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The Impact of COVID-19 on School Choice and Household Education Expenditures: Evidence from India*

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In October 2021, the Government of India opened most government schools across the country, ending world's second longest school closures as a result of COVID. What effects did these school closures have on school attendance and household expenditure on education? We use a long-run high-frequency panel from 2014 to 2022 matched to district-level data on changes in mobility, and staggered school re-openings across states and between grade levels within states to estimate the effects of COVID related school closures on school attendance and household expenditure on education. Descriptively, we find a sustained decrease in private school attendance and an increase in both public school attendance and school dropouts, with the latter decreasing to near zero in 2022. We find that COVID severity decreased total expenditures household expenditures and expenditures on education, with this driven by a decrease in private tuition. Finally, school re-openings led to a large and sustained shift in students from private schools to public schools and dropping out of school completely. Our findings have implications for understanding the effects of COVID on inequalities in human capital attainment and how to best target COVID recovery policies.

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INTRODUCTION

In October 2021, the Government of India opened most government schools across the country, ending the world's second longest school closures as a result of COVID.[1] The return to in-person schooling brought more than a return to physical classrooms. Given the economic impacts of one of the world's strictest lockdowns, commentators have speculated that many families that had previously been sending their children to private schools no longer had the resources to do so and moved their children to government schools (Central Square Foundation, 2020). As children return to schools, government and policymakers will be faced with the task of how to serve a student body that has been out of school for nearly two years and whose composition has changed in that period.

In this paper we ask what the effects of the COVID-19 lockdowns have been on school choice and household expenditures on education. In particular, we look to identify what impact the lockdowns have had on school choice and household-level educational expenditures and where households send their children after schools re-opened.

To identify the effects of lockdowns on school choice and household expenditures on education, we leverage a long-run high-frequency unbalanced panel available from 2014 to 2022 from the Centre for Monitoring the Indian Economy (CMIE). The Consumer Pyramids Survey from CMIE contains detailed consumption data on approximately 120,000 Indian households from 2014 to 2022. The data includes questions on how much households spend on six major educational items: private school tuition, books and supplies, school and college fees, extracurriculars, professional and vocational education, and education overseas. Given the nature of the panel, we can track how individual household expenditure has changed over time. CMIE also collects data on time use for individual members of the household, which combined with expenditure data, allows us to estimate whether children in the household are going to private or government schools, or have dropped out of schooling altogether.[2]

We combine this panel with two sources of data to identify variation in when schools were closed. First, we use Google Mobility Data that provides aggregated mobility from mobile phones using Google Maps. Google Mobility data provides information on deviations from a mobility baseline between January 3 and February 6, 2020 to workplaces, sites of retail and recreation, residential homes, parks, and transit stations, allowing us to estimate the effects of increased or decreased mobility on household-level expenditure decisions. Similar data has been used to estimate changes in mobility during COVID in a number of contexts (Andersen et al., 2023). Second, we manually code school reopening dates across all states in India. While the Central Government could set a national-level date for school re-openings, given that education is partially the responsibility of state-level governments, states were free to re-open (and close again) schools after the national-level opening date. For example, the state of West Bengal, the fourth largest state by population, did not reopen primary schools until February 2022, while the neighboring state of Assam reopened schools on the

[1] Mogul, Rhea, and Vedika Sud. January 28, 2022. "After more than 600 days shut out, Delhi's students just want to go back to school." *CNN*. https://edition.cnn.com/2022/01/27/india/india-delhi-schools-reopen-600-days-intl-hnk/index.html.

[2] Only household members older than 12 years old reported their use of time.

same day as the national government, closed them again in May 2022, and then reopened them once again in October 2022.

We first provide descriptive results of the impact of COVID-19 lockdowns on school choice and household educational expenditures. We find a large decrease in private school attendance from 40 to 20 percent of households with children that has not rebounded since 2020. This was matched almost equally with an increase in public school attendance and school dropouts in 2020 and 2021, and a decrease in out of school children and increase in children in public school in 2022. We also leverage differences in COVID severity between districts using district-level Google Mobility data. Here, we find that greater COVID severity led to a decrease in most household level expenditure, but only expenditure on private tuition was significant. This is largely consistent with descriptive results that shows broad decreases in expenditures on education. Students also spent less time on learning if they experienced greater COVID severity.

Given India's federal structure and separate reopening dates for different grades within states, we leverage between- and within-household variation in when children were able to return to school in a staggered difference-in-differences framework to causally estimate changes in school choice and educational expenditures (Callaway and Sant'Anna, 2020; de Chaisemartin and D'Haultfœuille, 2020). We find that the total household expenditure on education increased significantly as schools re-opened. However, household spending on private school tuition as well as individual student's learning time remained similar to that while schools were closed, suggesting the impacts of COVID persist after schools reopened.

Next, we adjudicate between five potential mechanisms to explain our findings. First, households might *substitute* expenditures from formal schooling to private tutoring. Second, households may reduce educational expenditures and *wait* until formal schools re-open. Third, the economic shocks of COIVD might leave households in a *demand-side crisis* resulting in a permanent reduction in educational expenditure and a shift from private to government schools. Fourth, government schools might provide greater *resources* during the pandemic, encouraging households to switch to government schools. Fifth, private schools might suffer a *supply-side crisis* leaving them unable to cover costs during lockdowns and pushing households to government schools. We find support for the second and third mechanisms in which households reduced expenditure on education as a result of COVID, and that this might potentially have longer-term effects. A year after schools have re-opened, we still see a large number of students out of school.

