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ABSTRACT

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Can Greater Access to Education Be Inequitable? New Evidence from India's Right to Education Act*

by Chirantan Chatterjee,† Eric Hanushek,‡ and Shreekanth Mahendiran§

June 6, 2020

Abstract

India took a decisive step toward universal basic education by proclaiming a constitutionally-guaranteed Right to Education (RTE) Act in 2009 that called for full access of children aged 6-14 to free schooling. This paper considers the offsetting effects to RTE from induced expansion of private tutoring in the educationally competitive districts of India. We develop a unique database of registrations of new private educational institutions offering tutorial services by local district between 2001-2015. We estimate the causal impact of RTE on private supplemental education by comparing the growth of these private tutorial institutions in districts identified a priori as having very competitive educational markets to those that had less competitive educational markets. We find a strong impact of RTE on the private tutoring market and show that this holds across alternative definitions of highly competitive districts and a variety of robustness checks, sensitivity analyses, and controls. Finally, we provide descriptive evidence that these private tutoring schools do increase the achievement (and competitiveness) of students able to afford them.

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1 Introduction

Decision makers in virtually all countries of the world see human capital development as key to their future economic prosperity, but they face uncertainty about what policies will best meet the sometimes conflicting goals of expanding access, improving quality, and lessening distributional concerns in their schools. This conundrum is most severe in developing countries where resource constraints are binding. These governmental policy problems are further complicated by the fact that individuals in society respond to the educational incentives they see and may take actions that interact both positively and negatively with government programs. This paper investigates private reactions through expansion in private tutoring to India's rapid governmental expansion of educational access.

All of the issues of access, quality, and private reactions came into play when India passed a 2009 constitutional amendment ensuring a "right to education" for all and set in motion both public and private adjustments to new educational policy requirements. The Right to Education Act (RTE) was designed to ensure a constitutionally-guaranteed right to pursue basic education (up to eighth grade) for all Indian children. Government schools had to be entirely free, and students could not be retained in grade or expelled. It also set minimal quality standards defined by physical facilities, teacher background, and maximum class sizes, and it required private schools to accept poor students up to one-quarter of their student body at first grade.

While the data are not perfect, Shah and Steinberg (2019) document a series of trends associated with the RTE.[1] They conclude that RTE led to significant increases in student enrollments along with a continuation in movement out of government schools and into private schools. Although not directly attributable to RTE, Kingdon (2017) finds significant declines in government school students between 2011 and 2016 that were matched by significant increases in private school enrollment over the same period. National data on achievement are

[1] Data on schooling in India may be pieced together from alternative sources and are not necessarily consistent across sources (see Kingdon (2017) and Shah and Steinberg (2019)). The most reliable overall data come from the National Sample Survey (NSS), an annual household survey. The official school data come from the District Information System on Education (DISE), which is an administrative data set of the Indian Ministry of Education, although the accuracy and comprehensiveness of the DISE data have been questioned. These data can be supplemented by the Annual Status of Education Report (ASER), which is a household survey by the Pratham Education Foundation (https://www.pratham.org/) focusing on rural education and including student test data.[2] The interaction of private tutoring with regular schooling of course is not always positive. Jayachandran (2014) finds that learning can be less in the regular classrooms when teachers are also providing private tutoring.

unavailable, but ASER achievement data for rural populations show significant declines in achievement since RTE with larger declines found in government compared to private schools (Kingdon (2017), Shah and Steinberg (2019)).

Our primary interest, however, is focused on the causal impact of RTE on the expansion of supplemental educational services in the form of private tutoring. Large scale private tutoring is common in many countries of the world (Bray (1999), Kim and Jung (2019)). This supplemental education is often called "shadow education," reflecting the close connection to and dependence on the government education system and its learning objectives. Importantly, however, there are limited and sketchy data and research on even the most fundamental aspects of shadow education such as extent, subject focus, cost, or outcomes.

Individual studies indicate considerable heterogeneity both within and between countries in the form and outcomes of shadow education (Bray (1999), Kim and Jung (2019)). As a result, judgments about the system as a whole vary considerably. Critics suggest that these private tutoring schools reinforce and perpetuate social inequities and at times may even distort instruction in the traditional schools. Supporters point to the increase in learning and human capital produced by them along with the possibility of even reducing the load on the traditional teachers.[2] This range of opinion suggests that overall judgements about the impact of shadow education rest on the balance between impacts on learning outcomes and impacts on the distribution of outcomes. In fact, government responses to private tutoring range from outright bans on private tutoring to active government encouragement (Dang and Rogers (2008)).

Nonetheless, there is no disagreement that private tutoring leaves out a portion of the population that cannot afford the tuition. Importantly, the excluded population is precisely the focus of the Right to Education Act, meaning that private responses directly offset at least a portion of the government actions designed to promote more educational equity.

We exploit the implementation of the Right to Education Act (RTE) in India in 2009 in order to trace the causal impacts of increased access to schooling on private tutoring. Our analysis builds on an original, newly-constructed database of educational start-ups. This

[2] The interaction of private tutoring with regular schooling of course is not always positive. Jayachandran (2014) finds that learning can be less in the regular classrooms when teachers are also providing private tutoring.

database tracks the entry of private tutorial centers across 375 (U.S. county-like) districts in 30 states of India. It uses official monthly administrative statistics compiled by the Ministry of Corporate Affairs of the Government of India (GoI) on firm registrations in the education sector between 2001 and 2015. These data are merged with information on existing district demographic and economic characteristics. Our empirical analysis uses a difference-in-differences approach to estimate the causal impact of the RTE on the expansion of private tutorials.

Our identification strategy is motivated by prior analyses that point to individuals' use of private tutoring to do better on high-stakes exams and to gain a competitive advantage over peers (Kim and Lee (2010), Azam (2016), Bray (2017), Ghosh and Bray (2018)). With the increased competition from expansion of access from RTE, one would expect a differential response of students that reflected previous levels of peer competition. Our main analysis focuses on districts where Indian Institutes of Technology (IIT's), the most prestigious engineering institutions, were located. These very selective institutions of higher education make school admissions in these districts particularly competitive.[3] We define these districts as educationally competitive districts and compare the consumer reliance on private tutorials in them to that in less competitive districts without such institutions. A regression-based pre-trends analysis with data prior to the expanded access of RTE supports a causal interpretation of these findings.

With the expansion of school access from RTE, we find that the number of private tutoring centers, called tuition centers in India, expanded at a monthly rate of 53 per billion persons in our educationally competitive districts. While tuition centers vary widely in size, this implies an expansion of tuition students in the fourteen IIT districts of some 172,000, assuming that these new centers average a conservative 1,000 students. While India has a wide range of

[3] It should be noted that IITs per se facilitate homogeneity in the student and faculty consumption. For example, a student from Northern India is completely free to choose IIT Chennai in Southern India as an option. This is clearly laid out in the 1961 IIT Act (see: https://en.wikipedia.org/wiki/Institutes_of_Technology_Act,_1961). That said, it has also been pointed out that costs of movement and cultural similarities may induce a regional stickiness of a representative student from a focal region to that region's IITs. So our approach is sensible to identify the causal effects in our study of RTE on private tutorials, though admittedly, sensitivity checks would be required on what is a competitive district in this regard and we do that in Section 8 below.

tertiary schools in India, the IIT's themselves have less than ten percent this number of total students.[4]

We also examine the effects of RTE on the entry of other educational units, i.e. private schools and higher educational institutions (HEI). We find limited indication of any effect of the introduction of RTE on private school registrations.[5] These weaker results may simply reflect that the entrepreneurs need to procure licensing and permissions from local or state government, something that is much less the case for tuition centers. We find no significant impact on new registrations of higher educational institutions.

In robustness analysis, we use alternative definitions of highly competitive districts: the existence of any new registrations of tuition centers, private school, or higher education institutions between 1991 – 2000; and the existence of a broader set of elite education institutions (Institutes of National Importance in India).[6] Additional robustness checks consider alternative allowance for the varying population size of districts and the staggered nature of implementation of RTE in India by state. For each, we find consistently strong causal evidence that RTE induced an expansion of private tutoring.

Finally, using descriptive evidence from the Annual Status of Education Report (ASER) dataset in India, we provide descriptive evidence on the falling quality of student outcomes. While the data are incomplete, the new tuition centers in the educationally competitive districts do appearto contribute to better student performance. These findings, however, need to be treated with caution because of the limitations of the ASER data.

Following a discussion of the private tutoring in India in the next section, we provide institutional background of RTE in India. Section 4 presents our empirical strategy, and section 5 describes the construction of our database. Sections 6 and 7 provide the main empirical results and the robustness analyses, respectively. These are followed by a series of extensions and a concluding discussion.

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[4] In 2018, there were 23 IITs with a total of 11,279 students. (https://en.wikipedia.org/wiki/Indian_Institutes_of_Technology, [accessed June 8,2020])

[5] Note, however, that we analyze registered private schools and do not consider unregistered schools, which may be substantial in some locations (e.g., see Rangaraju, Tooley, and Dixon (2012)).

[6] See https://en.wikipedia.org/wiki/Institutes_of_National_Importance

2 Shadow Education in India

While supplementary education is widely consumed around the world, there are limited consistent data on the extent and character of such education, in part because of varying definitions (Bray, Kobakhidze, and Suter (2020)). Perhaps the most consistent data on supplemental education is found in the survey accompanying the OECD international testing of the Programme for International Student Assessment (PISA) in 2012. It asked 15-year-old students how many hours per week they spent in out-of-school classes that were offered by a commercial company and paid for by students' parents. The percentage of students participating in such education ranged from four percent in Finland to over 50 percent in Thailand and Greece (Park, Buchmann, Choi, and Merry (2016)).

The nature and institutional structure of shadow education differs significantly across countries, and this leads to few generalizations that apply around the world. There are a large number of evaluations and assessments for individual countries, but these have been largely descriptive with few quantitative studies of the impact of supplementary education. A number of international reviews summarize the range of experiences (e.g., Bray (1999, 2017), Dang and Rogers (2008), Park, Buchmann, Choi, and Merry (2016), Kim and Jung (2019)).

In India, there has been a long tradition of private tutoring since the 1980s (Azam (2016)). There has been gradual increase in accessing private tuition by students across the different education levels leading to 13, 20, 30 and 31 percent of students attending primary, middle, secondary and senior secondary levels,[7] respectively, by 2007-08. There also exists large variation across the 29 states and 7 union territories in India. West Bengal leads with 75 percent of students accessing private tuition, and Mizoram is at the other end of the spectrum with 3 percent in 2014 (GOI, 2016).

The analyses in both India and other countries point to a variety of motivations for participation in private tutoring, but they invariably bring up competition for further education. A

[7]Primary levels include grades between 1-5, Middle levels include grades between 6-8, Secondary levels include 9th and 10th grade, and Senior Secondary levels include 11th and 12th grades.

recent report indicated that parents in India lack trust in government schools and spend as much as 35 percent of household income on private schooling and supplemental education.[8] The Indian data show relatively higher numbers of students employ private tuitions as they attend tenth and twelfth grades. These grades have high-stakes examinations that are an important determinant to each student's pursuit of desired academic streams at the tertiary level and of chances to gain entry in more prestigious higher education institutions. For example, Ghosh and Bray (2018) find in a sample of students from Bengaluru, India, that the top reason for participating in private tutoring was to score high marks on examinations, a response of 80 percent of Grade 10 students.

