
Notes: Figure displays perinatal mortality rates across private facilities, public facilities and home. The figure shows snapshot of perinatal mortality rates.



(a) Costs at Public Facilities



(b) Costs at Private Facilities



(c) Costs at Home Facilities

Figure 5: Median Out-of-pocket costs across facilities (INR)

Notes: Figure displays out-of-pocket costs (in constant Indian rupees) across public facilities (Panel a), private facilities (Panel b) and home (Panel c) by patient types (combinations of SES and ex-ante risk level). The left (right) figure in each panel shows snapshot of median out-of-pocket costs before (after) the announcement of JSY. Pre-policy period captures births before March 2005 and post-policy period captures births after March 2008 in districts that have had JSY for at least 6 months.

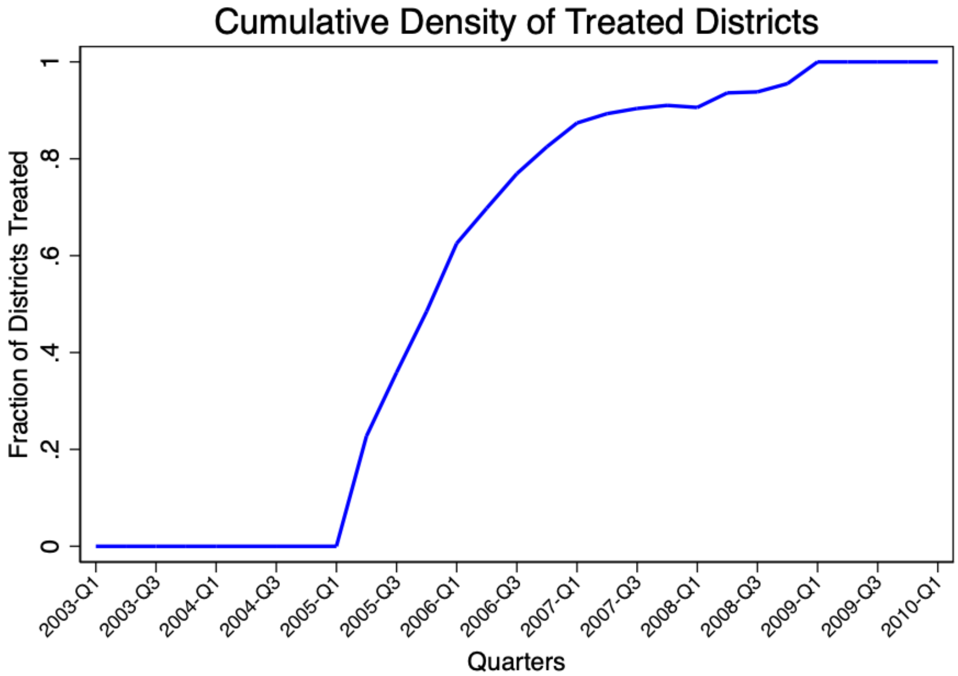


Figure 6: Cumulative density of roll-out of JSY across districts

Notes: Figure displays the cumulative density of treated districts under JSY over-time. This shows the fraction of treated and untreated districts in each quarter after the announcement of JSY in 2005 Q1.

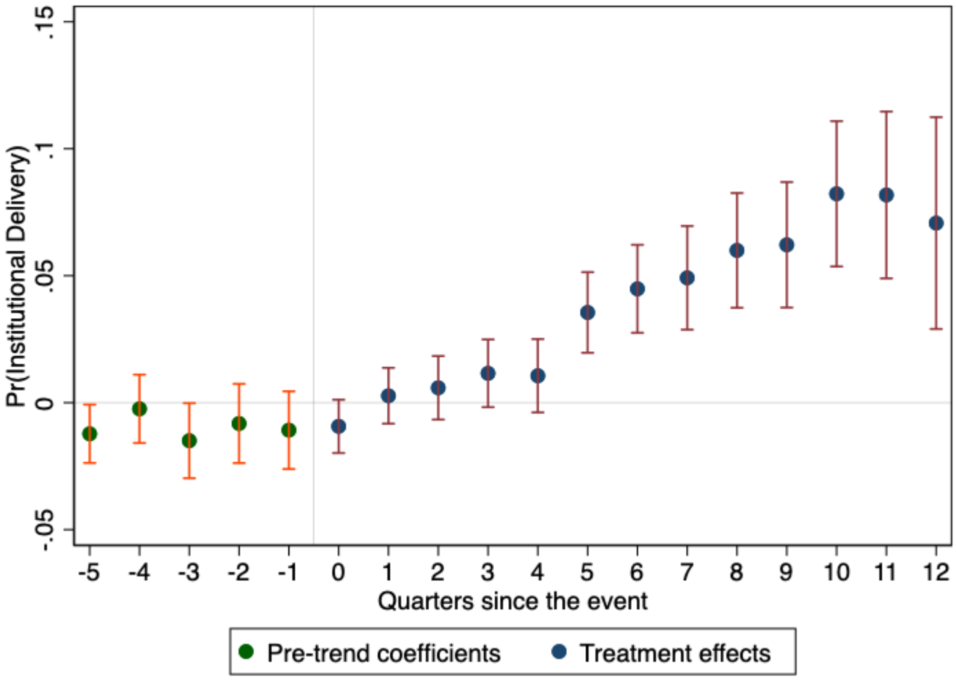
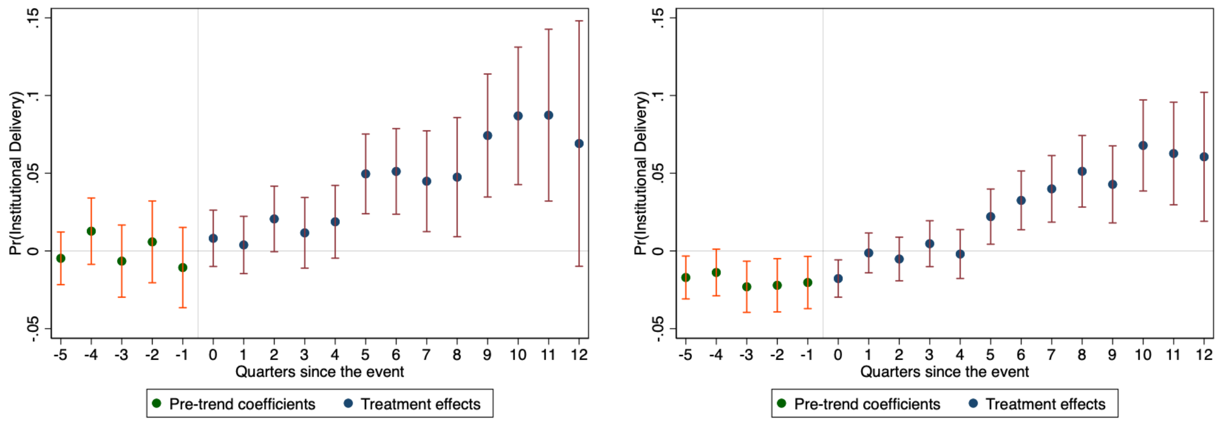


Figure 7: Effect of JSY on Institutional Delivery

Notes: This figure presents event study evidence of the effect of JSY on likelihood of institutional deliveries, following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



(a) BPL Sample (b) Non-BPL Sample

Figure 8: Effect of JSY on Institutional Delivery by SES

Notes: This figure presents event study evidence of the effect of JSY on likelihood of institutional deliveries by SES (BPL status), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

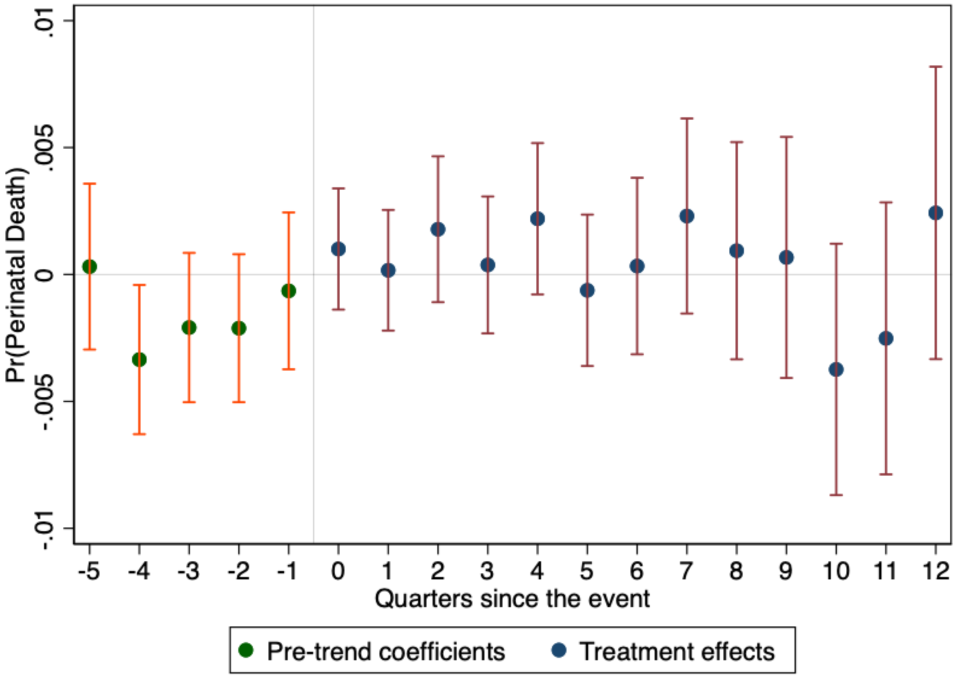


Figure 9: Effect of JSY on Perinatal Mortality

Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality, following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

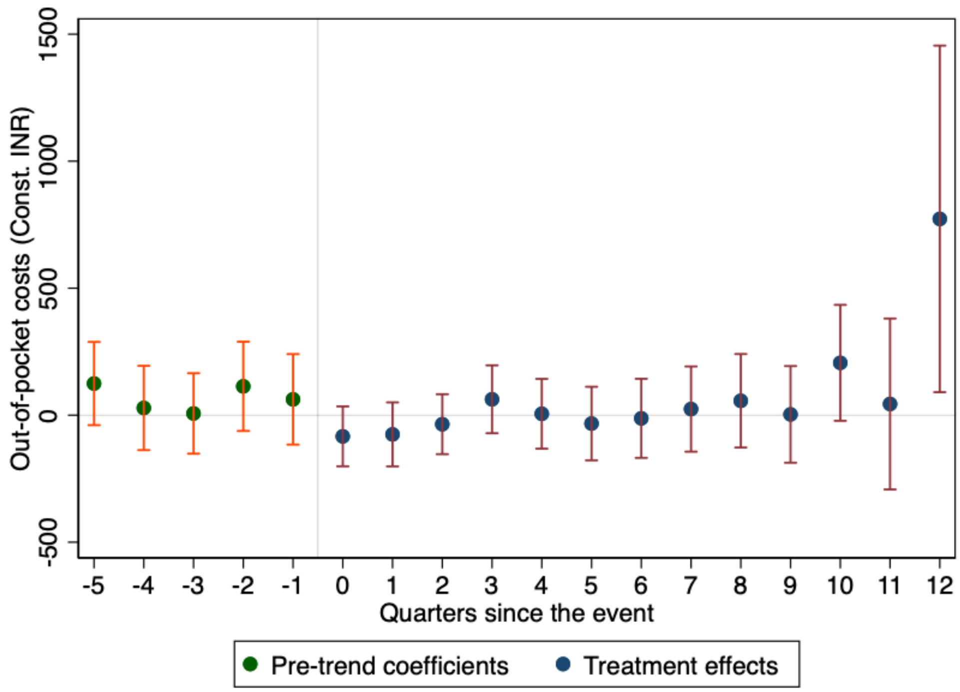
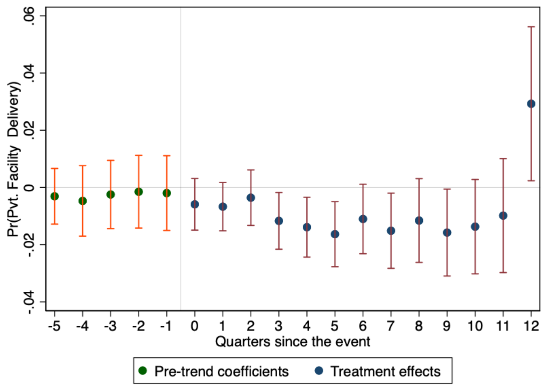
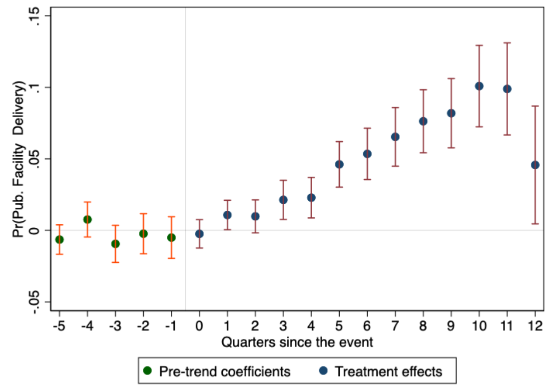


Figure 10: Effect of JSY on OOP Costs (Const. INR)

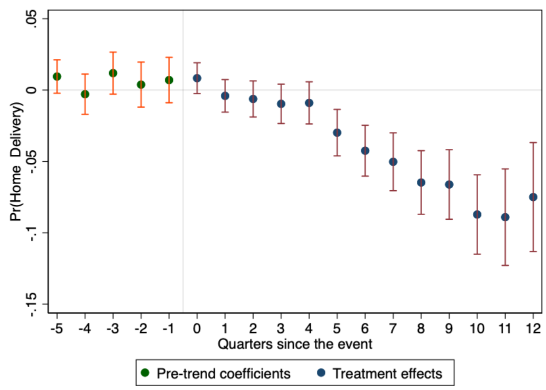
Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in Constant Indian Rupees), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