Our paper makes three major contributions. First, we contribute to a rapidly emerging literature on the impact of COVID on human capital formation in India and globally (Andrew and Salisbury, 2022; Angrist, Bergman and Matsheng, 2020; Li et al., 2023; Moscoviz and Evans, 2022; Singh, Romero and Muralidharan, 2022). The more optimistic findings suggest that low-cost technological and remediational measures have been able to mitigate and reverse the impacts of time out of school (Angrist, Bergman and Matsheng, 2020; Singh, Romero and Muralidharan, 2022), but these have been for children that governments and NGOs have been able to reach. Our paper also estimates *dropouts*, providing policy-relevant evidence on how much governments will need to target out-of-school children. Given the long-run nature of the panel, we can also track the impacts over a long period of time. Our paper is closest to Andrew and Salisbury (2022), although we expand on this paper by considering school choice, causally identifying the impacts of lockdowns on household human capital decisions, and precisely identifying when children were eligible to return to schools.

Second, we contribute to a literature on household expenditures on education during economic uncertainty more broadly. Families often adjust their investment levels in education when experiencing income shocks, which may negatively impact children's educational performance and outcomes (Ananat et al., 2011; Oreopoulos, Page and Stevens, 2008; Lunn and Kornrich, 2018). Investment levels are less likely to return to previous levels even when household income rebounds, especially for low-income households, as a result of job loss or income uncertainty. In this paper, we examine how households adjust their expenditure during and after lockdowns and further analyze the impacts on an important education investment decision: school choice.

Finally, for policymakers, we provide estimates of household-level human capital responses to the COVID-19 pandemic. COVID has shifted children from private to government schools and vice-versa, and in and out of schooling (Central Square Foundation, 2020). Understanding which children and households are most likely to be affected are of critical importance to policymakers as they look to mitigate COVID-related learning losses (Moscoviz and Evans, 2022). The data we use can also be continuously updated, allowing policymakers to apply our methods to later rounds of the CMIE data to better understand the medium-to-long-run effects of COVID-19 on school attendance and household human capital decisions in India. In the next section, we provide details on India's federal governance structure that provides the foundation of our identification strategies.

COVID-19's IMPACT ON EDUCATION IN INDIA

Given India's strong economic ties with China and large Indian expatriate student population in Wuhan in particular, India was one of the first countries in the world to begin reporting and tracking COVID cases domestically outside of China (Andrews et al., 2020). On March 12, 2020, India declared a formal lockdown across the country, exercising the Central (Federal) Governments powers to regulate movement for public health.[3] The lockdown lasted until May 31, 2020, at which point individual State Governments had the authority to extend the lockdown across their entire state or in certain districts to contain the spread of COVID as they saw fit.

Education in India is a concurrent subject, jointly determined by the Central and State Governments. While the Central Government provides the overarching curricular and pedagogical framework, state governments are responsible for teacher hiring and training and, most importantly for this paper's identification strategy, the regulation of private and government schools including when they can open and close. Primary schools in India extend from Grades 1 through 5 for ages 6 through 10, while upper primary extends from Grades 6 through 8 for ages 11 through 13, and secondary school extends from grades 9 through 12 for ages 14 to 17. Students sit national board exams in grades 10 and 12, which determine grade progression and university entrance and choice.

[3]Awasthi, Prashasti. March 12, 2020. "Centre invokes 'Epidemic Act' and 'Disaster Management Act' to prevent spread of coronavirus." *The Hindu Businessline*.

In response to the first wave of COVID-19, the Indian government announced a national lockdown on March 25, 2020, which continued until May 31, 2020. Beginning on June 1, 2020, India gradually eased COVID-19-related restrictions. However, schools remained closed until August 31, 2020. On September 1, 2020, the Indian government issued guidelines that allowed students in grades 9 through 12 to attend school voluntarily. After October 15, 2020, states had discretion over the opening and closing of schools. The discretion states had over the opening and closing of schools creates variation in the number of days of in-person schooling across states. As the Delta variant hit India in March and April 2021, states similarly exercised discretion over the opening and closing of schools.

Schools in India experienced the fourth longest school closures in the world after Indonesia, Bolivia, and Honduras (UNESCO, UNICEF and The World Bank, 2021). This was combined with one of the deepest economic shocks in the world, although India has also experienced a rapid rebound in growth (IMF, 2023). It is these two empirical realities that motivate this paper.

School Choice in India

An important feature of the Indian context is the size of the private schooling sector. Before 2020, nearly 30 percent of households nationally sent their children to private schools (ASER, 2019), with these numbers likely far higher in urban areas. In Figure 1, we estimate the share of students attending government and private schools between 2014 and 2022 using the CMIE data. Prior to the pandemic, the share of households sending their children to government (private) schools was decreasing (increasing) monotonically, with about 40 percent of children attending private schools in 2019. Starting in 2019, the share of children that were out of school increased slightly. Although this has decreased in the latest rounds of the CMIE data, it has not fully returned to zero, with most of the students returning to schools returning to private schools.

In the next section, we outline our sources of data and how we leverage them in our identification strategy.