Similarly, in assessing the rise in private tutoring in West Bengal, Amartya Sen (2009) notes:

> Underlying this rise is not only some increase in incomes and the affordability of having private tuition, but also an intensification of the general conviction among the parents that private tuition is "unavoidable" if it can be at all afforded (78 per cent of the parents now believe it is indeed "unavoidable" - up from 62 per cent). For those who do not have arrangements for private tuition, 54 per cent indicate that they do not go for it mainly — or only — because they cannot afford the costs. (p. 13)

Azam (2016) also describes the role of elite universities in motivating private tutoring, a factor entering into our analysis:

> The post-secondary institutions and programs remain highly stratified, with some offering much greater rewards (such as Indian Institute of Technology or All India Institute of Medical Sciences), hence demand for private supplementary tutoring during the years of senior secondary schooling remains intense. With the massive expansion of elementary education over time, the growth in number of seats in these premier institutions has not kept pace with the growth in number of students seeking admission in these institutes, resulting in much fiercer competition for the limited seats." (p 749)

The private, for-fee nature of this tutoring has obvious implications for the distribution of access. Azam (2016) reports that for 2007/08, the private tuition expenditure averaged 16.5 percent of per capita consumption, and this rose to 28.5 percent at senior secondary level. Thus, it is not surprising to find that at the secondary level, only 21.6 percent of students in the poorest quintile purchased private tutoring while 38.8 percent of students in the top quintile did.

[8] See: https://indianexpress.com/article/education/iim-a-study-parents-lack-trust-in-govt-schools-place-faith-in-tuition-teachers-5736589/

While the prevalent use of private tutoring at secondary education is evident, the rising demand for private tutoring for students enrolled at primary and middle levels cannot be overlooked. From surveying parents in 2008/09, the Pratichi (India) Trust reports: "The felt need of private tuition was so high that even in schools where parents thought that the performance of the teachers was extraordinarily good also thought that private tuition was still needed for 'even better performance of the children'." (Pratichi Research Team (2009))

Finally, the hierarchical structuring of education system leads to linkages between primary, middle and secondary education. The students' performance at the transition points, grade 5 at primary level and grade 8 at middle level, becomes critical and assessments of performance at these points act as gatekeepers to access secondary education (Jha et al, 2019). Given this, parents' belief of necessity of private tutoring at primary and middle levels will be more pronounced when combined with the desire to score higher marks in the high-stakes examinations at the secondary level. Thus, the perceived necessity of private tutoring permeates to primary and middle levels, as well, in India.

3 The Right to Education in India

In 2000, just 86 percent of Indian children were in primary schools, and the survival rate to grade 5 was 47 percent (UNESCO (2003)), underscoring India's longstanding challenge in providing broad access to schooling. With the worldwide push for expanded access in the Educational for All Initiative (UNESCO (2000a)), India began a push for universal access.

Passing the Right to Education Act followed a complicated path described in Appendix A, but the key features for our purposes are easily summarized. In 2002, the 86th amendment to the constitution introduced Article 21(a) which stated that "the State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may, by law, determine."[9] The RTE Act was first presented to the parliament in 2006, but it was rejected with lack of funds cited as the official reason.[10] However, the RTE Act gained

[9] https://www.india.gov.in/my-government/constitution-india/amendments/constitution-india-eighty-sixth-amendment-act-2002 - [Accessed as on March 14th 2019].
[10] See https://timesofindia.indiatimes.com/india/Centre-buries-Right-to-Education-Bill/articleshow/1748745.cms [accessed as on June 3rd 2020]

approval from the Union Cabinet in 2008 and then passed through the Lower and Upper House of the Indian parliament in July and August 2009, making it national law.

Subsequently, the state governments implemented the RTE Act by passing it in their own state legislatures, although not all states passed the Act in their legislatures at the same time. (See Appendix Table 1 for details about the time of each state's legislative enforcement). The last states passed it in 2012, three years after its enactment in the Indian Parliament. We exploit this feature of staggered enforcement by region and time in our robustness analysis (below).

RTE ensured that every child between 6 to 14 years has a right to admission in every neighborhood school but does not mandate that a child must access only neighborhood schools.[11] Further, any private unaided schools in the neighborhood has to allocate 25 percent of its seats at the entry level (class 1) for economically weaker sections and disadvantaged groups with the compensation for the costs incurred by the private schools coming from the government.[12]

RTE mandated that all schools offering primary and upper primary education must have good infrastructure in terms of a weather-proof building, boys' and girls' toilets, drinking water, ramps for handicapped children, a library and so on. It specified quality indicators such as teacher-pupil ratio below 1:30 for primary and 1:35 for upper primary section. The qualification of teachers, their working hours, and duties were also specified in RTE.

Although passed nationally in August 2009, only ten states enacted state RTE rules by 2011 (Taneja et al. (2011)). It was not until early 2012 that all states and union territories had drafted RTE rules, and compliance remained poor across all the states through 2015 (Sachdeva et al. (2015)). This variation in initial implementation also appears in subsequent adherence to various portions of the Act, particularly to quality mandates (see Appendix A). Perhaps unsurprisingly, there does at the same time appear to be stronger enforcement of the quality provisions in the private school sector as opposed to the government school sector.[13]

[11] Details can be found in Jha, Ghatak, Mahendiran, and Bakshi (2013) and are summarized in Appendix A.
[12] Private unaided schools are those which are managed by private management and does not take any assistance from the state or central government in any form.
[13]Rangaraju, Tooley, and Dixon (2012) describe the private unaided schools that offer education services to 65 percent of children in Patna, Bihar. They neither have the infrastructure nor qualified teachers to meet the RTE mandates. The enforcement of RTE has led to closing down of such schools or leaving them to continue as illegal entities without the proper recognition from the local government. On the other hand, the pubic schools do not face such stringent requirements.

The RTE Act enacted in August 2009 held promises of ensuring greater access in India to good quality primary and upper primary education to all children up to the age of fourteen years. However, the different economic and developmental stages of states have led to variation in implementation of the RTE Act, a finding recently also extended by Shah and Steinberg (2019). There also exists significant district-level heterogeneity in complying with RTE norms irrespective of economic status of the district and state.

4 Analytical Approach and Identification

Our focus is the relationship between RTE and private tutoring. While RTE was designed to expand free education to cover all primary students, private tutoring serves the interests of those who are willing and able to pay for the added education.

India has clearly had private tutoring for both remedial demands and for enhancement/competitive demands. Tuition centers, the Indian designation for private tutoring institutions that work after hours to complement the government schools, serve to advance the skills of students – either to bring them up to expectations for their cohort or to enhance the competitiveness of the student for admission to a higher quality institution of higher education (Azam (2016), Ghosh and Bray (2018), Bray (2017)).

The direction of potential impact of RTE on private schooling is clear. As RTE expands access to both government and private schools, it draws a new population of students into the schools. Unless the quality of new-entrant schools and of existing schools improves, there would be a clear increased remedial demand for the supplementary schooling found in the shadow education sector. In general, it would be difficult to distinguish the causal impact of RTE on the expansion of private tutoring from the overall trends in usage, because enrollment in private tutoring might be expanding for other reasons unrelated to RTE.

On the enhancement/competition margin there is a clearer way to see the causal impact of RTE on private tutoring. As Ghosh and Bray (2018) describe, the force of credentialism and competition is strong across broad income groups in India. The increase in qualified students from RTE increases competition for more advanced schools, particularly the most prestigious institutions of higher education. Moreover, an increase in access of schooling would be expected to have a larger impact in areas where competition within cohorts for grades is already high. A

simple model of choice for private supplements indicates that high-demand households will have greater use of private tutoring than low-demand households (Dang and Rogers (2008)) and that this demand will expand with increased school enrollment (Kim and Lee (2010)). Therefore, a comparison of the reactions of high- and low- demand households to the introduction of RTE provides a direct test of the impact of RTE on private tutoring.

The key to the identification of the causal effect of RTE on private tutoring is comparing changes in private tutoring for groups with intense educational competition and groups with less competitive pressures. Our main analysis leverages this intuition and defines highly competitive districts as those containing one of the premier technical schools, i.e., an Indian Institute of Technology (IIT).[14] The location and governance of the original IITs were exogenously set in 1961 as per the IIT Act.[15] The admissions competition for these undergraduate schools is especially intense as they have been traditionally viewed as a clear gateway to economic success in India. The comparison less-competitive districts are those lacking one of these institutions.[16] While students from throughout India ca attend any given IIT, the importance and competition clearly rises in the local district.

We make use of that heterogeneity in competitiveness at the district level to analyze a difference-in-differences model of expansion of private tutoring caused by the introduction of RTE. Consider T_{dt}, the number of new tuition centers per billion in region d and month t:

$$T_{dt} = \alpha_0 + \alpha_1 RTE_t + \alpha_2 C_d + \lambda_t + \beta(RTE_t \times C_d) + \gamma Z_{dt} + \varepsilon_{dt} \quad (1)$$

where RTE_t =1 for all months from August 2009 (its date of enactment) through March 2015 and =0 for all months before August2009; C_d is an indicator for competitive districts that have an IIT; Z_{dt} is a vector of time-varying characteristics of district d; and ε_{dt} is a stochastic error term. Our interest is β, the coefficient of the marginal impact of being in a competitive district after the enactment of *RTE*.

[14] Indian Institute of Technology (IIT). See https://en.wikipedia.org/wiki/Indian_Institutes_of_Technology.
[15] While there are currently 23 IITs, we only consider the 14 that were established before RTE was enacted.
[16] As mentioned earlier and as we discuss below, our results hold even if we expand the definition of competitive districts by not just whether there was an IIT in that district, but also if they had an institute of national importance – an INI as they are termed in India.

The intuition behind this estimation is that, if the educationally-competitive and the less-competitive districts are following common trends in the development of tuition centers, those trends would continue in the absence of RTE. Deviations from trend after the introduction of RTE are interpreted as the causal effect of RTE on private tutoring. In the empirical analysis we can verify and validate the parallel trend assumption.

Because of the lengthy discussions before adoption of RTE, we must also allow for anticipation effects in all of the estimation. Specifically, we add an indicator variable for being in a competitive district for either 12 or 24 months prior to enactment of RTE Act in August 2009. Alternatively, we include a 12- or 24-month time trend (*t*) for the competitive districts.

As noted, states embraced RTE at varying speed. Their passage of enabling legislation stretched from 2009 for a number of years after. Thus, in a parallel set of estimates we define $RTE_{dt} = 1$ if t is at or beyond the state enactment date for the state of district d. This estimation adds cross-sectional variation to the estimation at the cost of potential error in when the idea of expanded access to schools entered into decision making in district d.

It is also possible to analyze the impact of RTE on the development of new private schools and new institutions of higher education. These other institutions provide alternative outlets for the expanded educational demand. They do not, however, have the same flexibility as private tutoring centers, and they often involve large capital commitments. An important difference between tutoring firms and these alternative providers of additional education is that the latter (and especially new private schools) are heavily regulated. Thus, the contrast with tutoring involves both the nature of the services provided and the ease with which new firms can enter the market given government regulatory actions.

In the empirical analysis, we also pursue a number of specification tests and extensions. In a robustness analysis, we also investigate a series of alternative ways of defining treatment and comparison groups including prior usage of private tutoring and the competitive pressures generated by a broader set of premier tertiary institutions beyond just the IITs.

