The Importance of Being Local: Administrative Decentralization and Human Development*

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Abstract

We examine the human development consequences of transferring responsibility for public service provision to local governments in India, using state-level variation in the timing of administrative decentralization reforms. We find that devolution of the responsibility for health functions from state to local governments, without concomitant authority over personnel or taxation, results in a worsening of neonatal, infant and under-5 child mortality. States that conducted such partial devolution exhibit worse indicators of public health provision, as well as lower rates of primary school completion. Our results cannot be attributed to differential pre-trends, omitted variables bias, or heterogeneous treatment effects.

JEL codes: H77; H75; D73; H41

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1 Introduction

This paper examines the human development consequences of administrative decentralization. Administrative decentralization refers to the transfer of responsibility for providing public services from the central government and its agencies to sub-national or subordinate levels of government.[1] Administrative decentralization is distinct from fiscal decentralization, which involves the transfer of tax-and-spend powers to sub-national governments. It is also distinct from political decentralization, which refers to the extent to which local governments are directly elected by citizens.

Over 1970-2014, at least 123 countries have implemented administrative decentralization reforms (Tester, 2021). However, the development consequences of such reforms are theoretically ambiguous. Devolving administrative authority to local governments can improve public service delivery because of better information availability, better knowledge of citizens' preferences or better monitoring capacity at the local level (World Bank, 2004; Bardhan and Mookherjee, 2006a). However, service delivery could worsen if state capacity is weaker at the local level, if local officials are more likely to be corrupt, if decentralization results in loss of economies of scale, or if local elites can more easily capture public resources (Oates, 1972; Smith, 1985; Besley and Coate, 2003; Bardhan and Mookherjee, 2005, 2006b).

We examine a major decentralization reform in India, known as the *Panchayati Raj* Act, which was implemented via a constitutional amendment in 1993. India offers an important context for such a study because human development outcomes are generally poor (India was ranked 130 out of 189 countries in the U.N.'s Human

[1] Technically, administrative decentralization can occur via "deconcentration" to different levels of the central government, "delegation" to semi-autonomous bodies or "devolution" of authority to lower level governments. In a devolved system, local governments have clear and legally recognized geographical boundaries over which they exercise authority and within which they perform public functions (World Bank, 2001). We focus on administrative devolution in this paper, and will be using the terms "decentralization" and "devolution" interchangeably.

Development Index in 2018), and part of the impetus for the 1993 legislation was to improve development outcomes (Chaudhuri, 2006). Moreover, many studies argue that India's poor human development outcomes are due to poor quality or lack of effort in public service provision,[2] rather than a lack of resources.[3] Administrative decentralization thus has the potential to improve human development outcomes via better monitoring and accountability of the public sector.[4]

The *Panchayati Raj* Act was a comprehensive program of administrative, fiscal and political decentralization. States were required to establish a three-tier system of local government, comprising village, intermediate and district level governance bodies. 29 functional areas were slated for admninistrative devolution to these local government bodies, including education and public health facilities and staff, water provision, and sanitation. For fiscal decentralization, states were to establish State Finance Commissions to provide recommendations on revenue-sharing arrangements and grants to these local government institutions. In terms of political decentralization, all members of these local bodies were to be directly elected by the people every five years, and at least one-third of all local council seats were to be filled by women. While the legislation was broad in scope, states chose to enact different facets of the decentralization at different times, enabling us to identify the policy effects.

[2]A nationwide study from 2003 found that 40% of health service providers and 26% of teachers were absent on a typical working day (Chaudhury et al., 2006). Das et al. (2016) document substantially lower effort by public sector doctors in India, resulting in 83% of patient visits being to private doctors despite them being less qualified than public sector doctors.

[3]Banerjee and Somanathan (2007) document significant equalization of access to education and health facilities due to government policies in the 1970s and 1980s, prior to the decentralization reforms. In 2015, a primary health subcenter served four villages on average, which were approximately within 2.5 km (Government of India, 2015) and more than 98% of villages had a primary school within 5 km (Swaminathan et al., 2020)

[4]Prior studies have documented that better monitoring of public service providers results in improved service delivery (Björkman and Svensson, 2012; Duflo et al., 2012; Muralidharan et al., 2017, 2021).

To assess the effects of administrative decentralization, we put together new data on the state-level dates of *de facto* decentralization over the period 1990-2015, based upon a detailed reading of many official reports and documents. In particular, we track when states devolved administrative functions to local governments, and when they devolved the functionaries, namely the people tasked with performing or managing the functions. We then conduct a difference-in-difference (DiD) estimation of the impact of decentralization on health and education outcomes, comparing outcomes in treated states before and after devolution to outcomes in states that did not introduce administrative devolution.

Our analysis yields two main results. First, while there were nationwide improvements in child health outcomes in this period, states that devolved health functions experienced significantly lower gains in neonatal, infant and under-5 child mortality compared to states that did not devolve health functions. Second, such worsening arises entirely from states that devolved health functions but did not devolve control over functionaries. Infant mortality in these states increased by 1.36 percentage points (25% of the mean) after such incomplete devolution. For states where both functions and functionaries are devolved, we find no significant differences in child mortality rates between states that devolved and those that did not. We also find a similar result with regard to funds devolution: states that devolved functions but not the funds experienced a rise in child mortality, while states that devolved both funds and functions did not.

Our results are robust to a range of robustness tests. We verify that our results are not driven by state- and time-varying factors such as other ongoing initiatives (particularly political decentralization) or changes in state health budgets. We check for differential pre-trends between the treated and untreated states, finding insignificant effects in the years leading up to decentralization and significant effects after health functions and functionaries are decentralized. We also estimate models that are robust to heterogeneous treatment effects across early and late adopters of devo-

lution as suggested by the new DiD literature (de Chaisemartin and D'Haultfoeuille, 2020). Reassuringly, they confirm our negative effects on mortality outcomes among states that devolved functions and not functionaries.

Why are outcomes worse in states that only devolve functions? We find evidence that such incomplete devolution results in a decline in the quality of public service provision. States that devolved health functions but not functionaries have lower levels of prenatal care and immunization provision. Furthermore, we find that child mortality increases are highest among the poorest households, consistent with the idea that richer ones can afford private health care. Importantly, we find similar results for education, which was devolved at the same time as health. Primary school completion rates are lower among states that devolved only functions compared to states that did not devolve, while states that devolved functions and functionaries have similar outcomes to states that did not devolve. Overall, our results suggest that devolving responsibility, without concomitant authority over personnel or funding autonomy, is detrimental for human development outcomes. This is consistent with theoretical models where the presence of "multiple principals" worsens service provision due to increased moral hazard or adverse selection among agents, or "free-riding" among the multiple principals (Martimort, 1996; Dixit, 1997; Gailmard, 2009), as well as empirical results in a non-decentralization context (Gulzar and Pasquale, 2017).

We make two main contributions to the large literature on decentralization. First, we provide a well-identified study on the effects of administrative decentralization, that is not confounded with other dimensions of decentralization. Many prior reviews have found conflicting or inconclusive effects of decentralization on a range of outcomes (Bardhan and Mookherjee, 2006a; Treisman, 2007). This is often due to conflating different concepts and definitions of decentralization (Faguet, 2021), as well as employing relatively weak identification strategies.[5] Many recent studies,

[5]In their review of 34 empirical studies of full decentralization (i.e. devolving authority over

based on credible DiD designs, nevertheless find conflicting results. Using exogeneous variation from jurisdictional splits Dahis and Szerman (2021) find positive effects of decentralization on public service delivery in Brazil, while Cassidy and Velayudhan (2022) find negative effects on economic growth in Indonesia. Fleche (2021) finds centralization reduced self-reported well being in Switzerland, while Malesky et al. (2014) find that centralization improved public service delivery in Vietnam. Unlike these studies that identify the effect of a package of policy measures incorporating elements of political, administrative and fiscal decentralization, we identify the effects of administrative decentralization after controlling for political decentralization and investigate how administrative decentralization effects are shaped by the presence or absence of fiscal decentralization. There are few analyses of such interaction effects among these different policy dimensions.[6]

Second, our setting allows us to compare the effects of partial versus full administrative decentralization. We are unaware of any other study that is able to do such a comparison within the same country. Some studies have focused on providing evidence towards specific mechanisms (e.g. Dal Bó et al. (2021) highlight the informational advantage of subordinate levels of government). While our results are consistent with prior studies that document heterogeneous effects of decentralization in poor versus rich areas (Galiani et al., 2008), our main focus is on heterogeneous effects based on differences in the devolution process.

The rest of the paper is structured as follows: Section 2 outlines the Indian decentralization reforms, Sections 3 and 4 describe our data, and Section 5 delineates our empirical strategy. Sections 6 and 7 document our results and Section 8 concludes.

functions, functionaries and finance), Channa and Faguet (2016) classify only ten of these as having "very strongly credible" or "strongly credible" identification strategies. They conclude that better identified studies find positive effects of decentralization on education outcomes, but that there are few well-identified studies on health outcomes.

[6]Enikolopov and Zhuravskaya (2007) conduct a cross-country analysis of the interaction between fiscal and political decentralization effects.

2 Decentralization Reforms in India

2.1 India's *Panchayati Raj*

In April 1993, the 73rd and 74th amendments to the constitution of India came into force. These amendments, also known as the *Panchayati Raj* Acts, provided for a considerable degree of political, administrative and fiscal decentralization to local levels of government.[7] Each state was required to set up a three-tier system of local government with village, intermediate and district level governance bodies, known as *panchayats*. All members of these local bodies were to be directly elected by the people every five years, and the Act provided for the establishment of State Election Commissions to conduct such elections. States had the power to devolve 29 functional areas to *panchayats*, including services such as water provision, sanitation, education, public health and roads (see Table A.1). The legislation called for State Finance Commissions to be periodically set up, which would provide recommendations on revenue-sharing and make grants to these local government institutions. While some PRIs did exist before the 1990s, Ghatak and Ghatak (2002) argue that *panchayats* were generally ineffective, elections were not held regularly, and they did not assume any active role in public service provision. A few states, such as Gujarat, Maharashtra and West Bengal, did have effective *panchayats* and regular elections prior to the 73rd and 74th Amendments. However, all states had to modify their existing legislations along several dimensions to be in compliance with the *Panchayati Raj* Acts.

2.2 Progress of decentralization reforms

Most states amended or passed new *Panchayati Raj* Acts immediately in 1993 and 1994. These Acts called for the devolution of education and public health services,

[7] The 73rd Amendment applied to rural bodies and the 74th amendment applied to urban local bodies. In 1996, the Indian Parliament extended the provisions to Scheduled areas via the *Panchayats* Extension to Scheduled Areas Act (PESA). See Center for Policy Research (2014) for details.

among others, to village, intermediate and district *panchayats* in accordance with the constitutional amendment. Yet, these laws varied in their specificity on the nature of such delegation. For example, Gujarat clearly specified the powers and duties for each of the three *panchayat* tiers, and Maharashtra's legislation enabled *panchayats* to appoint and pay staff using their own funds. However, there was generally slow progress in actually devolving responsibility over public service provision to *panchayats*, with state health and education departments retaining control in most states (Chaudhuri, 2006).

Disappointed with the slow and uneven pace of administrative devolution, the central government in the 2000s began to ask states to move faster. The Ministry of *Panchayati Raj* became a separate ministry in May 2004 and took on a stronger advocacy role. The central Planning Commission published a report asking states to (a) conduct an "activity mapping" exercise for each devolved function that would unbundle the functions into smaller units of work and articulate the powers and duties vis-à-vis those smaller units to each *panchayat* tier, and (b) pass executive orders to operationalize these activity mapping exercises (Government of India, 2006). The report also highlighted that many states had not devolved the functionaries, i.e. made public employees fully accountable to local governments. Rather, public workers were still managed and monitored by their state-level departments. We observe an increase in the number of states enacting administrative devolution after this report. However, as late as 2015, more than two decades after the constitutional amendment, seven out of 25 states had not yet conducted the necessary reforms (details in section 3.1).