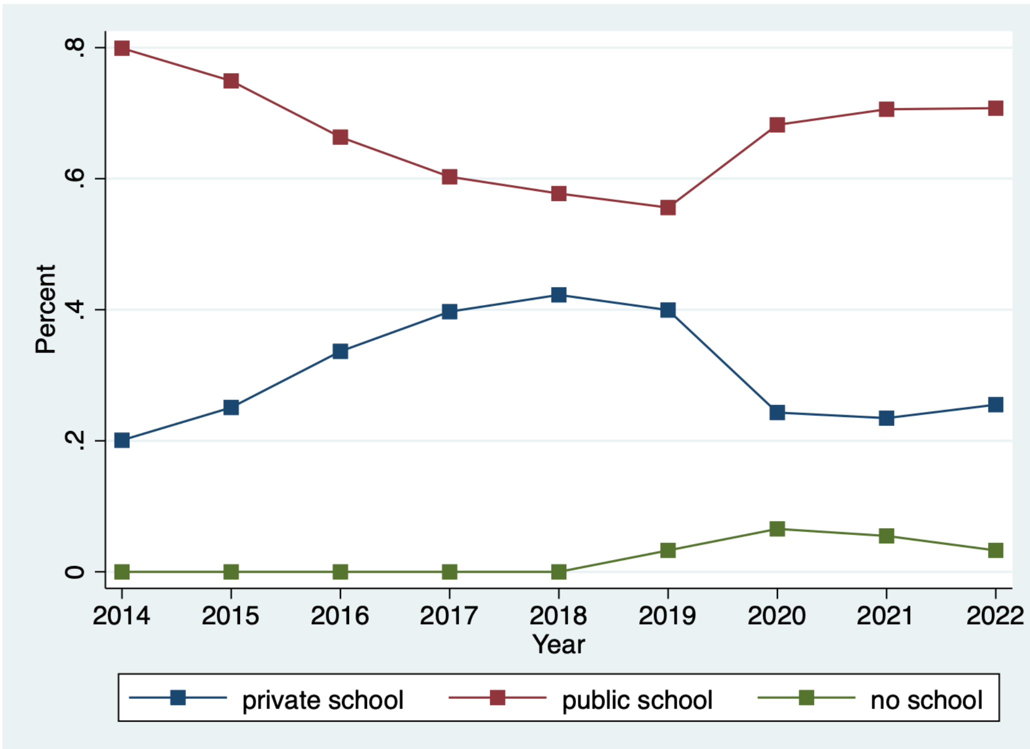
DATA AND METHODS

We leverage three sources of variation to understand the impact of COVID on household expenditure on education: differences in private school attendance before COVID; differences in the timing and severity of COVID mitigation policies across states in India; and differences in the timing of private school reopening across India. We take advantage of the variation in these sources right after the national lockdown between March and October 2020 in our identification strategy.

Centre for Monitoring the Indian Economy Consumption Pyramid

We use the Centre for Monitoring the Indian Economy's (CMIE) Household Consumption Pyramid, a quarterly household survey on consumption across a range of basic household goods. For our purposes, the survey contains seven questions on household expenditure on education and a household

Figure 1: School Choice: 2014-2022



Source: Centre for Monitoring the Indian Economy (CMIE) Household Consumer Pyramids.
Notes: Private and public school, and out of school ratios calculated from the CMIE data and Equation 3. Each point represents a yearly mean for whether a household sends their child to public or private school, or if the child is out of school.

roster that includes a time-use module. The seven questions on education ask how much households spend on school tuition, private tutoring, books, stationary, extracurriculars, education overseas, and miscellaneous educational expenditures. The survey also includes a quarterly time use survey that includes whether a household member has spent any time on educational activities in the past week. It is important to note that the CMIE data is a survey designed, in part, to measure consumer sentiment and household expenditures. As a result, the survey likely oversamples wealthier households in the country (Somanchi, 2021), and therefore might be an underestimate of some of the distributional effects of the pandemic for low-income households.

To estimate whether households send their children to private schools or any school before COVID in India, we either code households as sending their children to private schools if they have school-age children and they have any positive value for school or college fees, or we code households as sending their children to any school if any of the children in the household have any positive value for time spent studying.

Google Mobility Reports

We also leverage mobile phone location data provided by the Google COVID-19 Community Mobility Reports. The reports provide aggregate district-level data on changes in mobility from a five-week baseline period between January 3 to February 6, 2020. They report data for mobility to retail and recreation sites, groceries and pharmacies, parks, transit stations, workplaces, and residences. Data was collected from all Google Maps users with Location History turned on.[4]

School Closing and Reopening

Finally, given the perceived differential risks in COVID severity between children in primary and secondary schools, states across India re-opened primary and secondary schools at different times. Governments often prioritized reopening classes 10 and 12, the years in which students sit their board exams over other classes. To identify when schools and grades opened and closed across the country, we used newspaper reports and government circulars to code the exact day on which state governments re-opened or closed schools and for which classes.[5]

Empirical Set-Up

First, we look to estimate the effect of COVID severity on household-level expenditures on education. Formally, we estimate the following model:

$$(Y_{c,t} - Y_{c,baseline}) = \alpha_t + \beta_1 \text{COVID Severity}_{d,t} + Z_{h,t} + \epsilon_{s,t}, \tag{1}$$

where $Y_{c,t}$ denotes the natural log of an expenditure variable for child c in quarter t, $Y_{c,baseline}$ denotes the natural log the variable in the quarter immediately preceding the first national COVID lockdown in March 2020, COVID Severity$_{d,t}$ is the severity of COVID in district d in quarter t, and $Z_{h,t}$ is a vector of household level controls including a dummy for the age of all the other children in the household. $\epsilon_{s,t}$ is the error term. The coefficient of interest is β_1 that traces out the cumulative child-level response at various horizons t to COVID lockdowns in district d. Functionally, this replicates the estimation and identification strategy in Chodorow-Reich et al. (2020).

Next, we look to estimate the changes in expenditure between households that sent their children to different grades, leveraging the differences in school reopenings between school levels and school reopenings between states. Given a quarterly panel for all children, we denote the quarter in which a child's school reopened by Grade Open$_{i,g,s,t}$ and index the time relative to school opening quarter j as $j = t - \text{Grade Open}_{i,g,s,t}$ for $j \in \{-4, 4\}$ quarters relative to the school opening date where t is the current quarter. Formally, we estimate the following event study:

[4]Location History is turned off by default within Google Maps. Data is also not reported below the district level or if any district-level movement could be used to identify an individual user as a way of protecting user privacy.