5 Data on Educational Firms

There is no master listing of educational firms in India. We construct a data base of new firm entrants from the official Indian government company registry. In order to legally operate, all firms, including non-profit organizations, must register with the Registrar of Companies (ROC), which operates under the Ministry of Corporate Affairs (MCA) of the Government of India (GoI). The overall universe of all the firms that registered during the period 1900-2015 for 35 states and union territories is available online from the Ministry of Corporate Affairs website.[17,18,19,20]

The universe of all firms electronically available is about 1,459,084 with sufficient information including their principal business activity and year of registration available for some 1,457,281 firms. Appendix Table 2 reports the distribution of firm registrations in India by principal business activity across five time periods: (i) 1900-1950, (ii) 1951-1990, (iii) 1991-2000, (iv) 2001-2009 and (v) 2011-2015. Firms registered between 1900-1950 constitute only about 1.2 percent of the overall clean sample.[21] A majority of firm registrations, about 84 percent, took place during the period 1991-2015.

[17] For a recent description of the data, see: https://www.ideasforindia.in/topics/macroeconomics/firm-formation-in-india-the-last-40-years.html and https://blog.theleapjournal.org/2019/03/the-geography-of-firms-and-firm.html [Accessed as on April 21, 2019]. We retrieved the data from MCA website during December 2015.

[18]The data reports information on a range of variables including: (a) unique corporate identification number (CIN hereon) – which is used for filing taxation and for other legal purposes in carrying out the business operations, (b) the name of the firm, (c) firm status (whether it is still active, dormant or closed its operations as on 2015 though this information is noisy and it was unclear to us if it was updated dynamically), (d) type of firm – whether it is private or public, (e) firm category (whether it is limited by shares or limited by guarantees), (f) authorized capital, (g) paid up capital, (h) principal business activity (i) date of registration or incorporation (see footnote below) (j) state/union territory in which the firm was registered and (k) its office address with detailed city, district and pin code (similar to zip code in the USA).

[19]Principal business activity is categorized into (i) Agriculture, (ii) Business, (iii) Community/Social Enterprises, (iv) Construction, (v) Electricity, (vi) Finance, (vii) Insurance, (viii) Manufacturing (food, leather, machinery, metals, papers, wood, textiles, and others), (ix) Mining, (x) Real Estate, (xi) Trading, (xii) Transportation and related services, and (xiii) Others (firms for which this particular information is not provided in the dataset).

[20]The 35 states and union territories include Andaman and Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Dadar and Nagar Haveli, Daman and Diu, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Lakshadweep, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Telangana, Tripura, Uttar Pradesh, Uttarakhand, and West Bengal.

[21]The year of registration is the same as year of incorporation of the company. We make use of the term "registered" to refer to both the registration and incorporation of a company in this paper and use it as a measure of firm formation and entry in their respective industries.

We defined *tuition centers* as supplementary tutorial centers that operate outside of school hours. These are companies that offer fee-based classes to teach students concurrently attending elementary or secondary education (including technical/vocational courses offered at the secondary or senior secondary level). Additionally, they offer training for specialized entrance exams to pursue tertiary education.[22] While three percent are registered as public companies, we refer to them collectively as private tutoring centers.

We define *schools* as organizations that are fully substitutable for government schools and provide pre-school, elementary [grade 1 to 8], or secondary education [grade 9 to 12] education. Using the MCA dataset, we captured primarily private schools including international schools.

Higher education institutions or HEIs are defined as organizations providing tertiary education in science, commerce, and humanities. The broad definition captures institutions providing tertiary professional education such as the Indian Law Institute and the International College of Financial Planning. In addition, we were able to capture private entities that impart specialized education and skill such as taxation offered by Institute of Chartered Tax Advisers of India, music production by Audio Media Private Ltd, pilot training by Star Flight Training Educare Private Limited, and others.

We capture the number of new registrants in each category. This may differ from the overall presence of an entity in the country because of the ability of registered firms to add subsidiaries. For example, Delhi Public School Private Ltd has been franchising since 2007. Its main school is located in Delhi, but franchises are located across 108 districts in India and in 6 countries (UAE, Kuwait, Qatar, Saudi Arabia, Nepal and Singapore). Despite its widespread presence in the country, it appears as one unit in our dataset since the company has to register with Ministry of Corporate Affairs just once, irrespective of its corporate structure.

We use the unique corporate identification number (CIN) to identify the schools, tuition centers, and HEIs. The CIN is a 21-digit code containing information on the listing status, industry code, state code, incorporation year, ownership, and registration number of the firm. We

[22] India has a variety of admission exams for tertiary education: Indian Institute of Technology Joint Entrance Examinations (IIT JEE) for engineering students, National Eligibility Cum Entrance Test (NEET) for medicine students, and Common Law Admission Test (CLAT).

use the industry code in conjunction with the NIC 2004 (national industrial classification of 2004) classification to identify the five-digit codes for education, although these codes do not fully identify all schools, tuition centers, or HEIs. We then searched the entire database with key words such as "schools", "tuition", "learning", and "coaching" to identify other industry codes associated with schools or tuition centers. An algorithm that made use of the industry codes and key words jointly was adopted to identify the schools, tuition centers and HEIs from the master data. (Appendix Table 3 gives the details of the industry codes used to identify private tuition centers, schools and HEIs in our sample). Finally, all the identified firms were manually checked to ensure accuracy.

Using this strategy, we identified 880 private tuition centers, 366 schools, and 3,449 HEIs registered between 1991 and 2015 and located in 375 districts spread across 30 states and union territories of India. In our final analysis, we considered 171 months of data starting from January 2001 to March 2015, while the 1991-2000 registrations were used subsequently in the robustness analyses.[23] From each firm's office address, we aggregate the data by district and month of registration.

We obtained population data for each district from the decennial Census surveys conducted in 1991, 2001 and 2011 by the Office of the Registrar General & Census Commissioner, GoI. We make use of these data points to interpolate linearly district level population information for each month between 1991, 2001 and 2011, and extrapolated for the months between 2011 to March 2015. The district-month population information was then merged with the district-month firm registration database.

The registration data have been criticized recently for an incomplete representation of firm formation and their contribution to Indian GDP (Nagaraj (2015), Nagaraj and Srinivasan (2017)), but this remains to date the only source of official data of firm formation in India. Given the critique about the quality of the MCA dataset, we analyzed how many of the registered tuition centers, schools, and HEIs were still operating as on June 2019. We made telephone calls

[23] The registration data are sometimes incomplete. For the definition of educationally competitive districts in the robustness analysis, we consider reported investment of paid-up capital for registrations between 1990-2000, but these data are sometimes missing. We also considered the number of registrations of tuition centers between 1990-2000, but again these sometimes lacked data on paid up capital. We are unable to distinguish no effective investment as indicated by no paid-capital from simply missing data. We also fail to identify any unregistered firms that may be illegally operating.

and online searches for the 817 tuition centers, 325 schools, and 3,179 HEIs reporting positive investments at the time of registration.[24] We located 42 percent of tuition centers, 37 percent of schools, and 25 percent of HEIs that were still operating (although it is likely that some additional institutions might have been operating but simply could not be located). This finding reemphasizes the fact that the MCA dataset contains firms registered in the past. It is suitable for measuring entry, but is not a good source for credibly identifying exits, thus precluding any analysis of the long term implications of growth in this fee-based shadow education sector.

6 Basic Results

The introduction of the Right to Education potentially influences not only the expansion of government schools but also the growth of a variety of private institutions. We focus on tuition centers, the most prevalent of the alternative providers, and we show that their growth is strongly related to the expansion of schooling under RTE. We subsequently return to the other educational providers – private schools and higher education institutions.

6.1 The growth of tuition centers

We start with some overall descriptive statistics. Our basic sample covers 375 districts from 2001-2015. Table 1 provides a description of the flows of new tuition centers divided between those in less competitive districts (i.e., without an IIT) and those in competitive districts (with an IIT). The competitive sample includes the 14 districts that had an IIT before RTE.[25]

[Insert Table 1]

The top row or Table 1 equals the average number of new tuition center per million that opened in the decade prior to our analysis (1991-2000).[26] The IIT districts clearly began introducing and using tuition centers before the typical other district. The reasons for this are not clear, although the pressures to get into an IIT undoubtedly led to more competitive behavior and choices by parents.

[24]For online searches, we made use of google search engine and other search engines such as justdial, indiamart and sulekha to identify and validate whether an education firm is still operating its unit or not.
[25] Subsequent additions of new IITs brings the total currently available up 23.
[26] We accumulate the registration of new tuition centers over the decade to arrive at an indication of pre-existing differences in educational competition.

The next rows provide the raw entries of new tuition centers by year over our sample period, 2001-2015. Two things stand out: first, the expansion of tuition centers is always much larger in the competitive districts; and, second, there is a significant jump in tuition center openings beginning in 2007 and extending until near the end of the period. As we formally consider below, this pattern is consistent with differential educational competition across the two groups of districts and with substantial reactions to possible increased enrollment with RTE.

The bottom of this table shows the unadjusted averages in the number of new tuition centers (per million district residents) introduced annual from January 2001-August 2009 (pre-RTE) and from August 2009-March 2015 (post-RTE). While there is a small increase in private tutoring in the less competitive districts, it is only one-tenth of that in the competitive IIT districts.

6.2 The impact of RTE

Our analytical approach is to compare the reactions of competitive districts to less competitive districts after the expansion of education under RTE. This approach, however, assumes that the less competitive districts are a good comparison group. We begin with an analysis of the parallel trends assumption that is key to the impact evaluation and then move to the impact of RTE on the expansion of private tutoring. Throughout this analysis, our sample includes monthly data on the introduction of tuition centers normalized by district population. All standard errors in the regressions are clustered at the district level.[27]

6.2.1 Parallel Trends

A key element in assessing the adequacy of this comparison group is to check that the behavior leading up to the introduction of RTE was similar in these two sets of districts. This parallel trend assumption can be directly verified in the data leading up to the introduction of RTE.

[Insert Figure 1]

Figure 1 provides a visual display of the expansion of tuition centers between 2001 and 2015. The monthly registrations are flat until just before the final enactment of RTE but then

[27] The alternative of clustering at the state level yields very similar results.

show some increase with the anticipation of RTE and a strong jump after enactment in the educationally competitive districts.

[Insert Table 2]

In Table 2 we consider more formally the monthly introduction of tuition centers across our sample of 375 districts in the period before any potential impact of RTE (2001-2006). The simplest model (Col. 1) includes just an indicator for competitive districts, a time trend, and the competitive indicator times the time trend. This last term provides a direct test of whether the pre-trends are different. The common trends assumption cannot be rejected.

The other two columns look at variations in this test by adding a state fixed effect and by adding measures of district population and the manufacturing and software share of total company registrations to capture the level of economic activity. Again, there is no significant difference in the trend of tutoring centers between the competitive and less competitive districts before RTE.

6.2.2 Induced Expansion of Private Tutoring

The central question is whether introducing the Right to Education alters the demand for private tutoring. We present the estimates of the basic difference-in differences model (Eq. 1) in Table 3, using the registration data from January 2001 through March 2015. In the first four columns, we set the introduction of RTE at August 2009 – the date of enactment by GoI – and compare the subsequent addition of new tuition centers in the educationally competitive districts with IIT's to that in the other districts of India. The final two columns consider the staggered adoption of implementing legislation across the states and estimate the model with state-specific dates for effective introduction.