(a) Private Facility



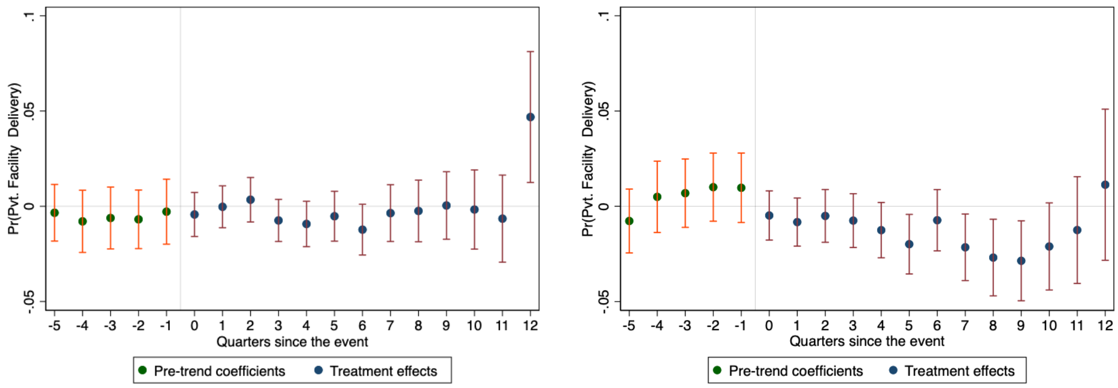
(b) Public Facility



(c) Home Facility

Figure 11: Effect of JSY on sorting across facilities

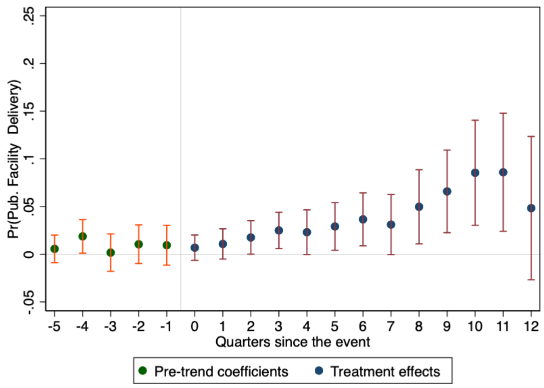
Notes: This figure presents event study evidence of the effect of JSY on likelihood of deliveries across different healthcare facilities, following our empirical strategy in section 4. Panel A presents change in likelihood at private facilities. Panel B and Panel C present change in likelihood at public facilities and home, respectively. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



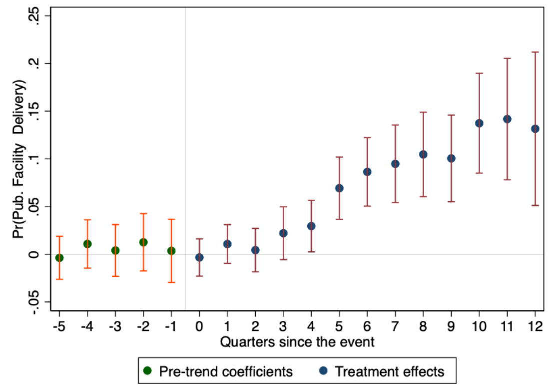
(a) Private Facility (Low-Risk) (b) Private Facility (High-Risk)

Figure 12: Effect of JSY on sorting into private facilities by risk

Notes: This figure presents event study evidence of the effect of JSY on likelihood of deliveries at private facilities by patients' ex-ante risk levels, following our empirical strategy in section 4. Panel A presents results for low-risk sample. Panel B presents results for high-risk sample. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



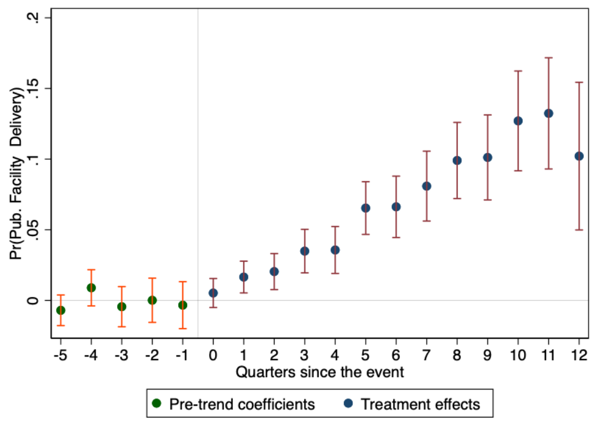
(a) Public Facility (Low Capacity)



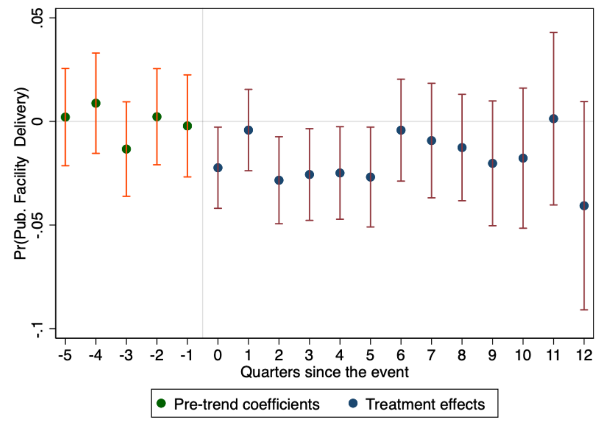
(b) Public Facility (High Capacity)

Figure 13: Effect of JSY on sorting into public facilities by Public Capacity

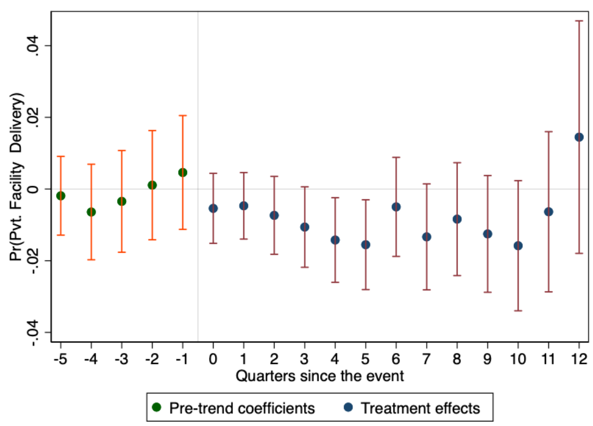
Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at a public facility separately by public sector healthcare capacity, following our empirical strategy in section 4. Panel A presents results for low-capacity districts. Panel B presents results for high-capacity districts. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



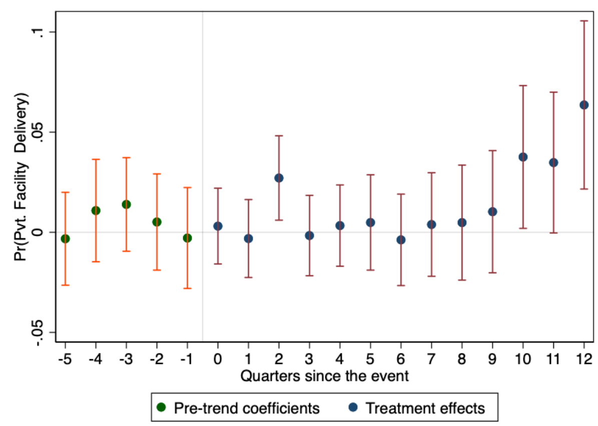
(a) Public Facility (Eligible Sample)



(b) Public Facility (Ineligible Sample)



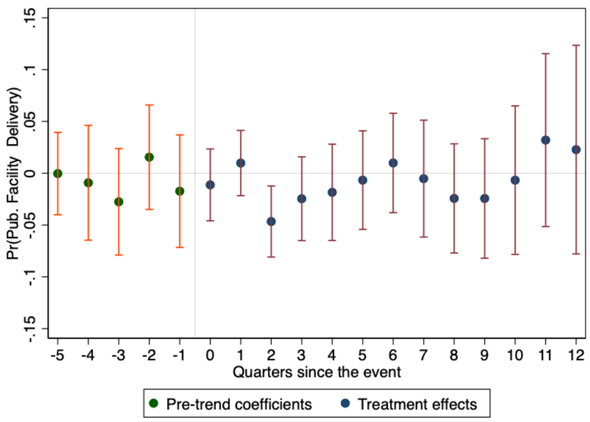
(c) Private Facility (Eligible Sample)



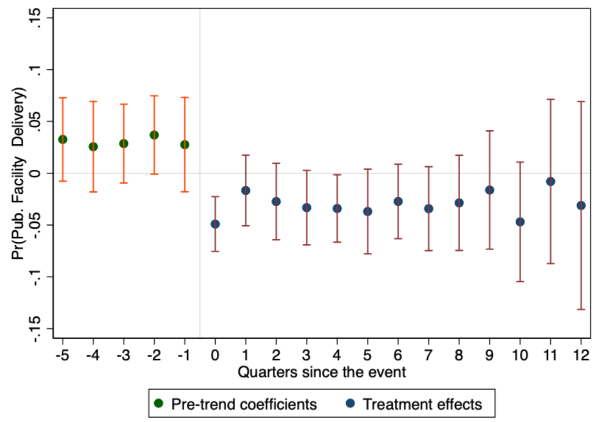
(d) Private Facility (Ineligible Sample)

Figure 14: Sorting across facilities by eligibility

Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at a public and private facilities separately by eligibility for JSY, following our empirical strategy in section 4. Panel A and Panel C present results for the eligible mothers. Panel B and Panel D present results for the ineligible mothers. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



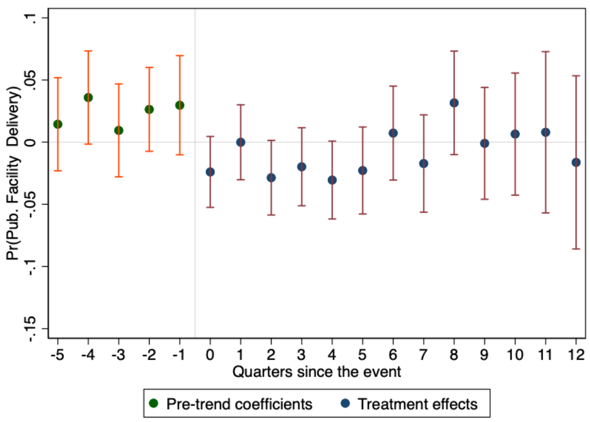
(a) Public Facilities (Ineligible, High Capacity)



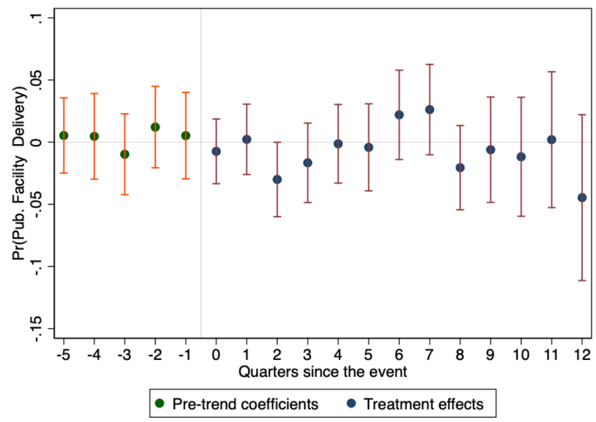
(b) Public Facilities (Ineligible, Low Capacity)

Figure 15: Sorting into public facilities for ineligible mothers over capacity

Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at public facilities for ineligible mothers separately by district's public sector capacity, following our empirical strategy in section 4. Panel A presents results for the high capacity districts. Panel B presents results for the low capacity districts. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



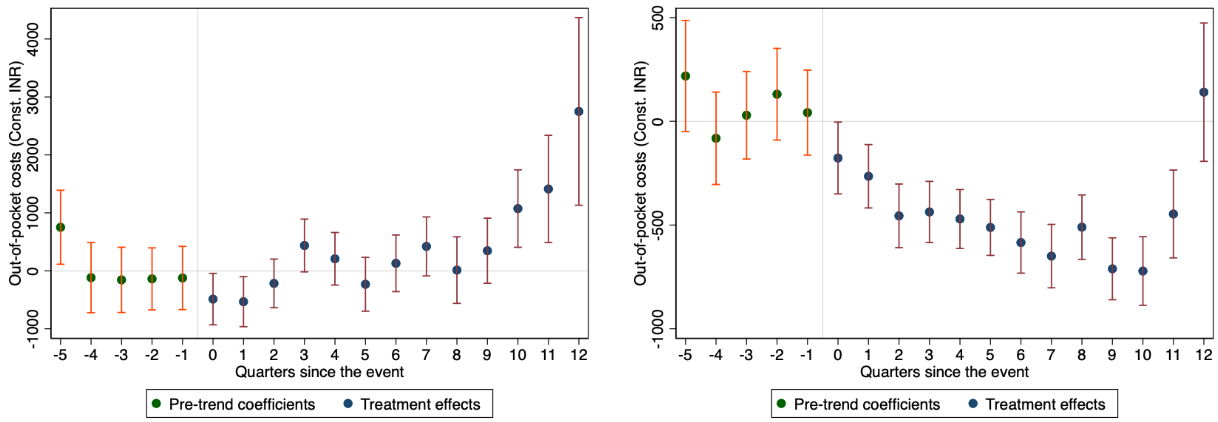
(a) Public Facilities (Ineligible, high-Risk)



(b) Public Facilities (Ineligible, Low-Risk)

Figure 16: Sorting into public facilities for ineligible mothers over riskiness

Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at public facilities for ineligible mothers separately by ex-ante risk level, following our empirical strategy in section 4. Panel A presents results for the high-risk mothers. Panel B presents results for the low-risk mothers. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

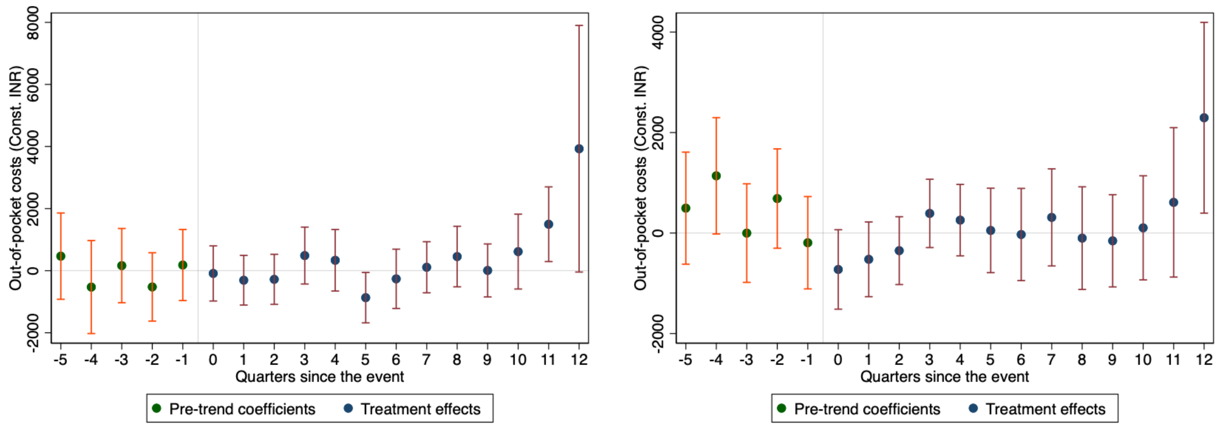


(a) Trip. Diff.: Private Costs (All Controls)

