Equilibrium Effects of Incentivizing Public Services*

Utkarsh Kumar† Parijat Lal‡

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Abstract

We study the equilibrium effects of subsidizing public services in the presence of vertically differentiated public and private suppliers by evaluating one of India's largest welfare schemes, the 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, and 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 into lower-quality public facilities. Second, only wealthier mothers sorted out of public facilities into more expensive private facilities in response to congestion and deteriorating care at public hospitals. Third, private hospitals increased prices without improvements in healthcare quality in states where eligibility was not universal, further crowding out higher-risk and poorer mothers. These findings point to the need for complementary public policies in addition to a subsidy like JSY.

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†Amazon. Email: uk2154@columbia.edu

‡Columbia Business School. Email: pl2700@columbia.edu

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. In theory, subsidies for the public option can discipline the market by restricting private suppliers' market power. However, they can also induce distortions in demand by incentivizing take-up of lower-quality services. We offer an empirical investigation of these claims in the context of India's maternal healthcare system, which features private providers, along with a lower-quality public option.

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 inadequate healthcare expertise and infrastructure. Concurrently, India accounted for almost a third of all neonatal deaths and a fifth of all maternal deaths around the world 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). In this context, 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 even though mothers sorted from home to institutional facilities, perinatal mortality did not decline, with congestion at public facilities partly explaining this puzzle (Powell-Jackson, Mazumdar, and Mills 2015; Andrew and Vera-Hernández 2022).

In this paper, we aim to offer a more holistic picture of the equilibrium interactions between the public and private sectors that contributed to the disappointing impact of JSY

in reducing perinatal mortality. To do this, we build on and extend findings from previous work to a larger sample of mothers across India. In our main analysis unpacking JSY, we first show that high-risk mothers sorted out of the highest-quality care at private facilities and into lower-quality public facilities. Second, as congestion led to deterioration of care at public hospitals, only mothers with high socioeconomic status adapted by sorting out of congested public facilities into more expensive private facilities. Finally, JSY led to an increase in prices at private facilities in a specific subset of states without improvements in healthcare quality, further restricting access to the highest-quality facilities.

JSY had two main components. First, pregnant women were offered significant cash incentives to deliver at a public healthcare facility. Second, the government appointed personnel in each village to assist pregnant women with various stages of motherhood. These Accredited Social Health Activists (ASHAs) 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 as low-performing states (LPS), while the remaining were considered 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 this 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 answer our research question empirically. First, this policy provided a large stimulus to demand in a market with vertically differentiated public and private suppliers, affecting market equilibrium in the process. Second, because JSY was a flagship policy under the government's larger healthcare agenda, special efforts were made to collect data on household choices, out-of-pocket costs, health infrastructure, and health outcomes in this context.

The data for this study come from three rounds of India's District-Level Household Survey (DLHS). This nationally representative dataset contains detailed retrospective information

on the most recent childbirth for each woman in the household.[1] This includes 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 socioeconomic status. Importantly, the survey also asked women several questions about previous pregnancies (for example, previous birthing complications, still-births, and fertility), which helps us assess 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 socioeconomic status and ex-ante risk level. We infer prices using 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), allowing 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. On average, private facilities provide higher quality care for childbirth 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, the likelihood of perinatal mortality is lowest at private facilities, (ii) more educated and richer mothers are more likely to deliver at private facilities than at 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. Median out-of-pocket costs for deliveries at private facilities are approximately four times larger than those at public facilities.

To study the causal effects of JSY, we use a staggered difference-in-differences research design exploiting 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 with JSY, the standard two-way fixed effects model may suffer from multi-collinearity and negative weighting.[2] and negative weighting. We therefore use the imputation method recommended by Borusyak,

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

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

Jaravel, and Spiess (2022) as our primary specification. The identification assumption behind our results is the parallel trends assumption, i.e., that 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 more comprehensive sample including rural and 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 birth is a sizable 8% increase in treated districts relative to untreated districts in quarters right after the policy was rolled out. Over the two years following the arrival of JSY in a district, the effect size grows to 27%. JSY was effective at targeting, as poorer mothers were more likely to receive JSY incentives. We also show suggestive evidence that JSY achieved higher rates of institutional births not only by reducing costs but also by relaxing norms and information frictions around 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, but is in line with previous studies of JSY. 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 this result. First, we show that JSY led to a mismatch of patient risk across facilities. From the perspective of reducing mortality, the ideal sorting would involve higher-risk patients getting treated at the highest-quality facilities (private facilities in this context). Although JSY resulted in fewer deliveries at home, we find that financial incentives under JSY diverted high-risk mothers away from private facilities into public facilities. While mothers saved money, they increased the risk of mortality by moving away from private facilities. Strikingly, we find that the primary targets of JSY, poor and high-risk mothers, experienced a 19% decline in the likelihood of delivering at a private facility.

Second, we show that only richer mothers adapted to congestion at public facilities by sorting into costlier private facilities. Specifically, in districts with low public sector capac-

ity, richer women (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 the work of Andrew and Vera-Hernández (2022), which documents that congestion from increased demand due to JSY resulted in an increase in perinatal mortality among mothers in districts with below median public sector capacity. We confirm their results using the entire population of mothers as opposed to a select sample of rural patients in low-performing states. In addition, we show that JSY reduced the quality of healthcare inputs (as measured by ante-natal checkups) received by patients in districts with lower public sector capacity.

Finally, we show that private facilities responded to increased competition from public facilities by increasing prices (as measured by out-of-pocket costs) without delivering improvements in quality (as measured by the likelihood of perinatal mortality). This further restricted access to higher quality healthcare in this setting. An important econometric challenge with this analysis is that JSY changed patient characteristics across births at public facilities, private facilities, and home. We present our results using a range of specifications flexibly controlling for patients' ex-ante risk and socioeconomic status. 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 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 framework provided by Chen and Riordan (2008), we find that the increase in price was likely a result of the *price sensitivity effect* (steeper residual demand) dominating the *market share effect* (downward pressure on prices from loss of market share). Prices increased by a statistically significant 4.6% in high-performing states, where women from high socioeconomic groups were not eligible for JSY benefits. As a result, the incentive to lower prices due to loss in market share was weaker in these states. Crucially, we find that prices also increased by 3.72% for mothers from lower socioeconomic groups (*below poverty line*, abbreviated as BPL).[3]

[3]This was despite the ability to price discriminate based on mothers' socio-economic status. Our data suggests

Price increases may 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 measured by perinatal mortality, despite now facing a less risky patient pool. Another possibility is that private facilities improved amenities. We find that the increase in prices at private facilities is at least partly driven by an increase in the rate of C-sections, even for BPL mothers. While we cannot rule out the possibility that this increase is demand driven, the reported costs for the procedure suggest that 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 policymakers must consider equilibrium responses while designing large-scale public policies. Although JSY was one of India's largest schemes 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. Higher-risk patients moved from higher-quality private facilities to congested public facilities, while the design of JSY led to an increase in prices at private facilities in a subset of states, 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 healthcare for India's poor, potentially via targeted vouchers.

Our paper contributes to several strands of the 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 the scheme adversely affected the quality of care received would have been of little value to understanding 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 by studying healthcare

BPL mothers pay 16% lower average prices at private facilities than non-BPL mothers.

services in markets where public and private suppliers co-exist and are vertically differentiated.

Second, we contribute to research on healthcare quality in low-income countries. Previous research has emphasized the supply side of healthcare quality. Das et al. (2016) show how the quality of healthcare varies across public and informal private providers in rural India. Studying the same scheme, Andrew and Vera-Hernández (2022) highlight the role of congestion due to limited public sector capacity in deteriorating healthcare quality. Mohanan et al. (2021) study how input- versus output-based incentives for care providers affect patient outcomes when there is heterogeneity in doctors' skill levels. We contribute to this work by incorporating the demand-side and exploring the role of subsidies for accessing high-quality care. Our finding that JSY led to higher-risk and poorer mothers moving away from higher-quality private 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. In work complementing this focus on the demand-side, Dupas and Jain (2023) show that patient-driven accountability can improve public service delivery in the context of health insurance.

A third relevant strand of literature concerns the competitive effects of publicly provided goods and services. Recent empirical work has explored the consequences of market entry by 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. In related work, Cunha, De Giorgi, and Jayachandran (2019) show that entry of public suppliers in the form of in-kind transfers reduced market prices for food. On the other hand, Atal et al. (2022) study the competitive effects of public entry in the market for pharmaceuticals and show that low-quality government providers led to segmentation, 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. We find that prices at private facilities in certain states increased as a result of increased competition from the public sector. In our setting, the private price

response is mediated by the extent to which the subsidy applied to the local market, which is consistent with the theoretical predictions in Chen and Riordan (2008).

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. The public sector provides two levels of care at low, administratively-set prices (Almeida et al. 2017). In the primary public healthcare system, basic health services are provided 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 of better quality but more remote. Both levels of the public system suffer from a lack of capacity.[4]

The private sector is largely unregulated and characterized by healthcare practitioners who run for-profit health facilities. Private facilities are mostly situated in urban areas and are more remote than PHCs, but less remote relative to secondary public healthcare facilities (CHCs and DHs). They 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 information on patient-facility interaction as reported by mothers to shed light on the economics of India's private healthcare system.[5]

[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.

Several statistics in our data suggest that private facilities provide higher-quality care than public facilities on average.[6]

During the time period explored in this study, take-up of health insurance was extremely low in 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 significant out-of-pocket costs. Accessing any institutional facility (public or private) required incurring additional expenses on transport, lodging, and other indirect healthcare costs while navigating a difficult problem of matching with ideal health facilities.

Beyond financial concerns, features of the Indian society prevented pregnant mothers from accessing institutional healthcare. Figure 1 presents reasons reported by mothers for not going to a health facility prior to the implementation of 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 also important reasons for delivering at home. 'Supply-side' reasons for delivering at home included mothers reporting poor quality of care at health facilities, distance, and inadequate infrastructure at government facilities, including the lack of doctors or beds. As a result, India suffered from a high fatality rate among mothers and newborns. Data from the World Bank 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) Scheme

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

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

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" was one of the flagship NRHM initiatives launched in April 2005.

The main objective of JSY was to reduce maternal and newborn mortality by incentivizing institutional births. The implementation of JSY had two main components. First, eligible mothers were offered a substantial cash transfer conditional on delivering at public facilities.[9] Second, the government appointed and incentivized Accredited Social Health Activists (ASHAs) 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

[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/7861979062147487 2646.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.

after these criteria were met, the benefits in HPS could only be received by mothers for their first two live births. Figure 2 shows fractions 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. 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.

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, respectively.[13], respectively. In each round, women were surveyed about their overall birth history but detailed information was collected only for 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 the birth (whether live, still-birth or induced/spontaneous abortion), birth order, year and month of delivery, place of birth[14] (whether a public facility, private facility, or home), whether the

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

[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.

mother received JSY cash, and the type of procedure (vaginal or cesarean section).We also have information on the quality of ante-natal (ANC) and post-natal care, pre- and post-labor complications, and whether a child was alive or dead at the time of the survey. Additionally, we observe socioeconomic and demographic information, including 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 (INR) using IMF's consumer price index data. Our main measure of socioeconomic status is whether a mother possessed a below poverty line (BPL) card.[15].

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 given in the 2001 census of India. Districts in DLHS 2 were found to be exactly the same as those in the 2001 census of India. We 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 also 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. This includes the number of beds, nursing staff members, and doctors present in government health facilities at the district level in DLHS rounds 2 and 3 for a subset of the sample. We normalize these measures of capacity using district-level populations from the 2001 and 2011

[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.

censuses, interpolating population for years corresponding to DLHS 2 (2002) and DLHS 3 (2008). Each of our three capacity variables are expressed as rates per 10,000 persons in the district.