[Insert Table 3]

The differential effect of RTE in competitive districts ($\beta(RTE_t \times C_d)$ in Eq. 1)) gives a direct estimate of the causal impact of RTE on the expansion of private tutoring. The first column provides the simplest estimates that do not allow for any anticipatory effects. Because of the history of the politics surrounding the final enactment of RTE, however, we might expect some anticipatory development of new tuition centers. Therefore, the remaining columns include terms that allow for some reaction to RTE before its formal ratification in August 2009.

This anticipatory effect is included with either dummies for the competitive districts in the 24 months leading up to RTE or by a 24-month time trend for the competitive districts. As seen most easily in Col. 4, the time trend for anticipatory effects is just significant at the 10 percent level. All regressions include state fixed effects, and Col. 3 and 4 include the population size of the district and the percentage of firm registrations in manufacturing and software in order to control for the overall development level and demand for skilled labor in the district. The increase in tuition centers within competitive districts is uniformly significant both quantitatively and statistically, ranging between 46 to 56 new tuition centers registrations per billion persons relative to less-competitive districts. For our most conservative specification in Col. 4 we see an increase of 53 new tuition centers registrations per billion persons in competitive districts relative to less competitive districts after RTE.

The final two columns introduce the time-varying implementation and enforcement of the individual states, using state-specific effective starting dates for RTE. These estimates in Col. 5 and 6 again show a strong impact of RTE on the expansion of private tutoring. In fact, the estimated impact is even larger when we take into account the varied actions of the states.

In sum, the constitutionally-expanded access through the Right to Education Act induced a strong development of more private tutoring centers in the districts with the most intensive competitive educational pressures.

6.2.3 Other Educational Expansion

The private tuition centers are the most responsive to altered educational competition, but other avenues of expansion exist. The other margins include private schools and higher education institutions.[28]

There has been a continued expansion in private schooling in India (Kingdon (2017)), but there is not a clear explanation of the varying causes of this expansion. Undoubtedly, this trend is motivated in part by concerns about the overall quality of the government schools.[29] Having

[28]Descriptive statistics show either no or small change in school and HEI registrations per million persons between pre and post RTE in both competitive and less competitive districts (see Appendix Table 4)

[29] While India has not been a recent participant in international testing, the available evidence leads strongly to a conclusion of low overall performance. Das and Zajonc (2010) construct tests that are comparable to the TIMSS assessments and find that students in the states of Orissa and Rajasthan perform very poorly in international comparisons, particularly at the lower parts of the achievement distribution. Students in Himachal Pradesh and Tamil Nadu states participated in the 2009 PISA tests and ranked at the bottom of the world distribution (Hanushek and

seen that RTE led to an expansion of tuition centers, it is natural to investigate whether there was a parallel push to the expansion of private schools.

Similarly, another point of impact could be the further development of higher education institutions (HEIs). These institutions are aimed at a group of students older than those directly affected by RTE. But, RTE potentially expands the number of students prepared for the wide variety of HEI programs, which often include specialized vocational courses that can be taken in conjunction with the regular schools.

[Insert Figure 2]

A parallel analysis of these other educational institutions shows much less responsiveness to RTE than tuition centers. Figure 2 shows the time pattern of these other institutions for the IIT districts and for the other, less competitive districts. In the raw data, we see no systematic response of these other institutions to the introduction of RTE.

[Insert Table 4]

When we reproduce the prior analysis for schools and HEIs, we find no systematic relationship between the introduction of RTE and their development. Table 4 examines the parallel trends assumption of these new investments, again comparing the competitive IIT districts to all others. There is no significant difference in registrations between the two sets of districts in the lead up to RTE (2001-2006) for either private schools (Col. 1-2) or HEIs (Col. 3-4).

The lack of new induced investment in schools and HEIs in the highly-competitive districts is seen in Table 5 where we present the difference-in-differences estimates of the impact of RTE. With the alternative specifications of any anticipatory effects and of other district factors and with the state-specific start dates, the response of new investments in private schools (Col. 1-3) and in HEIs (Col. 4-6) is uniformly insignificant.

[Insert Table 5]

Woessmann (2015)). Finally, Singh (2020) documents the low productivity of Indian schools (in Andhra Pradesh state) compared to schools in Vietnam and Peru.

The lack of responsiveness of these other educational institutions may not, however, be a simple reflection of limited induced demand for them. The approval process and regulatory structure surrounding these institutions is much more elaborate than that for tuition centers. As a result, these findings may indicate more the costs of developing these institutions than a lack of complementary demand.[30] In the face of this inertia, it may also be difficult to extract the effect of RTE with just the 14 IIT districts in the educationally competitive group (even though we could do this for private tutorial center entry.

7 Defining the Set of Educationally Competitive Districts

The previous analysis in Section 6 relied on the 14 educationally competitive districts defined on the basis of having an IIT that was established before RTE in 2009. It is important. however, to ensure that the prior findings were not driven by the definition of competitive districts. We can validate the overall finding of induced private tutoring by introducing other credible methods of identifying educationally competitive districts. We pursue two broad extensions – one based on refinements of the existence of other premier higher education institutions (not just IITs) in the district and one based on historical supplementary educational investments that occurred before our analysis period.

7.1 Premier Institutions of Higher Education

The IITs are India's premier engineering institutions and admission to one is extremely competitive. In 2018, there were less than 12,000 students across the IITs.[31] The number of such institutions has expanded over time, reaching a total of 23 in 2016, but we focused on those established prior to RTE. It is possible, however, that districts with IITs established closer to the passage of RTE are found in districts that have other characteristics that relate to educational demand, to the nature of RTE implementation, or to other important characteristics. To avoid the potential endogeneity of our educationally competitive districts, we consider alternative treatment groups.

[30] The lack of data on unregistered private schools may also enter into this finding. The RTE Act made unregistered schools illegal, but this likely was not closely enforced.

[31] https://en.wikipedia.org/wiki/Indian_Institutes_of_Technology [accessed May 20, 2020]

The first and most stringent approach is to look just at the seven IITs that were in existence before 2001, start of our analyses period. This restriction, however, potentially is offset by the small sample of resultant competitive districts and the loss of power in the analysis.

To circumvent this small sample problem, we broaden the indicators of educationally competitive districts based on the Institute of National Importance (INI) list prepared and updated by the Ministry of Human Resource and Development (MHRD), Government of India.[32] This broader set of institutions expands the educational focus to include medicine, management, architecture, management, information technology, and more. And like the IITs, these institutions have received INI designation at varying times, but in all cases represent very selective institutions.

We create two additional groupings of educationally competitive districts by merging information on districts with INIs with districts with IITs. For the second alternative, we define competitive districts as those which had a premier INI institution established before 2001 within the full set of 14 IIT districts. This condition, below referred to as "*IIT and premier institution established before 2001*" adds back three districts, leaving a sample of ten districts competitive districts. As a third alternative, we define competitive districts as those in which either an IIT or an INI school was established before 2001 – referred as "*Premier institution established before 2001*". For this group, we identify 39 districts as competitive districts.

7.2 Prior Investment in Supplementary Education

A different approach to defining educationally competitive districts relies on early use of private supplementary education across India. Returning to the data base on private educational investments, we use two added ways of defining competitive districts. First, we define any district that had new registrations for tuition centers, school or higher education institutions for the period 1991-2000 as showing prior competitiveness. We find 90 such districts.[33] Second, we expand on this to identify any district in the prior period that had recorded investments

[32] https://en.wikipedia.org/wiki/Institutes_of_National_Importance [accessed May 20, 2020]

[33] Only three districts (Gandhi Nagar, Hardiwar, and Medinipur) are categorized as competitive districts on the basis of an IIT but do not fall under competitive districts on the basis of prior number of centers and investments.

(measured by paid-up capital) in either tuition centers, schools, or higher education institutions. This definition of competitiveness yields 83 districts.[34]

7.3 Induced Private Options under Alternative Definitions of Competitive Districts

When we replicate our basic investment analysis for these expanded collections of treated competitive districts, we find consistent and often larger impacts of RTE. As before, we first confirm that these newly defined competitive districts again have parallel trends in registrations of tuition centers, private schools, and HEIs over the period 2001-2006 (see Appendix Tables 5-19).

[Insert Table 6]

Table 6 summarizes the impact of RTE on private education across both samples and institution type of the new registrations. This table shows just the differential impact of RTE across the five alternative samples, while the full estimation results can be found in Appendix Tables 20-34. The first row reproduces the estimate from Table 3, col. 3 and 5 for tuition centers along with the parallel specifications for private schools and HEIs in Table 5. The first three columns relate to the national enactment of RTE in 2009, and the latter three looks at state implementation dates.

Looking down column one, we see that all estimates of expanded private tutoring in the varying competitive groupings are statistically significant at the 5 percent level or better except for the estimate in the stringent seven-district sample of having an IIT before 2001. The estimates based on early investment in prior private supplementation in the bottom two rows are significant at better than the 1 percent level.

Interestingly, the impact of RTE on private schooling becomes more apparent when the competitive districts are defined by early investments (and when the sample of treated districts grows to larger numbers). It appears that RTE, with its potential influence on average school quality, increases the demand for private schools. It remains the case, nonetheless, that the new registrations for tuition centers is much greater that for schools. While this may be related to the

[34] While this second alternative definition of competitive districts has more categories of educational institutions, not all registrants report the amount of paid-up capital at registration. This could simply reflect missing data, or it could reflect that some registrants are not really prepared to begin operation at the time of registration.

scale of operations of the two, there is prima facie evidence against that argument. The average size of two institutions is not very different if viewed by the average paid up capital at registration of the two.

The development of new HEIs, however, still appears to be generally unrelated to RTE. The impact of RTE is insignificant regardless of the definition of the set of competitive districts. This finding may simply reflect the fact that HEIs are not directly serving competitive instincts but instead are providing a broader range of skills.

The consistency of results with these alternative definitions of educationally competitive districts makes it clear that the finding of a direct impact of RTE on private supplemental education is not an artifact of the specific comparison group.

7.4 Incorporating District Size

The prior models included a measure of district population in addition to analyzing the per capita development of new institutions. The measurement of population does, however, include some inaccuracies because it is necessary to interpolate population by district in our monthly registrations. One concern might be that the inaccuracies in population size distorts the measure of penetration. Additionally, it might be that district size, by affecting the size of the educational market, directly affects market entry. While the previous models did include population size as an explanatory factor, the direct impact may be obscured by that normalization.

As an alternative modeling approach, we look at the introduction of the absolute number of tuition centers (and schools and HIEs) and then control for district size. The parallel trend assumption holds for new tuition, school and HEI registrations across different definitions of competitive districts (see Appendix Table 35 and Appendix Figure 1). The estimates based on total number of new tuition center registrations, however, are qualitatively similar to our prior estimates (see Appendix Table 36). The impact of RTE in competitive districts remains strong and significant. Further, we find that the absolute number of school and HEI registrations have also increased in competitive districts, statistically significant at 5 percent except for the stringent definition as IIT established before 2001.