[5]This is a similar strategy used for major datasets in India that track communal riots (Varshney and Wilkinson, 2006), and other COVID mitigation policies across the country (Kalra and Novosad, 2021).

$$Y_{i,g,s,t} = \sum_{t \neq -1} \alpha_t \cdot \mathbb{1}\{j = t - \text{Grade Open}_{i,g,s,t}\} + \gamma_i + \zeta_g + \lambda_s + \delta_t + \epsilon_{i,g,s,t}, \tag{2}$$

Where $Y_{i,g,s,t}$ is expenditure on education for child i in school grade g, state s, and CMIE quarter t. Grade Open$_{i,g,s,t}$ is a dummy that takes the value of 1 if schools for child i in grade g, and state s are open in quarter t. γ_i are child fixed effects to account for children moving between grades during our panel period, ζ_g are grade-level fixed effects to compare children within grades, λ_s are state-level fixed effects to compare children within states, δ_t are quarter fixed effects, and $\epsilon_{i,t}$ is the error term.

The coefficient of interest is α_t which identifies the effect of staggered school reopenings and we plot in an event-study plot. We leverage the child-grade-state-time variation to identify the impact of reopening on school choice and educational expenditures. To estimate this coefficient, we use the `did_multiplegt` package from (de Chaisemartin and D'Haultfœuille, 2020).

To measure school switching, we leverage data on expenditures on school fees. The assumption here is that if a child spends time on educational activities and the household has any expenditure on school fees, the child is attending a private school. If the child spends time on educational activities and the household has zero expenditures on school fees, the child is attending a government school, and finally, if the child spends no time on educational activities, the child is not attending school. Formally, this is defined as:

$$\text{School Type}_{i,t} = \begin{cases} \text{Private School}_{i,t} = (\text{Expenditure on School Fees} > 0 \;\&\; \text{Time on Educational Activities} > 0), \\ \text{Government School}_{i,t} = (\text{Expenditure on School Fees} == 0 \;\&\; \text{Time on Educational Activities} > 0), \\ \text{No School}_{i,t} = (\text{Expenditure on School Fees} == 0 \;\&\; \text{Time on Educational Activities} == 0), \end{cases} \tag{3}$$

We then code a school switch in the following ways:

$$\text{Private to Government Switch}_{i,t} = \text{Government School}_{i,t} \;\&\; \text{Private School}_{i,\text{First Quarter 2020}}, \tag{4}$$

$$\text{Private to Dropout Switch}_{i,t} = \text{No School}_{i,t} \;\&\; \text{Private School}_{i,\text{First Quarter 2020}}, \tag{5}$$

$$\text{Government to Dropout Switch}_{i,t} = \text{No School}_{i,t} \;\&\; \text{Government School}_{i,\text{First Quarter 2020}}, \tag{6}$$

Where Private to Government Switch$_{i,t}$ takes the value of 1 if a child switches from private to government schools from Equation 3, Private to Dropout Switch$_{i,t}$ takes the value of 1 if a child switches from a private school to no school, and Government to Dropout Switch$_{i,t}$ takes the value of 1 if a child switches from a government school to no school. We compare school going in every quarter available to use from the CMIE data and calculate switching relative to the first quarter of 2020, prior to the COVID-19 pandemic's impact in India. The identifying assumption in Equations

4, 5, and 6 is that COVID severity does not predict rates of school going in either private or public schools in the pre-COVID period.

We should note that some private schools either reduced or eliminated school fees during school closures and once schools re-opened. This means that Equation 4 might overestimate the number of children switching from private to government schools, although we do not think that this should overestimate drop-outs from either private or public schools. The results we find in Figure 1 are consistent the share of students in private and public schools from other sources such as ASER (2019), suggesting our measure is accurate.

Median Mobility

Finally, to leverage the more limited Google mobility data, we also run a model that uses differences in mobility after the national lockdown was lifted in October 2020 to the beginning of the second wave in India in March 2021. For this specification, we run the following model:

$$Y_{i,t} = \beta(\text{Median Mobility} \times \text{Post-March 2021})_{d,t} + \gamma \text{Median Mobility}_d + \delta \text{Post-March 2021}_t + \epsilon_{i,t}, \quad (7)$$

where $Y_{i,t}$ is our educational expenditure outcome, Median Mobility$_d$ is a dummy that takes the value of 1 if the district in which household i lives in has above median mobility in google mobility and 0 otherwise, Post-March 2021$_t$ is a dummy that takes the value of 1 if it is after March 2021 and 0 otherwise, and $\epsilon i, t$ is the error term. β is the coefficient of interest and identifies the impact of living in a district that had greater mobility after the national lockdown on education expenditures.