(b) Trip. Diff.: Public Costs (All Controls)

Figure 17: Triple Difference results on OOP Costs (Cont. INR)

Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private and public facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at private facilities. Panel B presents results for deliveries at public facilities. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Additionally, the regressions include dummy variables for ex-ante risk-deciles and BPL status of mothers. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

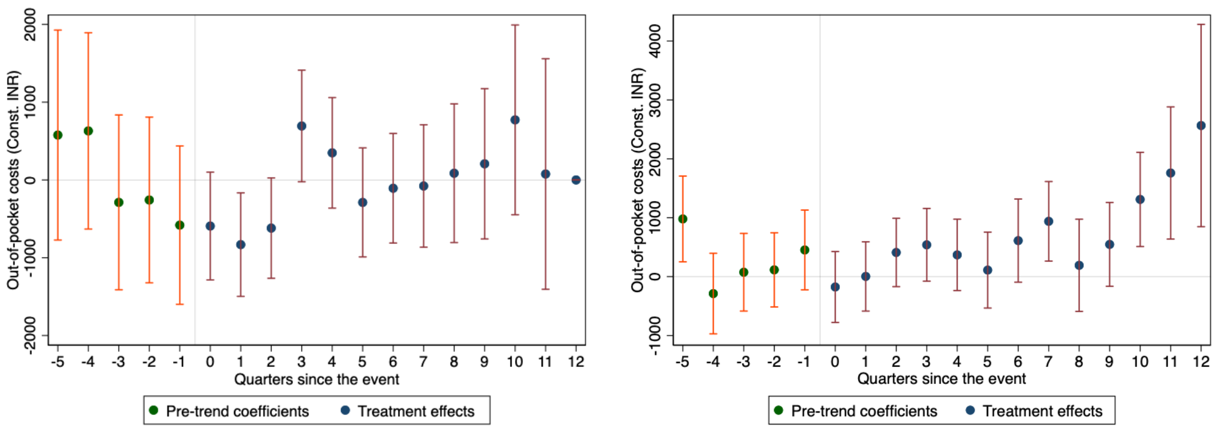


(a) High Capacity

(b) Low Capacity

Figure 18: Private facility price effect (by Public Sector Capacity)

Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at private facilities in districts with high public sector capacity. Panel B presents results for deliveries at private facilities in districts with high public sector capacity. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Additionally, the regressions include dummy variables for ex-ante risk-deciles and BPL status of mothers. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

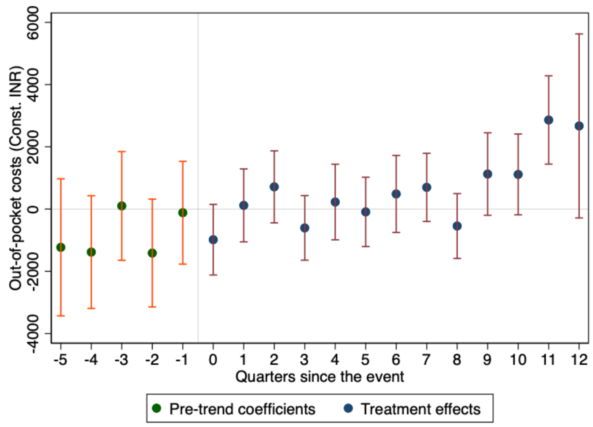


(a) Low Performing States

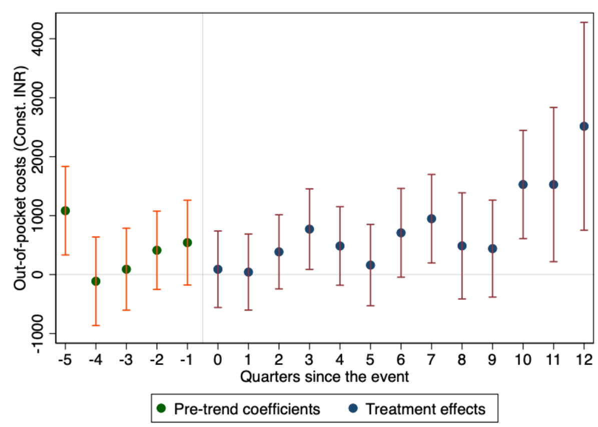
(b) high-performing states

Figure 19: Private facility price effect

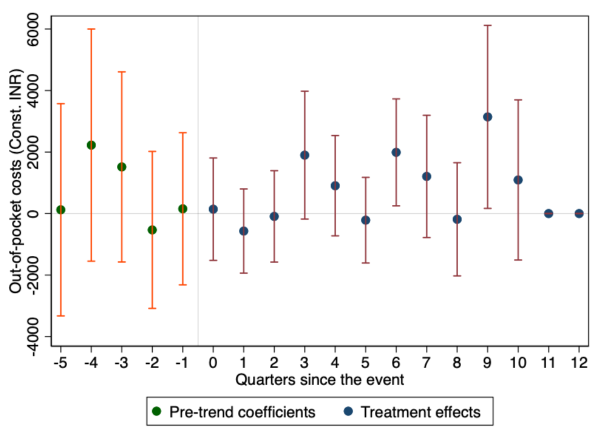
Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at private facilities in LPS. Panel B presents results for deliveries at private facilities in HPS. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Additionally, the regressions include dummy variables for ex-ante risk-deciles and BPL status of mothers. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



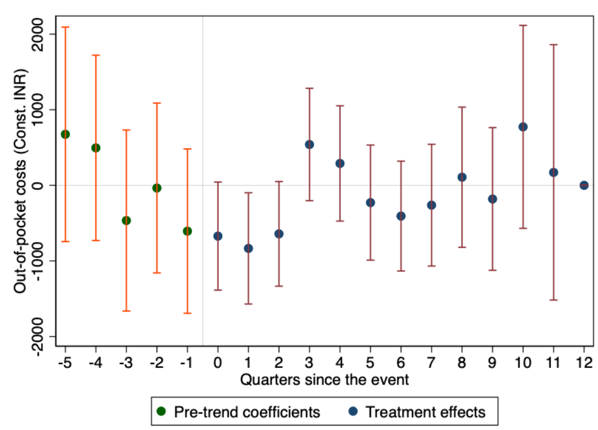
(a) high-performing states/BPL



(b) high-performing states/Non-BPL



(c) Low Performing States/BPL



(d) Low Performing States/Non-BPL

Figure 20: Private facility price effect (by SES)

Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at private facilities in HPS for BPL sub-sample. Panel B presents results for deliveries at private facilities in HPS for Non-BPL sub-sample. Panel C presents results for deliveries at private facilities in LPS for BPL sub-sample. Panel D presents results for deliveries at private facilities in LPS for Non-BPL sub-sample. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Additionally, the regressions include dummy variables for ex-ante risk-deciles and BPL status of mothers. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

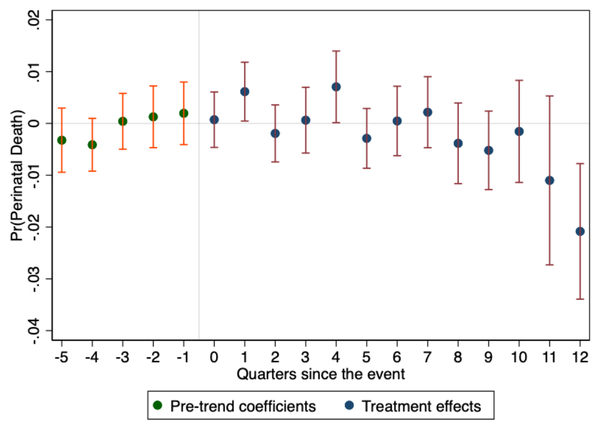


Figure 21: Trip. Diff.: Private Facilities Perinatal Death (All Controls)

Notes: This figure presents event study evidence of the effect of JSY on perinatal death at private facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Additionally, the regressions include dummy variables for ex-ante risk-deciles and BPL status of mothers. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

Table 1: Cash incentives under JSY in Indian rupees

State category	Rural areas		Urban areas	
	Mother incentive	ASHA incentive	Mother incentive	ASHA incentive
Low performing	1400	600	1000	400
High performing	700	600	600	400

Notes: Table depicts cash incentives under JSY for pregnant mothers as well as ASHA workers in urban and rural areas of high and low performing states as listed in policy documents from April 2005.

Table 2: Descriptive Statistics

	Mean	Std. Dev.	Bottom 10%	Median	Top 10%	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)
Mother Characteristics						
Caste - SC	0.190	0.10	0.05	0.19	0.31	592
Caste - ST	0.193	0.27	0.00	0.06	0.67	592
Mom's age at birth'	24.85	1.48	22.96	24.84	26.40	592
Whether under 18	0.076	0.05	0.02	0.07	0.14	592
Whether above 35	0.053	0.04	0.01	0.05	0.10	592
Mother's Schooling	8.297	1.17	6.85	8.23	9.86	592
Father's Schooling	8.984	1.00	7.62	9.05	10.17	574
Below Poverty Line	0.282	0.16	0.08	0.27	0.51	592
Rural	0.758	0.19	0.53	0.80	0.94	592
Hindu	0.754	0.26	0.33	0.86	0.97	592
Muslim	0.125	0.16	0.01	0.08	0.31	592
Perinatal Death	0.015	0.01	0.00	0.01	0.03	592
Facility Characteristics						
Pub. Beds (per 10k)	2.536	3.06	0.49	1.65	5.10	353
Pub. Nurses (per 10k)	0.333	0.46	0.04	0.21	0.69	353
Pub. OBGYNs (per 10k)	0.025	0.05	0.00	0.01	0.05	353
Av. Costs (Const. INR)	2565.9	2031.2	758.5	1884.2	5175.7	591
Private Price (Const. INR)	9733.6	3945.9	5353.1	9076.1	14930.4	581
Public Price (Const. INR)	2428.7	1159.7	1251.60	2200.2	3879.7	590
Home Price (Const. INR)	681.2	428.5	246.1	600.9	1182.9	544
Village Characteristics						
Distance PHC (kms.)	10.43	6.09	5.14	8.95	16.32	582
Distance CHC (kms.)	17.73	9.03	9.01	16.19	28.17	582
Distance District Hosp. (kms.)	34.45	16.97	16.87	33.75	52.01	583
Distance Pvt. Hosp. (kms.)	20.76	19.48	8.01	16.79	35.56	583

Note: This table presents descriptive statistics for our final sample for analysis. The data comes from rounds 2, 3 and 4 of the DLHS. Mother characteristics come from the DLHS module for eligible women. Facility characteristics come from self-reported information on out-of-pocket costs (interpreted as prices and normalized to constant 2010 Indian rupees) and perinatal mortality as well as the DLHS facilities module. Finally, the village characteristics come from the village module of the DLHS.

Table 3: Ex-ante risks and perinatal mortality

	Perinatal Death
Pre-labor Swelling	0.003***
	[0.001]
Pre-labor Paleness	0.001
	[0.001]
Pre-labor Visual Disturbance	-0.001
	[0.001]
Pre-labor Fatigue	-0.001
	[0.001]
Pre-labor Convulsion	0.000
	[0.001]
Pre-labor Foetus Movement	-0.002*
	[0.001]
Pre-labor Abnormal Position	0.005***
	[0.002]
Pre-labor Malaria	0.003
	[0.001]
Pre-labor Vomit	-0.002**
	[0.001]
Pre-labor Jaundice	0.005*
	[0.002]
Pre-labor Bleeding	0.007***
	[0.002]
Pre-labor Blood Pressure	-0.001
	[0.001]
Pre-labor Vaginal Discharge	0.006***
	[0.001]
Other Pre-labor Complication	0.000
	[0.001]
Multiple Births	0.052***
	[0.002]
Previous Abortions	-0.002
	[0.001]
Previous Still-births	0.006***
	[0.001]
Previous Deaths	0.093***
	[0.001]
Age less than 18	0.002**
	[0.001]
Age above 35	0.011***
	[0.001]
Birth Order	-0.010***
	[0.000]
R^2	0.077
Adjusted R^2	0.077
Observations	228610

Note: The table presents regression results from a regression of perinatal mortality on our twenty enlisted measured of ex-ante risks for mothers in our sample. The results from this regression are used to create a predicted continuous measure of riskiness for each mother. *** $p < .01$, $^{**}p < .05$, * $p < .1$

Table 4: Snapshot of data before and after JSY

	Pre-Policy			Post Policy		
	Home Birth	Public Birth	Private Birth	Home Birth	Public Birth	Private Birth
	(1)	(2)	(3)	(4)	(5)	(6)
Mother Characteristics						
Caste - SC	0.210	0.200	0.114	0.186	0.242	0.169
	(0.41)	(0.40)	(0.32)	(0.39)	(0.43)	(0.37)
Caste - ST	0.197	0.132	0.041	0.288	0.191	0.081
	(0.40)	(0.34)	(0.20)	(0.45)	(0.39)	(0.27)
Mom's age at birth'	25.659	24.121	24.729	25.305	24.415	24.932
	(5.74)	(4.71)	(4.70)	(5.46)	(4.75)	(4.70)
Whether under 18	0.076	0.084	0.064	0.065	0.076	0.055
	(0.27)	(0.28)	(0.24)	(0.25)	(0.27)	(0.23)
Whether above 35	0.084	0.032	0.037	0.076	0.035	0.034
	(0.28)	(0.18)	(0.19)	(0.26)	(0.18)	(0.18)
Mother's Schooling	6.813	8.425	10.072	7.531	8.703	10.639
	(3.11)	(3.43)	(3.71)	(3.25)	(3.34)	(3.73)
Father Schooling	8.049	9.208	10.797	8.202	9.337	10.637
	(3.42)	(3.70)	(3.72)	(3.26)	(3.32)	(3.59)
Below Poverty Line	0.363	0.246	0.138	0.272	0.258	0.129
	(0.48)	(0.43)	(0.34)	(0.45)	(0.44)	(0.34)
Rural	0.896	0.729	0.615	0.838	0.655	0.489
	(0.31)	(0.44)	(0.49)	(0.37)	(0.48)	(0.50)
Hindu	0.833	0.833	0.795	0.641	0.732	0.774
	(0.37)	(0.37)	(0.40)	(0.48)	(0.44)	(0.42)
Muslim	0.121	0.092	0.136	0.211	0.143	0.118
	(0.33)	(0.29)	(0.34)	(0.41)	(0.35)	(0.32)
Facility Quality						
Atleast 3 ANC	0.260	0.692	0.762	0.364	0.780	0.847
	(0.44)	(0.46)	(0.43)	(0.48)	(0.41)	(0.36)
Atleast 6 tests in ANC	0.111	0.512	0.668	0.183	0.528	0.660
	(0.31)	(0.50)	(0.47)	(0.39)	(0.50)	(0.47)
Delivery Cost (Const. INR)	633	2688	9966	537	2673	11152
	(942)	(3353)	(9301)	(1447)	(2982)	(9083)
Village Characteristics						
Distance Nearest Town	15.524	14.713	12.159	17.065	14.442	13.293
	(14.83)	(14.63)	(13.77)	(16.92)	(13.02)	(11.27)
Distance Government CHC	18.939	16.248	16.205	17.572	16.669	14.096
	(9.36)	(9.40)	(8.95)	(9.59)	(10.18)	(6.34)
Distance Government Hospital	33.969	34.992	32.734	38.312	37.521	37.189
	(14.10)	(15.01)	(13.77)	(18.39)	(18.97)	(18.51)
Distance Private Hospital	20.207	18.571	13.613	23.463	19.576	12.308
	(10.38)	(11.97)	(8.53)	(21.32)	(20.47)	(8.87)
Observations	9205	2512	2391	3870	4542	3167

Note: The table presents patterns of patient sorting across various facilities by patient characteristics. The table shows a snapshot of our data across facilities (private, public and home), and before and after the implementation of JSY in the district. We present statistics for the pre-JSY period (2004-05) and post-JSY period (2008-09 and at least three quarters after JSY).