7.5 Summary

Our attention to the impact of RTE on private tuition centers is motivated in large part because of the potential of increased inequities if disadvantaged students are less likely to get supplemental education. There is strong evidence that RTE led to increased demand for private schooling. By its very nature, this increased demand undoubtedly comes disproportionately from household better off in income terms. Thus, any gains in access to disadvantaged populations from RTE are offset to some extent by more limited access to private supplementary services. This in turn is likely to affect adversely the opportunities for further education of disadvantaged students – both those with access to school before RTE and those brought in by RTE.

8 ASER data on achievement

The overall evaluation of the impact, nonetheless, depends on how good tuition centers are at improving the skills of students. Previous analyses of private tutoring provide a general *prima facie* case that there are clear educational advantages to tuition centers in general (e.g., Banerjee, Cole, Duflo, and Linden (2007), but those centers induced to start by RTE may still be different.

The Annual Status of Education Report (ASER) data on student learning provides a partial, but incomplete picture of the quality impact of tuition centers. The ASER data on performance provides a glimpse into the learning in India, but it is confined to rural districts.[35]

We have limited data before RTE, making it impossible to estimate the full models that we did above. But it is informative to provide a description of how learning has changed in competitive and less competitive districts.

[Insert Table 7]

The performance of rural students from before 2007 can be directly compared to post-RTE performance (2009-2014). Table 7 breaks this aggregate performance into that for students attending tuition centers and that for those who did not. Interestingly, performance in each of

[35] The public version of student outcome data can be found at http://www.asercentre.org/p/359.html. The data in this paper use special tabulations provided to us by Pratham (https://www.pratham.org/).

these aggregate categories fell after RTE, reinforcing general concerns about how expanded access to schools might adversely affect overall school quality.

By either the IIT or any prior registrations definition, however, the smallest fall in scores is found for students in competitive districts who also attended tuition centers. While for obvious reasons these comparisons should not be over-interpreted, they are consistent with a conclusion that attendance at a tuition center leads to a competitive advantage.

These data also suggest better overall performance of students in the competitive districts (according to the alternative definitions of competitiveness applied here).

9 Conclusions

There is a long history of policy initiatives designed to expand access to schools in developing countries. Perhaps the most well-known is the "Education for All" initiative. This international initiative became central to policy discussions of UNESCO and the World Bank and was an essential element of the parallel education plank of the Millennium Development Goals of the United Nations.[36] These initiatives, catalyzed at international meetings beginning in 1990, were built on the overwhelming evidence of inequities around the world in access to schools and thus in limitations on future opportunities for wide swaths of the population to participate effectively in modern society. While there have been critiques of these movements based on quality aspects of expanded schools, there is no doubt that the sentiments behind them are well founded.[37]

This analysis of the 2009 constitutional mandate of a Right to Education in India suggests that providing access by itself may not effectively deal with the educational inequities. The Right to Education Act provided that all Indian children should be provided a free education meeting certain input-quality standard through age 14. On the surface this appears to open up the education system to disadvantaged students who were previously underserved and to further equity consistent with Education for All.

At the same time, the Indian education system is very competitive for those who wish to go further in schooling. It is especially competitive to gain admission into one of the Indian

[36] See, for example, UNESCO (2000b).
[37] Hanushek and Woessmann (2015)

Institutes of Technology (IIT), the premier undergraduate institutions in India. Adding more students to this competition through RTE in fact increases the stakes for students interested in enrolling in top schools. This intense competition has fueled a private tutoring sector that can help provide individuals with a competitive advantage for college admission.

When we trace registrations of new tuition centers across India, we find that they increase sharply with the introduction of RTE. Importantly, registrations are heavily skewed toward districts already having significant educational competition. Specifically, the introduction of RTE leads to substantial increases in tuition centers in districts that have an IIT compared to districts that do not have an IIT.

By comparing reactions to RTE in districts that are highly-competitive for further education with those that have long been less educationally competitive, we obtain causal estimates of the independent impact of RTE on private tutoring. Changes in defining competitive districts – to those either with very early prior expansion of tuition centers, with early capital investment in private educational institutions, or with other premier institutes of national importance – has little or no influence on the estimated relationship between RTE and the expansion of private tutoring. These estimates are robust to a variety of model specifications and alternative comparison groups.

Because the tuition centers charge fees that exclude the most disadvantaged, their clientele comes from higher up the income distribution. As a result, the tuition centers tend to reinforce existing inequities in access to education beyond the compulsory portion. In other words, opening up of access to primary and lower secondary schooling can induce private market responses that may inhibit further schooling of the newly enfranchised, and thus may thwart the government attempts to expand educational opportunities.

Interestingly, the debates in the legislature leading up to the Right to Education Act, there is no mention of tuition centers (the Indian term for private tutoring centers). The thought that RTE might also induce growth in private centers and thus reinforce some existing inequities does not appear to have been considered.

The limited evidence on student outcomes after RTE is not very encouraging. It suggests that aggregate performance has declined, a fact that might be forecast from bringing new,

previously not engaged students into the schooling sector. But the available evidence also suggests that attending private tutoring has on average been associated with better outcomes.

It is not possible to ascertain the net effect of RTE, where expansion of access to schooling is balanced by the disequalizing effect of induced private supplementation. But clearly the design of such government programs that have at their heart strong distributional objectives must also consider private reactions that might limit program effectiveness. Interestingly, writing before RTE, Amartya Sen (2009) concluded that private tutoring "effectively negates the basic right of all children to receive elementary education and replaces it by seeing effective education as a privilege, reserved for the better placed in society." He did not consider the possibility that governmental policies to open access to schooling could actually exacerbate the inequities of private tutoring.

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Table 1: Average flow of new tuition centres registrations per million persons

Year	Non-competitive districts		Competitive districts	
	Mean	SE	Mean	SE
1991-2000 (average)	0.000	0.000	0.012	0.005
2001	0.002	0.001	0.008	0.005
2002	0.000	0.000	0.004	0.003
2003	0.001	0.000	0.006	0.003
2004	0.001	0.000	0.005	0.003
2005	0.002	0.001	0.005	0.003
2006	0.002	0.001	0.046	0.038
2007	0.002	0.001	0.108	0.078
2008	0.003	0.001	0.101	0.057
2009	0.004	0.001	0.032	0.008
2010	0.005	0.001	0.035	0.008
2011	0.008	0.001	0.052	0.012
2012	0.008	0.001	0.177	0.063
2013	0.007	0.001	0.088	0.045
2014	0.005	0.001	0.112	0.063
2015	0.007	0.002	0.037	0.020
Number of districts	361	-	14	-
Average pre-RTE	**0.002**	**0.000**	**0.033**	**0.012**
Average post-RTE	**0.007**	**0.000**	**0.086**	**0.018**
Differences between post-RTE and pre-RTE	**0.005*****	**0.000**	**0.050*****	**0.021**

Note: Competitive districts have an IIT located in them before the enactment of RTE in August 2009 by Government of India. Standard errors are reported in parentheses. We undertook t-test to arrive at the differences of average registrations of tuition centres between pre and post RTE. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Testing the parallel trends for new tuition center registrations per billion persons

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-94.656	-95.958	-96.113
	[100.200]	[102.850]	[102.629]
Time Trend (t)	0.012	0.012	0.011
	[0.011]	[0.011]	[0.011]
Differential trend ($t \times C_d$)	**0.366**	**0.366**	**0.365**
	[0.367]	**[0.367]**	**[0.367]**
Population			0.000
			[0.000]
Share of Manufacturing [%]			-0.028
			[0.022]
Constant	-2.105	-3.536	-2.995
	[3.105]	[3.259]	[3.247]
Observations	27,000	27,000	27,000
R-square	0.003	0.015	0.015
State fixed effects	No	Yes	Yes

Note: Dependent variable: number of new tuition centers per billion population monthly in each district. Sample is January 2001 to December 2006. Standard errors clustered at the district level. Competitive districts are those with an IIT established before enactment of RTE in 2009. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 3: Effect of RTE on new tuition centers registrations per billion persons

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	31.055**	19.990**	21.113**	23.561**	32.268**	30.679**
	[15.070]	[8.645]	[9.826]	[10.715]	[15.408]	[14.270]
Post RTE Indicator (RTE_t)	1.101	0.401	0.734	0.825	-3.635**	-3.683**
	[2.725]	[2.814]	[2.746]	[2.738]	[1.584]	[1.589]
Differential Impact ($RTE_t \times C_d$)	**45.627****	**55.586****	**55.575****	**53.125****	**65.235****	**66.826****
	[18.096]	**[23.535]**	**[23.597]**	**[22.283]**	**[32.626]**	**[33.793]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing [%]	-0.066		-0.065	-0.065	-0.068	-0.068
	[0.079]		[0.079]	[0.079]	[0.080]	[0.080]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				2.574*		-0.273
				[1.547]		[1.564]
Constant	-2.228	-2.535	-1.870	-1.959	-2.004	-1.943
	[2.226]	[1.834]	[2.127]	[2.137]	[2.223]	[2.193]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.037	0.045	0.045	0.037	0.038	0.038
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Dependent variable: number of new tuition centers per billion population monthly in each district. Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. Competitive districts are those with an IIT established before enactment of RTE in 2009. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 1 percent respectively.

Table 4: Testing the parallel trends for new school and HEI registrations per billion persons

Independent Variables	New school registrations per billion persons		New HEI registrations per billion persons	
	[1]	*[2]*	*[3]*	*[4]*
Educationally Competitive District Indicator (C_d)	46.922	46.769	-1,553.771	-1,560.125
	[51.060]	[49.253]	[1,498.785]	[1,531.497]
Time Trend (t)	0.009	0.011	0.062	0.104
	[0.007]	[0.008]	[0.073]	[0.084]
Differential trend ($t \times C_d$)	**-0.110**	**-0.109**	**6.122**	**6.133**
	[0.140]	**[0.140]**	**[5.853]**	**[5.863]**
Population		-0.000		-0.000
		[0.000]		[0.000]
Share of Manufacturing [%]		0.017		0.489
		[0.032]		[0.506]
Constant	-1.917	-3.331	-6.379	-32.573
	[2.027]	[2.261]	[20.815]	[25.513]
Observations	27,000	27,000	27,000	27,000
R-square	0.003	0.010	0.015	0.056
State fixed effects	No	Yes	No	Yes

Note: Dependent variable: (col. 1-2) number of new schools per billion population monthly in each district; (col. 3-4) number of new HEI per billion population monthly in each district. Sample is January 2001 to December 2006. Standard errors clustered at the district level. Competitive districts are those with an IIT established before enactment of RTE in 2009. * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 5: Effect of RTE on new school registrations per billion persons and new HEI registrations

Independent Variables	**New School Registrations**			**New HEI Registrations**		
	$RTE_d = 1$ after August 2009		$RTE_{td} = 1$ after state enactment of RTE	$RTE_d = 1$ after August 2009		$RTE_{td} = 1$ after state enactment of RTE
	[1]	***[2]***	***[3]***	***[4]***	***[5]***	***[6]***
Educationally Competitive District Indicator (C_d)	22.551	14.005*	23.842	176.711	190.009	181.446
	[14.396]	[8.006]	[14.845]	[121.557]	[148.989]	[124.938]
Post RTE Indicator (RTE_t)	1.188	0.873	-0.053	-4.701	-4.209	-12.829
	[1.257]	[1.138]	[1.163]	[11.509]	[12.143]	[7.843]
Differential Impact ($RTE_t \times C_d$)	**-1.003**	**7.548**	**-9.867**	**-51.854**	**-65.159**	**-96.876**
	[11.526]	**[6.386]**	**[18.093]**	**[94.775]**	**[124.205]**	**[116.962]**
Population	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing [%]	-0.013	-0.012	-0.014	-0.159	-0.160	-0.158
	[0.034]	[0.034]	[0.034]	[0.256]	[0.255]	[0.258]
Constant	-2.154**	-1.846***	-2.191**	15.980	15.492	16.677
	[0.924]	[0.708]	[0.997]	[11.259]	[11.959]	[11.341]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.017	0.037	0.028	0.060	0.061	0.062
Inclusion of 24 month anticipatory effects	No	Yes	Yes	No	Yes	Yes

Note: Dependent variable: (col. 1-3) number of new schools per billion population monthly in each district; (col. 4-6) number of new HEI per billion population monthly in each district. Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. Competitive districts are those with an IIT established before enactment of RTE in 2009. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24 month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent.