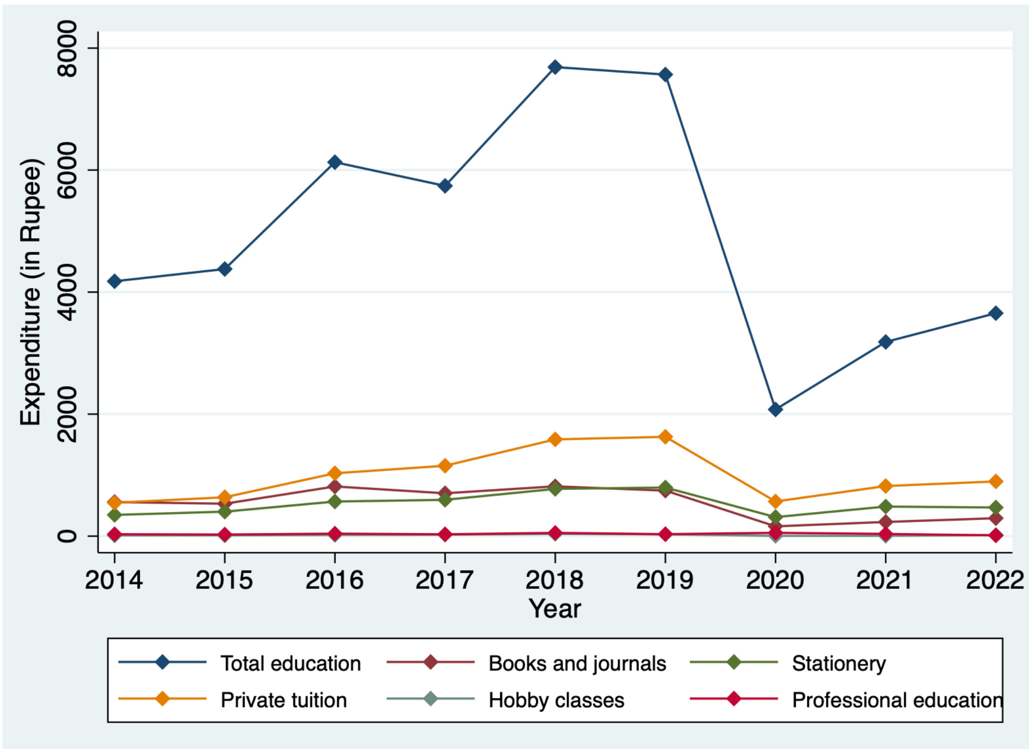
RESULTS

Before presenting our causal estimates on the impacts of re-openings on school choice and household expenditures on education, we provide descriptive illustrations of the trends in household expenditures on education in Figure 2. Across all categories of expenditure, expenditure decreased between 2019 and 2020, more than halving in most instances in that period for all categories of expenditure. These expenditures have begun to recover slightly, but have not returned to the same levels they were prior to the pandemic.

Household Expenditures

Next, we look to model these effects more formally. In Table 1, we estimate Equation 1 on the five categories of educational expenditure and total expenditure available from the CMIE data. Similar to Figure 2, greater reductions in COVID mobility are correlated with greater decreases in household education expenditures on total education expenditures, private tuition, books, and total household expenditure, although only the expenditure on private tuition is significant. The point estimates on hobby classes and professional education are positive although not significant.

Figure 2: Household Expenditure on Educational Services: 2014-2022



Source: Centre for Monitoring the Indian Economy Consumer Pyramids.
Notes: Yearly means calculated from CMIE's Consumer Pyramids. Each point presents the mean value for the four quarters in CMIE data for that year.

Table 1: Effect of COVID Severity on Household Expenditures on Education

	(1) Total education	(2) Private tuition	(3) Books	(4) Hobby Classes	(5) Time spent on learning	(6) Household Expenditure
Post-Covid	-0.0443	-0.1220***	-0.0075	0.0006	0.1995**	-0.00345
	(0.0579)	(0.0334)	(0.0716)	(0.2650)	(0.0845)	(0.0145)

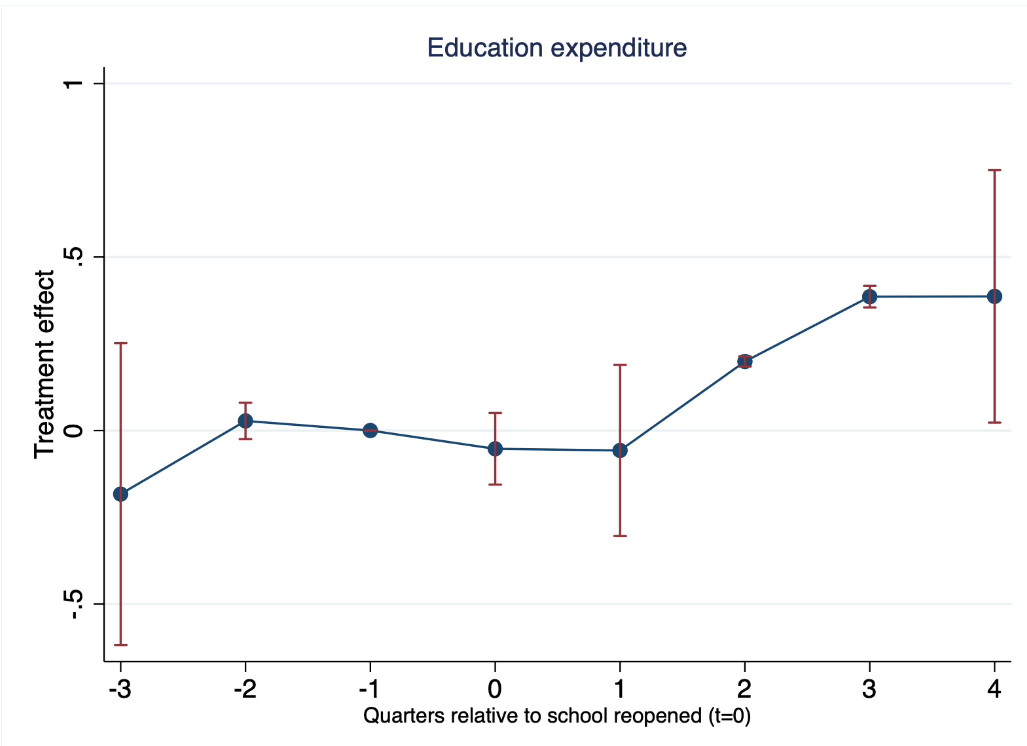
Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered at the district level in parentheses.

School Re-Opening

Next, we leverage the staggered re-opening of schools across states and age levels to estimate the impact of school re-openings on educational expenditures, time spent on learning, and whether children go to public or private schools or have dropped out of schooling altogether. We estimate Equation 2 in Figures 3 to 6.