Table 5: Effect of JSY on Inst. Births, Perinatal Death and OOP Costs (Const. INR)

		SES		Ex-ante Risk	
	Full Sample	BPL	Non-BPL	High-Risk	Low-Risk
	(1)	(2)	(3)	(4)	(5)
Panel A: Probability of Institutional Birth					
JSY	0.029***	0.035***	0.018**	0.037***	0.039***
	[0.007]	[0.011]	[0.007]	[0.008]	[0.008]
Dependent Var. Mean (2004-05)	.36	.21	.44	.39	.33
Treatment Effect (%)	8.08%	16.55%	4.07%	9.44%	11.89%
Number of Districts	587	586	587	577	577
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274964	78853	196108	111864	112122
Panel B: Probability of Perinatal Death					
JSY	0.001	0.001	0.001	0.001	0.000**
	[0.001]	[0.002]	[0.001]	[0.002]	[0.000]
Dependent Var. Mean (2004-05)	.02	.03	.02	.02	0
Treatment Effect (%)	3.72%	3.22%	4.87%	8.63%	.%
Number of Districts	587	586	587	577	577
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	282540	80404	202133	111976	112233
Panel C: OOP Costs (Const. INR)					
JSY	31.376	7.736	26.638	81.514	40.077
	[62.530]	[86.659]	[75.730]	[98.801]	[72.318]
Dependent Var. Mean (2004-05)	2526.07	1429.04	2970.22	3063.8	2106.34
Treatment Effect (%)	1.24%	.54%	.9%	2.66%	1.9%
Number of Districts	574	562	571	569	569
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	191950	51552	140337	95961	95860

Notes:

Note: This table presents our estimates of the impact of JSY on the likelihood of delivering at an institutional facility (panel A), the likelihood of perinatal mortality (panel B) and average out-of-pocket costs expressed in constant Indian rupees (panel C). Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In column (1), we present average effect of JSY for the entire sample. Columns (2)-(3) present average effect of JSY by mothers' SES status (BPL Status). Columns (4)-(5) present average effect of JSY by a mother's ex-ante risk level (whether a mother was above median level of risk). Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, **$p < .05$, * $p < .1$

Table 6: Average effect of JSY on Deliveries at Various Facilities

		SES		Ex-ante Risk	
	Full Sample	BPL	Non-BPL	High-Risk	Low-Risk
	(1)	(2)	(3)	(4)	(5)
Panel A: Public Faciltiy Births					
JSY	0.040***	0.047***	0.033***	0.049***	0.041***
	[0.007]	[0.010]	[0.007]	[0.008]	[0.007]
Dependent Var. Mean (2004-05)	.18	.14	.21	.2	.18
Treatment Effect (%)	21.94%	32.61%	15.77%	24.55%	22.1%
Number of Districts	587	586	587	577	577
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274964	78853	196108	111864	112122
Panel B: Private Faciltiy Births					
JSY	-0.012**	-0.012*	-0.015**	-0.012*	-0.002
	[0.005]	[0.007]	[0.006]	[0.006]	[0.005]
Dependent Var. Mean (2004-05)	.17	.07	.23	.19	.14
Treatment Effect (%)	-6.68%	-18.05%	-6.28%	-6.42%	-1.11%
Number of Districts	587	586	587	577	577
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274964	78853	196108	111864	112122
Panel C: Home Births					
JSY	-0.029***	-0.035***	-0.018**	-0.037***	-0.039***
	[0.007]	[0.011]	[0.007]	[0.008]	[0.008]
Dependent Var. Mean (2004-05)	.64	.79	.56	.61	.67
Treatment Effect (%)	-4.49%	-4.41%	-3.23%	-6.04%	-5.82%
Number of Districts	587	586	587	577	577
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274964	78853	196108	111864	112122

Note: This table presents our estimates of the impact of JSY on the likelihood of delivering at: (i) public facility (panel A), (ii) home births (panel B), and (iii) private facility (panel C). Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In column (1), we present average effect of JSY for the entire sample. Columns (2)-(3) present average effect of JSY by mothers' SES status (BPL Status). Columns (4)-(5) present average effect of JSY by a mother's ex-ante risk level (whether a mother was above median level of risk). Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 7: Average effect of JSY on Deliveries at Private Facilities by Types

	Y = I{Whether Delivery at Private Facility}			
	BPL Less Risk	BPL High Risk	Non-BPL Less Risk	Non-BPL High Risk
	(1)	(2)	(3)	(4)
JSY	-0.005	-0.017	-0.000	-0.013*
	[0.009]	[0.011]	[0.006]	[0.008]
Dependent Var. Mean (2004-05)	.06	.09	.18	.23
Treatment Effect (%)	-7.99%	-18.81%	-.17%	-5.73%
Number of Districts	565	552	577	576
District Fixed Effect	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y
Observations	29263	29578	82763	82094

Note: This table presents our estimates of the impact of JSY on the likelihood of delivering at a private facility by patient type. Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In column (1), we present average effect of JSY for the below poverty line and Low-Risk sub-sample. In column (2), we present average effect of JSY for the below poverty line and high-Risk sub-sample. In column (3), we present average effect of JSY for the above poverty line and Low-Risk sub-sample. In column (4), we present average effect of JSY for the above poverty line and high-Risk sub-sample. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 8: Institutional births, deaths and costs by public sector capacity

	Y = I{Inst. Birth}		Y = I{Perinatal Death}		OOP Costs	
	High Pub. Capacity	Low Pub. Capacity	High Pub. Capacity	Low Pub. Capacity	High Pub. Capacity	Low Pub. Capacity
	(1)	(2)	(3)	(4)	(5)	(6)
JSY	0.053***	0.012	0.001	0.002	-105.514	-45.545
	[0.016]	[0.012]	[0.002]	[0.002]	[80.320]	[62.847]
Dependent Var. Mean (2004-05)	.39	.3	.02	.02	1714.09	1374.77
Treatment Effect (%)	13.85%	3.96%	5.65%	9.95%	-6.16%	-3.31%
Number of Districts	174	175	174	175	170	173
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	75892	95847	77976	98737	53464	69972

Note: This table presents our estimates of the impact of JSY by public sector capacity. Districts with above median number of OBGYNs per 10,000 persons at public hospitals are high capacity districts. Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(2), we present average effect of JSY on likelihood of institutional births by public sector capacity. In columns (3)-(4), we present average effect of JSY on likelihood of perinatal death by public sector capacity. In columns (5)-(6), we present average effect of JSY on out-of-pocket costs (expressed in constant Indian rupees) by public sector capacity. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 9: Effects on real health inputs by public sector capacity

	Y = I{Death (High Risk)}		Y = I{Received ANC}		Y = Number of ANC		Y = I{Atleast 6 tests ANC)}	
	High Pub. Capacity	Low Pub. Capacity	High Pub. Capacity	Low Pub. Capacity	High Pub. Capacity	Low Pub. Capacity	High Pub. Capacity	Low Pub. Capacity
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JSY	0.000	0.007*	0.020	0.004	-0.036	-0.042	-0.009	-0.017*
	[0.004]	[0.004]	[0.015]	[0.015]	[0.109]	[0.078]	[0.011]	[0.010]
Dependent Var. Mean (2004-05)	.02	.02	.7	.63	3.82	3.54	.3	.23
Treatment Effect (%)	2.31%	46.26%	2.91%	.67%	-.95%	-1.2%	-3.02%	-7.22%
Number of Districts	171	174	174	175	174	175	174	175
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Observations	31108	39894	75912	95845	54505	64790	77976	98737

Note: This table presents our estimates of the impact of JSY by public sector capacity. Districts with above median number of OBGYNs per 10,000 persons at public hospitals are high capacity districts. Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(2), we present average effect of JSY on likelihood of perinatal death for high-Risk mothers by public sector capacity. In columns (3)-(4), we present average effect of JSY on likelihood of receiving ante-natal care (ANC) by public sector capacity. In columns (5)-(6), we present average effect of JSY on number of ante-natal check-ups received by public sector capacity. In columns (7)-(8), we present average effect of JSY on whether a mother was administered at least 6 out of 8 listed tests in ante-natal check-ups, by public sector capacity. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 10: Richer individuals adapt to worsening public sector quality

	Y = I{Birth: Public Fac.}		Y = I{Birth: Private Fac.}		Y = I{Birth: Public Fac.}		Y = I{Birth: Public Fac.}	
	Eligible	Ineligible	Eligible	Ineligible	Ineligible Low Pub. Cap.	Ineligible High Pub. Cap.	Ineligible High Risk	Ineligible Low Risk
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JSY	0.057***	-0.019*	-0.012**	0.012	-0.030	0.004	-0.012	-0.005
	[0.008]	[0.010]	[0.005]	[0.009]	[0.019]	[0.022]	[0.014]	[0.014]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.23	.22	.27	.26
Treatment Effect (%)	32.5%	-7.5%	-7.56%	4.44%	-13.05%	1.76%	-4.52%	-1.74%
Number of Districts	586	289	586	289	71	64	271	279
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Observations	208890	66037	208890	66037	17557	14844	26223	33084

Notes: This table presents our estimates of the impact of JSY on patient sorting across facilities by public sector capacity, and patients' eligibility and risk level. We divide our sample by a mother's eligibility for benefits under the JSY. Under JSY, all mothers in low-performing districts were eligible whereas richer mothers were not eligible in high-performing districts. Districts with above median number of OBGYNs per 10,000 persons at public hospitals are high capacity districts. Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(2), we present average effect of JSY on likelihood of delivery at a public facility by mothers' eligibility status. In columns (3)-(4), we present average effect of JSY on likelihood of delivery at a private facility by mothers' eligibility status. In columns (5)-(6), we present average effect of JSY on likelihood of delivery at a public facility for ineligible mothers in districts with low/high public sector capacity. In columns (7)-(8), we present average effect of JSY on likelihood of delivery at a public facility for ineligible mothers in districts by mothers' risk level. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, **$p < .05$, * $p < .1$

Table 11: Triple Difference: Effect of JSY on Out-of-pocket Costs relative to Home

	Y = Delivery Cost (Const. INR)					
	Place of Birth					
	Private	Public	Private	Public	Private	Public
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OOP Costs (Const. INR)						
JSY	122.9	-500.1***	115.7	-501.4***	115.5	-498.9***
	[150.4]	[56.0]	[150.5]	[56.0]	[150.4]	[56.0]
Dependent Var. Mean (2004-05)	9922.5	2677.3	9925.0	2678.8	9925.0	2678.8
Treatment Effect (%)	1.24%	-18.68%	1.17%	-18.72%	1.16%	-18.63%
Number of Districts	473	478	473	478	473	478
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	N	Y	Y	Y	Y
BPL Fixed Effect	N	N	N	N	Y	Y
Procedure Fixed Effect	N	N	N	N	N	N
Observations	112108	120806	112078	120775	112078	120775
Panel B: OOP Costs (Const. INR)						
JSY	-223.7*	-413.1***	-227.3**	-414.3***	-227.8**	-412.2***
	[115.8]	[49.5]	[115.8]	[49.6]	[115.8]	[49.6]
Dependent Var. Mean (2004-05)	9922.5	2678.7	9925.0	2680.2	9925.0	2680.2
Treatment Effect (%)	-2.25%	-15.42%	-2.29%	-15.46%	-2.3%	-15.38%
Number of Districts	473	478	473	478	473	478
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	N	Y	Y	Y	Y
BPL Fixed Effect	N	N	N	N	Y	Y
Procedure Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	112074	120765	112044	120734	112044	120734

Note: This table presents our estimates of the impact of JSY on out-of-pocket costs (expressed in constant Indian rupees) at public and private facilities. Estimates are from the triple difference specification similar to Equation 1 but with a third difference taken against the home option. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(2), we present average effect of JSY on out-of-pocket costs at private and public facilities respectively. In columns (3)-(4), we present average effect of JSY on out-of-pocket costs at private and public facilities respectively and additionally controlling for dummies of risk deciles in our regression specification. In columns (5)-(6), we present average effect of JSY on out-of-pocket costs at private and public facilities respectively, and additionally controlling for dummies of risk deciles and BPL status in our regression specification. Panel (A) does not control for procedure of birth and panel (B) controls for procedure of birth. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 12: Triple Difference: Effect of JSY on Perinatal Death relative to Home

	Birth at a Private Facility					
	I{Perinatal Death}			I{Received ANC}	I{Number of ANC}	I{Atleast 6 tests}
	(1)	(2)	(3)	(4)	(5)	(6)
JSY	0.001	-0.000	-0.000	-0.009	0.087^{**}	-0.024^{***}
	[0.002]	[0.002]	[0.002]	[0.008]	[0.040]	[0.007]
Dependent Var. Mean (2004-05)	.02	.01	.01	.92	5.64	.7
Treatment Effect (%)	7.54%	-1.99%	-2.01%	-.95%	1.54%	-3.43%
Number of Districts	496	496	496	496	494	496
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	Y	Y	Y	Y	Y
BPL Fixed Effect	N	N	Y	Y	Y	Y
Observations	150711	128266	128266	128248	85590	128266