Table 6: Summary of differential impact **(** $RTE_t \times C_d$ **)** under alternative definitions of competitive districts

Differential Impact **(** $RTE_t \times C_d$ **)** by definitions of competitive districts	N. of competitive districts	RTE = 1 after August 2009			RTE = 1 after state enactment		
		New Tuition registrations per billion persons	*New School registrations per billion persons*	*New HEIs registrations per billion persons*	*New Tuition registrations per billion persons*	*New School registrations per billion persons*	*New HEIs registrations per billion persons*
		[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
IIT before 2001	7	**77.652***	5.334	-189.866	**97.853**	-29.600	-252.833
		[43.827]	[11.507]	[239.499]	**[68.926]**	[33.500]	[212.575]
IIT and premier institutions established before 2001	10	**71.952****	8.470	-99.544	**80.933***	-15.120	-147.240
		[31.152]	[8.753]	[172.769]	**[44.170]**	[25.045]	[161.272]
Premier institutions established before 2001	39	**22.697****	5.693**	-6.022	**26.624***	-0.915	-17.822
		[9.979]	[2.443]	[44.826]	**[13.884]**	[6.604]	[42.199]
Any prior registrations of tuition centers, HEIs or private schools (1991-2000)	90	**22.174*****	4.745***	9.906	**22.600*****	0.946	-2.318
		[5.761]	[1.494]	[20.777]	**[7.329]**	[2.992]	[17.077]
Any prior investments (1991-2000)	83	**23.725*****	5.184***	10.685	**24.486*****	1.051	-2.586
		[6.221]	[1.606]	[22.434]	**[7.905]**	[3.231]	[18.439]

Note: Each cell provides estimates from a separate regression of the outcome identified in the column heading for the specific definition of competitive districts in each row. Sample is January 2001 to March 2015. All regressions include population, share of manufacturing and software firm registrations, 24-month anticipatory effects, state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. The joint test of dummies for 24-month anticipatory effects is statistically significant at 5 percent.

Table 7: Average scores in ASER Basic Learning Skills [5-16 years age] by competitive classification and attendance at tuition center

RTE Status [Pre-RTE = 2007 and Post RTE = 2009 to 2014] – Data on 2008 not available	Scores attained in Basic Learning Skills [English and Mathematics] by those attending tuition				Scores attained in Basic Learning Skills [English and Mathematics] by those **not** attending tuition			
	Less Competitive		Competitive		Less Competitive		Competitive	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Competitive defined as district with IIT established before RTE								
Pre-RTE	78.405	0.085	75.176	0.572	63.855	0.047	60.923	0.308
Post-RTE	74.769	0.041	76.614	0.241	60.149	0.022	60.382	0.147
Difference between Post and Pre RTE	**-3.636*** **	**0.041**	**1.438** **	**0.222**	**-3.706*** **	**0.053**	**-0.541**	**0.341**
Competitive defined as districts with any tuition, school or HEI registration 1991-2000								
Pre-RTE	78.351	0.089	78.117	0.251	63.431	0.050	66.234	0.128
Post-RTE	74.524	0.042	77.418	0.118	59.551	0.024	64.450	0.061
Difference between Post and Pre RTE	**-3.827*** **	**0.104**	**-0.700** **	**0.280**	**-3.880*** **	**0.021**	**-1.784*** **	**0.055**

Note: The average percentage of children accessing tuition centers for Pre-RTE was based on the data for the year 2007 and for 2009-2014 for Post-RTE period. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (SE) are reported in parentheses.
Source: Annual Status of Education Report dataset for the time period between 2007 to 2014 provided by Pratham Education Foundation.

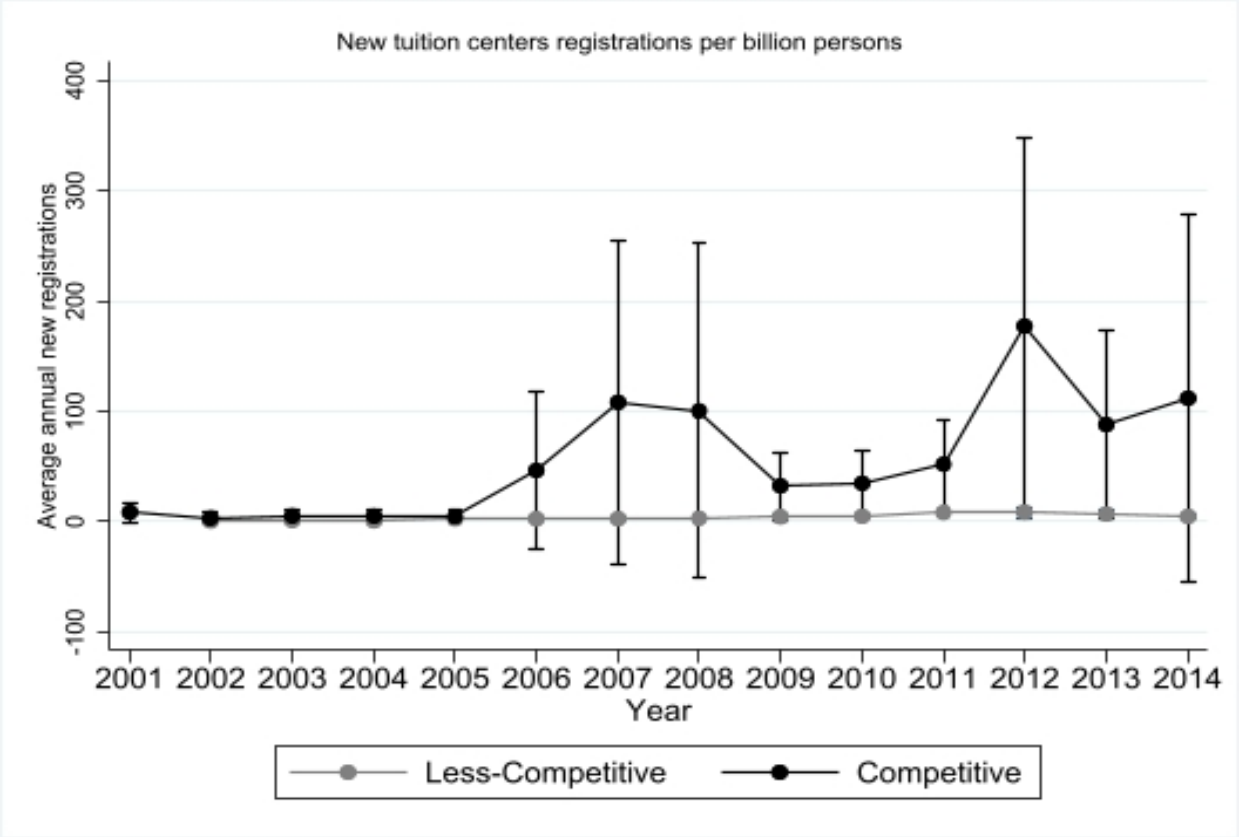


Figure 1: Graphical representation of parallel trends of new tuition centers registrations per billion persons

Note: The estimates were derived from regressing the new tuition centers registrations per billion persons on dummy for competitive districts interacted with dummies for year. Standard errors clustered at the district level. Competitive districts have an IIT located in them before the enactment of RTE in August 2009 by Government of India. The bandwidths represent the 95 percent confidence interval.

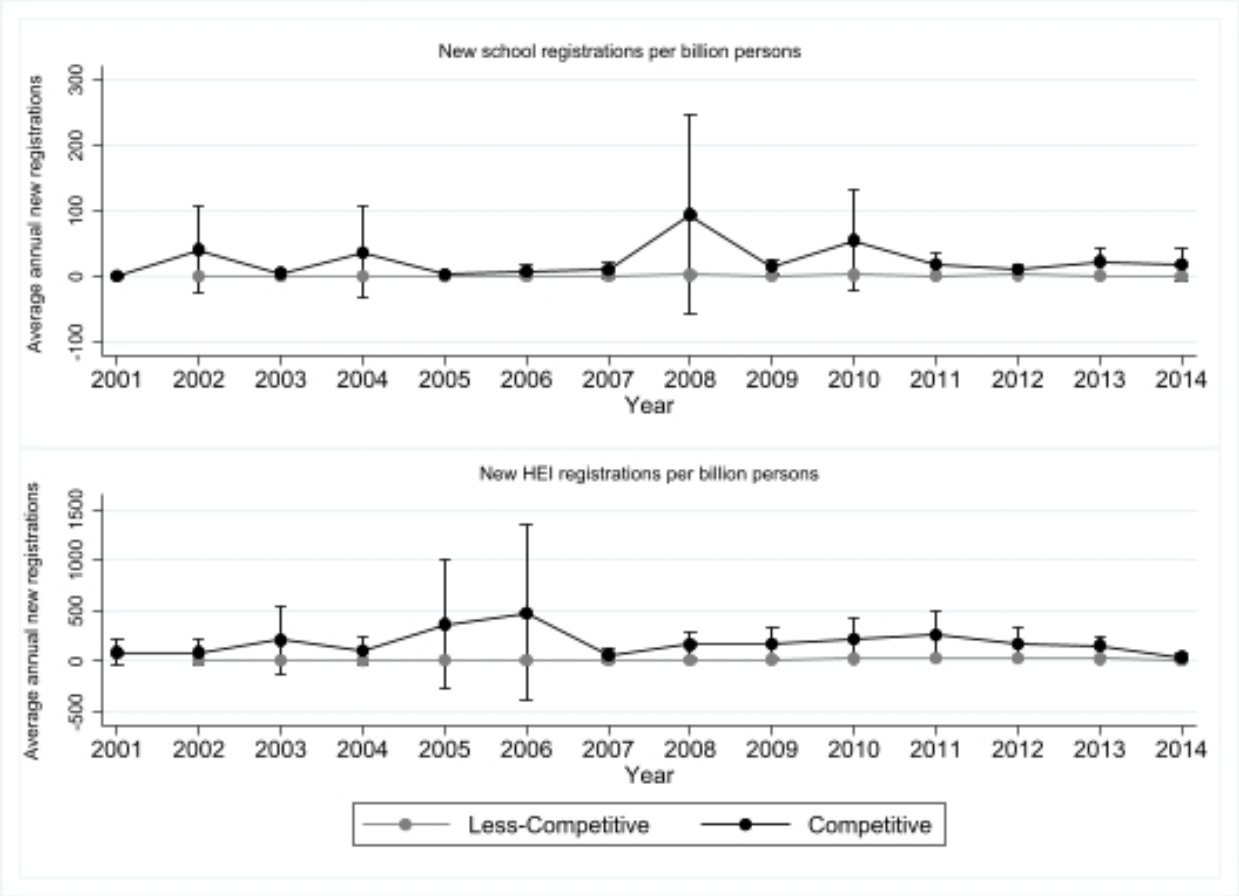


Figure 2: Graphical representation of parallel trends of new school and HEIs registrations per billion persons

Note: The estimates were derived from regressing the new school and HEIs registrations per billion persons on dummy for competitive districts interacted with dummies for year. Standard errors clustered at the district level. Competitive districts have an IIT located in them before the enactment of RTE in August 2009 by Government of India. The bandwidths represent the 95 percent confidence interval.