Progress on fiscal decentralization has been very poor with local governments relying on higher levels of government for the majority of their revenues. *Panchayats* are funded from four sources: central grants based on the recommendations of the five-yearly Central Finance Commissions; funds from centrally sponsored schemes such as the National Rural Employment Guarantee program (NREGA); loans and grants from state governments based on the State Finance Commission recommen-

dations; and their own sources of taxes and user fees on public services. Most local governments remain highly dependent on the state or central government for their revenues: as late as 2015, local governments generated only 8% of revenues from their own sources of taxation and fees (Government of India, 2016a), compared to 6% in the 1990s (Government of India, 2000). Most accounts suggest that *panchayats* have failed to expand their revenues because they change tax rates infrequently, they lack administrative capacity, they do not own productive assets and they are unable to charge user fees on state or central government properties (Government of India, 2016b).

Political decentralization has progressed faster than administrative or fiscal decentralization. By 2010, all states had conducted local government elections with the one-third gender quota, though there was considerable variation in the timing of elections across states (Iyer et al., 2012). The effects of this gender quota have been examined by many prior studies, some of which find that women's political representation changes policy outcomes towards those preferred by women (Chattopadhyay and Duflo, 2004; Iyer et al., 2012), while others find no effect or even a lower efficiency of pro-poor targeting (Bardhan et al., 2010; Rajaraman and Gupta, 2012; Afridi et al., 2017).[8] Starting in 2006, many states have increased the gender quota to one-half of all local council positions (Iyer and Triyana, 2022).

3 Data on Decentralization Progress

3.1 Dates of functions devolution

We code the progress of functions devolution by identifying the year when health and education functions were devolved (or not) to *panchayats* between 1993 and 2015. Our coding is based on a detailed reading of several different government publications and

[8]Narasimhan and Weaver (2022) show that Uttar Pradesh state's political decentralization in the 1990s led to better public goods provision.

reports (see Table A.2), as well as consulting many state *Panchayati Raj* websites for specific government or executive orders. Our main indicator for functions devolution equals one for years in and after state governments conducted activity mapping exercises *and* passed government or executive orders to operationalize them. For some states, like Gujarat and Maharashtra, their *Panchayati Raj* legislations contain activity mapping provisions and the date of legislation serves as the date of operationalization. For other states, the date of functions devolution is usually several years after the passage of their *Panchayati Raj* legislation.[9]

What did activity mapping look like in practice? While there is some variation across states, we find that district *panchayats* typically coordinate participation and promotion of national and state health programs, pass information from lower levels of government to the state, and coordinate measures against epidemics and other infectious diseases. District and intermediate *panchayats* are also authorized to undertake surveys and reports, procure medicines and medical equipment (e.g. X-ray machines), and promote immunization and child welfare programs. In contrast, village *panchayats* help with the execution of specific public health programs, identify land for a health sub-centre, manage cleaning and latrine construction, stray dog control, removal of carcasses, and other such local functions. While states vary somewhat in their specifics of activity mapping, only a few allow *panchayats* to construct public health buildings, and very few *panchayats* engage in procuring medicines or equipment with Kerala being the exception (John and Jacob, 2016).

With regard to education, the central government asked states to model their

[9]Our sources exhibit some ambiguity about the date of functions devolution in the cases of Bihar and Rajasthan. For Bihar, official sources list the date of health devolution as 2014, but some descriptive accounts suggest that this may have happened as early as 2011. For Rajasthan, the official sources describe activity mapping and devolution in 2003, but field observations on select Rajasthani *panchayats* found that they were not performing any health functions (John and Jacob, 2016). We verify that our results are not sensitive to recoding these dates.

activity mapping exercise on Kerala.[10] Village *panchayats* in Kerala manage government pre-primary and primary schools including the maintenance of schools and monitoring of teachers. They also manage libraries and implement literacy programs. In other states such as Assam, village *panchayats* promote enrollment and attendance in primary schools and monitor primary school teachers, while intermediate *panchayats* manage the school buildings and district *panchayats* oversee surveys and other educational programs.

Our data reveals considerable variation in the timing of functions devolution (Table 1). Only a handful of states effectively devolved both health and education before 2000, and devolution activities increased after the publication of the Planning Commission report in 2006. Despite this progress, seven states (out of 25) had not devolved health functions as of 2015 and six had not devolved education. All but one state devolved education at the same time as health; in fact, many states devolved drinking water, family welfare and women and child development at the same time as well. Our estimates of the impact of health (or education) functions devolution should thus be interpreted as a result of the devolution of this larger policy bundle.

Why do dates of administrative decentralization vary across states? Many factors appear to play a role including a prior history of well-functioning local governments (e.g. Gujarat and Maharashtra), party ideology (e.g. West Bengal and Kerala devolved when Communist parties were in power), political factors such as intra-party competition (Bohlken, 2016), and nudges from the central government such as the 2006 Planning Commission report. In terms of our difference-in-difference analysis, factors such as a state's history or long-standing political institutions will be controlled for by the inclusion of state fixed effects. National factors such as central government actions are accounted for by the inclusion of year fixed effects. Our estimates may be biased if the timing of devolution happens to be correlated with pre-existing trends in our outcome variables and/or other state-specific budget or

[10]This is also true for other functions where Kerala was an early leader in activity mapping.

policy changes that also affect our outcomes. We conduct several robustness tests to verify that this is not the case.

3.2 Dates of functionaries devolution

In addition to the year when functions were effectively devolved, we also code whether the devolution of functions was accompanied by any devolution of associated functionaries namely doctors, nurses, teachers and other public health and education workers. Full devolution of functionaries would, in theory, result in local bodies having the power to hire, monitor, sanction and fire public workers. This is not the case in any Indian state. Even in Kerala, a state with highly empowered local governments, *panchayats* cannot hire or fire doctors that are hired by separate state cadres and paid from state funds. However, *panchayats* in Kerala can monitor and sanction doctors, and have the authority to hire lower level public health workers such as ambulance drivers (John and Jacob, 2016).

Our data sources are less precise when it comes to the exact date of functionaries devolution. For states where such provisions were included in legislation, we have a precise date. But for others, we only have information on whether states had devolved functionaries as of 2007 and whether they had devolved functionaries as of 2015 (Government of India, 2008, 2016a). Our coding therefore adopts a "earliest possible date" as follows: For states that had devolved functionaries as of 2007, we code them as having devolved functionaries at the same time as health functions. For states that had devolved health functions but not functionaries in 2007, but were recorded as having devolved functionaries by 2015, we assign them a functionaries devolution date of 2008. For states that devolved health functions after 2007, and had devolved functionaries by 2015, we code them as having devolved functionaries at the same time as health functions. By this measure, 13 of the 18 states that had devolved health functions had also devolved health functionaries by 2015. We code the devolution of education functionaries in the same manner. Since most states

devolved health and education at the same time, and the data sources do not track functionaries of health and education separately, the functionaries devolution date for education closely mirrors that for health.

As a consistency check, we compare our coding of functionaries with other related measures. For example, the 2015-16 Devolution Report (Government of India, 2016b) reports the number of functionaries per 1000 population for all states in 2015. This includes both the local government's own functionaries such as the village *panchayat* secretary and functionaries transferred to local governments such as public health workers. The states that we code as having devolved functionaries reported 1.5 functionaries per 1000 people compared to 1.1 for states that we code as not having devolved functionaries.

3.3 Political and fiscal decentralization

We track the progress of political decentralization by coding the first year when the state conducted local council elections with the one-third gender quota, based on data from Iyer et al. (2012). Table 1 shows that political decentralization progressed much faster than administrative decentralization. By 2010, all states in our sample had implemented the gender quota.

Our data on funds devolution is limited because there is no uniform and consistent database of annual local government finances, a fact noted and bemoaned by multiple Central Finance Commissions. This makes it difficult to measure the extent of fiscal decentralization using measures such as the fraction of local government revenues that are raised by them versus granted by upper levels of government. The 2015-16 Devolution Report reports the taxes collected by the different *panchayat* tiers by state as of 2015 (Government of India, 2016b). We therefore create a crude indicator of fiscal decentralization that equals one if *panchayats* at each tier (district, intermediate and village) report collecting their own taxes. By this measure, only five states had implemented fiscal decentralization; all these states also report their

panchayats collecting user fees.

Since state and central government funding account for the bulk of local government revenues, we need to ensure that our results on administrative devolution are not driven by concurrent changes in such funding sources. We therefore construct several measures of funding from these sources: annual per capita state government spending on health and education, a larger category of annual social spending by the state (the sum of education, medical and public health, and water supply and sanitation), state government contributions to local bodies and per capita funding from the central government to local bodies (based on Central Finance Commission grants).

Before concluding this section, we want to emphasize that our specific measures of effective devolution of public health and education are more precise than aggregate devolution indices constructed by different organizations and scholars since the mid 2000s. This is both because these indices combine facets of administrative, fiscal and political decentralization into a single index, and because the components of these indices changed from year to year (see Government of India (2016b) for more details on the construction of the different indices).

4 Data on Human Development Outcomes

4.1 Health outcomes

We obtained data on health outcomes from India's National Health and Family Survey (NFHS) of 2015-16, which is part of the widely used multi-country Demographic and Health Surveys. This survey asks retrospective data on birth outcomes and child health to women aged 15-49 at the time of the survey, enabling us to construct a detailed cohort-level dataset. The survey covers more than 568,000 households and over a million live births across all states of India.

We focus on child mortality as our main health outcome, for two reasons. First,

infant mortality is a widely used measure of human development in both within-country and cross-country settings. Second, this outcome has the potential to be greatly affected by the functioning of the health system which provides pregnant mothers with information about proper nutrition and potential complications, services such as prenatal checkups and referrals to other health facilities, and inputs such as prenatal vitamins and infant immunizations. Prior work, for example, in Uganda has shown that better monitoring of the public health facilities resulted in large declines in child mortality (Björkman and Svensson, 2012; Björkman-Nyqvist et al., 2017).

We compute child mortality at three early life stages: neonatal mortality is an indicator variable that equals one if a child died within the first month of birth, infant mortality indicates whether a child died within the first year of birth and under-5 mortality indicates whether a child died within the first five years of birth. Note that these variables are conditional on the child reaching the specified age e.g. under-5 mortality is not defined if the child was born less than five years prior to the survey. All of these variables display a decreasing secular trend over time (Figure A.1).

Since these outcomes are conditional on a child being born, we also examine whether devolution is correlated with changes in the decision to give birth, and with changes in the sex of the child. For instance, if health facilities dramatically improved as a result of devolution, more families may decide to conceive children and the resulting increase in demand for health services may in turn have a detrimental effect (Malhotra, 2019). Prior literature has also shown that greater in-utero stress, nutritional or otherwise, leads to more girl births (Waldron, 1983; Low, 2000; Gluckman and Hanson, 2005). To account for these possibilities, we study two additional outcomes, namely fertility (a dummy for whether a woman gave birth in a specific year) and a dummy for whether the child born was female.

Our estimation sample includes birth cohorts born between 1990 and 2016. We

drop states and districts where the *Panchayati Raj* Act was not applicable.[11] In our final sample, we have 25 states that account for 95% of India's population, covering almost 1.1 million births over 26 birth cohorts (see Table A.3 for summary statistics).

The NFHS surveys also ask questions about prenatal care provision and immunization status of all births in the previous three or five years. To construct a partial panel of such variables over time, we pool together four waves of NFHS surveys.[12] We track the following prenatal care outcomes: whether a mother had three or more prenatal health visits over the course of her pregnancy, whether a tetanus shot was provided and whether iron supplements were provided. We also track the immunization status of all children over the age of 12 months, who are required to have at least eight vaccinations in their first year of life (three polio shots, three shots of DPT and one each of BCG and measles vaccines). We construct indicators of whether the child had no vaccines, had at least one vaccine or was fully vaccinated.

4.2 Education outcomes

We use the 75^{th} round of the National Sample Survey (NSS) conducted between July 2017-June 2018 to construct measures of educational attainment. The NSS is a nationally representative survey of more than 500,000 individuals from 113,757 households across all Indian states. Our two main outcomes are primary school completion and middle school completion, since the devolution reform specified devolution of primary and middle schools (Table A.1). Typically, students are enrolled in primary education from ages 6 to 10, and in middle school (grades 6-8) from ages 11 to 13. To allow for potential delays in school enrolment and progression, we restrict our sample to individuals aged 14 and above (for primary school completion) and to those aged

[11] These are the states of Jammu and Kashmir, Meghalaya, Mizoram and Nagaland, and a few hill districts in the states of Assam, Manipur, Tripura and West Bengal.

[12] The NFHS 1992-93 has these data for births in 1988-1993, NFHS 1998-99 covers births from 1996-1999, the NFHS 2005-06 has data for births in 2001-2006 and the NFHS 2015-16 covers births in 2010-2016.