Note: This table presents our estimates of the impact of JSY on likelihood of perinatal death at private facilities along with effects on various healthcare inputs. Estimates are from the triple difference specification similar to Equation 1 but with a third difference taken against the home option. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(3), we present average effect of JSY on perinatal death at private facilities increasingly and flexibly controlling for risk levels and BPL status. In column (4), we present average effect of JSY on whether a mother received an ante-natal check-up additionally controlling for dummies of risk deciles in our regression specification. In column (5), we present average effect of JSY on number of ANC check-ups a mother received additionally controlling for dummies of risk deciles in our regression specification. In column (6), we present average effect of JSY on number of tests done during ANC check-ups additionally controlling for dummies of risk deciles in our regression specification. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, $^{**}p < .05$, * $p < .1$

Table 13: Triple Difference: JSY and private sector market power

	Y = Delivery Cost (Const. INR)					
	Private Facility Birth					
	High Cap.	Low Cap.	LPS	HPS	HPS/Non-BPL	HPS/BPL
	(1)	(2)	(3)	(4)	(5)	(6)
JSY	73.823	-41.500	-91.272	490.893**	574.720**	347.934
	[276.219]	[262.506]	[242.342]	[217.857]	[230.318]	[327.582]
Dependent Var. Mean (2004-05)	9623.24	9114.04	8855.19	10669.39	10917.18	9347.1
Treatment Effect (%)	.77%	-.46%	-1.03%	4.6%	5.26%	3.72%
Number of Districts	146	142	260	213	213	203
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	Y	Y	Y	Y	Y	Y
BPL Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	30337	43153	78261	33817	24980	8814

Note: This table presents our estimates of the impact of JSY on out-of-pocket costs (expressed in constant Indian rupees) at private facilities. Estimates are from the triple difference specification similar to Equation 1 but with a third difference taken against the home option. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(2), we present average effect of JSY on out-of-pocket costs at private facilities in high and low capacity districts respectively. In columns (3)-(4), we present average effect of JSY on out-of-pocket costs at private facilities in low and high-performing states respectively. In columns (5)-(6), we present average effect of JSY on out-of-pocket costs at private facilities in high-performing states by mothers' SES. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table 14: Triple Difference: JSY and C-sections at private facilities

	Y = Whether birth via C-section			
		Private Facility Birth		
	Full Sample	HPS	HPS/Non-BPL	HPS/BPL
	(1)	(2)	(3)	(4)
JSY	0.029***	0.038***	0.035***	0.049**
	[0.007]	[0.009]	[0.009]	[0.019]
Dependent Var. Mean (2004-05)	.28	.31	.32	.29
Treatment Effect (%)	10.43%	12.04%	11.19%	17.22%
Number of Districts	495	235	235	230
District Fixed Effect	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y
Risk Deciles Fixed Effect	Y	Y	Y	Y
BPL Fixed Effect	Y	Y	Y	Y
Observations	128160	42662	31819	10826

Note: This table presents our estimates of the impact of JSY on likelihood of C-sections at private facilities. Estimates are from the triple difference specification similar to Equation 1 but with a third difference taken against the home option. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In columns (1)-(4), we present average effect of JSY on perinatal death at private facilities controlling for risk levels and BPL status. In column (1), we present average effect of JSY on whether a mother received a c-section. In column (2), we present average effect of JSY on whether a mother received a c-section in HPS. In columns (3)-(4), we present average effect of JSY on whether a mother received a c-section in HPS by SES status. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Equilibrium Effects of Subsidizing Public Services

Utkarsh Kumar and Parijat Lal

Appendix

A Additional Tables and Figures

A.1 Additional Figures

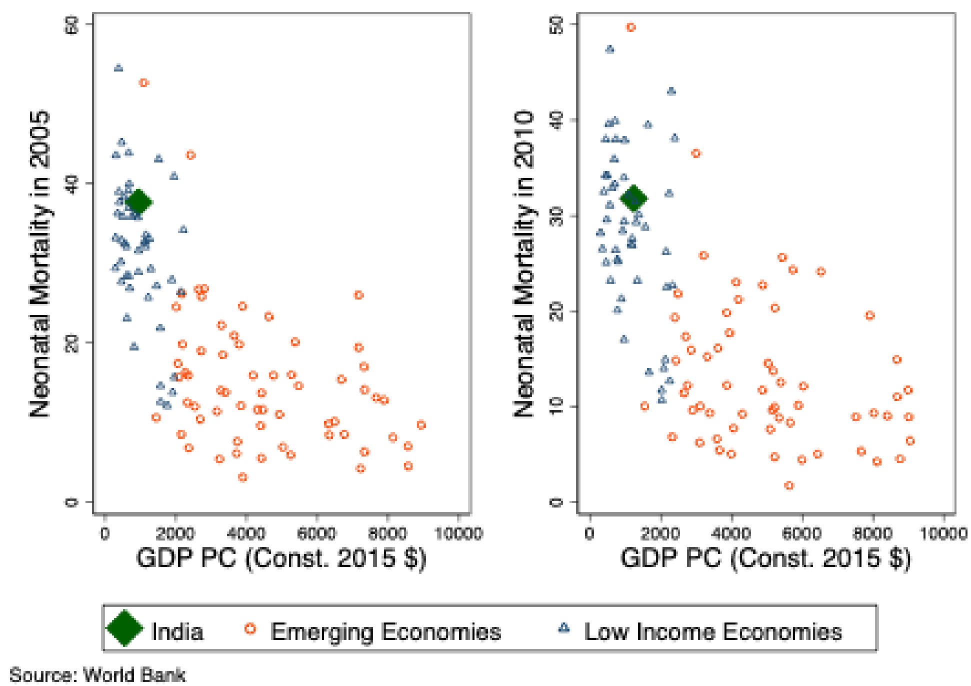
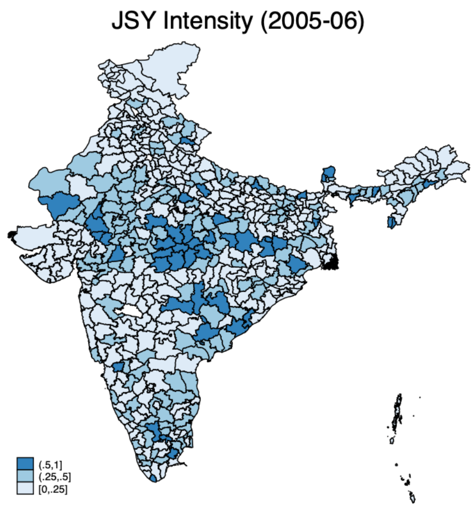
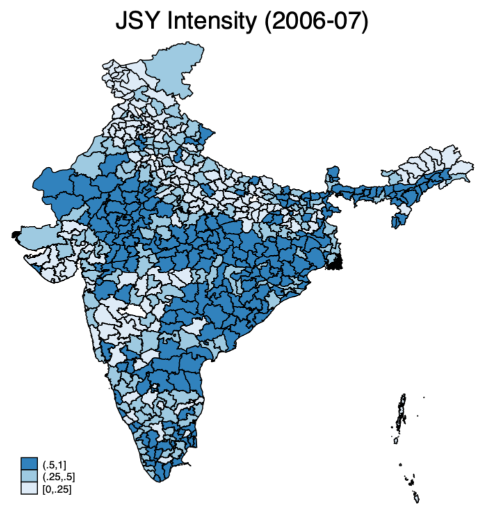


Figure A1: Neonatal Mortality across Countries

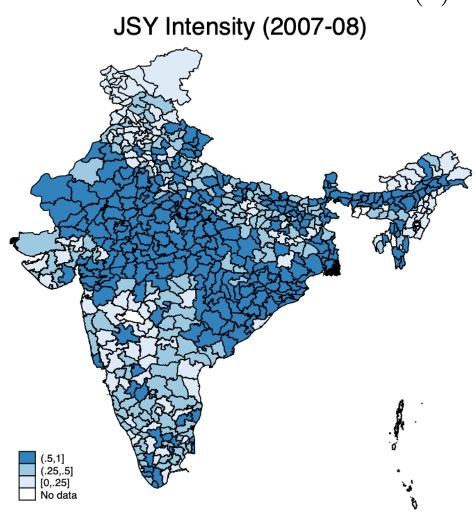
Notes: This figure displays rates of neonatal mortality and GDP per-capita across numerous low-income and emerging economies for years 2005 (left) and 2010 (right).



(a) JSY 2005



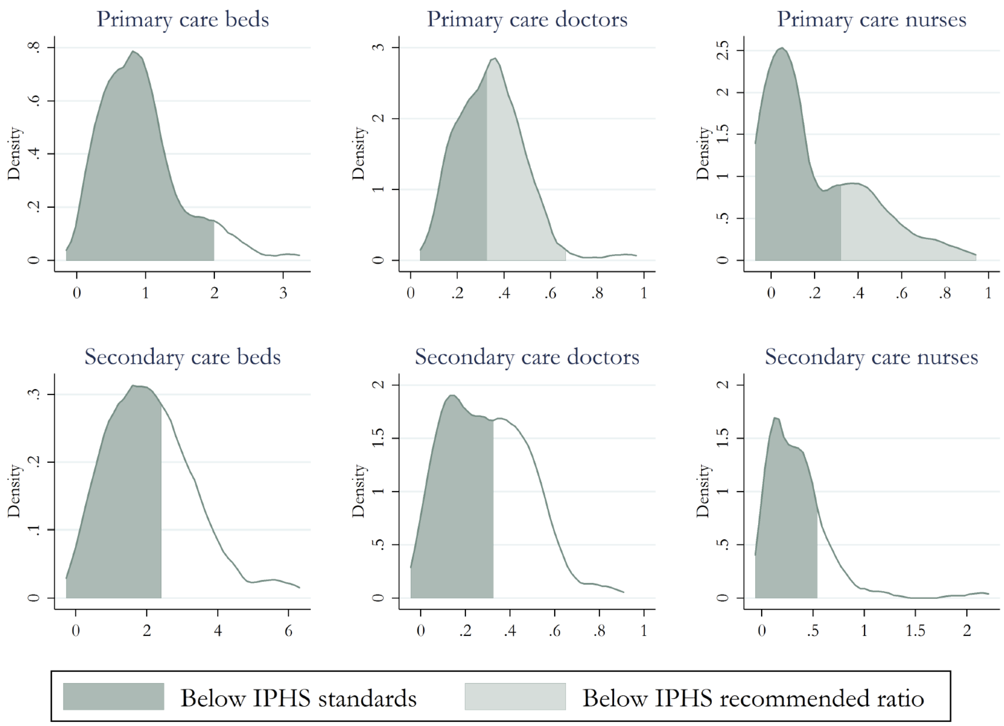
(b) JSY 2006



(c) JSY 2007

Figure A2: Rollout of JSY across districts

Notes: This figure displays the gradual roll-out of JSY across Indian districts over three years (2005, 2006 and 2007). Each figure displays the fraction of eligible mothers in a district that actually received financial assistance under JSY in a given year. In other words, each figure captures the intensity of JSY in Indian districts over three years after the official announcement of JSY.



Source: Andrew and Vera-Hernández 2022

Figure A3: Public Health Capacity in Indian Districts against required IPHS Standards

Notes: This figure displays the density of Indian districts that were below or above the Indian Public Health Standards (IPHS) in terms of capacity at primary and secondary care public facilities as calculated by Andrew and Vera-Hernández (2022).

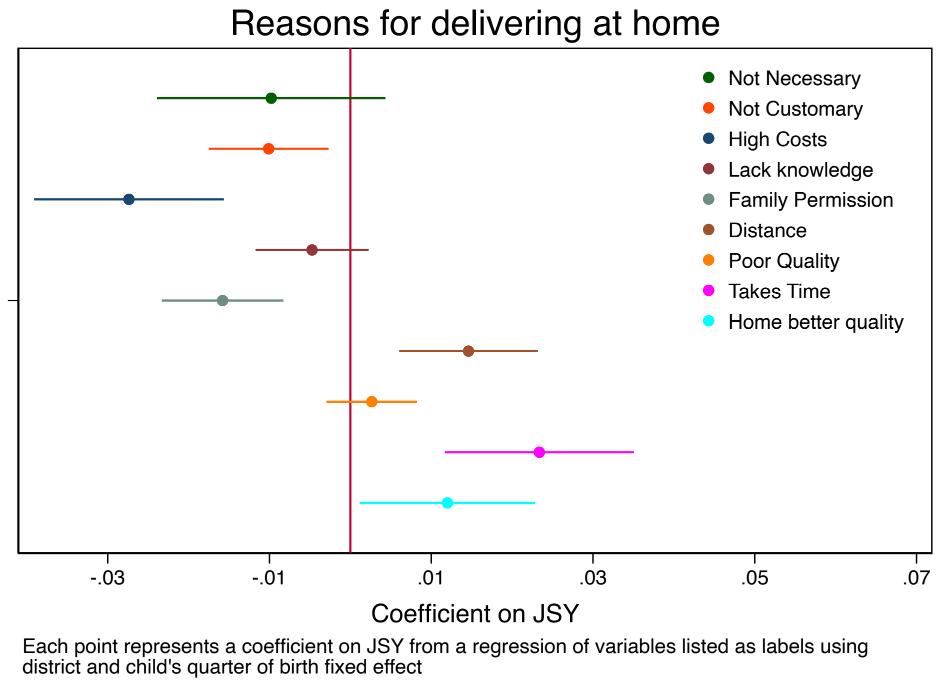
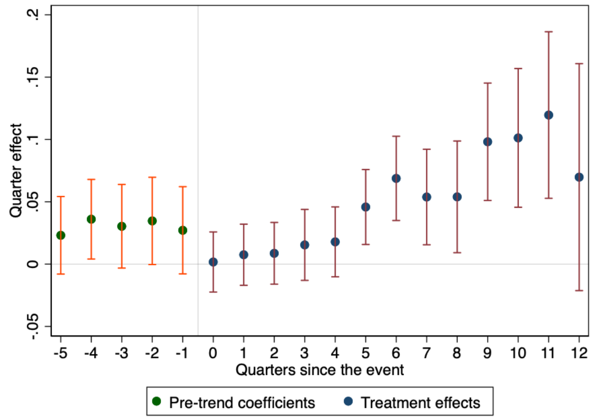
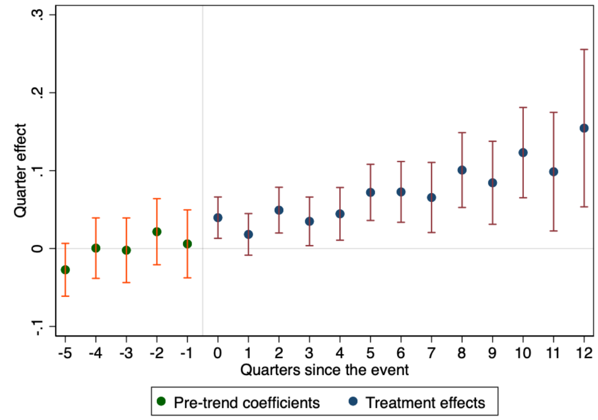