Appendix A. Institutional Background of RTE in India

The right to free and compulsory basic education has been a subject of heated debates since the beginning of independent India in 1947. These debates hinged on the premise that right to education was implicit in the right to life and personal liberty guaranteed by Article 21 – which was observed by the Supreme Court of India.[1] Further, it was also advocated by the Acharya Ramamurti Committee Report in 1990 to achieve universalization of elementary education (class 1 to class 8) as stated in the *Directive Principle of State Policy.*[2] While the momentum for right to education as a fundamental right was gaining in political and judicial spaces in India, GoI through District Primary Education Project (DPEP) and Sarva Shiksha Abhiyan (SSA) was investing in physical infrastructure, training of human resources (including teachers and government officials), and trying to diffuse operational guidelines to achieve universalization of elementary education. In particular, SSA was introduced in 2004 by GoI to achieve universalization of elementary education by 2010. The central government provided additional funding to invest in demand and supply-side interventions to achieve this target (Kingdon, 2007). But the goal was elusive as right to education without its fundamental right status was still an endeavor of the state subject to its resource constraints.

Finally, in 2002, the 86th amendment to the constitution introduced Article 21 (a) which stated that "*the State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may, by law, determine.*"[3] Formally thereafter, the RTE Act gained approval from the Union Cabinet in 2008, and then passed through the Lower and Upper House of the Indian parliament in July and August 2009. India thus joined more than 100 countries including United Kingdom, Japan, Germany, Belgium, Norway and others where the right to education is a fundamental and justifiable right of every citizen in the country from

[1]The two cases were Mohini Jain v. Union of India (1992) 3 SCC 666 and J P Unnikrishnan v. State of Andhra Pradesh, 1993 SCC (1) 645. In the case of J P Unnikrishnan v. State of Andhra Pradesh, 1993, the Supreme Court stated that: "The citizens of this country have a fundamental right to education. The said right flows from Article 21. This right is, however, not an absolute right. Its content and parameters have to be determined in the light of Articles 45 and 41. In other words, every child/citizen of this country has a right to free education until he completes the age of fourteen years. Thereafter his right to education is subject to the limits of economic capacity and development of the State."
[2]http://righttoeducation.in/how-was-original-article-45-constitution-arrived [Accessed as on March 14th 2019]
[3]https://www.india.gov.in/my-government/constitution-india/amendments/constitution-india-eighty-sixth-amendment-act-2002 - [Accessed as on March 14th 2019].

April 1st, 2010.[4] Consequently, the state governments enforced the RTE Act by passing it in their own state legislatures. It should be noted that not all states passed the Act in their legislatures at the same time (see Appendix Table 1 for details of time period of enforcement in each state). To elaborate, seven states/UTs - namely Andhra Pradesh, Bihar, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Uttar Pradesh, and Uttarakhand - were first to pass the RTE Act in their state legislatures. But even these states took about nearly eight months to pass the Act in their own legislatures. About 20 other states passed the RTE Act in their legislatures nearly after one year and more - where four states passed it only in 2012 which is nearly two years after its enactment in the Indian Parliament. We exploit this feature of staggered enforcement by region and time to build causal strength in our analysis as we describe below.

Jha, Ghatak, Mahendiran, and Bakshi (2013) categorized the main components of the RTE into *child entitlements* and *institutional arrangements*. In the former, RTE ensured that every child between 6 to 14 years has a right to admission in every neighborhood school. It defined neighborhood schools as 1 kilometer (km) from the habitation of a child at the primary level (grade 1 to 5) and 3 km from the habitation of a child at the upper primary level (grade 6 to 8). Although RTE provides the right to admission in neighborhood schools, it does not mandate that a child must access only these neighborhood schools to pursue elementary education. In essence, every child has a right to access these neighborhood schools but is free to access any schools of his/her preference. Further, the Act stated that private unaided schools[5] in the neighborhood has to allocate 25 percent of its seats at the entry level (class 1) for economically weaker sections and disadvantaged groups. The state was mandated to compensate for the costs incurred by the private schools. It included free midday meal, textbooks, uniforms, and notebooks as a right of every child pursuing elementary education. In addition, it made *no detention policy* and *comprehensive continuous evaluation* mandatory and guaranteed an environment free from discrimination, harassment, trauma or anxiety.

In terms of institutional arrangements, RTE mandated that all schools offering primary and upper primary education must have a good and inclusive infrastructure in terms of weather-

[4] We consider August 2009 once the RTE Act went through the Indian parliament as our effective cut-off date of national enforcement because all states knew from there on that sooner or later they have to comply to the provisions of the act.

[5] Private unaided schools are those which are managed by private management and does not take any assistance from the state or central government in any form.

proof building, boys and girl's toilet, drinking water, ramps for special children, library and so on. It also specified quality indicators such as teacher-pupil ratio being 1:30 for primary[6] and 1:35 for upper primary section. The qualification of teachers, their working hours and duties were specified very clearly in the Act to ensure that children accessing these neighborhood schools are provided with a quality education.

All schools were to comply with the norms specified by RTE ACT, otherwise they faced the possibility of being de-recognized by the government. To ensure this, the Act has mandated constitution of School Management Committee and State Advisory Council, in addition empowering existing local authorities, to monitor the compliance of norms specified and take actions in the event of violations. Overall, the RTE Act ensured that there was also a complementary quality monitoring role played by the social planner.

Although nationally enforced from August 2009, as we have discussed above, Taneja et al. (2011) find regional heterogeneity in implementation and report that there were only ten states which had come up with its State RTE rules by 2011. It wasn't until 2013 that all states and union territories had drafted its RTE rules. In a report assessing the RTE implementation in 2015, prior work shows that there exists very poor compliance with the RTE Act, 2009, across all the states. In general, the RTE Act has been implemented as *"yet another scheme"* (Sachdeva et al, 2015).

One of the reasons for non-uniform implementation of the Act is because of the different economic and development stages of states in India. Jha, Ghatak, Mahendiran, and Bakshi (2013) found that there were severe financial and governance challenges in Odisha, an economically poor state, whereas governance challenges plagued the implementation of RTE in Karnataka, an economically better-performing state, in India. Further, there exists district level variation in implementation of RTE Act especially in terms of providing free textbooks, maintaining the teacher-pupil ratio, availability of trained teachers, formation of School Management Committees (SMCs) and the 25 percent reservation of seats. Choudhary

[6] The teacher-pupil ratio was 1:30 for all schools offering primary sections with students less than or equal to 200. It must not exceed 1:40 for all schools offering primary sections with students more than 200. In terms of schools offering upper primary sections, there must be a teacher for every subject where the teacher-pupil ratio must not exceed 1:35 for schools catering to 100 students or less. For schools more than 100 students, there must be a head teacher and additional part-time instructors for work education, art, and health.

(2018)carried out the study in six major tribal districts in Jharkhand[7] and find considerable variations in the earlier-mentioned indicators of RTE Act both within and between the six districts. In Odisha, there was only 3 percent of schools which are fully compliant with the ten basic indicators of RTE Act; and it was below 1 percent of schools in districts such as Balangir, Nuapada, Rayagada, Nabarangpur, and Malkangiri by 2013.[8] An examination of the compliance of RTE Act in Karnataka, a better-performing state, indicate that only 17 percent of 60,002 primary schools adhere to the ten basic indicators of RTE Act in 2019.[9] Moreover, there was significant district wise variation in compliance of RTE norm in Karnataka. To illustrate, there were only 9.9 percent of schools in urban Bangalore complying to the RTE norms whereas about 34.3 percent of schools met the RTE norms in Gadag. The percentage of schools complying with RTE norms across the districts ranged between 6.8 percent in Vijayapura to 36 percent in Dakshina Kannada in 2019. Thus, it can be surmised that the implementation and compliance to RTE Act varied at the regional level, a feature we exploit in our identification strategy that we describe in section 4.

It is important to also highlight here the regulation of private schools under RTE Act. The compulsory compliance to norms for recognition and 25 percent reservation of seats attracted criticisms and exasperation from the private school management and the parents belonging to better income households. Popularly captured in a Bollywood movie *Hindi Medium*[10], the compulsory compliance requirement has brought about a concern related to incentivizing corrupt practices, often drawing parallels to the days of license raj in India (Aghion, Burgess, Redding, and Zilibotti (2008)), as the powers to make decisions are vested with the education department (Jha, Ghatak, Mahendiran, and Bakshi (2013)). Adding to these concerns, the state governments in India (except Karnataka, Rajasthan, Andhra Pradesh and Tamil Nadu), did not undertake any inclusive and participatory consultative process involving members from civil society, parent-teacher association, and other local community members in drafting its RTE rules (Taneja et al. (2011)).

[7]The six districts include Ranchi, Dumka, Gumla, Lohardaga, Pakur, and Pashchimi Singhbhum.
[8]http://odishachannel.com/index.php/4292/implementation-of-rte-act-in-odisha-abysmally-poor/ - [Accessed as on March 14th, 2019].
[9]https://timesofindia.indiatimes.com/city/bengaluru/only-17-primary-institutions-in-karnataka-adhere-to-rte-parameters/articleshow/67520125.cms - [Accessed as on March 14th 2019].
[10] See details on this movie based on parental travails in Delhi for a family trying to give their daughter elite education while coping with RTE Act here: https://www.imdb.com/title/tt5764096/ [Accessed as on April 21, 2019].

Despite these issues, the state governments have enforced and regulated the private unaided schools more strictly under RTE Act. During 2015-2018, the National Independent Schools Alliance (NISA) reports that there were 2,469 private schools closed, 13,546 private schools served closure notice and 4,482 private schools are on closure threat owing to non-compliance of RTE norms across fourteen states in India.[11] While this shows that the government have enforced compliance as mandated by RTE Act, it has raised debate over the financial viability of low-cost private schools to run its operations. A recent study points out that the closing of these schools owing to one or other technicality of RTE Act would result in 60 percent of children being forced out of the school education system in Patna city (Rangaraju, Tooley, & Dixon, 2012).