17 and above (for middle school completion). These age restrictions imply that we are only able to examine school completion outcomes for cohorts exposed to devolution in year 2008 or earlier i.e., we are unable to examine the full range of devolutions for education outcomes. Since there have been large secular increases in schooling across India in the past several decades (see Figure A.2), we exclude very old cohorts from our analysis by restricting to individuals aged 35 and below at the time of the survey.

5 Empirical Strategy

Our empirical strategy compares child mortality and education outcomes across birth cohorts that were exposed to devolution to those that were not. Variation in such exposure comes from the timing of devolution across different states. Our difference-in-differences (DiD) regression specification takes the following form:

$$Y_{ist} = \alpha_s + \delta_t + \beta * DEV_{st} + X_{ist}\gamma + \epsilon_{ist} \tag{1}$$

where Y_{ist} is the health or education outcome of individual i born in state s and birth year t. Our main explanatory variable DEV_{st} is an indicator that equals one if the individual born in state s and year t is exposed to functions devolution. For health outcomes, this indicator equals one if the state has devolved health functions at least one year before the individual is born, i.e., $DEV_{st} = 1$ if state s devolves health functions in year $t-1$ or earlier. We prefer this lagged specification, since devolution can affect child mortality outcomes via changes in effective prenatal care that take place over the course of pregnancy.

For primary school completion and years of education, DEV_{st} equals one if state s has devolved education before the individual enters primary school, i.e., in years $(t+5)$ or earlier. For middle school completion, DEV_{st} equals one if state s has devolved education functions in year $(t+11)$ or earlier. Note that these indicators measure whether an individual was exposed to devolution throughout their primary

or middle school years. We can compute an alternative measure of partial exposure to devolution as indicators for whether some of the individual's time in primary or middle school was subject to devolution. The measure of partial exposure would equal one if state s devolved education functions prior to $(t + 10)$ for primary school completion, and prior to $(t + 14)$ for middle school completion. Unlike the measure of full exposure that captures devolutions in year 2008 or earlier, the measure of partial exposure would capture the impact of devolutions up to year 2014.

In specification 1, α_s and δ_t are fixed effects for state s and birth year t respectively, that control for time-invariant state characteristics and annual factors that affect all states such as national elections or the National Rural Health Mission introduced in 2005. X_{ist} controls for characteristics of the individual or household that could affect health or education outcomes. For health outcomes, these include dummies for rural versus urban residence, caste and religion of the household, mother's age at birth and its square, mother's birth year, education, age at marriage and height (an indicator of the mother's nutritional and health history). We also control for the gender and birth order of child i in X_{ist}, since prior research has shown that health outcomes differ by birth order and gender (Jayachandran and Pande, 2017). For education outcomes, we control for gender, marital status, rural versus urban residence, indicators for caste and religion categories, and household income. Standard errors are clustered at the state level, since our main explanatory variable varies at the state level. Since we are restricted to only 25 states, we also report p-values using a wild bootstrap procedure.

As described before, many states undertook only a partial administrative devolution by devolving responsibility for health functions to local governments but not devolving functionaries. Theoretically, the impact of functionaries devolution is ambiguous: it may make functions devolution more effective (e.g. via better monitoring of personnel) or could make things worse (e.g. if local authorities can be more easily bribed to overlook employee absenteeism). To examine whether the impact of

functions devolution depends on the status of functionaries devolution, we run the following interacted specification:

$$Y_{ist} = \alpha_s + \delta_t + \beta_1 DEV_{st} + \beta_2 DEV_{st} * FUNC_{st} + X_{ist}\gamma + u_{ist} \quad (2)$$

where DEV_{st} is as defined in equation (1) and $FUNC_{st}$ is defined similar to DEV_{st}, but using indicators for whether state s has devolved functionaries. All other terms are the same as in equation (1). The coefficient β_1 therefore represents the impact of functions devolution without any devolution of functionaries, while β_2 reflects the additional impact of devolving functionaries in addition to functions. The total devolution effect for states that devolved both functions and functionaries is therefore $\beta_1 + \beta_2$.

There are three main threats to identification in our setting. First, this DiD approach assumes that states that devolved health functions would, in the absence of devolution, have had parallel child mortality trends to states that did not devolve health. Second, the timing of decentralization across states may be correlated with other economic or political factors that may independently affect our outcomes. Third, our estimator may be biased in the presence of heterogeneous treatment effects that vary across early versus late reformers. We examine these concerns in detail in section 6.2.

6 Administrative Devolution and Health Outcomes

6.1 Devolving functions with and without functionaries

Our estimates from equation (1) show that the devolution of health functions from state to local governments results in increases in neonatal, infant and child mortality (Table 2, columns 1, 3, 5). The estimate for infant mortality is statistically significant at the 10% level of significance, while that for under-5 mortality is significant at the 5% level. P-values from a wild bootstrap procedure are shown in brackets below the

standard errors in parantheses, and lead to similar conclusions regarding statistical significance.

This overall detrimental effect is entirely attributable to functions devolution that happens without functionaries devolution. The estimated β_1 coefficients from specification (2) indicate that such incomplete devolution increases neonatal mortality by 0.75 percentage points, infant mortality by 1.36 percentage points and under-5 mortality by 1.62 percentage points (Table 2, columns 2, 4 and 6). These are large effects, corresponding to 19%, 25% and 24% of the sample means, and they are all statistically significant at the 1% level. These effect sizes are comparable to the effect of socioeconomic covariates: partial devolution increases neonatal mortality by 0.04 standard deviations (Table 2, column 2), comparable to the 0.08 standard deviation increase when mothers have no education compared to those who have some education.

The estimated β_2 coefficients are negative, statistically significant and similar in magnitude to the β_1 coefficients. In other words, the combination of functions and functionaries devolution increases neonatal, infant and under-5 mortality by an insignificant 0.14, 0.38 and 0.6 percentage points respectively. We verify that the sum of the β_1 and β_2 coefficients is not statistically different from zero (see p-values in Table 2, columns 2, 4, 6). Our results show that even full administrative decentralization (of functions and functionaries) does not lead to improvements in health outcomes.

6.2 Robustness checks

We subject our results in Table 2 to a series of robustness checks; these are performed for the interacted specification of equation (2).

Differential pre-trends: To check whether health outcomes were trending differently in states that devolved, we plot year-by-year coefficients of the impact of devolution for five years before devolution and six years after devolution in an "event-study" graph (Figure 1). For each of our outcomes, the left hand plot shows the

estimated β_1 coefficients, while the right hand plot shows the estimated β_2 coefficients, while the vertical line represents the timing of devolution. We find, reassuringly, that none of these coefficients is statistically significant in years prior to the functions or functionaries reforms, while most of the post-reform coefficients are statistically different from zero. These significant effects can be discerned very quickly after the devolution date, and are stable for several years after devolution i.e., our results on mortality increases are not simply due to temporary transition issues.

State- and time-varying omitted variables: We show that our results remain similar to the baseline results of Table 2 when we control for the timing of gender quota implementation (Table 3, columns 1, 3 and 5). This is important to verify since prior research has shown a strong role of women leaders in improving health outcomes (Bhalotra and Clots-Figueras, 2014; Brollo and Troiano, 2016; Bhalotra et al., 2022). We show that the results remain very similar in magnitude and statistical significance when we control for annual state per-capita spending on the category of medical and public health services (Table 3, columns 2, 4 and 6). Our results also remain similar if we control instead for other dimensions of spending such as per capita state social spending (which includes education, public health, water and sanitation), per capita state transfers to local bodies and per capita central goverment funding to *panchayats* (Table A.4). These results highlight that administrative devolution was not correlated with changes in state budgetary priorities.

Recoding specific devolution dates: We examine sensitivity to recoding of devolution dates that we were unsure of (see section 3.1), namely recoding Bihar's devolution date to 2011 rather than 2014, recoding Rajasthan as "not devolved," and changing the date of functionaries devolution to three years ahead for the states where the documents did not clearly specify a date (see section 3.2). All of these make little difference to the magnitude and significance of the β_1 coefficients; our β_2 coefficients are now slightly smaller in magnitude and sometimes statistically insignificant; however, the sum $\beta_1 + \beta_2$ is still statistically indistinguishable from zero

(Table A.5). This means that our substantive conclusions regarding the impact of devolution remain unchanged by such recoding.

Changing the estimation sample: We rerun our base specification after dropping families that report moving to their current area of residence after the child was conceived, or were recorded as visitors at the time of the survey.[13] This helps address the potential concern that families may migrate in response to better or worse quality of public services, as shown in some other settings (Urquiola, 2005). Our β_1 and β_2 coefficients retain their size and significance for all three child mortality outcomes even with this restriction (Table A.6, columns 1, 3 and 5). To rule out the concern that different types of households may choose to give birth before and after devolution, we re-run our regression with mother fixed effects, which effectively controls for any time invariant unobservable differences across mothers that could be correlated with a child's health outcomes. While the estimated coefficients are slightly smaller in magnitude, they remain statistically significant (Table A.6, columns 2, 4 and 6).[14] We further verify that our results are not being driven by any one state-specific policy by rerunning our main regressions, dropping one state at a time. The resulting coefficients for both β_1 and β_2 lie within a relatively narrow band (Figure A.3).

Heterogeneous treatment effects: The DiD estimator is a weighted average of several different comparisons of "treated" units with "not-yet-treated" units and with "already treated" units. If states that devolve early have a different treatment effect than those that devolve later, then some of these comparisons may be

[13]Most migration in India is within-state, so that even if households have moved, they would still have been subject to the state's devolution reforms. The data do not allow us to distinguish between within-state and cross-state migrants, so that this restriction is likely to be more conservative than needed.

[14]Note that identification in this sample arises from women who have had multiple children, and had births in both pre-devolution and post-devolution periods. Since this may not reflect the characteristics of the nationwide representative sample, we show this as a robustness check.

entering with negative weights and thereby leading to biased and misleading DiD coefficients (de Chaisemartin and D'Haultfoeuille, 2020; Goodman-Bacon, 2021). To assess the validity of this concern, we first present our DiD estimates (based on equation 1) separately for the sample of states that did not devolve functionaries and for those that did, as recommended by de Chaisemartin and D'Haultfoeuille (2020).[15] The results are shown in Table 4, panel A, and are consistent with those of Table 2: incomplete devolution of functions leads to significantly worse child health outcomes across all three measures of child mortality (columns 1, 3, 5), while devolving functions and functionaries has no significant effect on child mortality outcomes (columns 2, 4, 6). Examining the weights involved in computing these DiD estimators, we find that the sum of the negative weights in any of these specifications is a maximum of 0.13 (out of a total of 1). We therefore conclude that heterogeneous treatment effects by state are unlikely to be a source of bias in our analysis.

We also construct two alternative DiD estimators, as suggested by the recent literature. The first is based on de Chaisemartin and D'Haultfoeuille (2020), and compares outcomes from period (*t-1*) to period t (date of devolution) between groups that switch from untreated to treated with groups that are untreated at both dates (the "instantaneous" effect). A modified version of this compares the outcomes from period (*t-1*) to period (*t+6*), the sixth dynamic effect. Reassuringly, we find consistent results across the standard DiD estimates in panel A of Table 4 and the de Chaisemartin and D'Haultfoeuille (2020) estimates in panel B. In both cases, devolution of health functions without functionaries increases neonatal, infant and under 5 mortality. The estimates are of comparable statistical significance, although some of the "instantaneous" effects lose statistical significance.

The second alternative DiD estimator is constructed using only the "not-yet-treated" units as the control group (Callaway and Sant'Anna, 2021; Sun and Abra-

[15] In these specifications, we do not exploit the temporal variation in the timing of functionary devolution. Rather, we split the sample based on whether a state devolved functionaries or not.

ham, 2021). For ease of computation, we pool the data to the state-birth year level and run weighted regressions using counts of individuals in each state-birth year as weights. These alternative estimators are similar in sign and significance for states that devolved functions but not functionaries, showing a rise in all three measures of child mortality (panel C, columns 1, 3, 5). This alternative DiD estimator shows increases in infant and under-5 mortality even for states that did devolve both functions and functionaries (panel C, columns 4 and 6); however, these effects are not apparent in the year-by-year graphs based on this strategy (Figure A.4).