Figure A4: JSY and Reasons for Delivering at Home

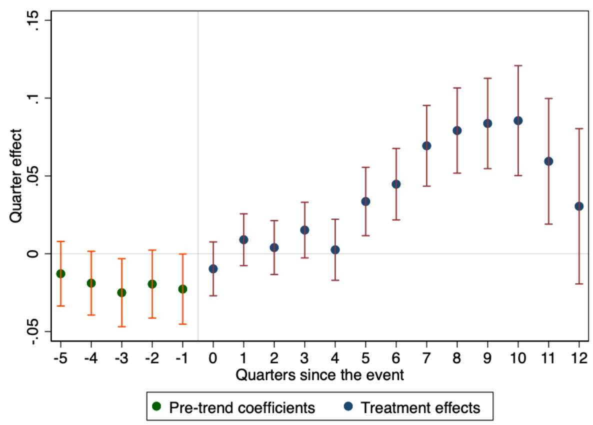
Notes: This figure presents difference-in-difference estimates of JSY on stated reasons for delivering at home instead of an institutional facility. Each dot corresponds to an estimated coefficient for a dependent variable listed in the legend, and horizontal lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



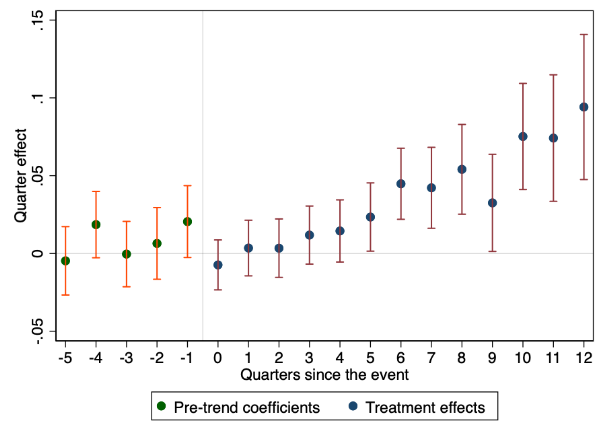
(a) BPL, Low-Risk Sample



(b) BPL, High-Risk Sample



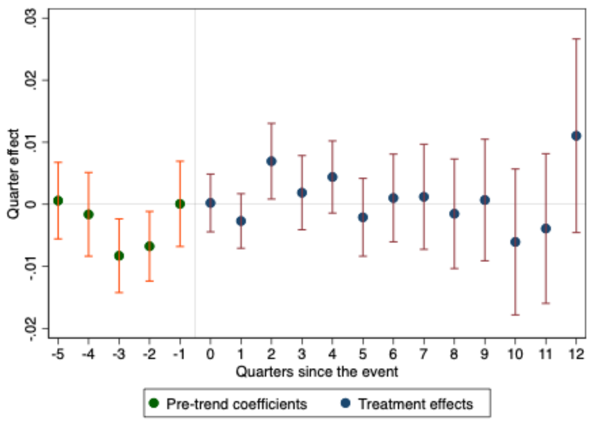
(c) NonBPL, Low-Risk Sample



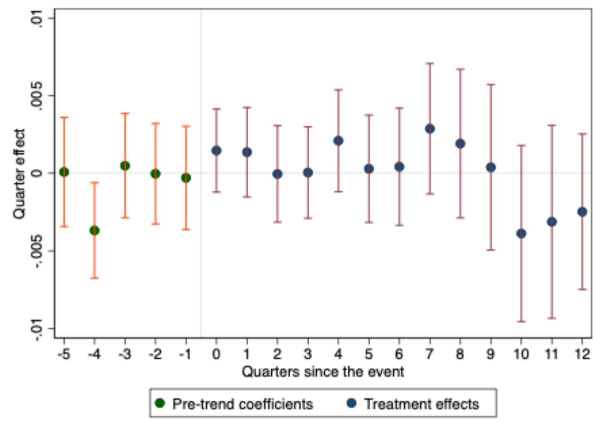
(d) NonBPL, High-Risk Sample

Figure A5: Effect of JSY on Institutional Delivery by Types

Notes: This figure presents event study evidence of the effect of JSY on likelihood of institutional deliveries for different types of patients (combinations of patients' SES and ex-ante risk), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



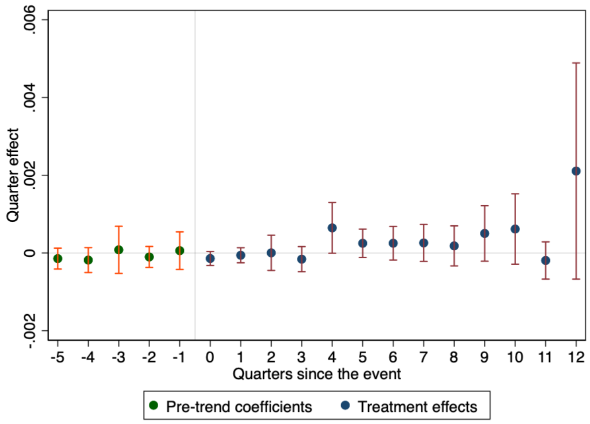
(a) BPL Sample



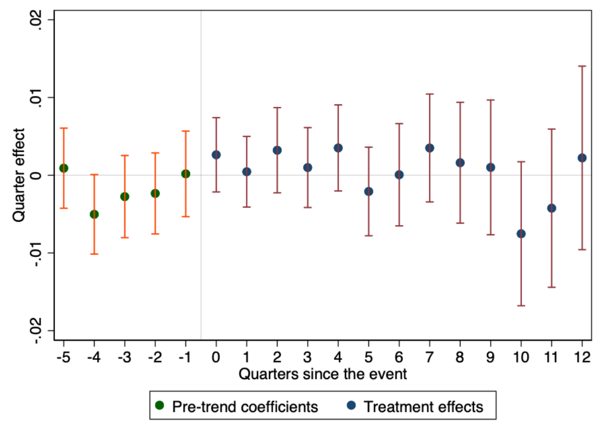
(b) Non-BPL Sample

Figure A6: Effect of JSY on Perinatal Mortality by SES level

Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality by SES (BPL status), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



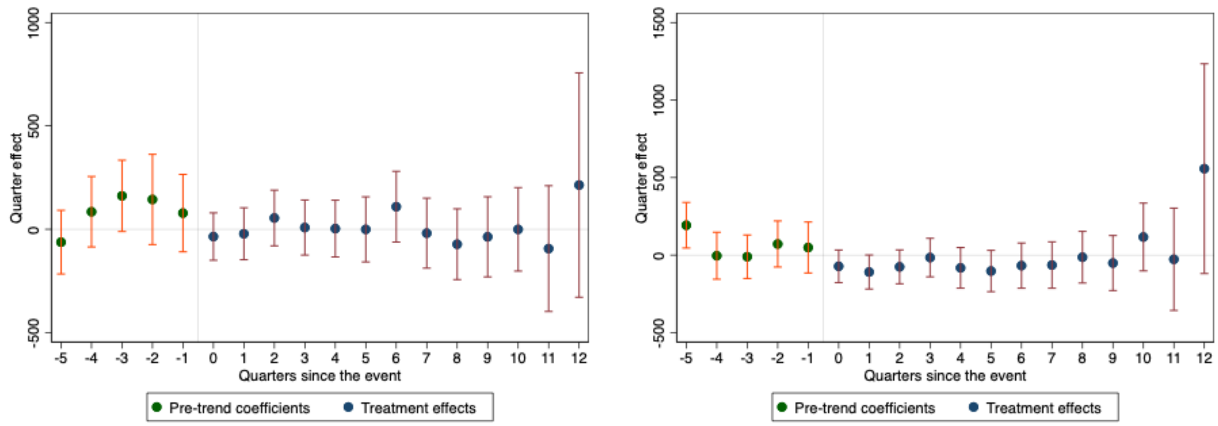
(a) Low-Risk Sample



(b) High-Risk Sample

Figure A7: Effect of JSY on Perinatal Mortality by Risk level

Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality by patient's ex-ante risk level, following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

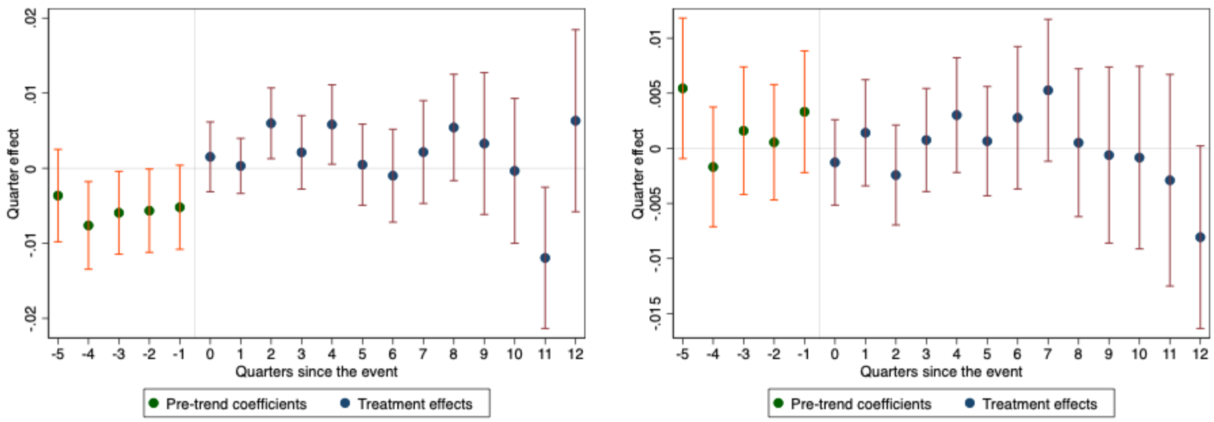


(a) BPL Sample

(b) Non-BPL Sample

Figure A8: Effect of JSY on OOP Costs by SES level (Const. INR)

Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in Constant Indian Rupees) by SES (BPL status), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

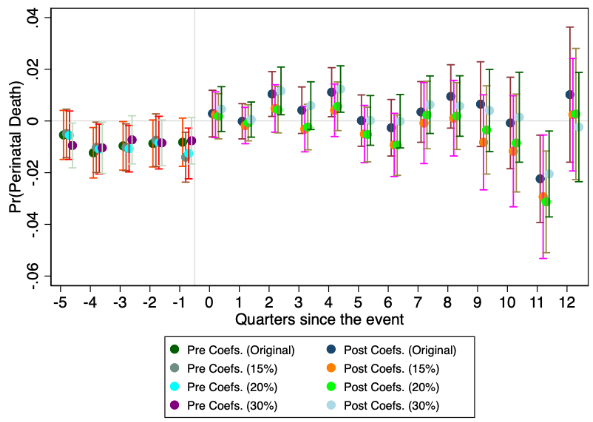


(a) Low Capacity

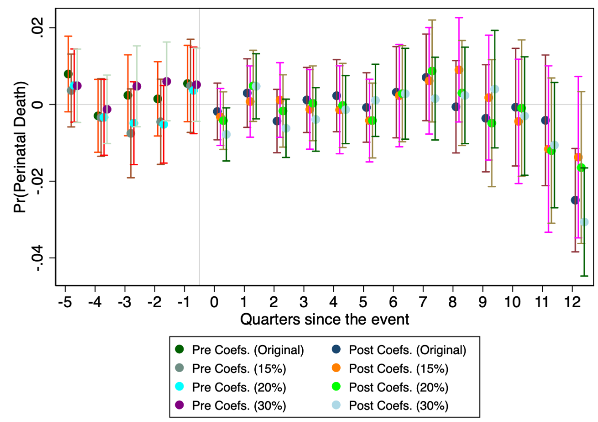
(b) High Capacity

Figure A9: Effect of JSY on Perinatal Mortality by Public Sector Capacity

Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality separately by public sector healthcare capacity, following our empirical strategy in section 4. Panel A presents results for low-capacity districts. Panel B presents results for high-capacity districts. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.



(a) Low Capacity Districts



(b) High Capacity Districts

Figure A10: Robustness: Effect of JSY on Perinatal Mortality by Capacity (Obgyns)

Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality for high-risk patients by a district's public sector capacity, following our empirical strategy in section 4 across the four discrete definitions of treatment under JSY including our original definition of treatment in subsection 3.2. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the the district was treated under JSY, and exploits the gradual roll-out of JSY across Indian districts. Each dot corresponds to an estimated coefficient, and vertical lines indicate the 95% confidence intervals. Standard errors are clustered at district level.

A.2 Additional Tables

Table A1: Balance Table

Variable	Early Treatment	Late Treatment	Difference
Birth at institutional facility	0.431	0.450	0.019
	(0.267)	(0.238)	(0.023)
Birth at private facility	0.191	0.211	0.020
	(0.182)	(0.166)	(0.016)
Birth at public facility	0.224	0.221	-0.004
	(0.141)	(0.179)	(0.015)
Birth at home	0.585	0.568	-0.017
	(0.263)	(0.237)	(0.023)
Perinatal Death	0.016	0.015	-0.001
	(0.018)	(0.015)	(0.001)
Delivery Cost (Const. INR)	2,952	3,116	164
	(2,589)	(2,247)	(223)
SC	0.177	0.200	0.023**
	(0.095)	(0.116)	(0.010)
ST	0.183	0.152	-0.030
	(0.212)	(0.259)	(0.022)
Mother's age at birth	25.074	25.646	0.572***
	(1.557)	(1.631)	(0.145)
Mothers under 18 yrs	0.070	0.052	-0.018***
	(0.058)	(0.053)	(0.005)
Mothers over 35 yrs	0.058	0.065	0.008*
	(0.046)	(0.050)	(0.004)
Mothers Education	8.133	8.460	0.327***
	(1.158)	(1.223)	(0.109)
BPL	0.345	0.297	-0.049***
	(0.208)	(0.198)	(0.018)
Rural	0.774	0.742	-0.032**
	(0.129)	(0.173)	(0.014)
Received at least 3 ANCs	0.504	0.502	-0.003
	(0.277)	(0.259)	(0.024)
Received at least 6 ANC Tests	0.372	0.346	-0.026
	(0.301)	(0.269)	(0.026)
Distance to CHC	18.126	16.954	-1.171
	(7.787)	(9.577)	(0.802)
Distance to public Hosp.	31.801	31.453	-0.348
	(12.935)	(15.305)	(1.301)
Distance to private Hosp.	20.138	20.469	0.331
	(10.591)	(22.297)	(1.627)
Number of Districts	225	261	580

Note: The table presents summary statistics for several variables during the period before JSY was announced across districts that were treated early (among first 50% of the treated districts) vs districts that were treated later.