Table 2 presents descriptive information on our final sample. Three elements are worth noting. First, public capacity is severely lacking. The median district in our sample has 16.5 beds, 0.1 OBGYNs, and only 2.1 nursing staff members per 100,000 persons. Second, average out-of-pocket cost at private facilities are about four times larger than costs at public facilities, and almost 12 times larger than the costs of delivering at home. Third, for the median district, district hospitals (representing the highest level of public sector care) are twice as far as the nearest private facility. This is important because Acharya and McNamee (2009) show that a nontrivial 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 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 in which a district is treated with JSY if the following criteria are met: (i) at least 25% of eligible[16] women delivering in public hospitals in that quarter must report receiving financial assistance for their delivery, and (ii) the same fraction of women

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

must report receiving financial assistance over the following year.[17] We include the latter requirement in order to avoid falsely assigning treatment status to a district due to likely sampling errors. Once a district-quarter meets this criteria, we consider that district treated under JSY for all following quarters, so 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 in a staggered fashion as necessary personnel and public frameworks were put in place. Our measure considers the roll-out of JSY as reported by recipients and is not affected by incentives at the administrative level to inflate measures. Second, this classification provides us a discrete treatment status that allows for clean comparisons of treated and untreated districts over time (Borusyak, Jaravel, and Spiess 2022; De Chaisemartin and d'Haultfoeuille 2020; Sun and Abraham 2021). shows differences in characteristics between districts that were treated early (among the first 50% of districts to be treated) and districts that were treated later. The statistics are largely balanced, with some evidence that districts with lower levels of education and higher levels of poverty were treated earlier.

We test the robustness of our definition by: (i) redefining treatment status using different cut-offs (15%, 20%, and 30%) and (ii) defining a continuous treatment variable, following Powell-Jackson, Mazumdar, and Mills (2015), that captures 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 set the intensity measure to zero prior to the launch of JSY in 2005.

Figure A2 presents a visualization of the rollout of JSY across Indian districts using our continuous intensity variable. Reassuringly, we find that our two treatment measures are very strongly correlated.

[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.

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 according to the Indian Public Health Standards (IPHS) of public hospital capacity across all three 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 measures of capacity to the number of beds, doctors, and nursing staff members at secondary healthcare facilities, normalized by 10,000 persons.

Our primary measure of pre-JSY public healthcare capacity in a district is the number of obstetricians and 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 facilities lack medical experts: the median district has 0.1 OBGYNs for every 100,000 persons. Second, the lack of medical expertise at public hospitals is a highly cited reason for the poor quality of public hospitals.[18]. Third, Pandey and Sharma (2017) show that increasing experts at India's public facilities has been exceptionally difficult. Between 2005-2010, while the number of CHCs (secondary-level public healthcare facilities) increased by 35%, the number of OBGYNs at public facilities increased by just 2.7%. Reassuringly, all three of our capacity variables 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's capacity value is above (or below) the median reported in DLHS 2. Balance Table A2 presents evidence on the balance of observables across low capacity and high capacity districts. We see that high capacity districts have higher overall rates of institutional births (higher rates of public facility births, along with lower rates of private facility and home births). Public facilities in high capacity districts also offer both a higher quantity (as measured by whether mother received at least 3 ANC tests) and quality (whether at least 6 out of 8 tests were conducted

[18] See, for example https://www.indiaspend.com/83-shortage-of-specialists-in-community-health-centres-26127/

during ANC) of health inputs than low-capacity districts.

For robustness checks, we use all three variables of capacity to create a district-level capacity index. Table A3 presents factor loadings from the principle component analysis for this exercise.

Finally, we show evidence using our defined JSY treatment variable that there was no differential increase in public capacity for treated versus 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 rolled out the scheme without investing in commensurate healthcare capacity.

Ex-ante risk level

The presence of various healthcare facilities offering differing quality of care makes it likely that patients will sort into different facilities. An important factor to consider in our context is a mother's ex-ante level of medical risk, which corresponds to the likelihood of her newborn facing adverse health outcomes and the need for quality institutional care. 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 variables, including pre-labor complications[19], history of complications in previous deliveries[20], as well as age group dummies and the birth-order of the reported 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 the results of this exercise. For our regression analysis, we define a high-risk patient as one with above median predicted mortality risk.

[19]For example, swelling, paleness, visual disturbances, fatigue, convulsions, and abnormal position of child.
[20]For example, previous abortions or still-births.

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 socioeconomic status (as captured by whether a mother is from a household below the poverty line, or BPL) and ex-ante risk level (whether a mother is above or below the median level of risk). This gives us 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. 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 socioeconomic 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.

Fact 2: Average quality of care is higher at institutions 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. The home option is the omitted category. Columns (1)-(3) show that when controlling for pre-determined risk, the likelihood of perinatal mortality is lowest at private 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 the average quality of treatment is highest at private facilities.[22] This is in line with the findings from Das et al. (2016). Table 4

[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.

[22] Unfortunately, we do not have healthcare quality indicators at individual hospitals therefore, we conduct

presents raw statistics from our sample that capture patient sorting across facilities. First, richer, urban, and highly educated households prefer private facilities the most, followed by public facilities and delivering at home. Second, the 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 facilities, followed by public facilities and home.

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

4 Econometric Specification

The roll-out of JSY across Indian districts 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 ordinary least squares (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 the cumulative

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.

density of treated districts over time. We see that by 2009, all districts in our sample were treated with JSY.

Therefore, 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 a mother 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. 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. Finally, ϵ_{ibdt} captures idiosyncratic error. We cluster standard errors at the district level, which is the level at which treatment varies.

We construct the 'imputation estimator' in three steps. First, we estimate Equation 1 using OLS on the untreated sample, or those with $JSY_{dt} = 0$. This gives us the estimates of expected counterfactual outcomes 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 specific 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.

Our results rely on the parallel trends assumption: absent JSY, treated and un-treated districts would have the same trends in outcome variables. We provide support for this assumption by testing pre-trends. Specifically, 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 turn on for districts h periods after treatment. 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 presenting evidence on the 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 a value of 1 if mother i delivered at an institutional facility (either public or private), $Y_{ibdt} = 1$[Institutional Delivery] as our dependent variable in Equation 1. In Table 5, we present the average treatment effect of JSY. We find that JSY led to an 8.1% increase in the probability of delivering at a medical facility (Column 1 in Panel A of Table Table 5).

Figure 7 shows the 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 over time and by the end of two years, mothers in treated districts were nearly 10 percentage points more likely to deliver at an institutional facility relative to mothers in yet-to-be-treated districts 27% higher relative to pre-JSY levels). 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 samples to rural mothers. 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. Figure A4 presents results from difference-in-differences regressions using reported reasons for not seeking institutional care as dependent variables on the JSY treatment for the sample of mothers who 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 of lower socioeconomic 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 the reported OOP costs in constant INR as our dependent variable. Intuitively, the effect of JSY on OOP costs depends on the overall sorting of patients across our three groups of places for delivery. Our descriptive statistics in Table 2 showed that, on average,

private facilities charged the highest prices. Moving from home to a public facility would, on average, imply higher net prices. On the other hand, switching from private facilities to public facilities would imply lower prices, especially 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 the null result. Moreover, 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).

Overall, our results suggest that while JSY was effective in targeting and inducing pregnant mothers to take-up institutional healthcare, it did not lower the incidence of perinatal mortality. Table A5 shows that likelihood of perinatal mortality is lower for institutional births despite higher levels of patient risk on average. 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 to JSY

Given that JSY was one of the Indian government's largest public health schemes in recent decades, its muted impact presents a policy conundrum for policymakers. This puzzle has been identified by previous studies, and our contribution is to highlight the explanatory role of interactions between both public and private providers in this context. As such, we propose three equilibrium responses that contribute to the overall effect of JSY. We show that JSY: (1) resulted in a mismatch of patient risk across facilities, (2) created congestion and deterioration of care at public facilities (Andrew and Vera-Hernández (2022)), with only richer mothers being able to sort 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

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

accessible.

5.2.1 JSY resulted in mismatch of risk across facilities

From the perspective of improving health outcomes, an ideal match would involve higher risk patients getting treated at higher-quality facilities. We find evidence that financial incentives under JSY diverted high-risk mothers from private facilities (higher-quality care) to public facilities (lower-quality care). In our exposition, we use three dummy variables take a value of 1 if mother i delivered at the relevant place. In this context, patients necessarily substitute from one choice to another, and so our results should be interpreted as relative changes in equilibrium choices.

We begin by presenting the impact of JSY on patient sorting across private facilities, public facilities, and home (see Figure 11). We find that as a result of JSY, public facilities gained market share at the expense of both private facilities and home births. Public facilities received a net increase in market share of 22% over the pre-reform baseline of 18% (see column (1) of Table 6). The market share of home births and private facilities fell by 4.5% and 6.7%, respectively, over baseline shares of 64% and 17% (see column (1) of Table 6).

Our interpretation of this finding is that while moving out of home births improves health-care quality on average, a significant fraction of mothers also moved out of private facilities which provide the highest-quality of care in this context. Next, we explore the characteristics of patients that sorted out of private facilities due to JSY. Intuitively, if only low-risk mothers who did not require high-quality services sorted out of private facilities, this reallocation may not adversely affect health outcomes. However, upon splitting our sample between high- and low-risk mothers, we find that the decline in private facility births was driven by high-risk mothers.

Finally, we explore the socioeconomic characteristics of high-risk patients that switched out of private facilities. Column (2) in Table 7 shows that high-risk mothers from BPL households were most likely (nearly 19% over baseline mean) to move out of private facilities. This suggests that the intended targets of JSY, poorer and high-risk mothers, may have lost out on higher-quality private healthcare.

One caveat in this discussion of quality is that private sector healthcare quality varies wildly across facilities (Das et al. 2016), even though they are of the highest quality on average. We cannot confirm that the facilities accessed by BPL mothers indeed provided better quality than the public facilities they moved to in response to JSY. One reassuring fact is that the private facilities chosen by BPL mothers were much more expensive than public facilities. Given the substantially higher costs at private facilities, this suggests an intent to find higher-quality alternatives to public facilities (see Figure 5).

5.2.2 JSY caused congestion at public facilities

Next, we build on previous work showing that the quality of treatment at public facilities deteriorated as a result of congestion from JSY. To do this, we rely on revealed preferences inferred from mothers' sorting behavior. Andrew and Vera-Hernández (2022) specifically highlight the role of congestion at public hospitals 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 and extends the findings from this paper. First, we replicate their evidence of congestion, as measured by declining healthcare quality, using the entire available population, as opposed to a select sample of rural patients in LPS. Second, we show that in districts with lower public sector capacity, richer mothers were able to adapt to worsening public sector quality by sorting into more expensive private facilities.

We start by showing that public sector capacity was consequential for the impact of JSY on institutional births. Figure 13 shows that JSY led to a higher increase in institutional births in high capacity districts relative to low capacity districts. Columns (1)-(2) of Table 8 present average treatment effects. Here, 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 perinatal mortality for the high-risk mothers across low and high public capacity districts. We see that high-risk mothers in low capacity districts experienced a statistically significant increase in the likelihood of perina-

tal 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 lower levels 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 for whether a mother received at least 6 out of 8 tests 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 for more expensive private facilities. We begin by pointing out evidence suggesting that sorting across facilities reflects mothers (the demand-side) weighing the trade-offs between perceived quality (or utility) of treatment at a given facility and the cost, rather than a supply-side phenomenon whereby 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, qualitative evidence shows that patients often wait in long lines at public facilities, but are not refused treatment.

To present clean results on the adaptive behavior 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 received incentives under JSY in low-performing states, whereas non-BPL "ineligible" mothers in HPS did not. 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 "ineligible" mothers by 7.5% (columns (1)-(2) of Table 10 and panels (a)-(b) in Figure 14). Second, a 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 suggests that ineligible mothers experienced some form of disutility from delivering at public facilities post JSY in districts with low public sector

capacity. This *crowding-out* could either imply a behavioral response to JSY by "ineligible" mothers[25] 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.

5.2.3 JSY resulted in higher prices at private facilities

Next, we evaluate the private sector's response to JSY. The 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, private hospitals account for a large fraction of OBGYNs and maternity beds in India.[26]

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 health inputs received by mothers. One important challenge with this analysis is that JSY changed patient characteristics across facilities. Delivery of the same (medical) services can vary across patients and make patient-patient comparisons difficult in the presence of selection. To overcome selection concerns, we present regression results for a range of specifications flexibly controlling for ex-ante patient risk and socioeconomic status. Moreover, we augment our main difference-in-differences specification 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. 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 by 18% on average. This finding is confirmed in our event studies shown in panel (b) in Figure 17.

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

[26] 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.