6.3 Do other dimensions of decentralization matter?

As discussed earlier, political decentralization was implemented in all states prior to administrative decentralization. We have already verified that the effects of administrative decentralization are not confounded by the effects of this earlier measure (see section 6.2). Since we do not have states that conduct administrative but not political decentralization, we cannot evaluate whether and how the two measures complement each other in shaping development outcomes.

We can examine such complementarities in the context of fiscal decentralization. We show results separately for states that had some funds decentralization (proxied by whether *panchayats* at all tiers report collecting any taxes in 2015) and states that had no funds decentralization. Among states with some funds decentralization, neither functions nor functionaries devolution is associated with any significant change in child mortality rates (Table A.7, columns 1, 3 and 5). However, for states that had no funds decentralization, we see a significant rise in child mortality rates when health functions are devolved, which is reversed when functionaries are also devolved (columns 2, 4 and 6). This strongly suggests that building the capacity of local governance institutions, via strengthening their financial ability to raise revenues and/or giving them supervisory authority, should be strongly emphasized in decentralization initiatives.

7 The Role of Public Service Delivery

We consider the mechanisms that might underlie the observed worsening of child mortality outcomes under partial decentralization. We first verify that fertility trends do not respond strongly to such measures. We then show three pieces of evidence that suggest worsened delivery of public services as the main determinant rather than any changes in private behavior or other state policies.

7.1 Fertility responses

We first verify that the deterioration of child mortality outcomes is not driven by increased fertility in response to devolution (which may increase the burden on public health facilities), or by a changing gender mix of children (since male children are typically more fragile at very young ages). This is also an important check to perform, since child mortality outcomes are conditional on the birth of a child. We find that devolution of functions and functionaries results in a marginally significant decline in fertility, while devolution of functions alone has no effect (Table A.8, columns 1 and 2). While this may be indicative of better provision of family planning services under full devolution, the effect size is very small (only 0.45% of the mean). There is no significant effect of devolution on the probability of the child being a girl (Table A.8, columns 3 and 4).

7.2 Differential effects by gender and wealth

Many previous studies have documented the high degree of son preference in India and consequently, the fact that girl children are often more neglected than boys (see, among others, Jayachandran and Kuziemko (2011)). It is therefore important to examine whether child mortality of girls suffers more than that of boys when there is a decline in the efficiency of public health functioning. In the case of administrative devolution, the patterns are mostly similar for boys and girls (Table A.9). All but one

of the estimated β_1 and β_2 coefficients are larger in magnitude for girls compared to boys, though they are not statistically different from those of boys. This is consistent with girls' mortality rates being more responsive to public health service quality, as families may be more willing to spend on private health care for boys to compensate for shortfalls in public provision.

A second dimension of heterogeneity may arise from household resources. Poorer households are likely to be more dependent on the public health system, while richer ones have the option to pay for private health care if public services deteriorate. We therefore examine whether administrative devolution has larger effects on poorer households, by running separate regressions for households in each of five wealth quintiles. As expected, we find that both the β_1 and the β_2 coefficients are larger in magnitude for poorer households than for the richer ones (Figure 2).

7.3 Measures of health service provision

Using direct measures of prenatal care provision, as well as indicators of child immunization, we show that devolution of health functions, without functionaries devolution, results in worse service delivery. Pregnant mothers in states with incomplete devolution are significantly less likely to be provided tetanus shots and their children are more likely to be unvaccinated (Table 5, columns 2 and 4). In both cases, these negative effects are reversed for states that additionally devolved functionaries. Note that these regressions are based on an incomplete sample of birth cohorts due to the data constraints described in section 4.1.

We examined data on the growth of health facilities and health personnel as a potential channel to explain these shortfalls in service delivery (Government of India, 2015). Using data from 2005 and 2015, we find that states that devolved health functions and functionaries experienced a 0.35% annual growth in the number of health facilities, compared to 0.29% in states that devolved health functions but not the functionaries and 1.3% in states that did no devolution. The corresponding rates of

growth for antenatal care workers were 2.4%, 4.1% and 1.1% (the differences between groups are not statistically significant). Since the comparisons of physical facilities are different from those of manpower, the evidence is not conclusive about the role of the "quantity" dimension of health care provision, and our earlier analysis indicates that health care spending did not change in response to devolution initiatives.

7.4 Administrative devolution and education outcomes

Our analysis of primary school completion rates yields similar results to those on child mortality. Primary school completion decreases among states that devolve education functions (Table 6, column 1). This negative effect is completely driven by states that only devolved functions and not functionaries; these states experience a 4.2 percentage point decline in primary school completion, corresponding to 4.6% of the sample mean (column 2, β_1 coefficient). Among states that devolved both functions and functionaries we observe no difference in primary school completion compared to states that did not devolve (column 2, $\beta_1 + \beta_2$).

We find slightly different results in the case of middle school completion. Middle school completion is no different among states that devolved education functions without functionaries, compared to those that did not do any devolution. But, middle school completion is higher by 5.5 percentage points among states that devolved both functions and functionaries, corresponding to 7% of the sample mean (Table 6, column 4).

As in the case of health outcomes, the results on primary and middle school completion are robust to controlling for per capita state spending on education (Table A.10, columns 1 and 4), as well as controlling for the timing of political decentralization (columns 2 and 5). The results increase in magnitude if we use a "partial exposure" to devolution measure, which equals one if a state devolved at any time during a child's tenure in primary school; our original DEV_{st} measure equaled one if devolution happened before the child started primary school. The result with the

partial exposure measure are shown in Table A.10, columns 3 and 6.

The education results show similar patterns of heterogeneity as the mortality ones, bolstering our conclusion that the main mechanism is a worsening of public service delivery under incomplete devolution. When we look at the association with funds devolution, we see that there are no negative effects of devolving functions or functionaries in states where local governments collected at least some taxes on their own (Table A.11, column 1). But, devolving functions without associated functionaries or funds leads to lower primary school completion (column 2). In the case of middle school completion, we find that states that devolved both functions and functionaries do better regardless of whether they devolved funds. Local responsibility over functionaries seems to be an important driver of middle school completion.

Finally, examining heterogeneity by gender, we find significantly lower primary school completion for girls among states that only devolved education functions but not functionaries, and no significant impact on boys (Table A.12, columns 1 and 2). Both girls and boys experience higher middle school completion under complete devolution, with no improvement under partial devolution (columns 3 and 4). The coefficient for girls is almost twice as large as for boys, again consistent with the idea that girls' education is more dependent on public provision compared to boys.[16]

8 Conclusions

We conduct the first analysis of the administrative devolution provisions of India's *Panchayati Raj* constitutional amendments. In contrast to prior studies on decentralization reforms, we examine the actual processes involved in administrative devolution, and find that these distinctions matter. In particular, devolution of health functions without devolution of either functionaries or funds results in a statistically

[16]Unlike the NFHS, the NSS surveys do not provide a wealth quintile, making it difficult to conduct heterogeneity analyses by household wealth.

significant increase in child mortality rates. Devolution of functions together with functionaries results in no net change in child mortality rates, suggesting that these reforms did not result in better functioning of the public health system in India. This is a disappointing result, since improving public service provision was one of the main drivers for the decentralization reforms.

Several pieces of evidence support the hypothesis that incomplete devolution results in a decline in the quality of public service provision. We find declines in the provision of prenatal care and immunization, and the effects are higher for poorer households who rely more on public services. Our results for education mirror those on health, suggesting that such declines in public service delivery are broad-based. An important policy implication is that decentralization policies need to be implemented with care, and that separating responsibility from authority can be detrimental for human development.

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Table 1: Timing of Administrative and Political Devolution Across States

	Administrative Decentralization		Political Decentralization
	# of states devolved health	# of states devolved education	# of states held local elections with gender quota
Before 1993	0	0	4
1993	1	1	1
1994-1997	3	3	14
1998-2002	0	0	2
2003-2006	5	5	3
2007-2012	7	8	1
2013-2015	2	2	0
Not devolved as of 2015	7	6	0

Notes: See Table A.2 for details of data sources. The 73rd amendment is not applicable to the states of Jammu & Kashmir, Meghalaya, Mizoram and Nagaland.

Table 2: Impact of Functions and Functionaries Devolution on Child Mortality

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
Devolved Health (β_1)	0.0034	0.0075***	0.0072*	0.0136***	0.0092**	0.0162***
	(0.0020)	(0.0019)	(0.0035)	(0.0029)	(0.0039)	(0.0034)
	[0.131]	[0.003]	[0.081]	[0.007]	[0.045]	[0.005]
Devolved Health * Devolved Functionaries (β_2)		-0.0061*		-0.0098**		-0.0102**
		(0.0030)		(0.0040)		(0.0044)
		[0.090]		[0.063]		[0.100]
$\beta_1 + \beta_2 = 0$ (p-value)		0.583		0.352		0.176
$\beta_1 + \beta_2 = 0$ (p-value), wild bootstrap		[0.629]		[0.412]		[0.223]
Mean of dep var	0.039		0.055		0.068	
Child Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mother Controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and state FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,097,697	1,097,697	1,054,264	1,054,264	869,522	869,522

Notes: Robust standard errors clustered at the state-level in parentheses. p-value from wild bootstrap in brackets. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table 3: Impact of Devolution on Child Mortality, Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
	Control for timing of political decentralization	Control for per-capita state health spending	Control for timing of political decentralization	Control for per-capita state health spending	Control for timing of political decentralization	Control for per-capita state health spending
Devolved Health (β_1)	0.0075***	0.0072***	0.0136***	0.0125***	0.0162***	0.0155***
	(0.0019)	(0.0019)	(0.0028)	(0.0028)	(0.0034)	(0.0034)
Devolved Health * Devolved Functionaries (β_2)	-0.0062**	-0.0058*	-0.0100**	-0.0086**	-0.0101**	-0.0088*
	(0.0029)	(0.0030)	(0.0038)	(0.0042)	(0.0042)	(0.0047)
$\beta_1 + \beta_2 = 0$ (p-value)	0.603	0.560	0.365	0.318	0.172	0.112
Mother and Child Controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,097,697	1,072,713	1,054,264	1,029,280	869,522	844,538

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table 4: Impact of Devolution on Child Mortality, Alternative DiD Estimators

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
	Functionary = 0	Functionary = 1	Functionary = 0	Functionary = 1	Functionary = 0	Functionary = 1
	Panel A: DiD Estimator, Split Sample					
Devolved Health (β)	0.0062***	0.0003	0.0119***	0.0018	0.0132***	0.0040
	(0.0018)	(0.0018)	(0.0035)	(0.0027)	(0.0034)	(0.0028)
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	511,135	586,562	490,975	563,289	405,326	464,196
	Panel B: de Chaisemartin and D'Haultfoeuille (2020) Estimator					
Devolved Health (β)	0.0047	0.0017	0.0073***	0.0027	0.0056	0.0027
Instantaneous treatment effect	(0.0032)	(0.0032)	(0.0024)	(0.0027)	(0.0029)	(0.0032)
Devolved Health	0.0049**	-0.0008	0.0090***	0.0012	0.0070***	0.0034
Average Dynamic Treatment Effect (6)	(0.0023)	(0.0024)	(0.0020)	(0.0024)	(0.0020)	(0.0022)
	Panel C: State-Birthyear, Callaway and Sant'Anna (2021)					
Devolved Health (β)	0.0059***	0.0002	0.0118***	0.0047*	0.0110***	0.0079***
	(0.0015)	(0.0021)	(0.0016)	(0.0024)	(0.0026)	(0.0027)

Notes: Standard errors in parantheses, clustered at state level (panels A and C) or bootstrapped with state level clustering (panel B) . *** p<0.01, ** p<0.05, * p<0.1. There are no controls included in these specifications, other than state and year fixed effects.