In Figure 3, we estimate the effect of school re-opening on educational expenditures. We find that school re-openings have led to nearly a twenty percent increase in educational expenditures four quarters after schools re-opened.[6]

Figure 3: The Effects of School Re-Openings on Household Education Expenditure

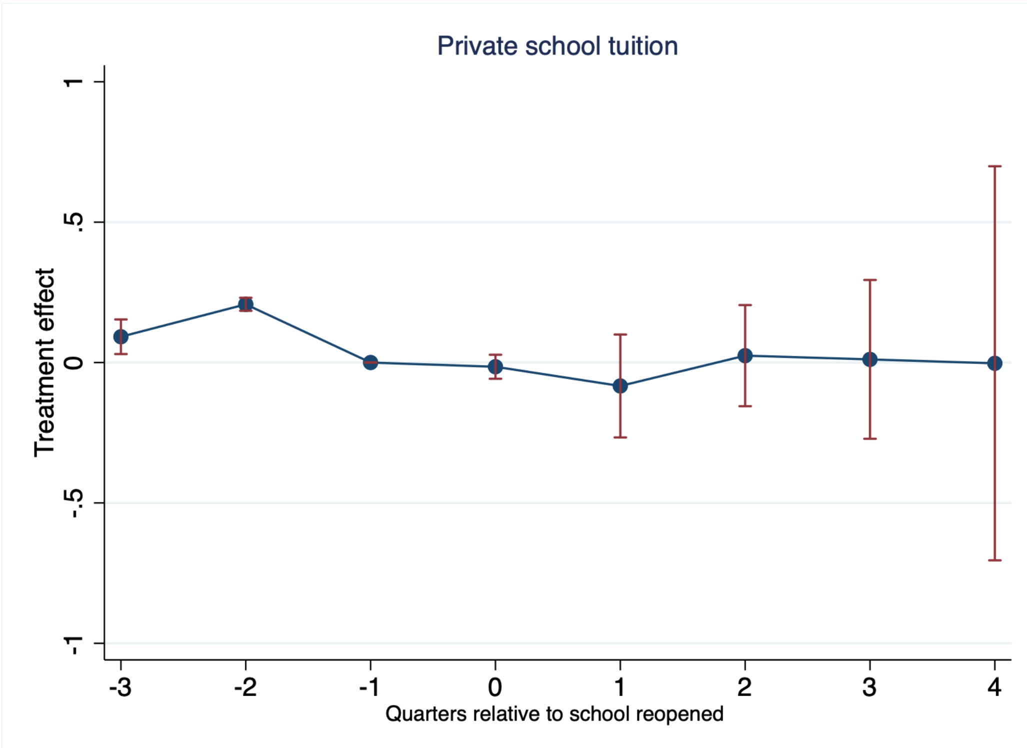


Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

Turning to private school tuition, we find that there has been no change in expenditures on private school tuition up to four quarters after schools re-opened in India (Figure 4). This is consistent with Figures 1 and 2 that show a movement from private schools to both dropping out of school altogether and government schools.

[6]We provide a table of the average treatment effects of all these results in Table A1.

Figure 4: The Effects of School Re-Openings on Household Private Tuition Expenditure



Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

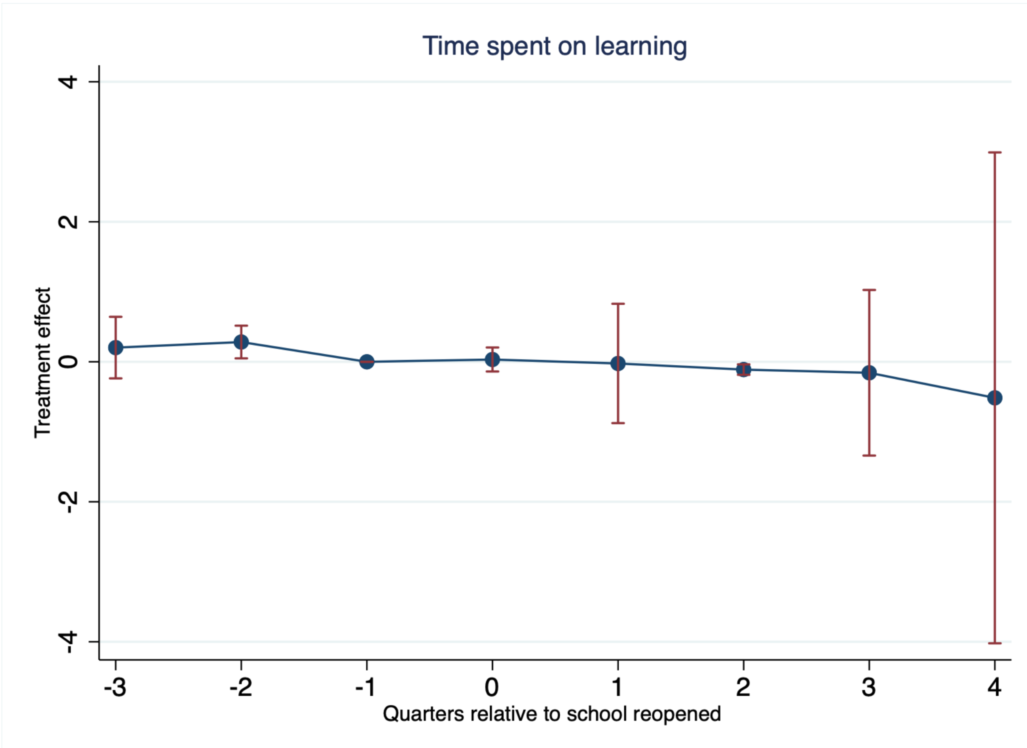
School Switching and Drop-Outs

Next, we turn our attention to how much time children are spending on learning as well as where students attend school. We use questions on household expenditure on education combined with Equation 3 to estimate whether a child is studying in government or private schools. We first look at time spent on learning for all children within households (Figure 5). It does not appear that school re-openings have changed time spent on learning in any significant way, suggesting that children were either engaged in remote education prior to school re-openings, or a large drop out from schools once schools re-open, two findings we explore next.