Our results on consumer sorting from showed that incentives under JSY reduced demand for private facilities. Taken together, these findings suggest that private hospitals faced significant competitive pressure from public facilities. If this increase in competitive pressure lowered private sector prices while maintaining their quality of treatment, JSY may have indirectly improved access to high-quality care. However, 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 this price response to JSY, we present event studies of our triple difference estimates in panel (a) in Figure 17. We find a price decline in the initial two quarters after the roll-out of JSY (6%), but a sharp reversion and increase in prices thereafter.

Next, we test whether JSY affected the quality of care 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. This result is interesting in light of our finding that JSY led to a disproportionate level of high-risk patients leaving the private option.[27] We further probe changes in healthcare inputs (quantity and quality of ANC checkups) received by mothers at private facilities in columns (4)-(6) in Table 12. We find mixed evidence: while the average 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 may explain this increase in private sector prices. 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 phenomenon is consistent with our findings. Two features of JSY can give rise

[27]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.

to the *price sensitivity effect* dominating. First, variation in the eligibility for incentives across markets can curb the elasticity of demand. Specifically, the fact that certain mothers in high-performing states were not offered cash incentives makes this ineligible group less likely to switch. Second, congestion at public facilities may have further depressed sorting out of private options.

While we cannot reject the hypothesis of similar price changes in low capacity districts compared to high capacity ones (see columns (1)-(2) of Table 13 and Figure 18), we find that the increase in prices 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. [28]. As far as providing access to high-quality healthcare is concerned, this pattern may have further deterred poorer women from accessing private facilities in HPS.

Prices at private facilities could increase as a result of improvements in amenities. In Table 14, we show that the increase in costs at private facilities is at least partly driven by an increase in C-sections, even for BPL mothers. Our data suggests that, while possible, this increase is unlikely to be driven by demand from mothers, as opposed to medical necessity or excessive prescriptions by providers: BPL mothers have to spend approximately 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 an improvement in healthcare quality. This ultimately reduced welfare for mothers choosing the private option, while also deterring access to the highest-quality of care.

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

5.3 Robustness

Appendix B presents extensive evidence that our main results are robust to several alternate definitions of a district's treatment status and public sector capacity. For treatment status, we use two kinds of alternate definitions: (i) we vary the cutoff values used to define the discrete JSY treatment (15%, 20% and 30%) and (ii) we construct a continuous variable called JSY Intensity (following Powell-Jackson, Mazumdar, and Mills (2015)), which is defined as the fraction of all *eligible* mothers who reported receiving government assistance under JSY. For public sector capacity, we use a continuous capacity index created using first principal components of the three relevant variables 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 that the results for our three equilibrium mechanisms are also robust.

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, the Janani Suraksha Yojana (JSY), which offered subsidies to pregnant women in India to deliver at public facilities, with a goal of lowering maternal and perinatal mortality by reducing home births. Using the staggered roll-out of JSY across Indian districts, we confirm previous 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) in response to JSY, the scheme was unable to lower perinatal mortality.

Given the scale of JSY, these findings poses a conundrum for Indian policymakers. This paper highlights the role of interactions between public and private suppliers in shaping important outcomes and improving our understanding of effectively designing public policies at scale. We provide evidence on three equilibrium responses that contributed to the disappointing impact of JSY. First, we show that JSY resulted in a mismatch between patient risk and healthcare facilities. We use several statistics in our data to argue that private facilities

offered the highest-quality of care on average, and that JSY induced high-risk mothers to sort away from these facilities.

Second, we show that public sector healthcare capacity was not increased commensurately along with the roll-out of JSY. This resulted in lower healthcare quality due to congestion at public facilities. We complement Andrew and Vera-Hernández (2022). by replicating their findings that perinatal mortality increased in districts with low public capacity using a larger sample. We also show that mothers ineligible for JSY in high-performing states adapted to this worsening quality of care at public facilities by moving towards private options. We argue that this is revealed-preference evidence supporting deteriorating public sector quality.

Finally, despite increased competition from public facilities, private facilities increased prices without any evidence of improvement in their quality of care. This further reduced access to higher-quality healthcare for mothers. We also find that the price increase was primarily driven by high-performing states, where mothers from higher SES were not eligible for JSY incentives. This finding is consistent with the theoretical predictions of Chen and Riordan (2008), in which 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).

Overall, we see that the success of large-scale public policies depends crucially on equilibrium responses in the market. More research is needed to explore potential channels that can steer the effects of public policies in the direction of intended outcomes. Ultimately, policymakers need to predict equilibrium responses and incorporate complementary mechanisms when designing policies to ensure that benefits reach intended targets and do not produce unexpected distortions, such as heightening inequities in access to care.

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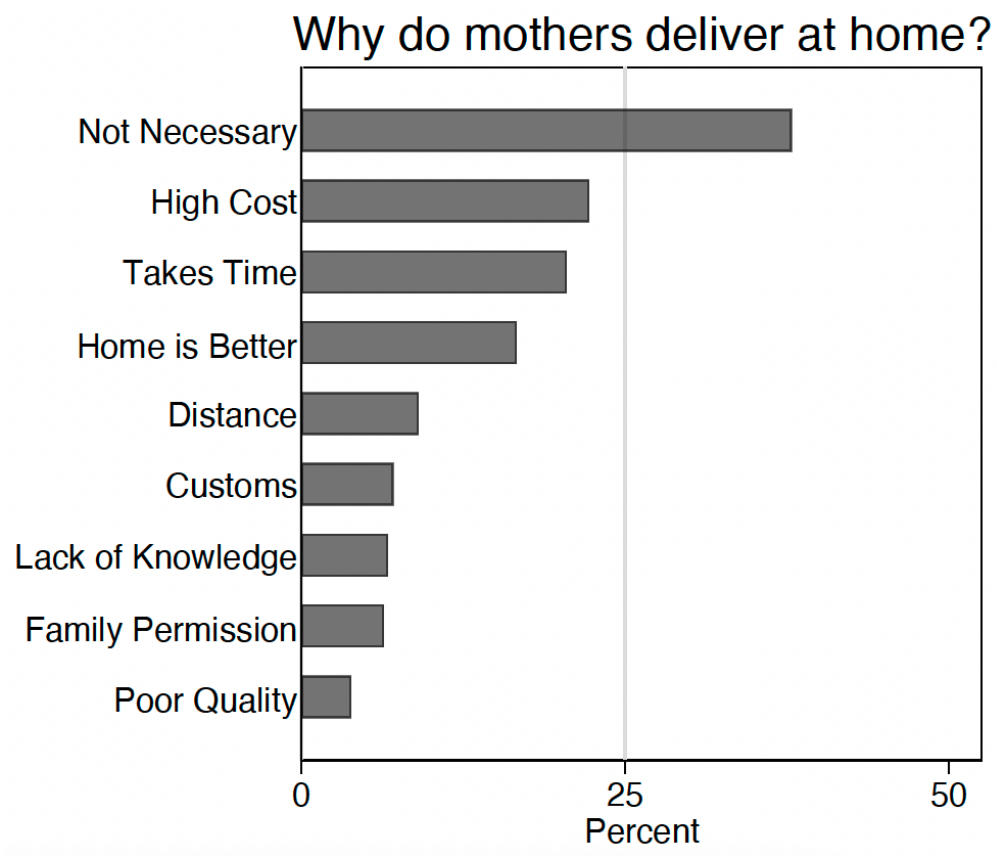
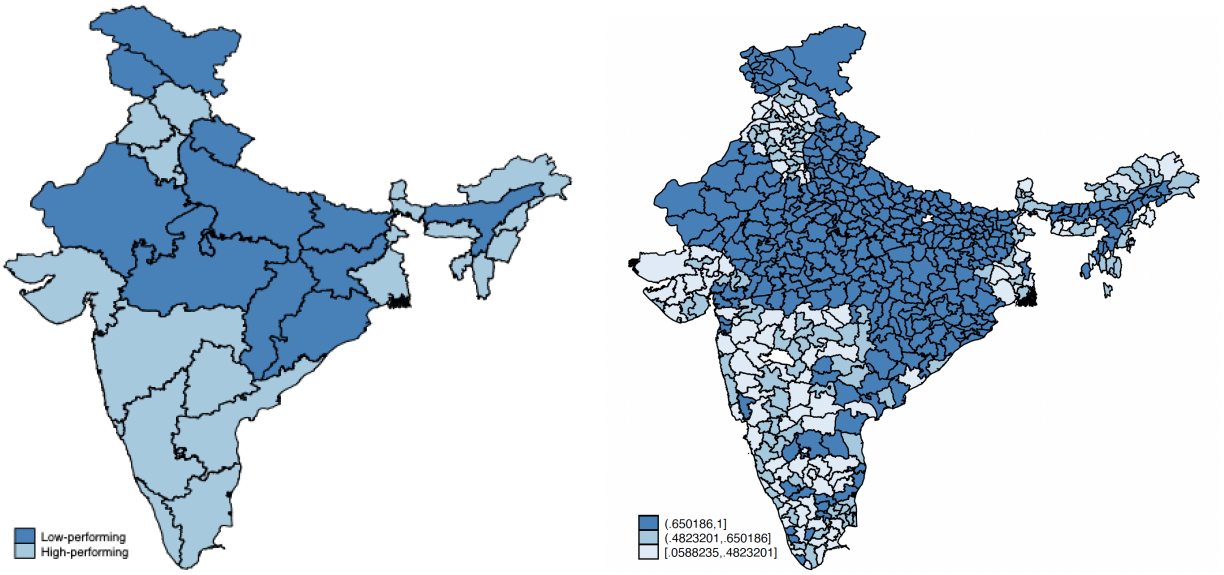


Figure 1: Reported Reasons for Home Births

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.

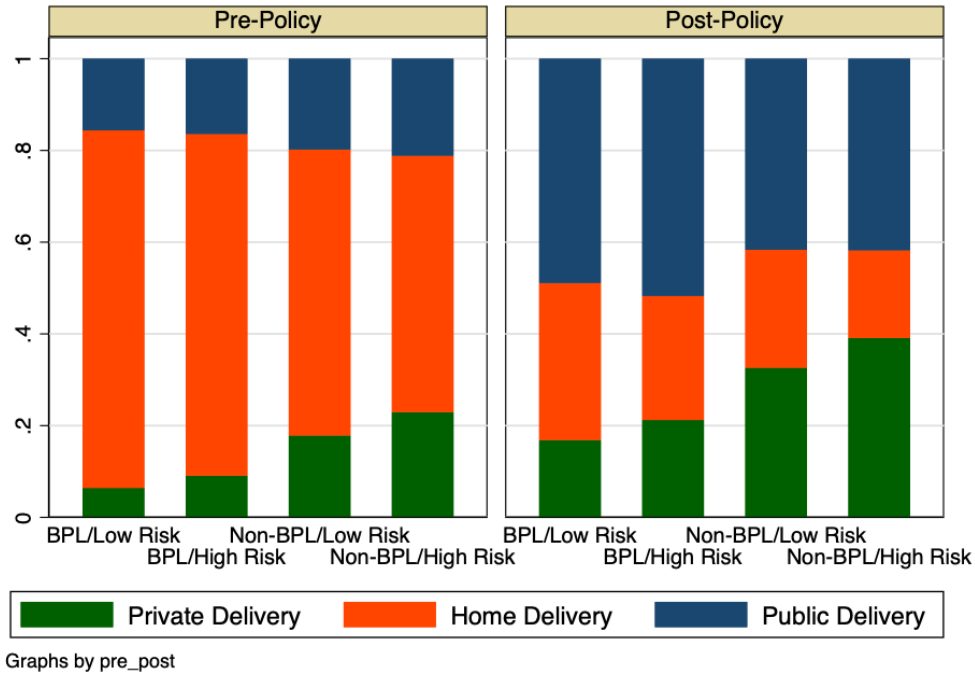


Figure 3: Patient sorting by types

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.