Table 5: Impact of Devolution on Health Care Provision

	(1)	(2)	(3)	(4)	(5)	(6)
	Indicators of prenatal care			Childrens' immunization		
	Three or more prenatal visits	Tetanus injection provided	Iron supplements provided	No vaccinations	Partially vaccinated	Fully vaccinated
Devolved Health (β_1)	0.0249	-0.140**	-0.0446	0.0619*	0.0303	-0.0921
	(0.0610)	(0.0671)	(0.0514)	(0.0348)	(0.0499)	(0.0809)
	[0.783]	[0.088]	[0.442]	[0.132]	[0.580]	[0.316]
Devolved Health * Devolved	0.00535	0.0768	0.0056	-0.0433	-0.0472	0.0904
Functionaries (β_2)	(0.0725)	(0.0780)	(0.0521)	(0.0399)	(0.0486)	(0.0798)
	[0.948]	[0.402]	[0.928]	[0.344]	[0.383]	[0.317]
$\beta_1 + \beta_2 = 0$ (p-value)	0.427	0.137	0.124	0.541	0.623	0.976
$\beta_1 + \beta_2 = 0$ (p-value), wild bootstrap	[0.482]	[0.212]	[0.180]	[0.592]	[0.648]	[0.980]
Mean of dep var	0.575	0.847	0.712	0.139	0.344	0.517
Individual and Mother controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	252,119	252,240	253,134	252,662	252,662	252,662

Notes: Robust standard errors clustered at the state-level in parentheses. p-value from wild bootstrap in brackets. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth, and mother's year of birth fixed effects.

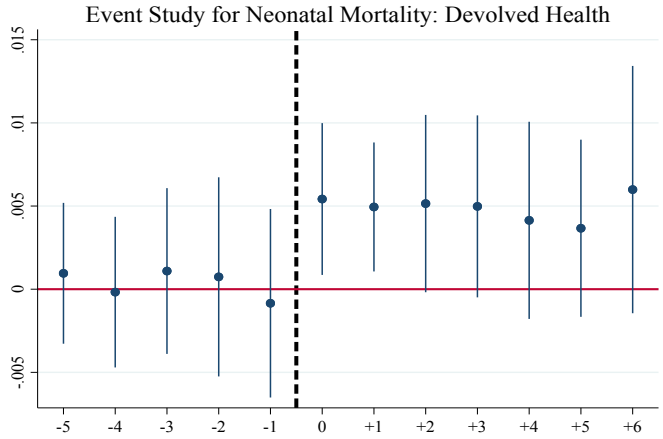
Table 6: Impact of Functions and Functionaries Devolution on School Completion

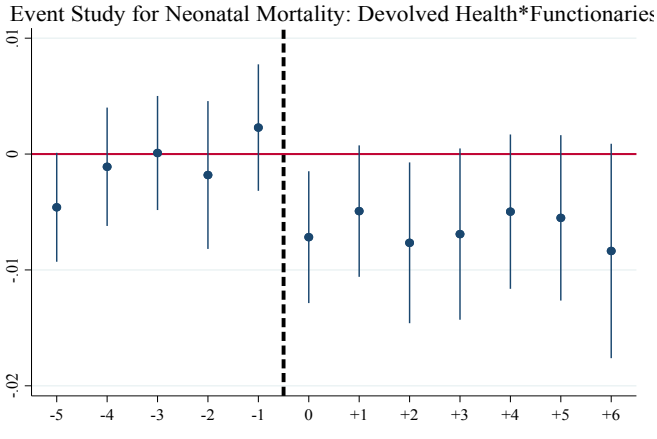
	(1)	(2)	(3)	(4)
	Primary School Completion		Middle School Completion	
Devolved Education (β_1)	-0.0276*	-0.0418**	0.0284*	-0.0160
	(0.0150)	(0.0163)	(0.0161)	(0.0173)
	[0.108]	[0.098]	[0.116]	[0.375]
Devolved Education * Devolved Functionaries (β_2)		0.0189		0.0707***
		(0.0227)		(0.0208)
		[0.525]		[0.011]
$\beta_1 + \beta_2 = 0$ (p-value)		0.220		0.0029
$\beta_1 + \beta_2 = 0$ (p-value), wild bootstrap		[0.285]		[0.017]
Mean of dep var	0.901		0.805	
Individual and Family Controls	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes
Observations	177,516	177,516	149,239	149,239

Notes: Robust standard errors clustered at the state-level in parentheses. p-value from wild bootstrap in brackets. *** p<0.01, ** p<0.05, * p<0.1. Individual and family controls include indicators for gender, marital status, Muslim, Christian, Sikh and other religions, SC, ST and OBC, and rural households, and log of household's monthly income. An individual is exposed to decentralization if they are born at least 5 years prior to decentralization (for primary school) and at least 10 years prior to decentralization (for middle school). Sample is restricted to individuals aged 14 to 35 (for primary school completion) and those aged 17 to 35 (for middle school completion).

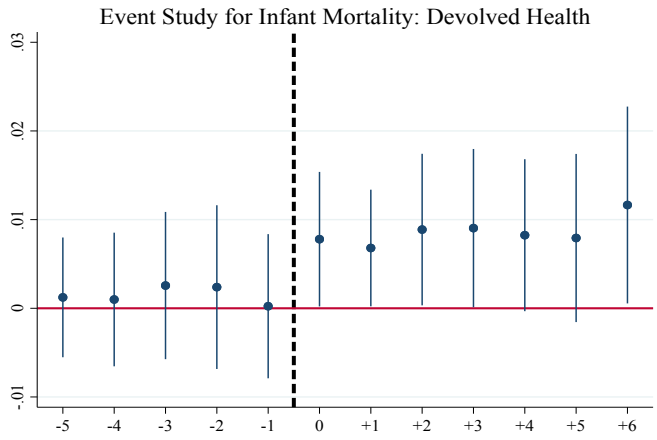
Figure 1: Year-by-year Effects of Administrative Decentralization on Child Mortality

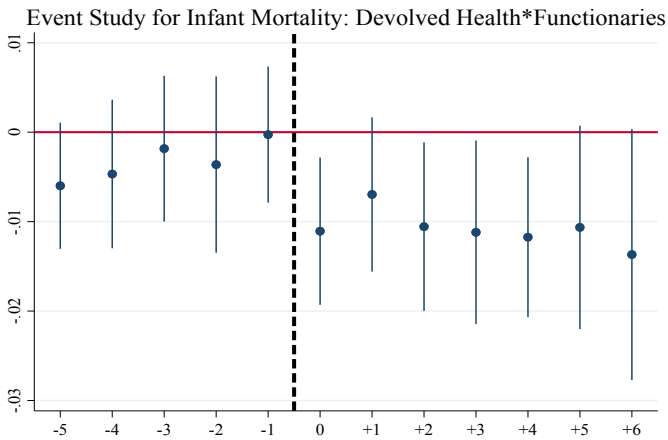
Panel A: Neonatal Mortality



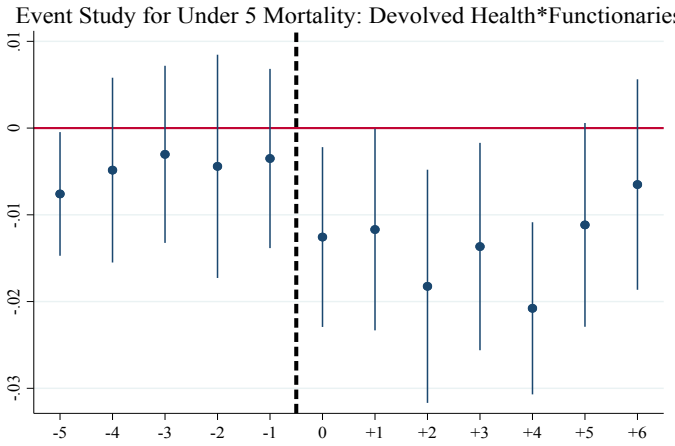


Panel B: Infant Mortality





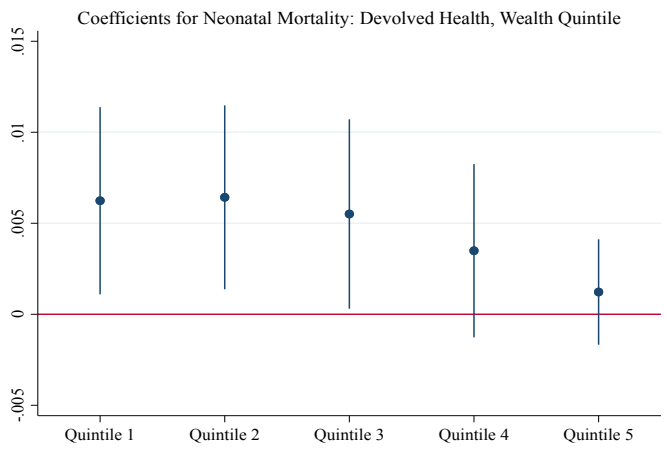
Panel C: Under-5 Child Mortality

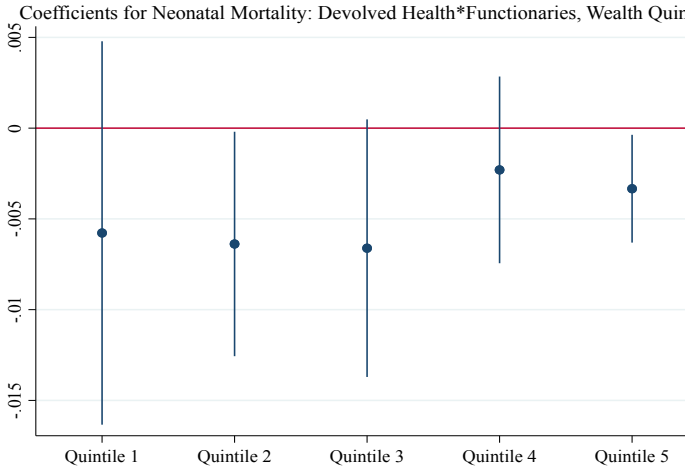


Figures on the left show the estimates β_1 for each year before and after the functions devolution. Figures on the right show corresponding estimates β_2 for each year before and after the devolution of functions and functionaries. Dashed vertical lines indicate the timing of the reform.

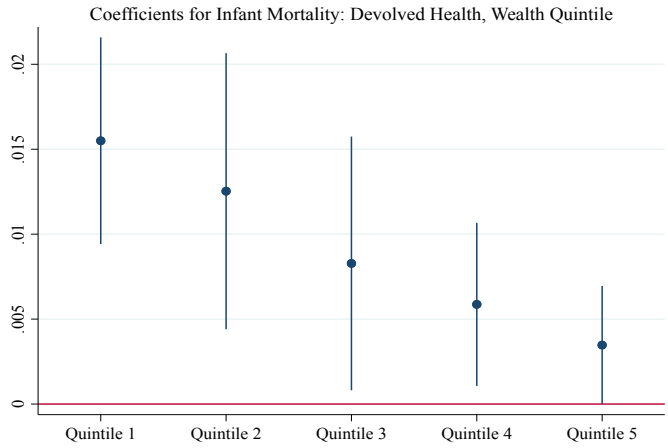
Figure 2: Heterogeneous Effects of Administrative Decentralization by Wealth on Child Mortality

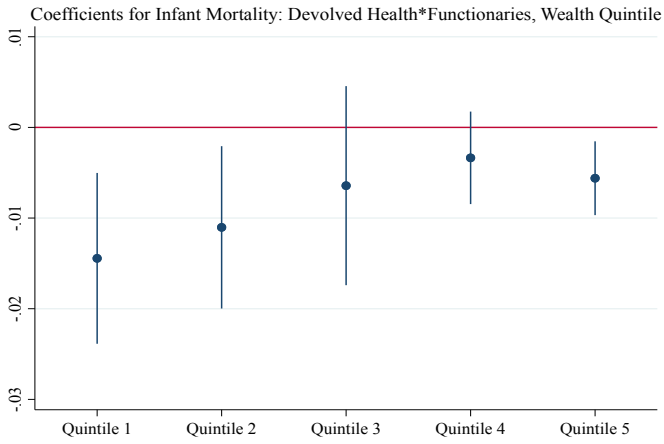
Panel A: Neonatal Mortality



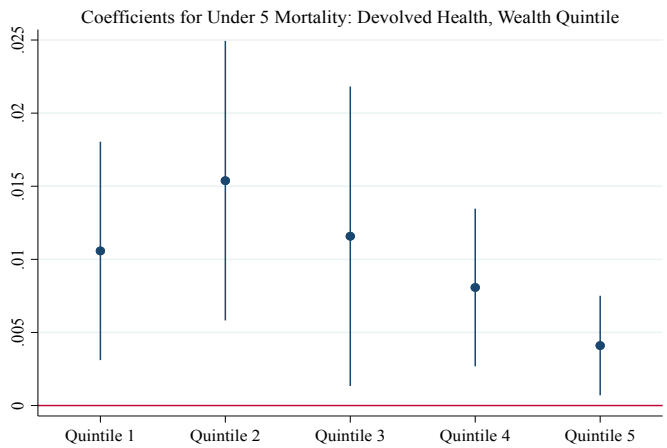


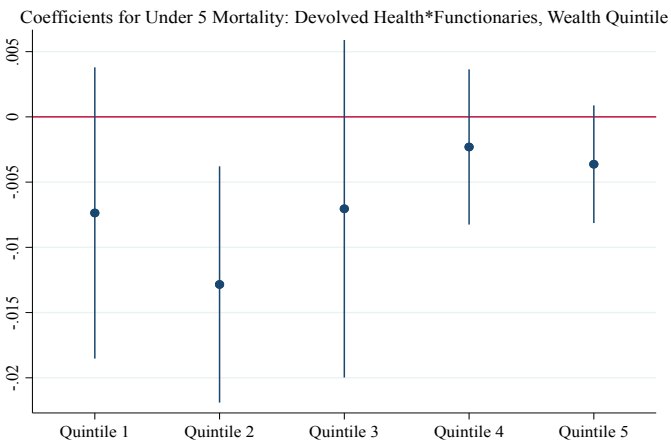
Panel B: Infant Mortality





Panel C: Under-5 Child Mortality





Figures on the left show the estimates β_1 for each wealth quintile after the functions devolution. Figures on the right show corresponding estimates β_2 for each wealth quintile after the devolution of functions and functionaries.