School re-openings were also accompanied by a switch from private to government schools of about 2.5 percent (Figure 6 in the first quarter after schools re-opened and about one percent in the second quarter after schools re-opened, with this declining to zero three and more quarters after schools re-opened.

Looking at whether children have dropped out from schooling entirely after attending private schools before COVID related lockdowns, we find a large, positive, and significant effect of school re-openings on school dropouts. School re-openings led to a nearly four percent increase in students that

Figure 5: The Effects of School Re-Openings on Child Time Spent on Learning



Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

were previously attending private schools to drop out of school entirely. This effect is concentrated immediately after schools re-open, with an imprecisely but consistently estimated zero effect two and mroe quarters after schools re-open.

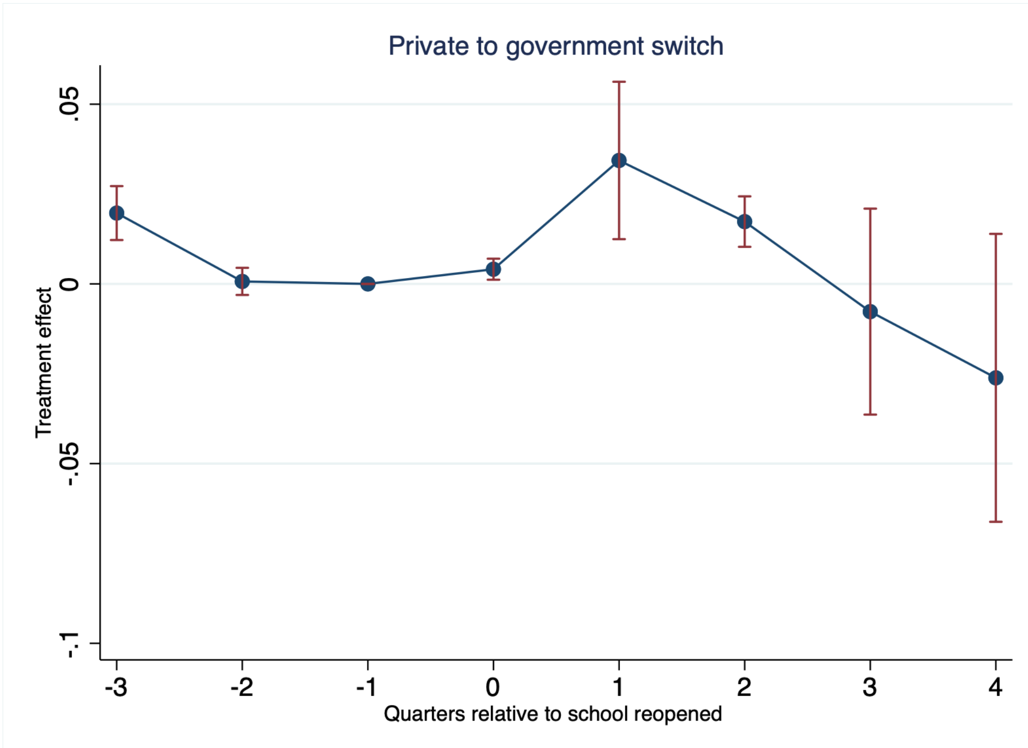
Finally, we explore the impact of school re-openings on dropouts from government schools (Figure 8.) Here we find no effect on school re-openings on dropouts at any point after schools re-open or prior to school re-openings.

CONCLUSION

In this paper we employed a high-frequency unbalanced panel from 2014 to 2022 matched to data on changes in mobility during COVID-19 and reopening dates for schools across India to provide a number of estimates on the impact of COVID-19 on human capital acquisition in India. We estimate the impacts of COVID on household expenditure, school choice, and time spent on learning for children in the household.

We find that COVID related lock downs and decreases in mobility led to a decrease in educa-

Figure 6: The Effects of School Re-Openings on Switching from Private Schools to Government Schools



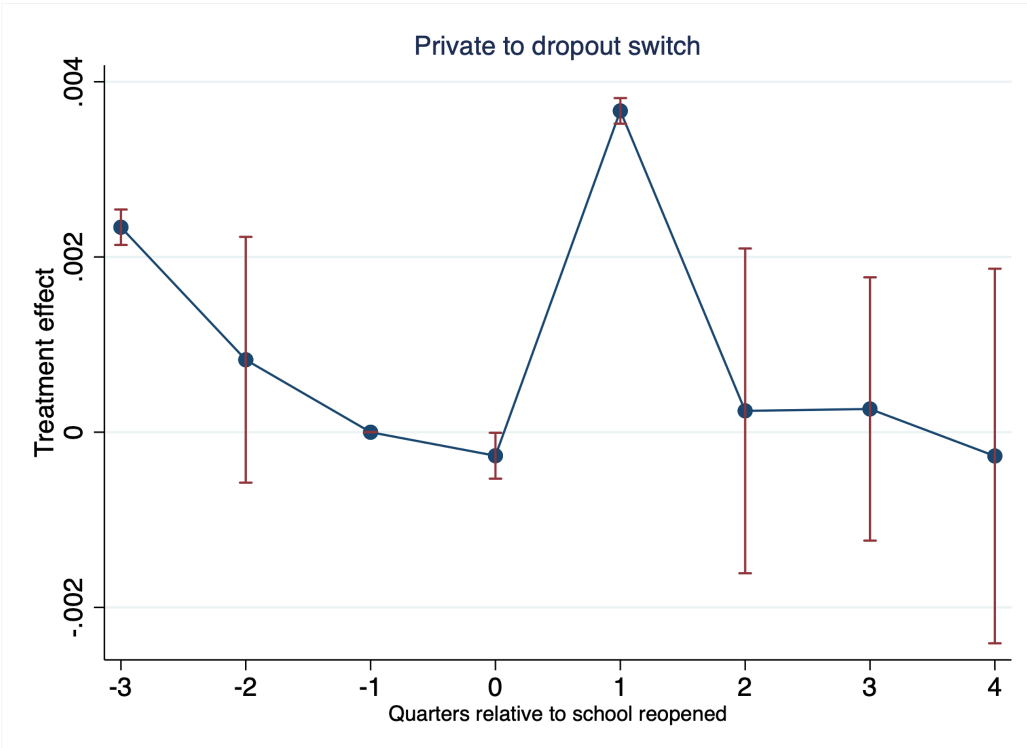
Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

tion expenditures, although this was primarily concentrated in private tuition. These expenditures rebounded after schools re-opened. Children in households spent more time on learning during COVID than they did prior to COVID, and they have not changed their time spent on learning once schools have re-opened, suggesting that there has been a permanent increase in time dedicated to education since COVID.