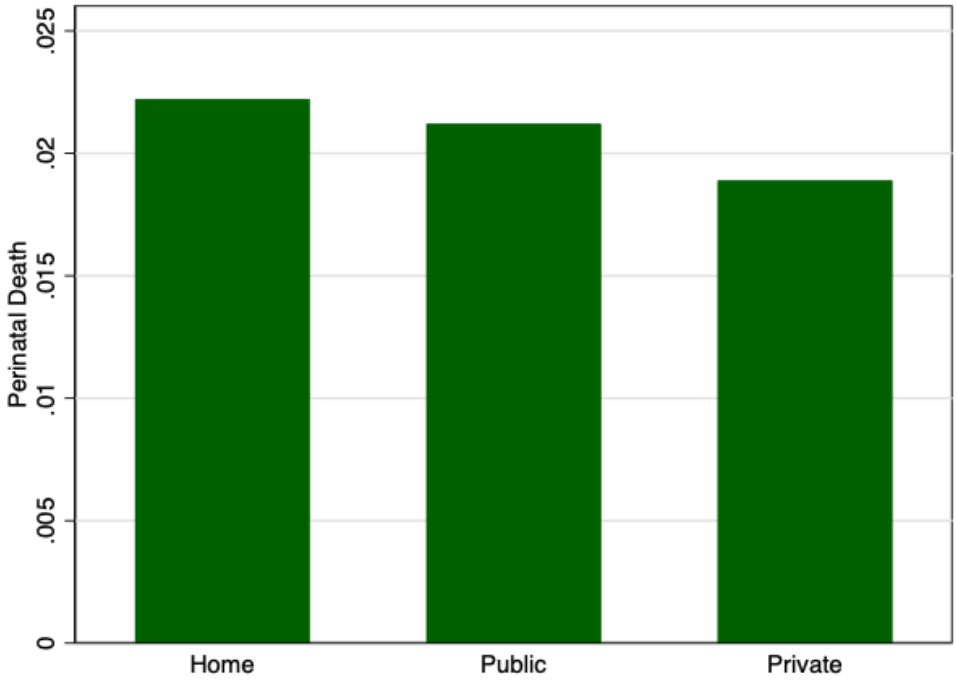
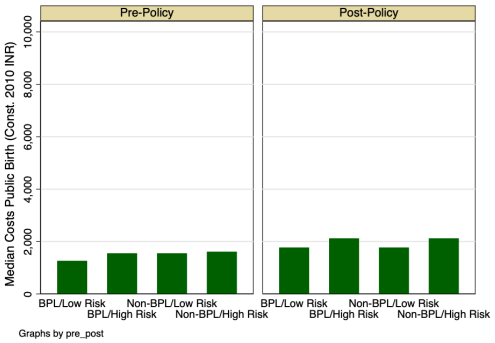
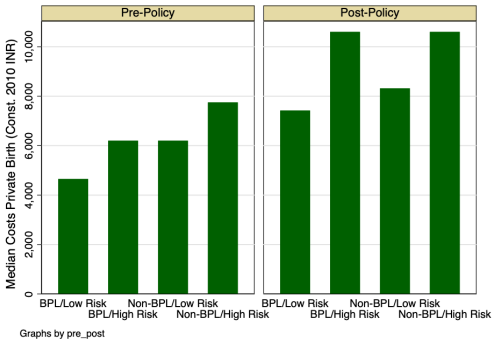


Figure 4: Perinatal Death by facility

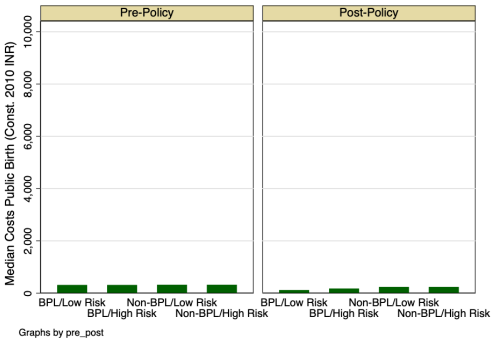
Notes: Figure displays perinatal mortality rates across private facilities, public facilities and home. The figure shows snapshot of perinatal mortality rates.



(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.

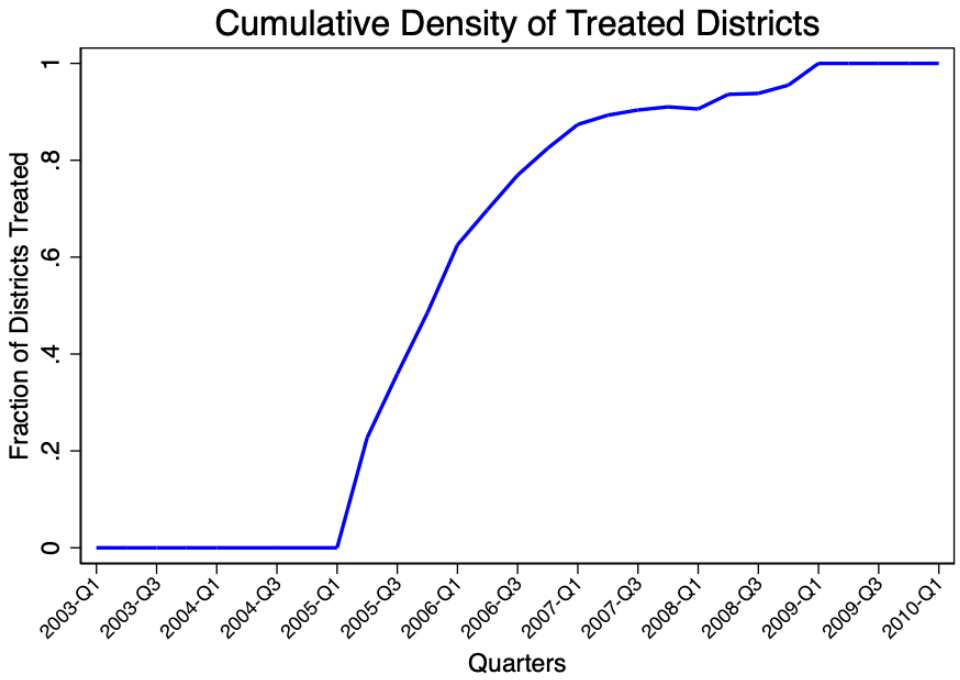


Figure 6: Cumulative density of roll-out of JSY across districts

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.

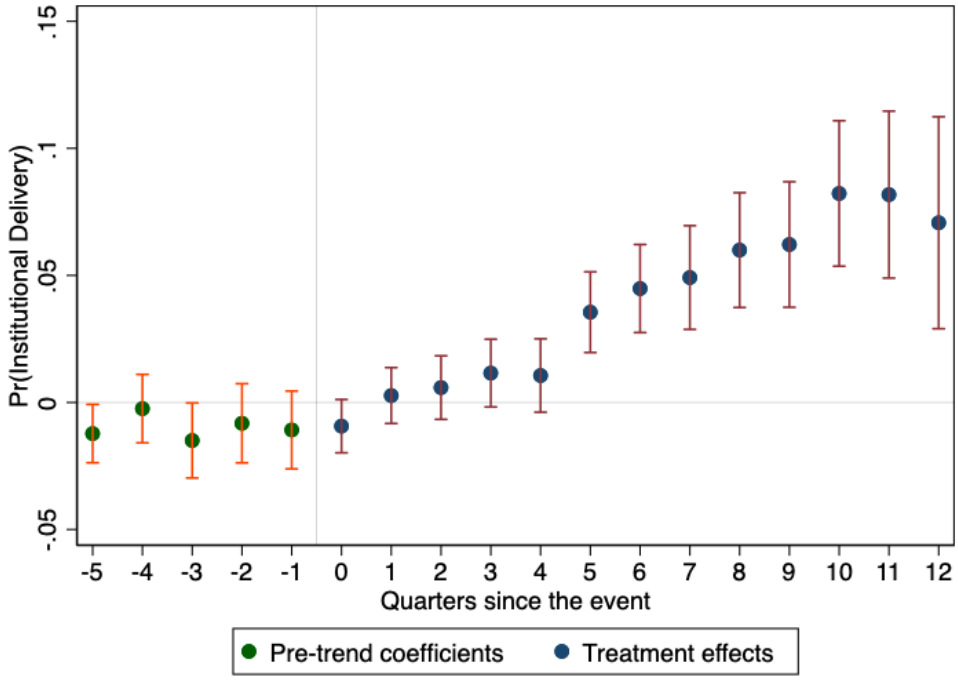
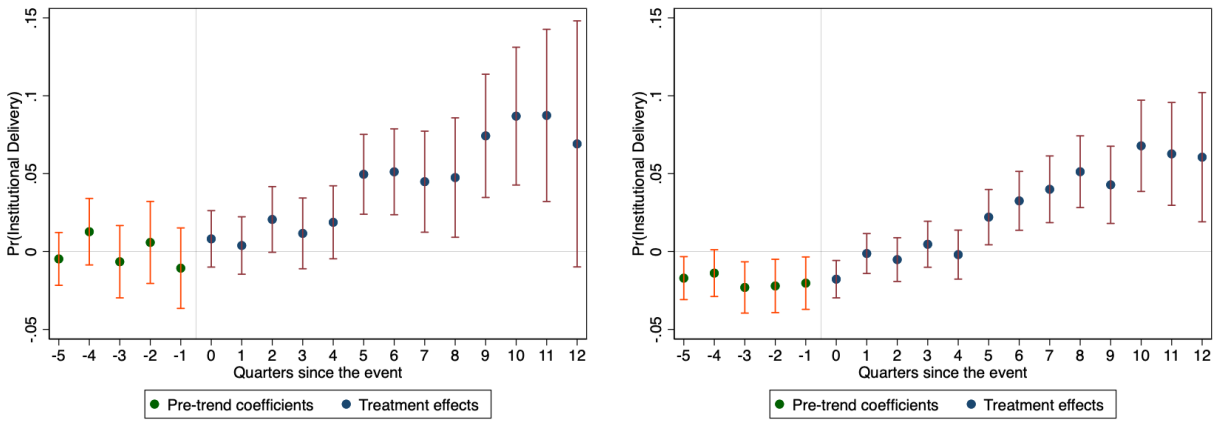


Figure 7: Effect of JSY on Institutional Delivery

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.

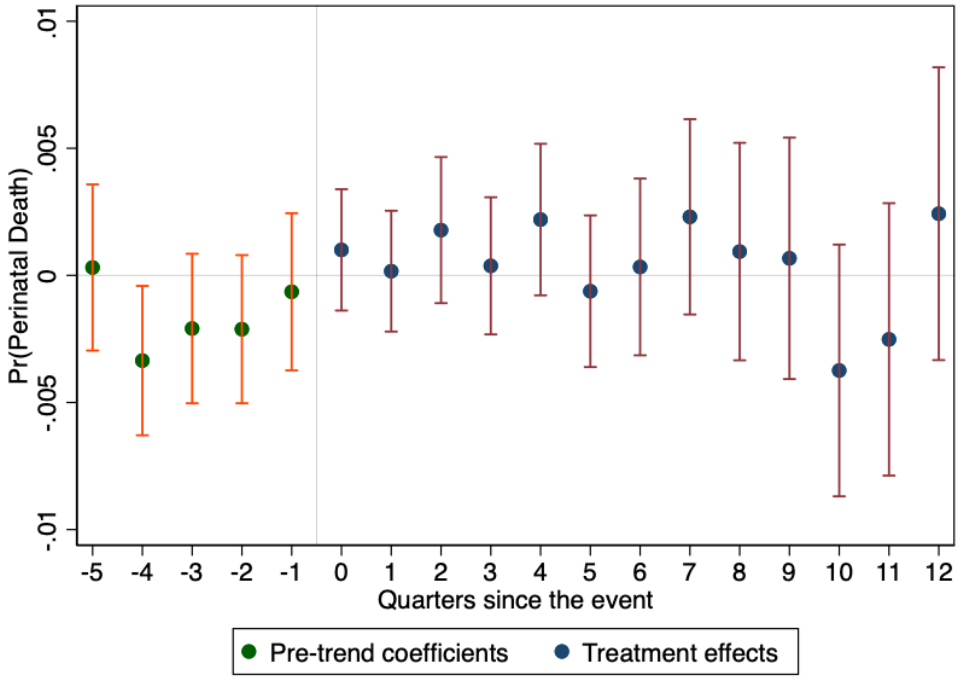


Figure 9: Effect of JSY on Perinatal Mortality

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.