Table A2: Balance Table by Capacity

Variable	Low-Capacity Districts	High-Capacity Districts	Difference
Birth at institutional facility	0.374	0.423	0.048**
	(0.235)	(0.215)	(0.024)
Birth at private facility	0.181	0.166	-0.014
	(0.151)	(0.156)	(0.017)
Birth at public facility	0.175	0.240	0.065***
	(0.152)	(0.157)	(0.017)
Birth at home	0.644	0.594	-0.050**
	(0.235)	(0.212)	(0.024)
Perinatal Death	0.017	0.016	-0.001
	(0.016)	(0.021)	(0.002)
Delivery Cost (Const. INR)	2,401	2,705	303
	(1,797)	(1,934)	(204)
SC	0.175	0.186	0.011
	(0.097)	(0.111)	(0.011)
ST	0.178	0.180	0.002
	(0.272)	(0.257)	(0.028)
Mother's age at birth	25.546	25.431	-0.115
	(1.547)	(1.702)	(0.175)
Mothers under 18 yrs	0.062	0.060	-0.002
	(0.052)	(0.059)	(0.006)
Mothers over 35 yrs	0.073	0.059	-0.014***
	(0.047)	(0.046)	(0.005)
Mothers Education	8.115	8.280	0.165
	(1.124)	(1.059)	(0.118)
BPL	0.314	0.302	-0.011
	(0.179)	(0.207)	(0.021)
Rural	0.790	0.771	-0.019
	(0.128)	(0.138)	(0.014)
Received at least 3 ANCs	0.426	0.483	0.057**
	(0.257)	(0.246)	(0.027)
Received at least 6 ANC Tests	0.287	0.316	0.029
	(0.271)	(0.239)	(0.028)
Distance to CHC	18.088	17.136	-0.952
	(9.249)	(7.934)	(0.930)
Distance to Public Hosp.	32.098	31.693	-0.404
	(14.434)	(13.915)	(1.529)
Distance to Private Hosp.	19.614	21.800	2.186
	(17.261)	(17.894)	(1.898)
Observations	173	172	580

Note: The table presents summary statistics for several variables during the period before JSY was announced across districts with above and below median capacity.

Table A3: First Principle Component

	Eigenvector (1) Comp1
OBGYN per 10,000	.5406908
STAFF per 10,000	.6040319
BEDS per 10,000	.5854903

Note: The table presents loadings on the first principle component of three public sector capacity variables (OBGYNs, Nursing staff, beds) each normalized by 10,000 persons from DLHS 2 (before JSY was implemented). The results are used to create a continuous measure for district level public-sector capacity before JSY.

Table A4: Did Government Invest In Public Facilities in treated districts?

	Obgyns/10K	Nurses/10K	Beds/10K
	(1)	(2)	(3)
Treated	-0.000	-0.000***	-0.000
	[0.000]	[0.000]	[0.000]
District FE	Y	Y	Y
Year FE	Y	Y	Y
Observations	450	450	450

Note: The table presents evidence that government did not invest in public sector capacity alongside JSY. Columns (1)-(3) present results from a difference-in-difference regression of number of OBGYNs, Nursing staff, beds respectively on treatment status of a district using data from from DLHS 2 (before JSY) and DLHS 3 (after JSY). Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table A5: Does place of birth matter for perinatal mortality?

	Y = Perinatal Death				
	(1)	(2)	(3)	(4)	(5)
Private Facility	0.0000	-0.0046***	-0.0029***	0.0003*	-0.0037***
	[0.0006]	[0.0006]	[0.0007]	[0.0001]	[0.0010]
Public Facility	-0.0010	-0.0036***	-0.0023***	0.0002	-0.0025**
	[0.0006]	[0.0006]	[0.0006]	[0.0001]	[0.0009]
SES	Yes	Yes	Yes	Yes	Yes
Risk Controls	No	Yes	Yes		
Quarter FE	No	No	Yes		
District FE	No	No	Yes		
High Risk Sample				No	Yes
Observations	289246	228610	225531	114870	174376

Note: This table shows the extent to which choice of a delivery facility (private, public or home) can explain perinatal mortality using several regressions of a dummy variable for perinatal death on choice of facility.

Table A6: Average effect of JSY on Institutional Delivery by Types

	Y = I{Whether Institutional Birth}			
	BPL Less Risk	BPL High Risk	Non-BPL Less Risk	Non-BPL High Risk
	(1)	(2)	(3)	(4)
JSY	0.045***	0.058***	0.033***	0.026***
	[0.013]	[0.014]	[0.008]	[0.008]
Dependent Var. Mean (2004-05)	.22	.26	.38	.45
Treatment Effect (%)	20.87%	22.14%	8.6%	5.89%
Number of Districts	566	552	577	576
District Fixed Effect	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y
Observations	29293	29595	82847	82189

Note: This table presents our estimates of the impact of JSY on the likelihood of delivering at an institutional facility by patient type. Estimates are from the staggered DiD specification in Equation 1. The empirical analysis uses quarterly panel data for all districts in our sample period. We do not impose a time window for our results. In column (1), we present average effect of JSY for the below poverty line and low-risk sub-sample. In column (2), we present average effect of JSY for the below poverty line and high-risk sub-sample. In column (3), we present average effect of JSY for the above poverty line and low-risk sub-sample. In column (4), we present average effect of JSY for the above poverty line and high-risk sub-sample. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, **$p < .05$, * $p < .1$

Table A7: Distance and delivery place

	Home Birth	Public Birth	Private Birth
	(1)	(2)	(3)
Distance to Pvt. Hospital	0.0004	0.0005	-0.0009**
	[0.0004]	[0.0004]	[0.0003]
Distance to Pub. Hospital	0.0014***	-0.0018***	0.0005
	[0.0005]	[0.0005]	[0.0003]
District FE	Y	Y	Y
Year FE	Y	Y	Y
Birth Order	Y	Y	Y
Individual Conts.	Y	Y	Y
Risk Dummies	Y	Y	Y
Observations	154780	154780	154780

Note: This table presents evidence that distance to a facility affects patient choice. Column (1) presents results from a fixed effects regression of a dummy variable for home birth on distance to nearest (secondary level) public and private facilities while controlling for district, year, birth order risk deciles fixed effects and individual level controls. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, **$p < .05$, * $p < .1$

Table A8: Robustness: Effect of JSY on Institutional Delivery and Perinatal Mortality

	10%	20%	30%	JSY Intensity
	(1)	(2)	(3)	(4)
Panel A: Probability of Institutional Birth				
JSY	0.040***	0.037***	0.027***	
	[0.008]	[0.008]	[0.007]	
JSY Intensity				0.015***
				[0.005]
Dependent Var. Mean (2004-05)	.36	.36	.36	.36
Treatment Effect (%)	11.21%	10.45%	7.5%	4.16%
Number of Districts	585	585	588	592
District Fixed Effect	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y
Observations	274806	274806	275040	273430
Panel B: Probability of Perinatal Death				
JSY	-0.001	0.001	0.000	
	[0.001]	[0.001]	[0.001]	
JSY Intensity				0.000
				[0.001]
Dependent Var. Mean (2004-05)	.02	.02	.02	.02
Treatment Effect (%)	-3.48%	2.48%	.34%	.31%
Number of Districts	585	585	588	592
District Fixed Effect	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y
Observations	282378	282378	282619	280956

Note: This table presents our estimates of the impact of JSY on the likelihood of delivering at an institutional facility (panel A) and perinatal mortality (panel B) using three discrete definitions of treatment status in Equation 1 in columns (1)-(3) and continuous treatment in specification described in Equation A1 in columns (4). Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

Table A9: Robustness: JSY and Mis-match of risk across facilities

	Y = I{Whether Delivery at Private Facility}				
	Full Sample	Low Risk	High Risk	High Risk/Non BPL	High Risk/BPL
	(1)	(2)	(3)	(4)	(5)
Panel A: Treatment at 15% cutoff					
JSY	-0.007	-0.001	-0.014	-0.021**	-0.002
	[0.006]	[0.006]	[0.009]	[0.010]	[0.010]
Dependent Var. Mean (2004-05)	.17	.14	.18	.25	.07
Treatment Effect (%)	-4.12%	-.69%	-7.63%	-8.49%	-3.7%
Number of Districts	585	573	585	585	573
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274806	111988	162221	112898	49205
Panel B: Treatment at 20% cutoff					
JSY	-0.010*	-0.005	-0.015*	-0.023**	-0.010
	[0.006]	[0.006]	[0.008]	[0.009]	[0.009]
Dependent Var. Mean (2004-05)	.17	.14	.18	.25	.07
Treatment Effect (%)	-5.58%	-3.41%	-8.24%	-9.01%	-15.55%
Number of Districts	585	573	585	585	573
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	274806	111988	162221	112898	49205
Panel C: Treatment at 30% cutoff					
JSY	-0.015***	-0.004	-0.025***	-0.034***	-0.021**
	[0.005]	[0.005]	[0.006]	[0.007]	[0.008]
Dependent Var. Mean (2004-05)	.17	.14	.18	.25	.07
Treatment Effect (%)	-8.41%	-2.44%	-14.05%	-13.34%	-31.24%
Number of Districts	588	581	588	588	578
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	275040	112295	162319	112975	49258
Panel D: Continuous Treatment					
JSY Intensity	-0.022***	-0.015***	-0.030***	-0.027***	-0.037***
	[0.003]	[0.004]	[0.005]	[0.006]	[0.007]
Dependent Var. Mean (2004-05)	.17	.14	.18	.25	.07
Treatment Effect (%)	-12.72%	-10.23%	-16.44%	-10.9%	-54.56%
Number of Districts	592	592	592	592	585
District Fixed Effect	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y
Observations	273430	111786	161642	112334	49304

Note: This table presents our estimates of the impact of JSY on patient sorting across healthcare facilities in India using three discrete definitions of treatment status in Equation 1 in Panels A through C and continuous treatment in specification described in Equation A1 in Panel D. In column (1), we present average effect of JSY on likelihood of delivering at private facilities. Columns (2)-(3) present average effect of JSY on likelihood of delivering at private facilities for low and high-risk patients. Columns (4)-(5) present likelihood of delivering at private facilities for high-risk mothers across non-BPL and BPL mothers. *** $p < .01$, **$p < .05$, * $p < .1$

Table A10: Robustness: Effect of JSY on Congestion (capacity measure: OBGYNs)

	Y = I{Pub. Facility}		Y = I{Pvt. Facility}		Y = I{Pub. Facility}	
	Elig	Inelig	Elig	Inelig	Inelig/High Cap	Inelig/Low Cap
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Treatment at 15% cutoff						
JSY	0.066***	-0.009	-0.010	0.008	0.035	-0.016
	[0.009]	[0.012]	[0.007]	[0.013]	[0.025]	[0.018]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	37.79%	-3.54%	-6.33%	3.04%	16.02%	-7.13%
Number of Districts	584	287	584	287	64	71
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208811	65958	208811	65958	14844	17554
Panel B: Treatment at 20% cutoff						
JSY	0.065***	-0.012	-0.008	0.007	0.004	-0.022
	[0.008]	[0.010]	[0.006]	[0.010]	[0.020]	[0.017]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	37.39%	-4.77%	-5.36%	2.68%	2.07%	-9.61%
Number of Districts	584	287	584	287	64	71
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208811	65958	208811	65958	14844	17554
Panel C: Treatment at 30% cutoff						
JSY	0.054***	-0.020**	-0.010*	0.007	0.006	-0.045***
	[0.008]	[0.009]	[0.005]	[0.008]	[0.019]	[0.017]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	31.05%	-8.07%	-6.17%	2.47%	2.91%	-19.86%
Number of Districts	587	290	587	290	65	71
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208928	66075	208928	66075	14882	17557
Panel D: Continuous Treatment						
JSY Intensity	0.044***	-0.003	-0.024***	0.003	0.006	0.010
	[0.006]	[0.006]	[0.004]	[0.006]	[0.011]	[0.012]
Dependent Var. Mean (2004-05)	.17	.25	.16	.27	.22	.23
Treatment Effect (%)	24.91%	-1.18%	-15.36%	1.24%	2.84%	4.3%
Number of Districts	592	293	592	293	67	71
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	209080	64349	209080	64349	14611	17114

Note: This table presents our estimates of the impact of JSY on congestion at public healthcare facilities in India using number of obgyns per 10,000 persons as our capacity measure, and three discrete definitions of treatment status in Equation 1 in Panels A through C and continuous treatment in specification described in Equation A1 in Panel D. In columns (1)-(2), we present average effect of JSY on likelihood of delivering at public facilities for "eligible" and "ineligible" mothers. Columns (3)-(4) present average effect of JSY on likelihood of delivering at private facilities for "eligible" and "ineligible" mothers Standard errors are displayed in parentheses and are clustered at district level. Columns (5)-(6) likelihood of delivering at public facilities for "ineligible" mothers across high and low capacity districts. *** $p < .01$, ** $p < .05$, * $p < .1$

Table A11: Robustness: Effect of JSY on Congestion (capacity measure: Capacity Index)

	Y = I{Pub. Facility}		Y = I{Pvt. Facility}		Y = I{Pub. Facility}	
	Elig	Inelig	Elig	Inelig	Inelig/High Cap	Inelig/Low Cap
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Treatment at 15% cutoff						
JSY	0.066***	-0.009	-0.010	0.008	-0.001	-0.019
	[0.009]	[0.012]	[0.007]	[0.013]	[0.017]	[0.012]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	37.79%	-3.54%	-6.33%	3.04%	-.42%	-8.26%
Number of Districts	584	287	584	287	93	42
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208811	65958	208811	65958	20292	10264
Panel B: Treatment at 20% cutoff						
JSY	0.065***	-0.012	-0.008	0.007	-0.004	-0.024
	[0.008]	[0.010]	[0.006]	[0.010]	[0.015]	[0.026]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	37.39%	-4.77%	-5.36%	2.68%	-1.85%	-10.34%
Number of Districts	584	287	584	287	93	42
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208811	65958	208811	65958	20292	12110
Panel C: Treatment at 30% cutoff						
JSY	0.054***	-0.020**	-0.010*	0.007	-0.006	-0.055***
	[0.008]	[0.009]	[0.005]	[0.008]	[0.016]	[0.018]
Dependent Var. Mean (2004-05)	.17	.25	.16	.28	.22	.23
Treatment Effect (%)	31.05%	-8.07%	-6.17%	2.47%	-2.97%	-23.69%
Number of Districts	587	290	587	290	94	42
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	208928	66075	208928	66075	20330	12110
Panel D: Continuous Treatment						
JSY Intensity	0.044***	-0.003	-0.024***	0.003	0.012	0.013
	[0.006]	[0.006]	[0.004]	[0.006]	[0.011]	[0.012]
Dependent Var. Mean (2004-05)	.17	.25	.16	.27	.22	.23
Treatment Effect (%)	24.91%	-1.18%	-15.36%	1.24%	5.34%	5.74%
Number of Districts	592	293	592	293	96	42
District Fixed Effect	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y
Observations	209080	64349	209080	64349	19979	11746

Note: This table presents our estimates of the impact of JSY on congestion at public healthcare facilities in India using capacity index as our capacity measure, and three discrete definitions of treatment status in Equation 1 in Panels A through C and continuous treatment in specification described in Equation A1 in Panel D. In columns (1)-(2), we present average effect of JSY on likelihood of delivering at public facilities for "eligible" and "ineligible" mothers. Columns (3)-(4) present average effect of JSY on likelihood of delivering at private facilities for "eligible" and "ineligible" mothers Standard errors are displayed in parentheses and are clustered at district level.