With respect to school choice, we find a large and lasting effect on school choice away from private schools. Students attending private schools prior to COVID are more likely to have dropped out from schooling altogether and have shifted to public schools. The size of the shift from private to public schools does not compensate for the number of children that have dropped out of schooling altogether, a noticeable and concerning increase in the number of students no longer in school in India.

Beyond the results of our paper, the data and methods used here can be updated by policy-makers to continuously provide an estimate of school attendance and educational expenditures to understand post-COVID trajectories of children in India. The Centre for Monitoring the Indian Economy updates their panel quarterly, and our methods are easily replicable with new data, allowing

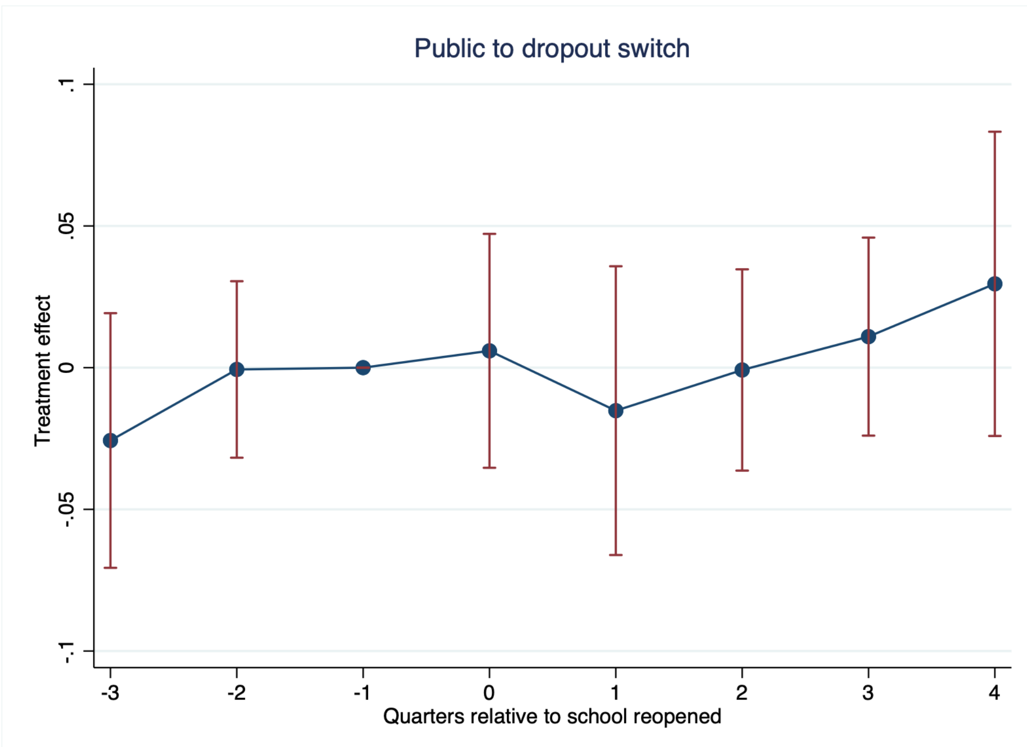
Figure 7: The Effects of School Re-Openings on Private School Drop-Outs



Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

others to extend the methodology here further in time to understand the medium-to-long-run effects of COVID on educational expenditures, school choice and attendance, and time on learning. This provides a useful metric to better understand supports that children may require as various state-level school systems welcome students back from COVID related lockdowns.

Figure 8: The Effects of School Re-Openings on Government School Drop-Outs



Source: Center for Monitoring the Indian Economy Consumer Pyramids and Author's Own Source.
Notes: Standard errors clustered at the state-grade-level.

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A Appendix

A1 TABLES

In this section, we provide tables of the average treatment effects for the main results presented in the main body of the paper. In Table A1, we provide the average treatment effect for Figures 3, 4, and 5.

Table A1: Average Treatment Effects of School Closure on Expenditure and Time Spent on Learning

	(1) Education expenditure	(2) Private tuition	(3) Time spent on learning
School reopening	0.1687***	-0.0116	-0.3320
	(0.0377)	(0.0750)	(1.1492)

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the state-grade level in parentheses.

In Table A2, we provide the point estimates for the average treatment effects for Figures 6, 7 and 8.

Table A2: Average Treatment Effects of School Re-Opening on School Choice

	(1) Private to public	(2) Private to dropout	(3) Public to dropout
School reopening	0.0087***	0.0009***	0.0040
	(0.0019)	(0.0002)	(0.0161)

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at the state-grade level in parentheses.

A2 DATA CONSTRUCTION & LIMITATIONS

Two districts in Delhi, Shahdara and South East Delhi, were created out of the original nine districts of Delhi. As there is no direct correspondence between these two districts and the original nine districts in the data, we are unable to match the Google Mobility data, which has these two districts, with the CMIE data, which includes them in the various districts out of which they emerged.

The full list of states and districts covered by the CMIE surveys can be found in their survey design and sample document.