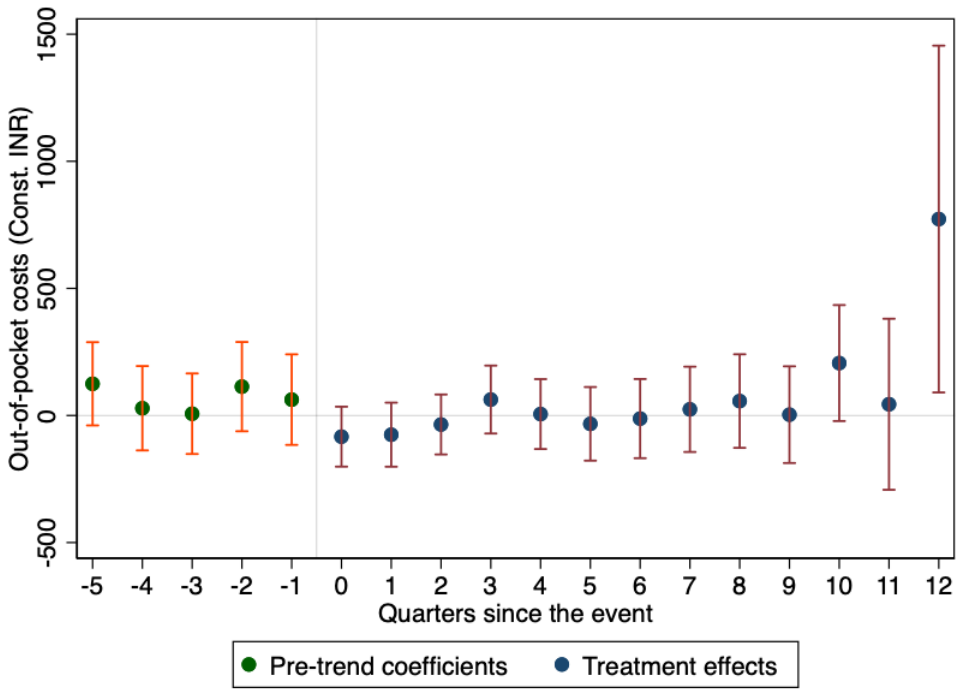
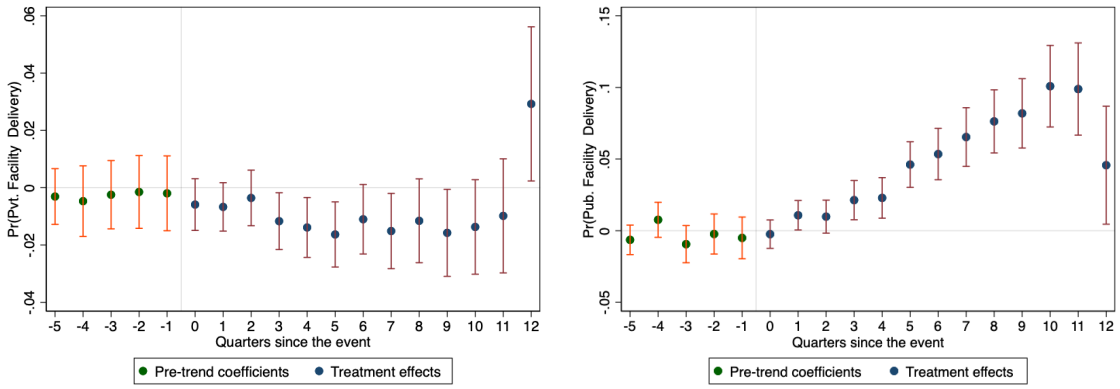


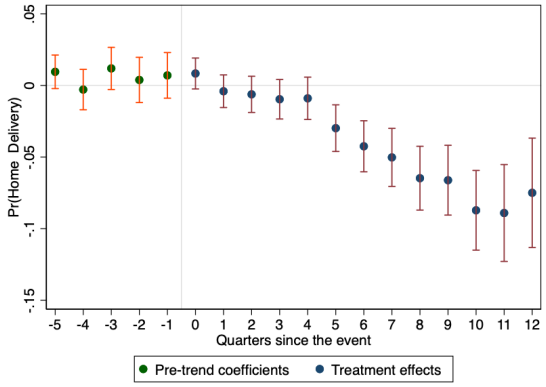
Figure 10: Effect of JSY on OOP Costs (Const. INR)

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

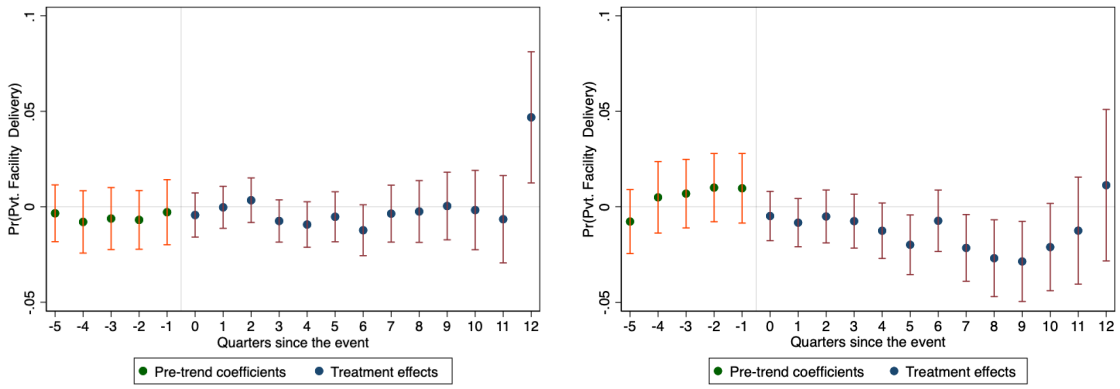
(b) Public Facility



(c) Home Facility

Figure 11: Effect of JSY on sorting across facilities

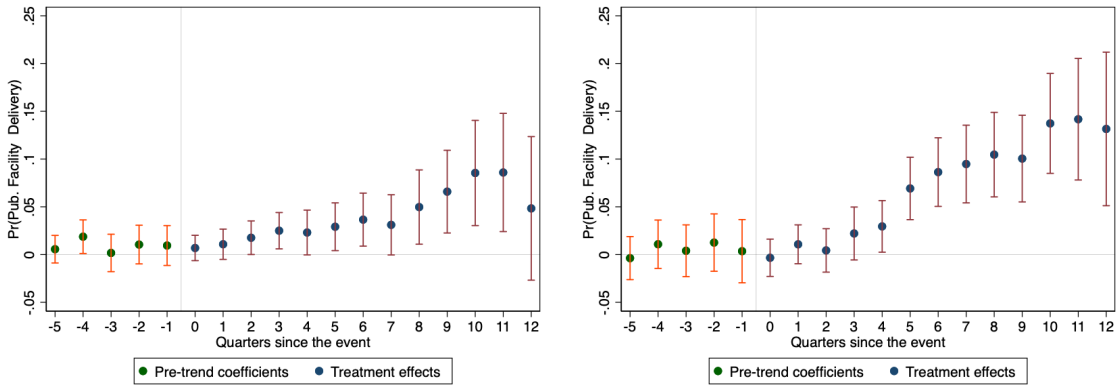
Notes: This figure presents event study evidence of the effect of JSY on likelihood of deliveries across different healthcare facilities, following our empirical strategy in section 4. Panel A presents change in likelihood at private facilities. Panel B and Panel C present change in likelihood at public 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

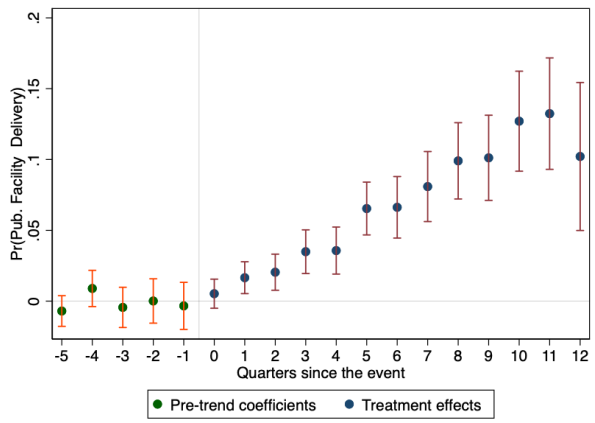
Notes: This figure presents event study evidence of the effect of JSY on likelihood of deliveries at private facilities by patients' ex-ante risk levels, following our empirical strategy in section 4. Panel A presents results for low-risk sample. Panel B presents results for high-risk sample. The figure 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.



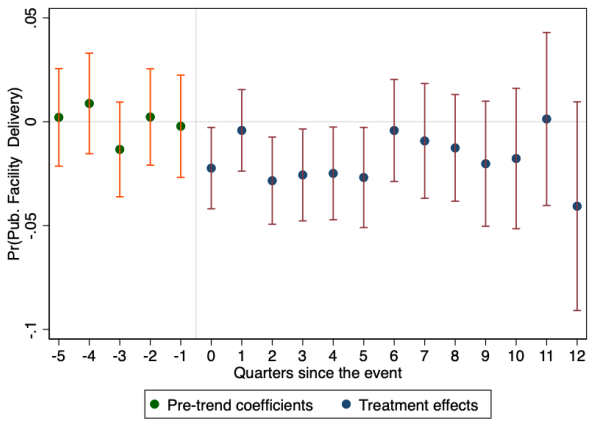
(a) Public Facility (Low Capacity) (b) Public Facility (High Capacity)

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

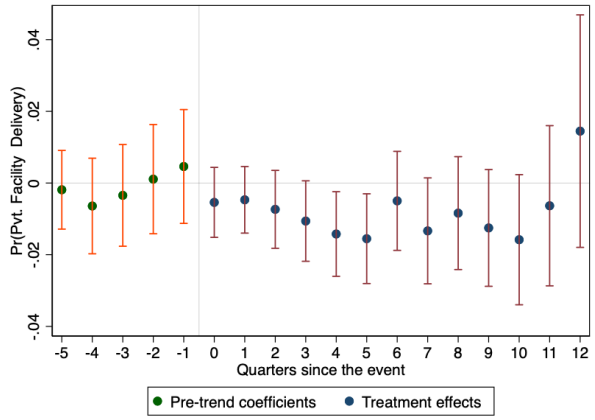
Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at a public facility separately by public sector healthcare capacity, following our empirical strategy in section 4. Panel A presents results for low-capacity districts. Panel B presents results for high-capacity 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.



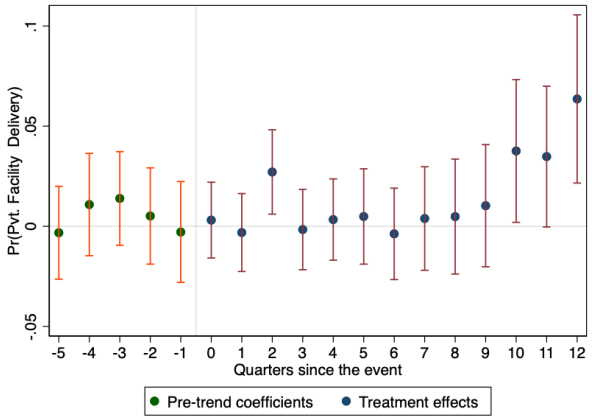
(a) Public Facility (Eligible Sample)



(b) Public Facility (Ineligible Sample)



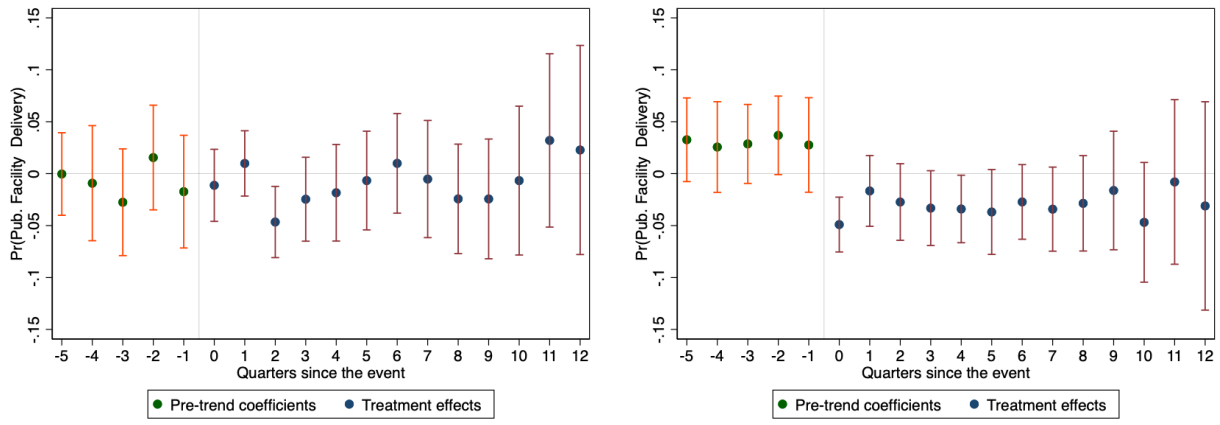
(c) Private Facility (Eligible Sample)