The Importance of Being Local: Administrative Devolution and Human Development

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Appendix Tables and Figures
October 2022

Table A.1: Devolution Areas Listed in the 11th Schedule of the Constitution of India

1. Agriculture including agricultural expansion
2. Land improvement & implementation of land reforms
3. Animal Husbandry, Dairying and poultry
4. Fisheries Industry
5. Minor irrigation, water management and watershed development
6. Social forestry and farm forestry
7. Small scale industries involving food processing
8. Minor forest produce
9. Safe water for drinking
10. Khadi, village and cottage industries
11. Rural housing
12. Fuel and fodder
13. Rural electrification, including distribution of electricity
14. Road, culverts, bridges, ferries, waterways and other means of communication
15. Education including primary and secondary schools
16. Non-conventional sources of energy
17. Technical training and vocational education
18. Adult and non-formal education
19. Public distribution system
20. Maintenance of community assets
21. Welfare of the weaker sections especially SC/ST
22. Social welfare, including welfare of the handicapped and mentally retarded
23. Family welfare
24. Women and child development
25. Markets and Fairs
26. Health and sanitation including hospitals, primary health centres and dispensaries
27. Cultural activities
28. Libraries
29. Poverty Alleviation Programmes

Notes: Obtained from https://www.jagranjosh.com/general-knowledge/list-of-subjects-covered-in-the-11th-schedule-of-the-indian-constitution-1510219894-1; accessed August 2021.

Table A.2: Data Sources

State legislation: Individual state *Panchayati Raj* Acts

Progress of administrative decentralization (functions, functionaries, funds): State profiles in *The State of Panchayats 2007-08* (Government of India, 2008); *Rural Local Body, Core Functions and Finances,* A study commissioned for the Fourteenth Finance Commission by the Centre for Policy Research, New Delhi (2014); Annual Report 2015-16 Ministry of Panchayati Raj (Government of India, 2016a); *Devolution Report of 2015-16* (Government of India and Tata Institute of Social Sciences, 2016b).

Executive orders: Department of *Panchayati Raj* websites of various states.

Progress of political decentralization: Iyer et al. (2012)

Table A.3: Summary Statistics, National Family Health Survey 2015-16

Variables	Obs	Mean	SD	Min	Max
Child mortality and birth outcomes					
Neo Mortality (child death in first month)	1,097,697	0.039	0.194	0	1
Infant Mortality (child death in first year)	1,054,264	0.055	0.228	0	1
Under 5 Mortality (child death in first five years)	869,522	0.068	0.251	0	1
Fertility (whether woman had any birth in that year)	10,017,968	0.109	0.311	0	1
Dummy for girl birth	1,102,907	0.475	0.499	0	1
Birth Order					
First birth	1,102,907	0.348	0.476	0	1
Second birth	1,102,907	0.294	0.456	0	1
Third birth	1,102,907	0.175	0.380	0	1
Fourth birth	1,102,907	0.093	0.290	0	1
Fifth or higher birth	1,102,907	0.089	0.285	0	1
Mother characteristics					
Muslim	1,102,907	0.14	0.34	0	1
Schedued Castes (SC)	1,102,907	0.20	0.40	0	1
Scheduled Tribes (ST)	1,102,907	0.14	0.35	0	1
Other Backward Castes (OBC)	1,102,907	0.43	0.49	0	1
Rural	1,102,907	0.76	0.43	0	1
Mother's age at birth of child	1,102,907	23.97	4.84	13	49
Education categories					
No education	1,102,907	0.47	0.50	0	1
Primary education	1,102,907	0.15	0.36	0	1
Secondary education	1,102,907	0.32	0.47	0	1
More than secondary	1,102,907	0.05	0.22	0	1
Mother height categories					
Less than 148 cm	1,102,907	0.24	0.43	0	1
Between 148 and 151 cm	1,102,907	0.25	0.43	0	1
Between 151 and 155	1,102,907	0.25	0.43	0	1
More than 155 cm	1,102,907	0.25	0.43	0	1
Missing	1,102,907	0.01	0.11	0	1
Mother's age at marriage categories					
Less than 15	1,102,907	0.15	0.36	0	1
15<=age married<18	1,102,907	0.33	0.47	0	1
18<=age married < 21	1,102,907	0.29	0.45	0	1
Age married >=21	1,102,907	0.23	0.42	0	1
Missing	1,102,907	0.05	0.21	0	1

Table A.4: Impact of Devolution on Child Mortality, Controlling for State and Central Government Spending

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Neonatal Mortality			Infant Mortality			Under 5 Mortality		
	Control for per-capita state social spending	Control for per-capita state transfers to panchayats	Control for per-capita Central Finance Commission grants	Control for per-capita state social spending	Control for per-capita state transfers to panchayats	Control for per-capita Central Finance Commission grants	Control for per-capita state social spending	Control for per-capita state transfers to panchayats	Control for per-capita Central Finance Commission grants
Devolved Health (β_1)	0.0068***	0.0070***	0.0077***	0.0119***	0.0123***	0.0141***	0.0155***	0.0140***	0.0167***
	(0.0018)	(0.0021)	(0.0018)	(0.0027)	(0.0032)	(0.0028)	(0.0033)	(0.0036)	(0.0036)
Devolved Health * Devolved Functionaries (β_2)	-0.0057*	-0.0051	-0.0063**	-0.0085*	-0.0075*	-0.0102**	-0.0092*	-0.0065	-0.0105**
	(0.0029)	(0.0031)	(0.0029)	(0.0042)	(0.0044)	(0.0040)	(0.0046)	(0.0044)	(0.0044)
$\beta_1 + \beta_2 = 0$ (p-value)	0.637	0.422	0.580	0.370	0.225	0.340	0.125	0.0743	0.165
Mother and Child Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,072,713	1,058,929	1,097,697	1,029,280	1,015,496	1,054,264	844,538	830,754	869,522

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table A.5: Robustness of Results to Recoding Devolution Timing for Specific States

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Neonatal Mortality			Infant Mortality			Under 5 Mortality		
	Recode Bihar date to 2011	Recode Rajasthan as "not devolved"	Move functionaries date 3 years ahead	Recode Bihar date to 2011	Recode Rajasthan as "not devolved"	Move functionaries date 3 years ahead	Recode Bihar date to 2011	Recode Rajasthan as "not devolved"	Move functionaries date 3 years ahead
Devolved Health (β_1)	0.0075***	0.0075***	0.0053***	0.0136***	0.0136***	0.0097***	0.0162***	0.0163***	0.0108***
	(0.0019)	(0.0019)	(0.0017)	(0.0029)	(0.0027)	(0.0030)	(0.0034)	(0.0033)	(0.0038)
Devolved Health * Devolved Functionaries (β_2)	-0.0061*	-0.0058	-0.0042	-0.0098**	-0.0085	-0.0059	-0.0102**	-0.0076	-0.0044
	(0.0030)	(0.0037)	(0.0029)	(0.0040)	(0.0052)	(0.0041)	(0.0044)	(0.0054)	(0.0044)
$\beta_1 + \beta_2 = 0$ (p-value)	0.583	0.609	0.725	0.352	0.322	0.460	0.176	0.0985	0.254
Mother and Child Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,097,697	1,097,697	1,097,697	1,054,264	1,054,264	1,054,264	869,522	869,522	869,522

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table A.6: Devolution and Child Mortality, Robustness to Choice of Sample

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
	Drop Visitors and Movers	Mother Fixed Effects	Drop Visitors and Movers	Mother Fixed Effects	Drop Visitors and Movers	Mother Fixed Effects
Devolved Health (β_1)	0.0063***	0.0078**	0.0127***	0.0097**	0.0154***	0.0112**
	(0.0015)	(0.0032)	(0.0022)	(0.0040)	(0.0026)	(0.0040)
Devolved Health * Devolved Functionaries (β_2)	-0.0056**	-0.0077**	-0.0099**	-0.0091*	-0.0109**	-0.0103*
	(0.0027)	(0.0036)	(0.0036)	(0.0048)	(0.0040)	(0.0056)
$\beta_1 + \beta_2 = 0$ (p-value)	0.783	0.961	0.476	0.893	0.277	0.845
Child Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mother Controls	Yes	No	Yes	No	Yes	No
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	849,731	1,097,697	813,371	1,054,264	661,536	869,522

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table A.7: Does the Impact of Administrative Devolution Vary with Fiscal Devolution?

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
	Funds - Yes	Funds - No	Funds - Yes	Funds - No	Funds - Yes	Funds - No
Devolved Health (β_1)	0.0029	0.0091***	0.0042	0.0163***	0.0019	0.0209***
	(0.0028)	(0.0027)	(0.0035)	(0.0037)	(0.0038)	(0.0038)
Devolved Health * Devolved Functionaries (β_2)	-0.0082	-0.0070*	-0.0092	-0.0117**	-0.0016	-0.0151***
	(0.0046)	(0.0039)	(0.0050)	(0.0052)	(0.0054)	(0.0051)
$\beta_1 + \beta_2 = 0$ (p-value)	0.167	0.458	0.155	0.330	0.913	0.232
Mother and Child Controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	178,663	919,034	171,777	882,487	141,999	727,523

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table A.8: Impact of Devolution on Fertility and Girl Births

	(1)	(2)	(3)	(4)
	Mother's Fertility		Girl Birth	
Devolved Health (β_1)	-0.0003	0.0000	-0.0008	0.0029
	(0.0002)	(0.0002)	(0.0026)	(0.0049)
Devolved Health * Devolved Functionaries (β_2)		-0.0005*		-0.0056
		(0.0003)		(0.0048)
$\beta_1 + \beta_2 = 0$ (p-value)		0.084		0.290
Mean of Dep.	0.11		0.475	
Mother Controls	Yes	Yes	Yes	Yes
Child Controls	No	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes
Observations	10,017,968	10,017,968	1,102,907	1,102,907

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls are birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage. Fertility regressions also control for time since the last birth.

Table A.9: Does Administrative Devolution Affect Health Outcomes of Boys and Girls Differently?

	(1)	(2)	(3)	(4)	(5)	(6)
	Neonatal Mortality		Infant Mortality		Under 5 Mortality	
	Girls	Boys	Girls	Boys	Girls	Boys
Devolved Health (β_1)	0.0069***	0.0078***	0.0142***	0.0130***	0.0175***	0.0150***
	(0.0016)	(0.0027)	(0.0031)	(0.0030)	(0.0038)	(0.0036)
Devolved Health * Devolved Functionaries (β_2)	-0.0065***	-0.0056	-0.0108**	-0.0087*	-0.0121**	-0.0084*
	(0.0022)	(0.0039)	(0.0040)	(0.0046)	(0.0052)	(0.0045)
$\beta_1 + \beta_2 = 0$ (p-value)	0.863	0.447	0.475	0.301	0.339	0.094
Mother and Child Controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	521,395	576,302	500,769	553,495	412,189	457,333

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Child controls include indicator for girls and birth order fixed effects. Mother controls include indicators for Muslim, SC, ST, OBC, and rural, indicators for mother's education, mother's age at child birth and its square, mother's year of birth fixed effects, categorical variables for mother's height and age at marriage.