Columns (5)-(6) likelihood of delivering at public facilities for "ineligible" mothers across high and low capacity districts. *** $p < .01$, $^{**}p < .05$, * $p < .1$

Table A12: Robustness: Triple Diff: Private Sector response to JSY

	Y = OOP Cost in HPS (Const INR.)			Healthcare Quality			
				Perinatal Death	Rec. ANC	Number ANC	At least 6 tests
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Treatment at 15% cutoff							
JSY × Pvt	228.690	222.570	213.359	0.000	-0.018**	0.083*	-0.024***
	[234.499]	[233.155]	[232.856]	[0.002]	[0.007]	[0.044]	[0.008]
Dependent Var. Mean (2004-05)	10669.39	10669.39	10669.39	.01	.92	5.64	.7
Treatment Effect (%)	2.14%	2.09%	2%	2.92%	-1.94%	1.48%	-3.47%
Number of Districts	211	211	211	496	496	494	496
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	Y	Y	Y	Y	Y	Y
BPL Fixed Effect	N	N	Y	Y	Y	Y	Y
Observations	33816	33810	33810	128266	128248	85590	128266
Panel B: Treatment at 20% cutoff							
JSY × Pvt	421.226*	409.787*	397.592*	0.000	-0.010	0.075*	-0.025***
	[224.703]	[224.057]	[223.572]	[0.002]	[0.007]	[0.042]	[0.007]
Dependent Var. Mean (2004-05)	10669.39	10669.39	10669.39	.01	.92	5.64	.7
Treatment Effect (%)	3.95%	3.84%	3.73%	7.27%	-1.09%	1.34%	-3.54%
Number of Districts	212	212	212	496	496	494	496
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	Y	Y	Y	Y	Y	Y
BPL Fixed Effect	N	N	Y	Y	Y	Y	Y
Observations	33821	33815	33815	128266	128248	85590	128266
Panel C: Treatment at 30% cutoff							
JSY × Pvt	583.370***	584.952***	574.918***	-0.001	-0.002	0.093**	-0.009
	[223.073]	[222.132]	[221.907]	[0.001]	[0.008]	[0.039]	[0.007]
Dependent Var. Mean (2004-05)	10669.39	10669.39	10669.39	.01	.92	5.64	.7
Treatment Effect (%)	5.47%	5.48%	5.39%	-16.62%	-.26%	1.65%	-1.26%
Number of Districts	218	218	218	497	497	496	497
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	Y	Y	Y	Y	Y	Y
BPL Fixed Effect	N	N	Y	Y	Y	Y	Y
Observations	34601	34595	34595	128279	128261	85608	128279
Panel D: Continuous Treatment							
JSY × Pvt	523.621**	521.927**	481.547**	-0.001	0.001	0.045	0.013
	[222.233]	[222.016]	[222.588]	[0.002]	[0.008]	[0.043]	[0.008]
Dependent Var. Mean (2004-05)	10757.54	10757.54	10757.54	.01	.92	5.63	.7
Treatment Effect (%)	4.87%	4.85%	4.48%	-17.9%	.07%	.8%	1.89%
Number of Districts	291	291	291	592	592	591	592
District Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Quarter Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Birth Order Fixed Effect	Y	Y	Y	Y	Y	Y	Y
Risk Deciles Fixed Effect	N	Y	Y	Y	Y	Y	Y
BPL Fixed Effect	N	N	Y	Y	Y	Y	Y
Observations	71173	71159	71159	223367	223336	161920	223367

Note: This table presents our triple difference estimates of the impact of JSY on out-of-pocket costs (in Const. INR) at HPS and healthcare quality at private facilities using three discrete definitions of treatment status in Equation 1 in Panels A through C and continuous treatment using specification described in Equation A2 in Panel D. The third difference is taken against the home option. In columns (1)-(3), we present average effect of JSY on out-of-pocket costs increasingly and flexibly controlling for risk and SES status. Columns (4)-(7) present triple difference results on healthcare quality at private facilities. Standard errors are displayed in parentheses and are clustered at district level. *** $p < .01$, ** $p < .05$, * $p < .1$

B Robustness of reduced-form results

This appendix presents evidence on robustness of our main results to alternate definitions of important variables in our analysis. As discussed in subsection 3.2, we used somewhat arbitrary definitions of a district's treatment status under JSY and a measure of district's pre-existing public capacity.

We present robustness results using two kinds of alternate definitions for a district's treatment status under JSY. First, we define three alternate discrete treatment variables for JSY using cutoff values of 15%, 20% and 30%.[30] And second, we define a continuous variable *JSY intensity* as our measure of treatment for a district and is defined as the proportion of all eligible women delivering in public facilities in a district-year who reported receiving government cash assistance. Zero intensity implies that there were no JSY recipients in that district-year, while an intensity of one means that all eligible women who gave birth in a government facility in that district-year were beneficiaries of the policy.

We run the regression specification as in Equation 1 for the three discrete treatment variables and we run the following two-way fixed effects regression specification using the continuous measure, *JSY Intensity*:

$$Y_{ibdt} = \alpha_d + \beta_b + \gamma_t + \tau . JSY Intensity_{dt} + \epsilon_{ibdt} \tag{A1}$$

Here, Y_{ibdt} represents the outcome variable of interest that varies at the level of an individual i, birth order b, district d and quarter of birth t. α_d and γ_t represent district and quarter of birth fixed effects respectively. Since our data only has detailed information for a mother's last birth, we also include a birth order fixed effect, represented by β_b, to account for unobservables specific to the birth order. $JSY Intensity_{dt}$ is a continuous measure that captures roll-out of JSY in Indian districts over quarters after its announcement. τ captures our targeted treatment effect of JSY that does not vary by individual and quarter. Finally, ϵ_{ibdt}

[30] For instance, at the cut-off value of 15%, a district is said to be treated if two conditions are met: at least 15% of eligible women must report receiving financial assistance in the given quarter and the same fraction of women must report receiving financial assistance over the following year.

captures idiosyncratic error that satisfies: $E[\epsilon_{ibdt}|\alpha_d, \beta_b, \gamma_t, JSYIntensity_{dt}] = 0$. We cluster standard errors at the district level, our unit of treatment.

It should be noted that this specification suffers from consequences of ignoring treatment effect heterogeneity as highlighted by (Borusyak, Jaravel, and Spiess 2022; De Chaisemartin and d'Haultfoeuille 2020; Sun and Abraham 2021). Nevertheless, this demonstrates that our results hold under the previously conventional difference-in-difference methods.

We also present robustness of our results to an alternate definition of pre-JSY district level public hospital capacity. We use a measure of public facility capacity index created using first principal components of the three capacity variables observed in our data (OBGYNs, nurses and beds), each normalized by 10,000 persons. Table A3 presents the first principal components from this analysis.

B.1 Effect of JSY on Institutional Births and Mortality

Table A8 presents our results on the effect of JSY on likelihood of institutional delivery and perinatal mortality. Consistent with our main results, we find that JSY significantly increased the likelihood of institutional births across our four definitions of treatment (see Panel A in Table A8). Panel A in Table A8 shows that JSY did not have a significant effect on perinatal mortality.

B.2 Effect of JSY on mismatch of patient risk across Facilities

Table A9 presents robustness results for our finding that JSY led to a mismatch in patient risk across health facilities in India across our four definitions of treatment in panels A through D. Specifically, we show that as a result of JSY, high-risk patients were less likely to deliver at the highest quality (private sector) facilities in India. Columns (2)-(3) in Table A9 across panels A through D show that JSY induced high-risk mothers to switch out of private facilities.

B.3 Effect of JSY on Congestion at Public Facilities

First, we present robustness of our replication of the result in Andrew and Vera-Hernández (2022) that high-risk mothers experienced an increase in likelihood of perinatal death in low public capacity districts. We show, in Figure A10, that our results hold across the four discrete definitions of treatment under JSY including our original definition in subsection 3.2.

Table A10 presents robustness results for our finding that high SES "ineligible" mothers adapted to deteriorating healthcare capacity by moving away from public facilities in low capacity districts to private facilities. Panels A through C of Table A10 presents our results using the three alternate discrete measures of a district's treatment status using number of OBGYNs per 10,000 persons as a measure for public sector capacity. Panel D presents evidence of adaptation behavior by "ineligible" mothers using the continuous measure of *JSY Intensity*.

Table A11 replicates these results using a capacity index generated using principle components on three variables on public sector capacity in our data namely OBGYNs per 10,000 persons, nurses per 10,000 persons and beds per 10,000 persons. We find that our results are consistent across the two measures. We also find that our results remain stable across panels A through D.

B.4 Private Facility response to JSY

In our robustness tests, we again present robustness results for our three alternate discrete definitions of treatment under JSY (using 15%, 20% and 30% as cut-offs) and our continuous variable *JSY intensity* as our measure of treatment for a district. We present triple difference results as in our main results with the third difference taken against the home option, the outside option. For our continuous treatment measure, we run the following triple difference regression specification, with the third difference taken against the home option:

$$Y_{ibdt} = \alpha_d + \beta_b + \gamma_t + \beta_1.JSY\,Intensity_{dt} + \beta_2.\mathbb{1}Pvt.Dvy._{dt} + \beta_3.\mathbb{1}Pub.Dvy._{dt} \tag{A2}$$

$$+\beta_4.JSY\,Intensity_{dt} \times \mathbb{1}Pvt.Dvy._{dt} + \beta_5.JSY\,Intensity_{dt} \times \mathbb{1}Pub.Dvy._{dt} + \epsilon_{ibdt} \tag{A3}$$

Here, Y_{ibdt} represents the outcome variable of interest that varies at the level of an individual i, birth order b, district d and quarter of birth t. α_d and γ_t represent district and quarter of birth fixed effects respectively. We also include a birth order fixed effect, represented by β_b, to account for un-observables specific to the birth order. $JSYIntensity_{dt}$ is a continuous measure that captures roll-out of JSY in Indian districts over quarters after its announcement. β_4 captures our targeted triple difference treatment effect of JSY for outcomes at private facilities and does not vary by individual and quarter. We cluster standard errors at the district level, our unit of treatment.

Panels A through D in Table A12 present our triple difference estimates. Columns (1)-(3) present the treatment effect of JSY on out-of-pocket costs (in Const. INR) at private facilities in high-performing states increasingly and flexibly controlling for risk deciles and BPL status. We find that JSY significantly increased out-of-pocket costs (prices) at private facilities. Columns (4)-(7) present the effect of JSY on a number of measures of healthcare quality at private facilities. We find that JSY did not affect the likelihood of perinatal mortality at private facilities.

C Price increasing effects of public competition

In this appendix, we provide a theoretical basis for our finding that prices at private healthcare facilities in India increased as a response to increased competition from public facilities due to a substantial subsidy for eligible mothers. Chen and Riordan (2008) provides conditions under which increased market competition from an entrant can lead to an increase in incumbent's prices. While there is no entry in our context, the same forces are likely present in our case.

C.1 Theory

We adopt the exposition from Atal et al. (2022). Consider a population of consumers of size one choosing which healthcare facility to access: private facilities (H), public facilities (G) and home (outside option, O). Consumer's utility is for each choice is given by:

$$u_{ic} = \begin{cases} v_{iH} - p_H & \text{c=H} \\ v_{iG} - p_G & \text{c=G} \\ 0 & \text{c=O} \end{cases}$$

where v_{ic} is the value of option c for consumer i and p_c is the price they pay for their choice. The option value follows a joint differentiable distribution $H(v)$. Consumers make a discrete choice over their three options and choose the one that provides them highest utility. The probability that consumer i chooses c is:

$$s_{ic} = Pr(u_{ic} \geq u_{ik} \; for \; each \; k)$$

Integrating this probability over the distribution of valuations gives us market shares for each option c: s_c.

Given these preferences, private suppliers choose prices p_H to maximize $\pi_H = s_H(p_H - c_H)$. Public facilities on the other hand charge a low administratively set price p_G. Under JSY, the prices at public facilities are lowered exogenously to $p_G^{'}$. We want to understand the conditions under which this fall in competitor's (public facilities) price induces a price increase by private facilities.

Chen and Riordan (2008) show that private facilities' price response depends on two counteracting forces. While a loss of market share puts a downward pressure on private facilities' price, more inelastic residual demand induces upward pressure on prices. More formally, let $F(v_H)$ be the marginal distribution of valuation of the private option and let $G(v_G|v_H)$ be the conditional distribution of valuation for the public option conditional on valuation of the private option. Given these definitions, Chen and Riordan (2008) show that the incumbent's price increases if and only if the following condition holds:

$$\int_{p_H}^{\infty} [G(v|v) - G(p_H|v)] f(v) dv \leq (p_H - c_H) \int_{p_H}^{\infty} [g(p_H|v) - g(v|v)] f(v) dv$$

On the left, this condition captures the *market share effect* where the greater market share that private facilities lose, greater is their incentve to lower prices. The right side of this inequality captures the *price sensitivity effect* - the steeper the residual demand curve for private facilities after JSY (more inelastic residual demand), larger is the incentive for them to raise prices.

C.2 Discussion

Our results on private sector's price response in subsubsection 5.2.3 are consistent with *price sensitivity effect* dominating the *market share effect* in high-performing states.

In subsubsection 5.2.3, we established that private facilities increased their price as a response to a reduction in prices at public facilities induced by JSY without an accompanied improvement in quality at private facilities. Moreover, we found that the increase in price was largely driven by private hospitals in high-performing states where high SES mothers were not offered incentives under JSY. We posit that complete coverage of JSY in low-performing states resulted in a dominant *market share effect* that put downward pressure on prices whereas incentivizing only low SES mothers in high-performing states led to a dominant *price sensitivity effect*.