(d) Private Facility (Ineligible Sample)

Figure 14: Sorting across facilities by eligibility

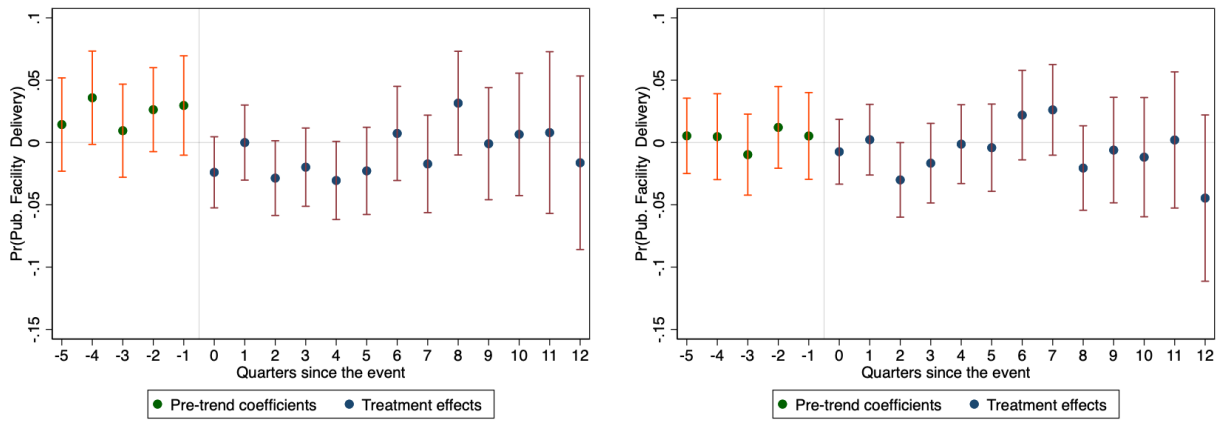
Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at a public and private facilities separately by eligibility for JSY, following our empirical strategy in section 4. Panel A and Panel C present results for the eligible mothers. Panel B and Panel D present 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

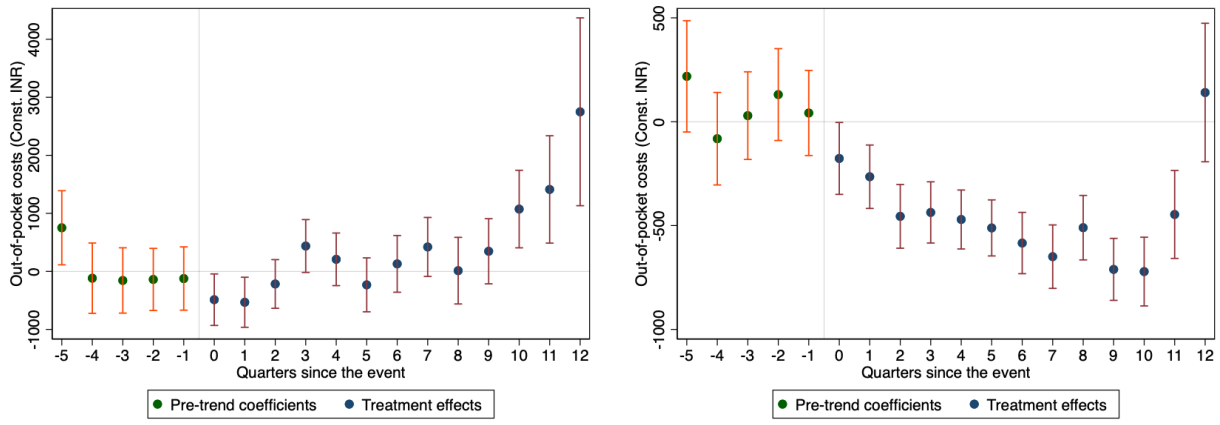
Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at public facilities for ineligible mothers separately by district's public sector capacity, following our empirical strategy in section 4. Panel A presents results for the high capacity districts. Panel B 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

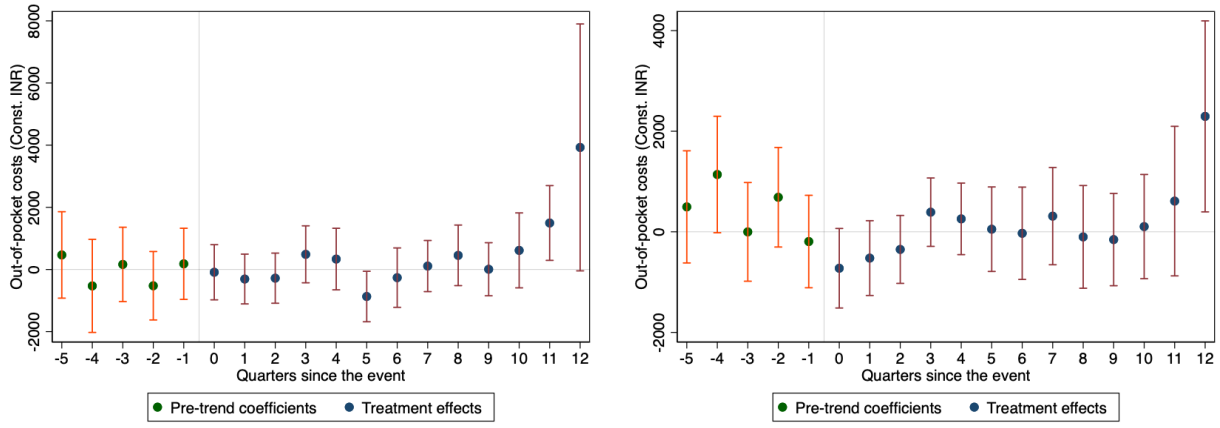
Notes: This figure presents event study evidence of the effect of JSY on likelihood of delivery at public facilities for ineligible mothers separately by ex-ante risk level, following our empirical strategy in section 4. Panel A presents results for the high-risk mothers. Panel B presents results for 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)

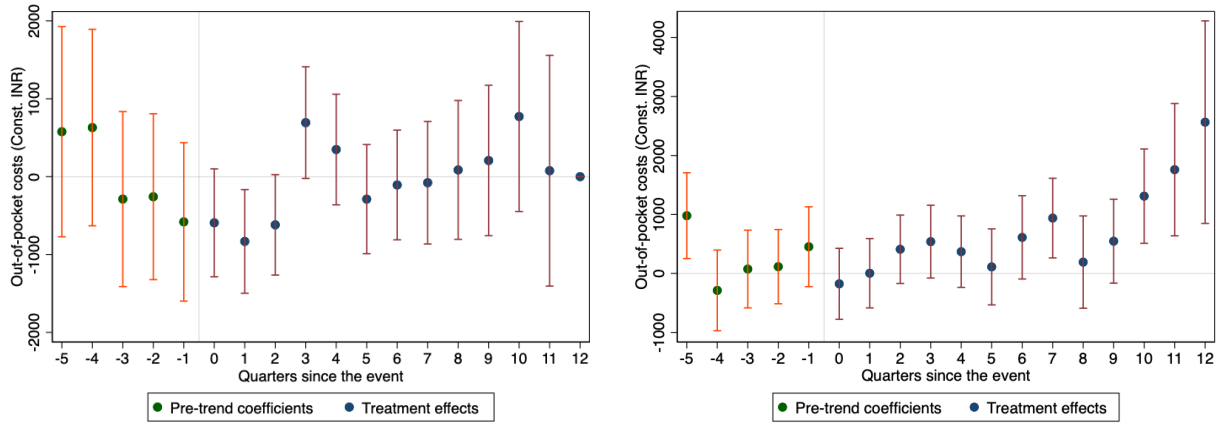
Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private and public facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at 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.

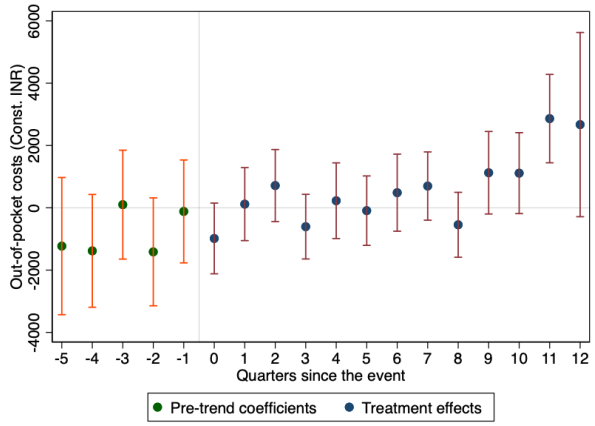


(a) Low-Performing States

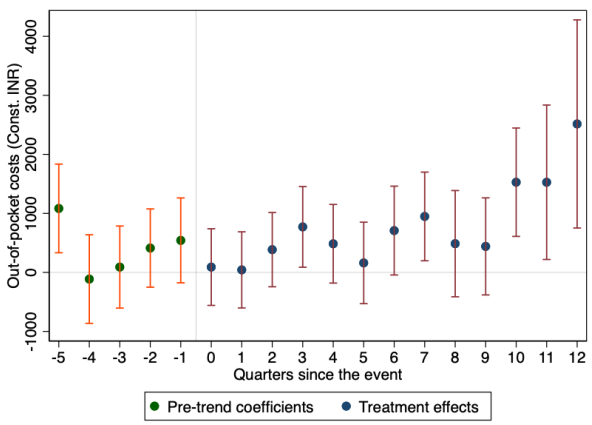
(b) High-Performing States

Figure 19: Private facility price effect

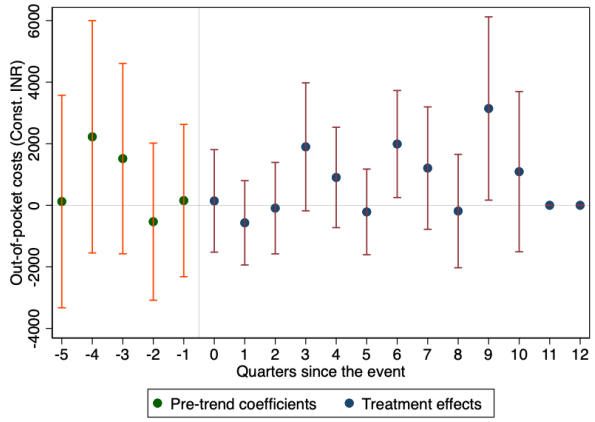
Notes: This figure presents event study evidence of the effect of JSY on out-of-pocket costs (in constant Indian rupees) at private facilities, following our empirical strategy in section 4 with an additional difference taken over the home option. Panel A presents results for deliveries at private facilities 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.



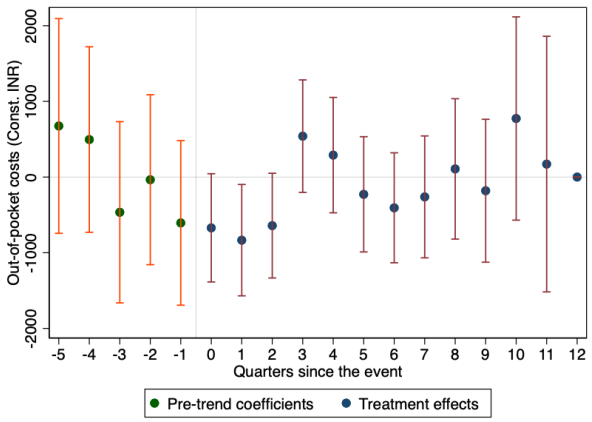
(a) High-Performing States/BPL



(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.