Table A.10: Devolution and Education Outcomes, Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)
	Primary School Completion			Middle School Completion		
	Control for per-capita state education spending	Control for timing of political decentralization	Partial exposure to devolution	Control for per-capita state education spending	Control for timing of political decentralization	Partial exposure to devolution
Devolved Education (β_1)	-0.0311*	-0.0415**	-0.0292*	-0.0131	-0.0160	-0.0255
	(0.0166)	(0.0172)	(0.0147)	(0.0186)	(0.0173)	(0.0203)
Devolved Education * Devolved Functionaries (β_2)	0.0134	0.0183	0.0526***	0.0662**	0.0701***	0.0956***
	(0.0222)	(0.0233)	(0.0174)	(0.0242)	(0.0205)	(0.0232)
$\beta_1 + \beta_2 = 0$ (p-value)	0.232	0.203	0.148	0.002	0.005	0.004
Individual and Family Controls	Yes	Yes	Yes	Yes	Yes	Yes
Birth year and state FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	165,548	177,516	177,516	137,271	149,239	149,239
R-squared						

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Individual and family controls include indicators for gender, marital status, Muslim, Christian, Sikh and other religions, SC, ST and OBC, and rural households, and log of household's monthly income. An individual is exposed to decentralization if they are born at least 5 years prior to decentralization (for primary school) and at least 10 years prior to decentralization (for middle school). Sample is restricted to individuals aged 14 to 35 (for primary school completion) and those aged 17 to 35 (for middle school completion).

Table A.11: Administrative Devolution and Education Outcomes, Does Fiscal Devolution Matter?

	(1)	(2)	(3)	(4)
	Primary School Completion		Middle School Completion	
	Funds -Yes	Funds - No	Funds -Yes	Funds - No
Devolved Education (β_1)	-0.0111	-0.0546**	0.0008	-0.0225
	(0.0153)	(0.0197)	(0.0194)	(0.0244)
Devolved Education * Devolved Functionaries (β_2)	-0.0250	0.0432	0.0453***	0.0749**
	(0.0175)	(0.0290)	(0.0092)	(0.0273)
$\beta_1 + \beta_2 = 0$ (p-value)	0.124	0.635	0.083	0.006
Individual and Family Controls	Yes	Yes	Yes	Yes
Birth year and State FE				
Observations	40,424	137,092	34,482	114,757

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Individual and family controls include indicators for gender, marital status, Muslim, Christian, Sikh and other religions, SC, ST and OBC, and rural households, and log of household's monthly income. An individual is exposed to decentralization if they are born at least 5 years prior to decentralization (for primary school) and at least 10 years prior to decentralization (for middle school). Sample is restricted to individuals aged 14 to 35 (for primary school completion) and those aged 17 to 35 (for middle school completion).

Table A.12: Differential Effects of Administrative Devolution on Boys vs Girls's Education

	(1)	(2)	(3)	(4)
	Primary School Completion		Middle School Completion	
	Girls	Boys	Girls	Boys
Devolved Education (β_1)	-0.0681***	-0.0168	-0.0293	0.0005
	(0.0232)	(0.0128)	(0.0222)	(0.0143)
Devolved Education * Devolved Functionaries (β_2)	0.0330	0.0039	0.0865**	0.0505***
	(0.0355)	(0.0145)	(0.0313)	(0.0150)
$\beta_1 + \beta_2 = 0$ (p-value)	0.228	0.297	0.031	0.001
Individual and Family Controls	Yes	Yes	Yes	Yes
Birth year and State FE	Yes	Yes	Yes	Yes
Observations	81,163	96,353	68,465	80,774

Notes: Robust standard errors clustered at the state-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Individual and family controls include indicators for gender, marital status, Muslim, Christian, Sikh and other religions, SC, ST and OBC, and rural households, and log of household's monthly income. An individual is exposed to decentralization if they are born at least 5 years prior to decentralization (for primary school) and at least 10 years prior to decentralization (for middle school). Sample is restricted to individuals aged 14 to 35 (for primary school completion) and those aged 17 to 35 (for middle school completion).

Figure A.1: Child Mortality Outcomes

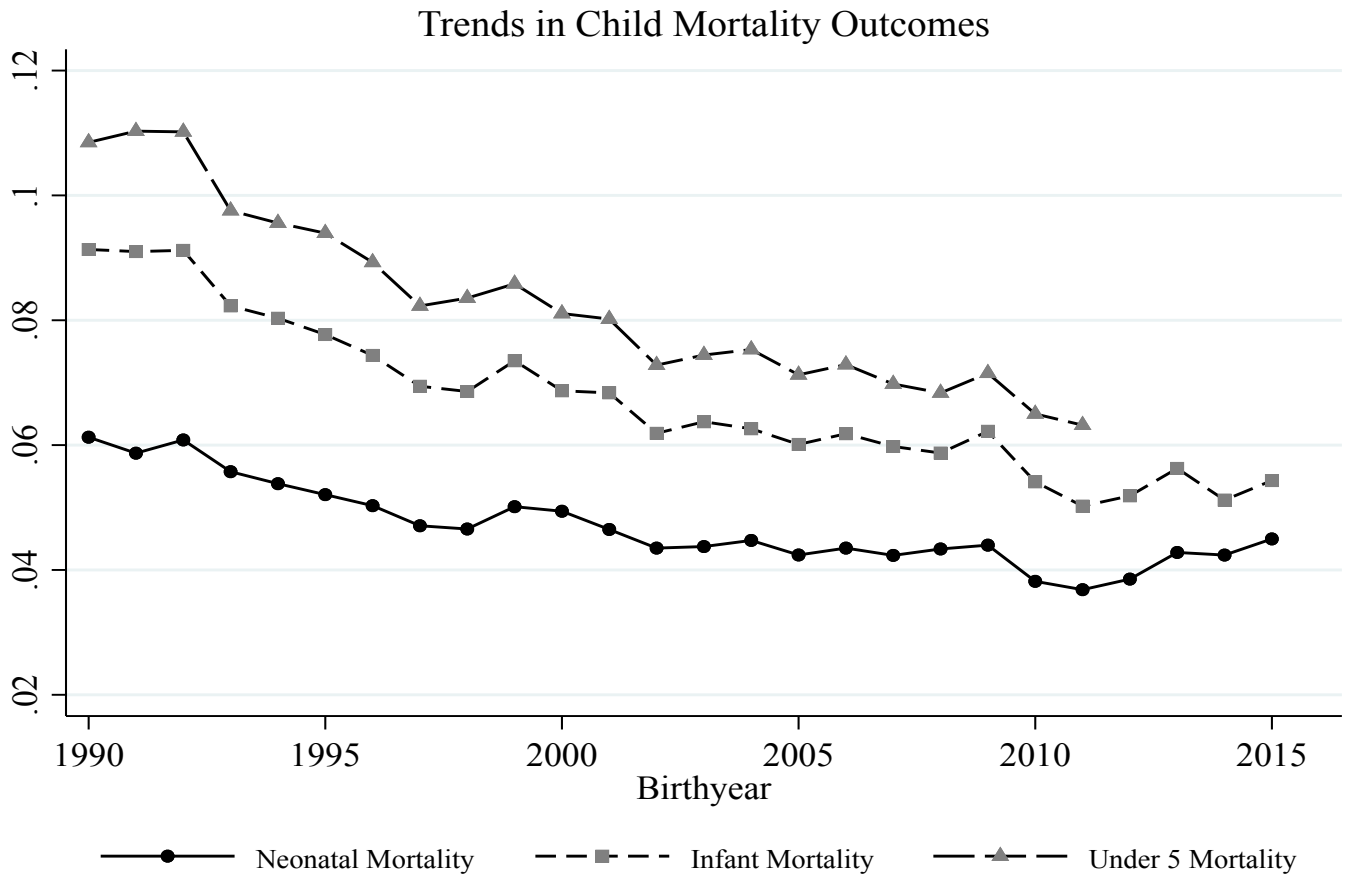


Figure A.2: Trends in School Completion Outcomes

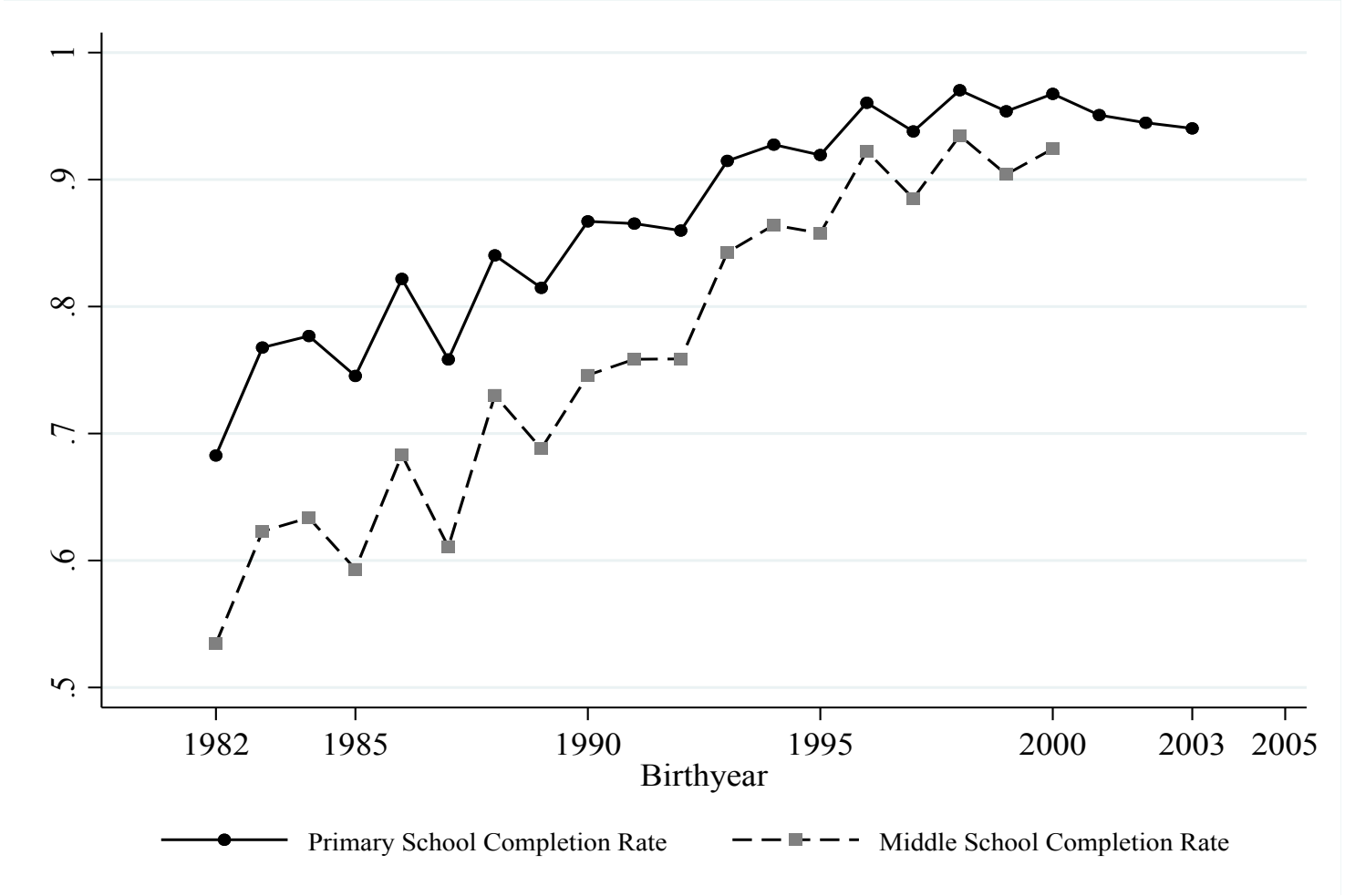
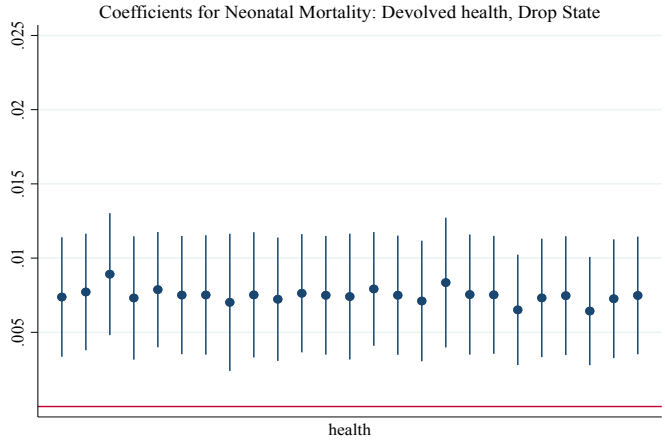
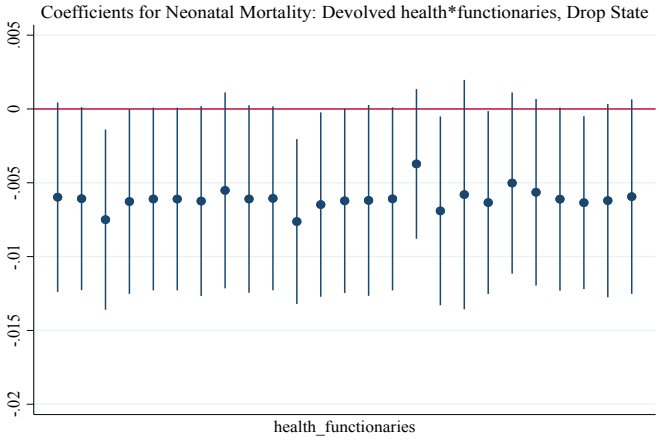