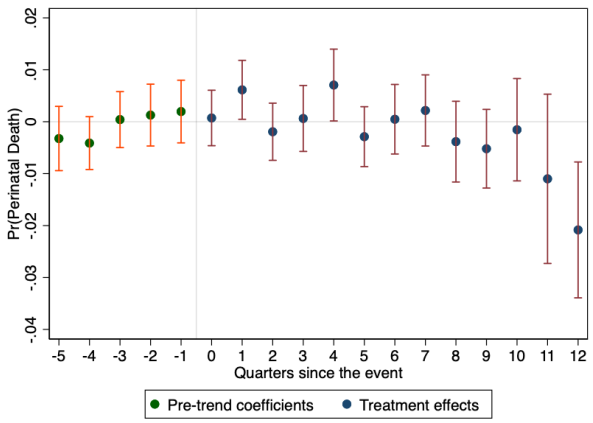


Figure 21: Trip. Diff.: Private Facilities Perinatal Death (All Controls)

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

Notes: 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

Notes: 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

Notes: 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:

Notes: 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

Notes: 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

Notes: 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

Notes: 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

Notes: 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 states. 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

Notes: 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

Notes: 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 antenatal 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

Notes: 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

Notes: 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

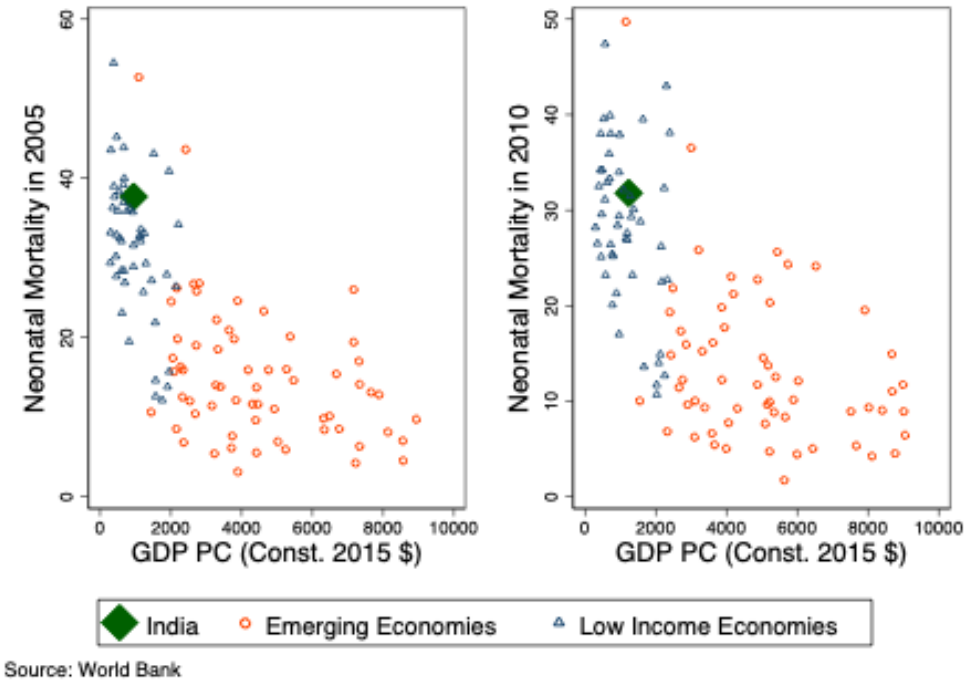
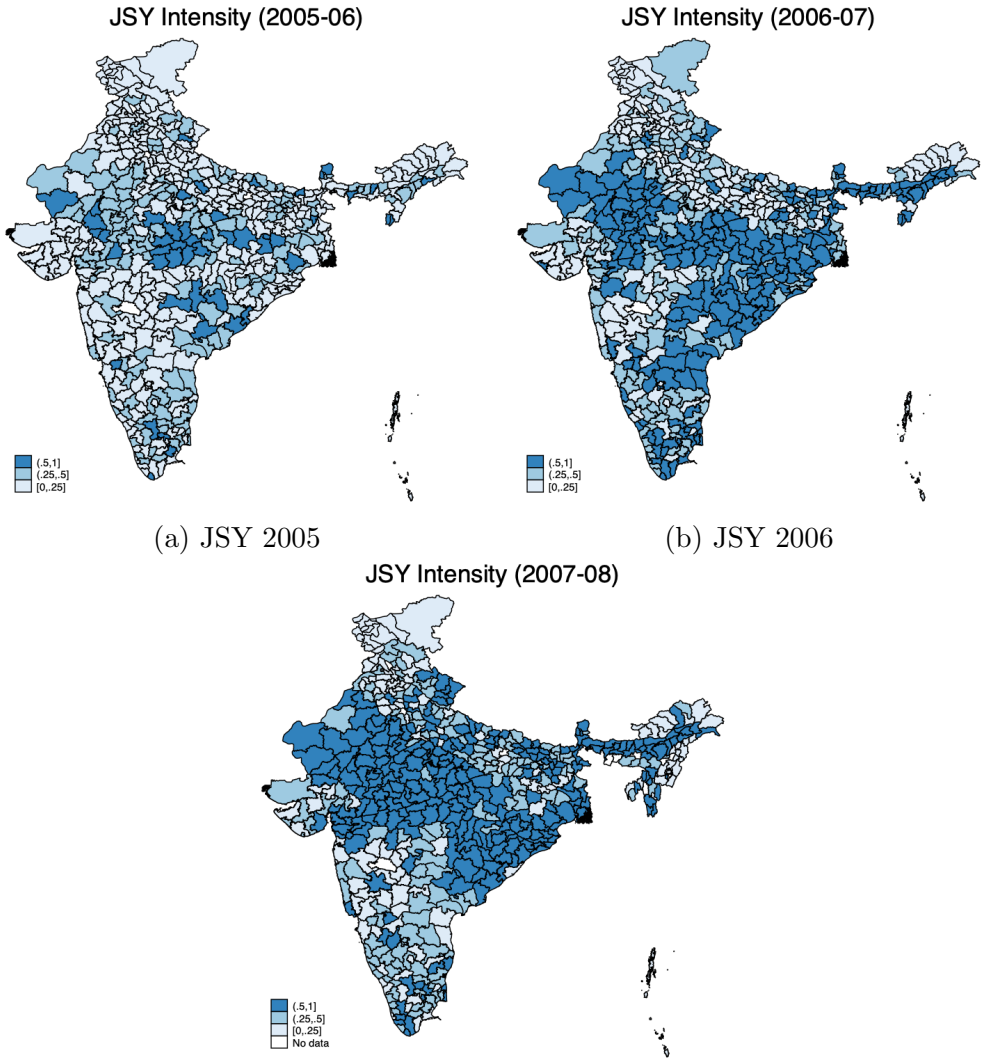


Figure A1: Neonatal Mortality across Countries

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).

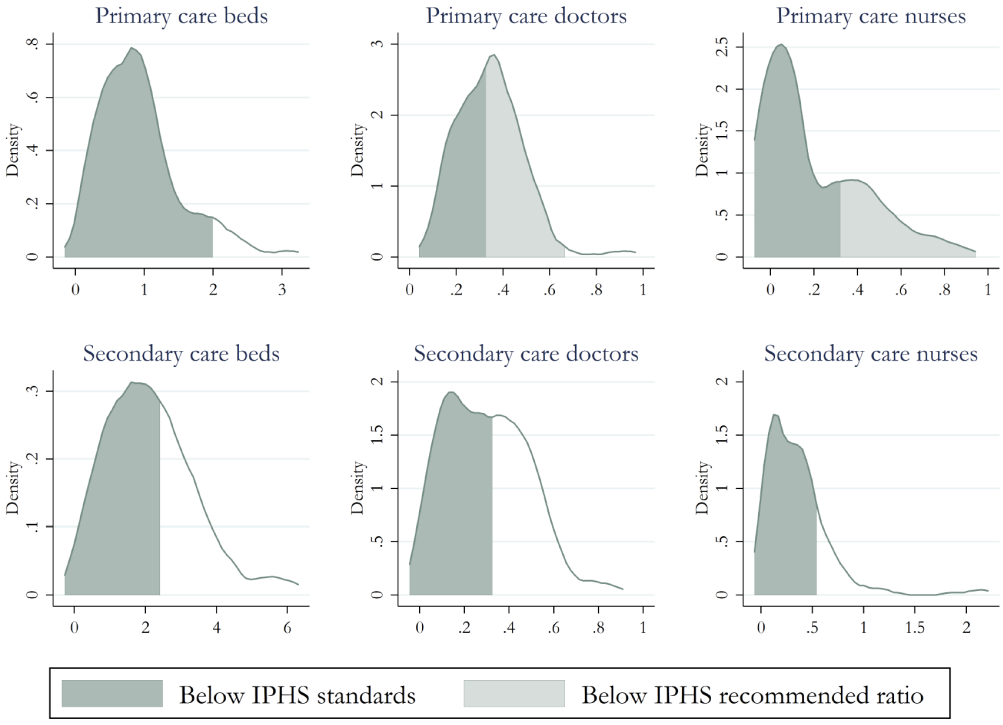


(a) JSY 2005 (b) JSY 2006

(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).

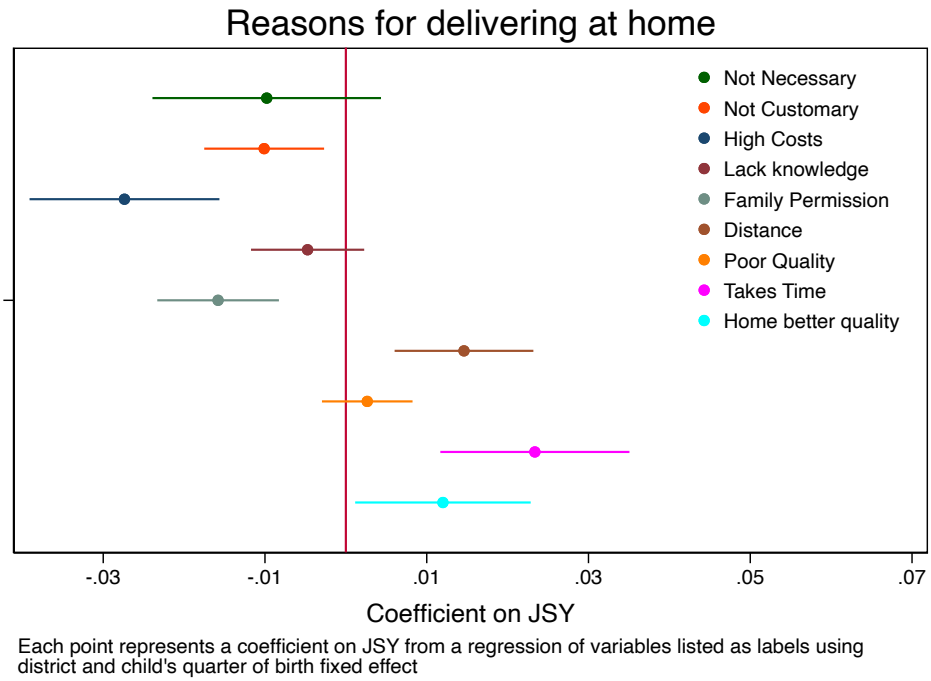
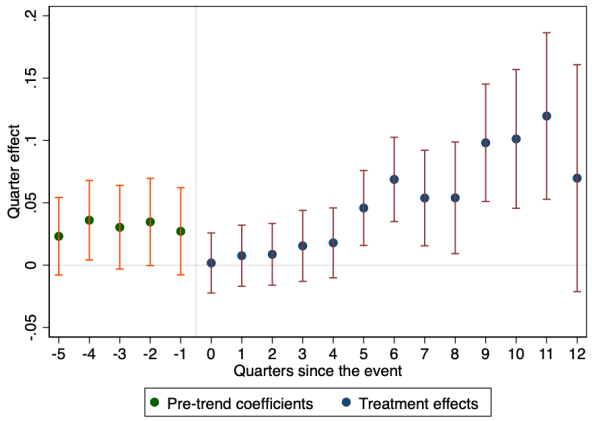
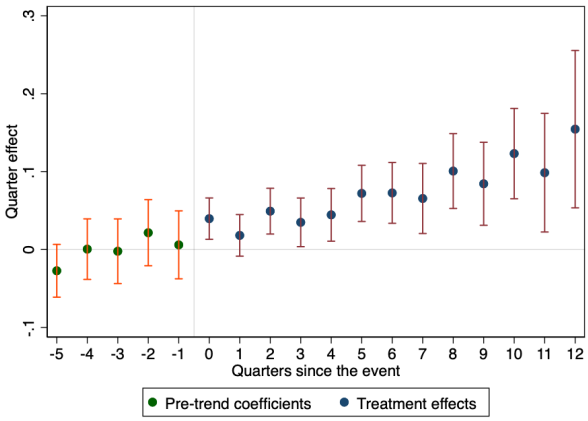