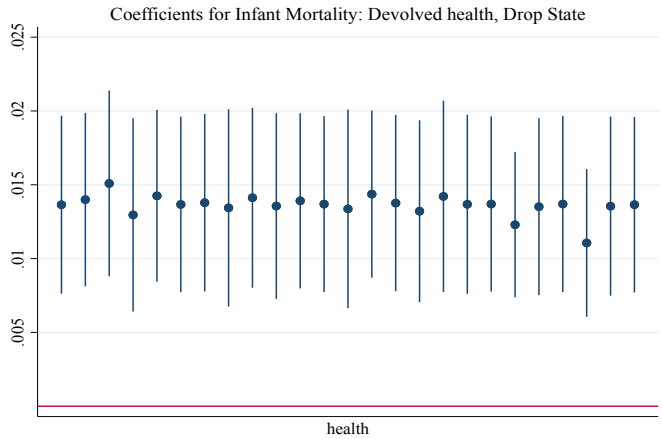
Figure A.3: Coefficients on Administrative Decentralization, Dropping One State at a Time

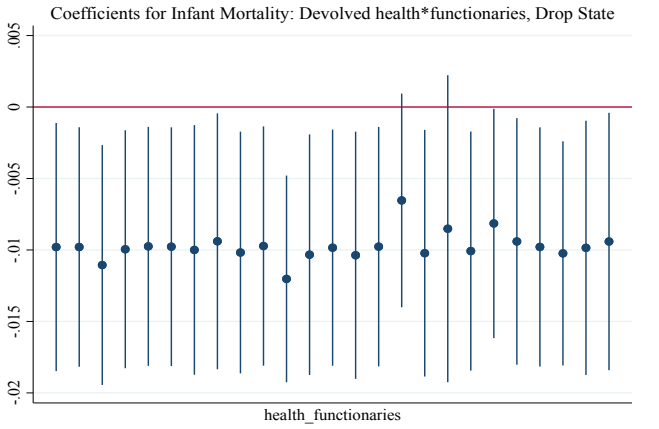
Panel A: Neonatal Mortality



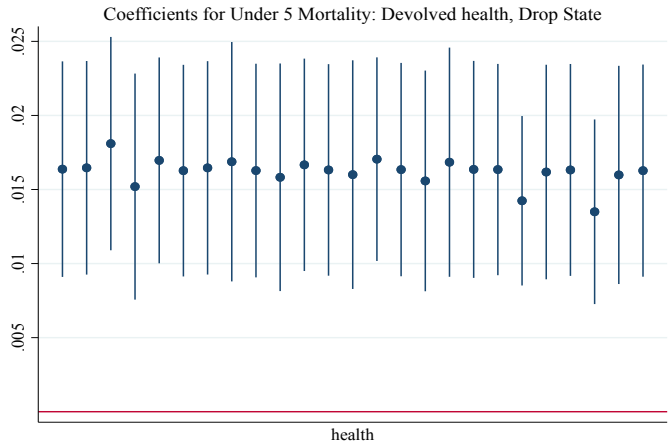


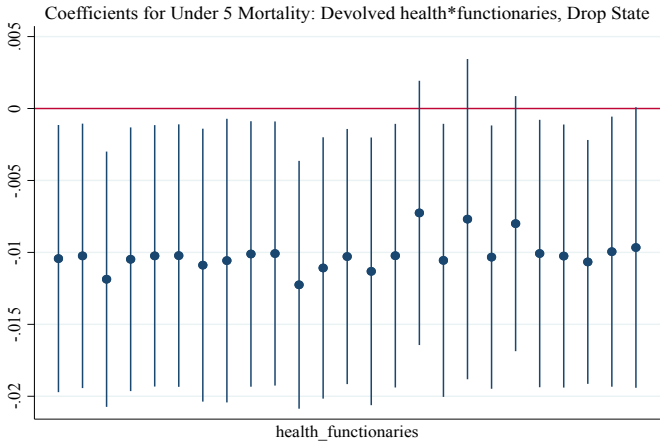
Panel B: Infant Mortality





Panel C: Under-5 Child Mortality

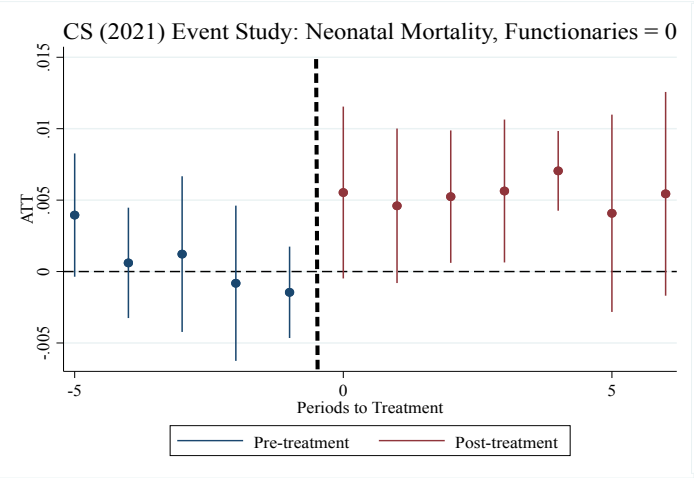


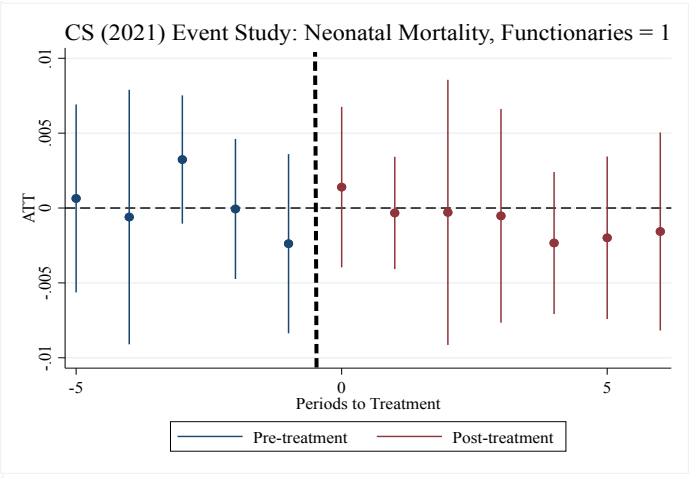


Figures on the left show the estimates β_1 dropping one state at a time after the functions devolution. Figures on the right show corresponding estimates β_2 for the devolution of functions and functionaries dropping one state at a time.

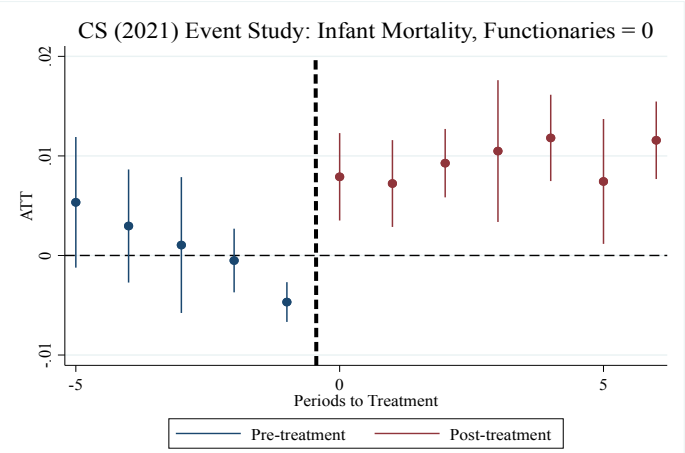
Figure A.4: Callaway and Sant'Anna (2021) Event Study Estimates

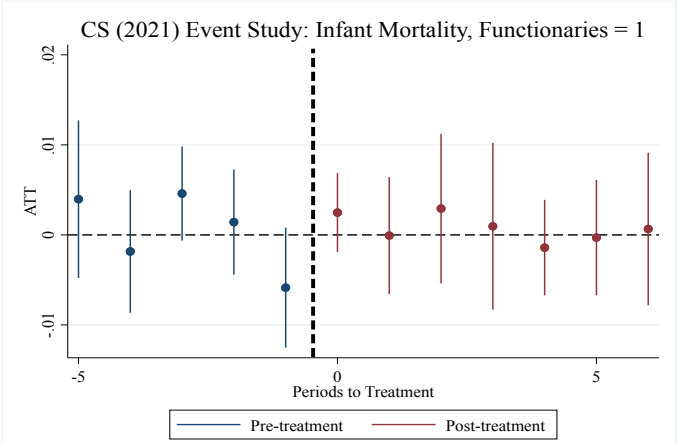
Panel A: Neonatal Mortality



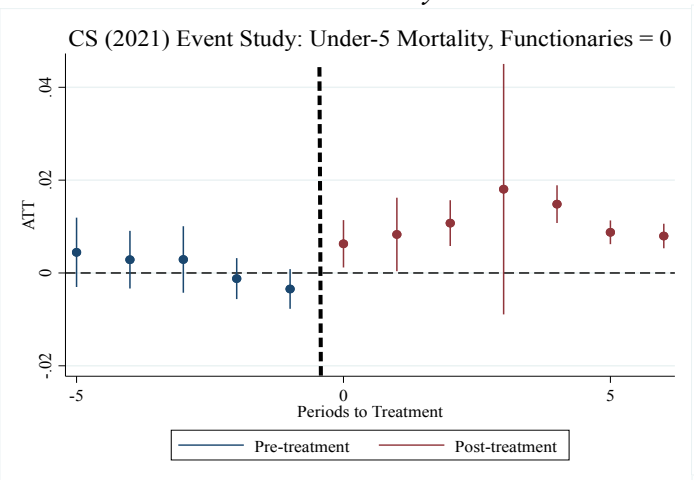


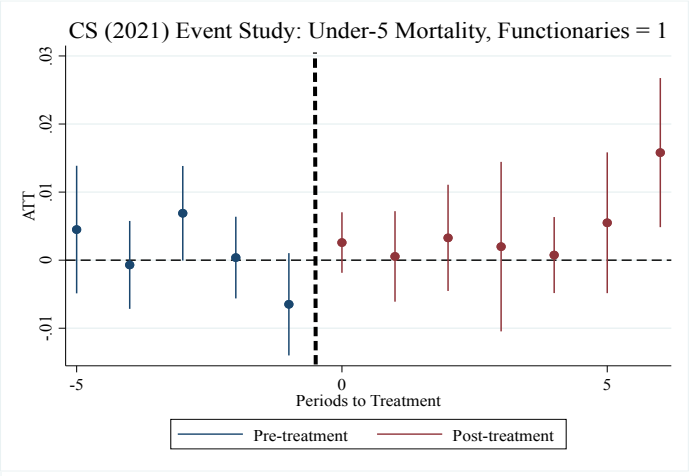
Panel B: Infant Mortality





Panel C: Under-5 Child Mortality





Figures on the left show the estimates β_1 for each year before and after the functions devolution. Figures on the right show corresponding estimates β_2 for each year before and after the devolution of functions and functionaries. Dashed vertical lines indicate the timing of the reform. All estimates use "never-devolved" states as the control group.