Figure A4: JSY and Reasons for Delivering at Home

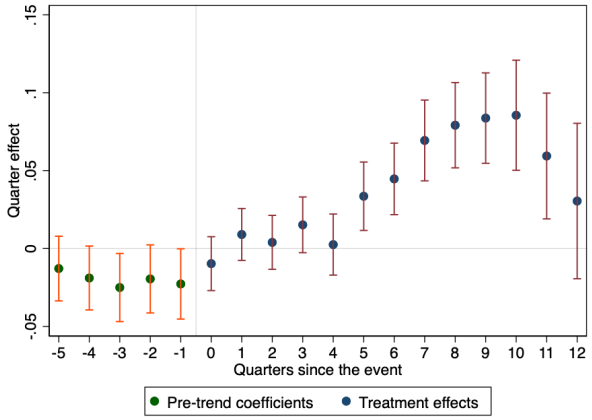
Notes: This figure presents difference-in-difference estimates of JSY on stated reasons for delivering at home instead of an institutional facility. Each dot corresponds to an estimated coefficient for a dependent variable listed in the legend, and horizontal lines indicate the 95% confidence intervals.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



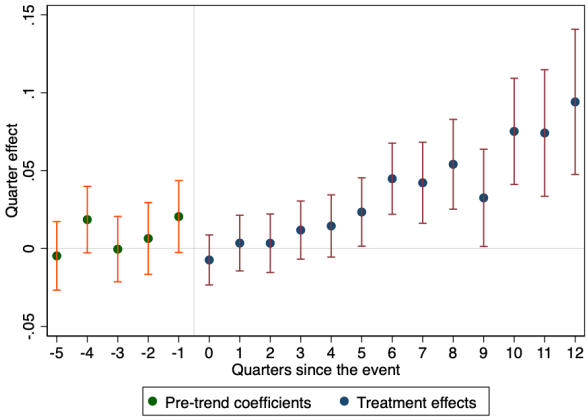
(a) BPL, Low-Risk Sample



(b) BPL, High-Risk Sample



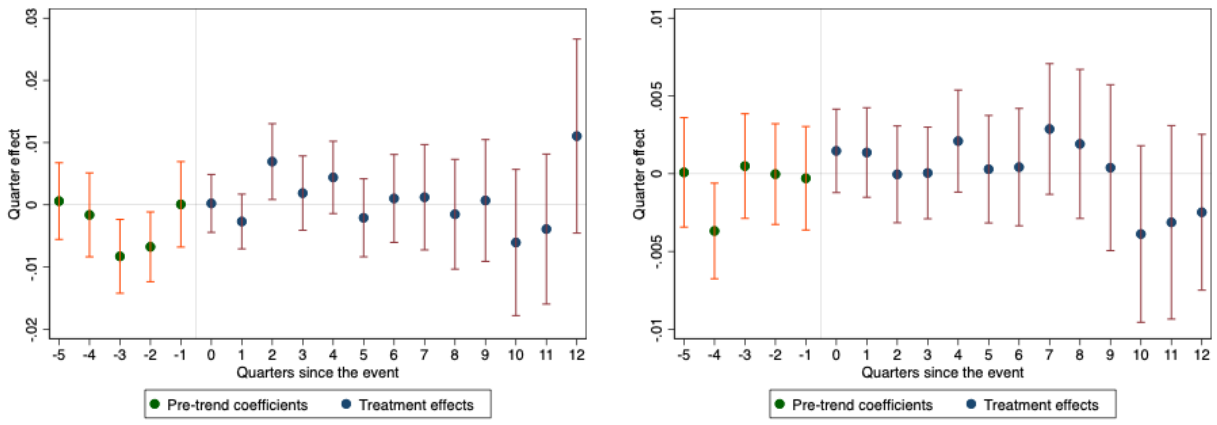
(c) NonBPL, Low-Risk Sample



(d) NonBPL, High-Risk Sample

Figure A5: Effect of JSY on Institutional Delivery by Types

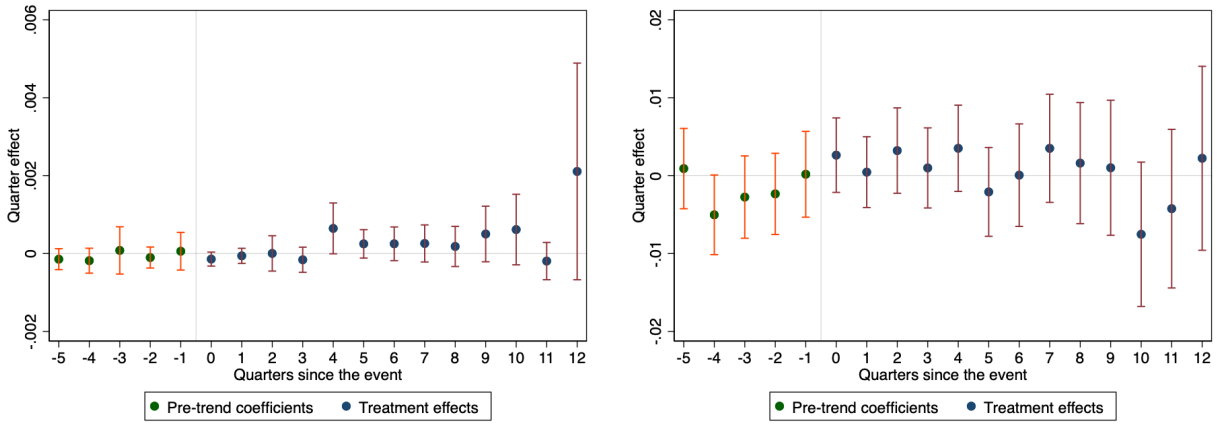
Notes: This figure presents event study evidence of the effect of JSY on likelihood of institutional deliveries for different types of patients (combinations of patients' SES and ex-ante risk), following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time 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.

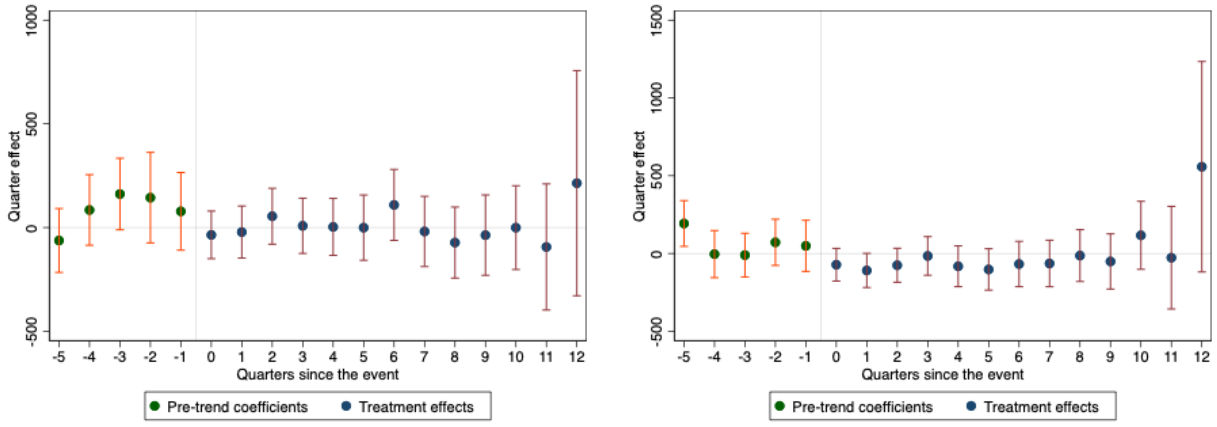


(a) Low-Risk Sample

(b) High-Risk Sample

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

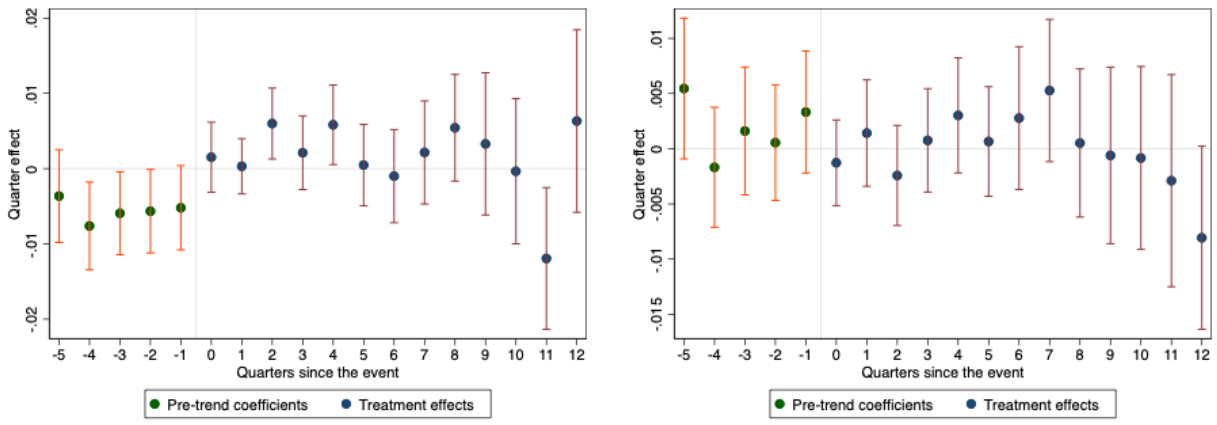
Notes: This figure presents event study evidence of the effect of JSY on likelihood of perinatal mortality by patient's ex-ante risk level, following our empirical strategy in section 4. The figure uses quarterly data on pregnant mothers in a time window of 5 quarters before and 12 quarters after the 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.

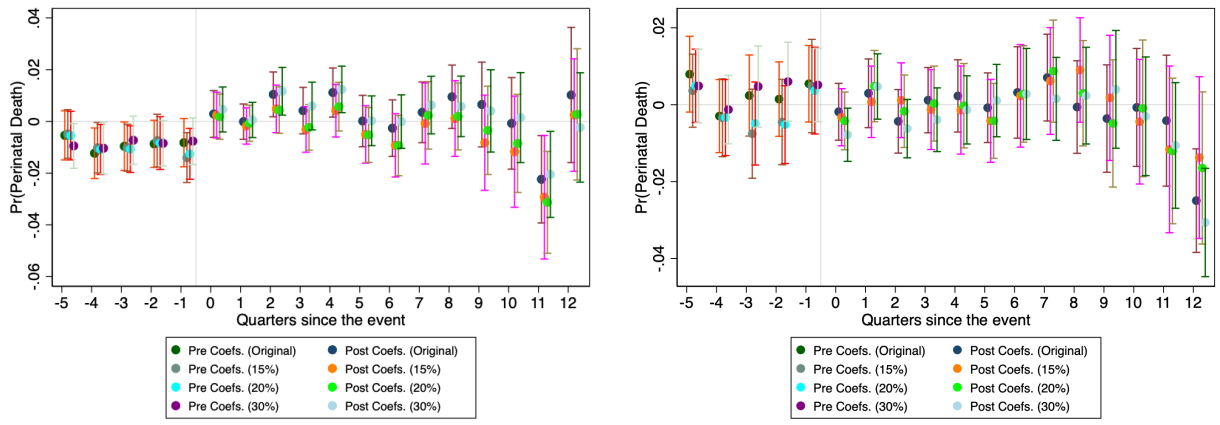


(a) Low Capacity

(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%.[29] 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*:

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

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. $JSYIntensity_{dt}$ 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}

[29] 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:

$$Y_{ibdt} = \alpha_d + \beta_b + \gamma_t + \beta_1.JSYIntensity_{dt} + \beta_2.\mathbb{1}Pvt.Dvy._{dt} + \beta_3.\mathbb{1}Pub.Dvy._{dt} \quad \text{(A2)}$$

$$+\beta_4.JSYIntensity_{dt} \times \mathbb{1}Pvt.Dvy._{dt} + \beta_5.JSYIntensity_{dt} \times \mathbb{1}Pub.Dvy._{dt} + \epsilon_{ibdt} \quad \text{(A3)}$$

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*.