In sum, the RTE Act enacted in August 2009 held promises of ensuring greater access to good quality primary and upper primary education to all children up to the age of fourteen years. However, the evidence indicates that the different economic and developmental stages of states have led to variation in implementation of the RTE Act, a finding recently also extended by Shah and Steinberg (2019). Second, we find that there exists significant district-level heterogeneity in complying with RTE norms irrespective of economic status of the district and state. Third, we observe that there is weak adherence to ensuring infrastructural and quality indicators such as teacher-pupil ratio, availability of trained teachers and so on. But the states have taken stringent actions against private schools which do not comply with the prescribed norms of RTE Act. We utilize this Act as a quasi-natural experiment to understand how the introduction of regulation in formal education system affects the shadow system in India. While in theory, RTE would have expanded the demand for education, the regulatory requirements seem enough to constrain supply raising the opportunity for shadow education through private supplementary tutorial centers to rise in India (Kim and Lee (2010)), perhaps through the channel of teachers holding a second job or turning entrepreneurs or even with new entry as we detail above. One of the supplementary requirements in RTE was also that teachers were banned from engaging in private

[11] http://nisaindia.org/data-on-school-closures - Accessed as on [March 14th 2019]. The fourteen states include Andhra Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu and Uttar Pradesh. Note that, one would ideally like to examine survival of schools, varying by leader and laggard districts, pre and post RTE. But as we mention below, our data only allows us to credibly and comprehensibly observe registration and entry but is noisy and problematic to measure exit, we hence leave it for future research to extend in follow-on analysis.

coaching during off-school hours, a requirement which could incentivize the marginal teacher to turn entrepreneurial and start a private tutorial center instead.[12]

[12] See Section 28 of the RTE Act that prohibits private tuition by teachers, here: http://righttoeducation.in/forums/suggest-rte-amendments/section-28-prohibition-of-private-tuition-by-teacher [Accessed as on April 21 2019].

Appendix Table 1: Details of state-wise enactment of RTE rules

Sno	State	Act coming to force [from MHRD]
1	Andaman & Nicobar Islands	01-04-2010
2	Andhra Pradesh	01-04-2010
3	Arunachal Pradesh	03-06-2010
4	Assam	03-11-2011
5	Bihar	01-04-2010
6	Chandigarh	01-04-2010
7	Chhattisgarh	15-11-2010
8	Dadra & Nagar Haveli	01-04-2010
9	Daman & Diu	01-04-2010
10	Delhi	23-11-2011
11	Goa	02-08-2012
12	Gujarat	18-02-2012
13	Haryana	03-06-2011
14	Himachal Pradesh	05-03-2011
15	Jammu and Kashmir	Not Enacted Yet
16	Jharkhand	14-05-2011
17	Karnataka	28-04-2012
18	Kerala	06-05-2011
19	Lakshadweep	01-04-2010
20	Madhya Pradesh	26-03-2011
21	Maharashtra	11-10-2011
22	Manipur	21-10-2010
23	Meghalaya	01-08-2011
24	Mizoram	28-03-2011
25	Nagaland	21-03-2011
26	Odisha	18-10-2010
27	Puducherry	27-10-2011
28	Punjab	12-10-2011
29	Rajasthan	30-03-2011
30	Sikkim	11-08-2010
31	Tamil Nadu	12-11-2011
32	Tripura	11-07-2011
33	Uttar Pradesh	01-04-2010
34	Uttarakhand	01-04-2010
35	West Bengal	16-03-2012

Note: Individual state RTE rules were downloaded from https://mhrd.gov.in/rte_state_rules [Accessed as on June 5th 2019]

Appendix Table 2: All Registrations by Principal Business Activity in India 1900 - 2015

Type of principal business activity	Year of Registration				
	1900-1950	1951-1990	1991-2000	2001-2009	2010-2015
Agriculture	3.21	2.44	3.70	2.33	2.77
Business	5.99	12.29	16.60	22.02	31.06
Community/Social Enterprises	4.26	3.09	4.10	6.18	7.50
Construction	1.33	3.91	4.76	13.58	10.71
Electricity	0.55	0.23	0.50	1.33	1.80
Finance	5.91	12.10	14.63	2.97	2.41
Insurance	0.48	0.03	0.03	0.14	0.07
Manufacturing	21.91	37.53	26.08	21.14	15.29
Mining	1.86	1.16	1.08	1.25	1.12
Real Estate	1.57	2.81	3.56	5.84	9.69
Trading	11.10	9.75	13.80	17.78	14.51
Transport	2.04	2.47	3.13	3.90	3.07
Others	39.79	12.19	8.03	1.56	0.00
Total	17,468	2,13,321	3,51,970	4,05,557	4,68,965

Note: 1. The above table presents the column percentage of firms by principal business activity (PBA) for five time periods: (i) 1900-1950, (ii) 1951-1990, (iii) 1991-2000, (iv) 2001-2009 and (v) 2010-2015. 2. The data is available for each month in any particular year. The table provides a consolidated number of firms in each time period for the sake of brevity. Source: Authors calculation using the Registrar of Companies database from Ministry of Corporate Affairs, Government of India.

Appendix Table 3: List of industry codes under education in NIC 2004

Sno	Industry Code	Description
1	**8010**	**Primary education**
1a	80101	Primary education, including pre-primary and upper-primary education.
1b	80102	Literacy programmes for children who have no opportunity to attend schools.
1c	80103	Adult education primary level including upper-primary.
2	**8021**	**Secondary/Senior Secondary education [including special school-type education for handicapped students]**
2a	80211	Gender Secondary/Senior Secondary education, generally designed to qualify students either for vocational and technical education or for university entrance without any special subject pre-requisite.
2b	80212	General Secondary/Senior Secondary school-type education for handicapped students.
2c	80213	Adult education, Secondary/Senior Secondary level.
3	**8022**	**Technical and vocational Secondary/Senior Secondary education [includes all type of technical and vocational education. The programmes emphasis a subject matter specialization and instruction of both theoretical background and practical skills].**
3a	80221	Technical and vocational Secondary/Senior Secondary education below the level of university
3b	80222	Technical and vocational school type education for handicapped students
3c	80223	Adult education, Secondary/Senior Secondary level, technical and vocational
4	**8030**	**Higher education [includes post-secondary/senior secondary sub-degree level education that leads to university degree or equivalent]**
4a	80301	General higher education in science, commerce and humanity
4b	80302	Higher education in engineering/other technical courses
4c	80303	Higher education in medical/bio-technology and related courses
4d	80304	Higher education in professional/vocational courses like hotel management, fashion design, secretarial procedures, teacher's training, law etc.
4e	80305	Higher education in management courses.
4f	80306	Higher education in information technology courses.

4g	80309	Higher education n.e.c viz. oriental studies etc.
5	**8090**	**Other education**
5a	80901	Education by correspondence, through radio and television broadcasting and other distance learning media.
5b	80902	Coaching centers
5c	80903	Activities of the individuals providing tuition
5e	80904	Activities relating to training/education/conduct of specialised course in computer knowledge.

Source: NIC code – 2004, Ministry of Statistics and Programme Implementation, Government of India.

Appendix Table 4: Average flow of new school and HEIs registrations per million persons

Year	New school registrations per million persons				New HEIs registrations per million persons			
	Less-competitive districts		Competitive districts		Less-competitive districts		Competitive districts	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
1991-2000 (average)	0.000	0.000	0.006	0.004	0.003	0.000	0.089	0.020
2001	0.000	0.000	0.001	0.001	0.010	0.002	0.089	0.050
2002	0.001	0.000	0.041	0.036	0.011	0.002	0.091	0.050
2003	0.001	0.000	0.005	0.003	0.011	0.002	0.208	0.080
2004	0.001	0.000	0.037	0.037	0.008	0.001	0.110	0.053
2005	0.000	0.000	0.003	0.002	0.016	0.002	0.366	0.195
2006	0.001	0.000	0.008	0.004	0.013	0.002	0.479	0.283
2007	0.002	0.000	0.010	0.004	0.011	0.001	0.065	0.016
2008	0.002	0.001	0.095	0.056	0.016	0.002	0.163	0.046
2009	0.001	0.000	0.016	0.006	0.022	0.002	0.173	0.059
2010	0.003	0.001	0.055	0.041	0.027	0.003	0.223	0.063
2011	0.002	0.000	0.019	0.006	0.032	0.003	0.259	0.075
2012	0.003	0.001	0.011	0.004	0.031	0.003	0.173	0.087
2013	0.002	0.000	0.023	0.008	0.025	0.002	0.159	0.047
2014	0.001	0.000	0.019	0.007	0.011	0.001	0.044	0.011
2015	0.003	0.001	0.010	0.007	0.008	0.002	0.023	0.011
Number of districts	361	-	14	-	361	-	14	-
Average pre-RTE	**0.001**	**0.000**	**0.024**	**0.009**	**0.013**	**0.001**	**0.199**	**0.043**
Average post-RTE	**0.002**	**0.000**	**0.024**	**0.008**	**0.024**	**0.001**	**0.159**	**0.025**
Differences between post-RTE and pre-RTE	**0.001*** **	**0.000**	**0.000**	**0.006**	**0.011*** **	**0.001**	**-0.041**	**0.057**

Note: Competitive districts have an IIT located in them before the enactment of RTE in August 2009 by Government of India. Standard errors are reported in parentheses. We undertook t-test to arrive at the differences of average registrations of tuition centres between pre and post RTE. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table 5: Testing the parallel trends for new tuition center registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-220.882	-224.135	-224.320
	[187.274]	[192.324]	[192.010]
Time Trend (t)	0.010	0.010	0.009
	[0.011]	[0.011]	[0.011]
Differential trend ($t \times C_d$)	**0.835**	**0.835**	**0.835**
	[0.685]	**[0.686]**	**[0.686]**
Population			0.000
			[0.000]
Share of Manufacturing [%]			-0.029
			[0.021]
Constant	-1.516	-2.978	-2.434
	[3.086]	[3.233]	[3.213]
Observations	27,000	27,000	27,000
R-square	0.005	0.017	0.017
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 6: Testing the parallel trends for new school registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	95.317	93.622	94.590
	[96.793]	[92.610]	[93.212]
Time Trend (t)	0.009	0.009	0.012
	[0.007]	[0.007]	[0.008]
Differential trend ($t \times C_d$)	**-0.234**	**-0.234**	**-0.234**
	[0.262]	**[0.262]**	**[0.262]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.015
			[0.031]
Constant	-1.944	-2.736	-3.410
	[2.022]	[2.117]	[2.261]
Observations	27,000	27,000	27,000
R-square	0.004	0.012	0.012
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 7: Testing the parallel trends for new HEIs registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-3,165.715	-3,199.656	-3,182.109
	[2,869.992]	[2,943.855]	[2,933.933]
Time Trend (t)	0.058	0.058	0.105
	[0.072]	[0.072]	[0.083]
Differential trend ($t \times C_d$)	**12.425**	**12.425**	**12.432**
	[11.208]	**[11.214]**	**[11.211]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.444
			[0.498]
Constant	-5.293	-16.861	-31.905
	[20.457]	[20.696]	[25.045]
Observations	27,000	27,000	27,000
R-square	0.029	0.067	0.069
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 8: Testing the parallel trends for new tuition center registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-146.363	-148.427	-148.544
	[136.470]	[140.105]	[139.811]
Time Trend (t)	0.011	0.011	0.010
	[0.011]	[0.011]	[0.011]
Differential trend ($t \times C_d$)	**0.559**	**0.559**	**0.559**
	[0.500]	**[0.500]**	**[0.500]**
Population			0.000
			[0.000]
Share of Manufacturing [%]			-0.028
			[0.020]
Constant	-1.736	-3.171	-2.669
	[3.091]	[3.241]	[3.224]
Observations	27,000	27,000	27,000
R-square	0.004	0.016	0.016
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 9: Testing the parallel trends for new school registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	64.903	63.713	64.651
	[70.655]	[67.610]	[68.221]
Time Trend (t)	0.009	0.009	0.012
	[0.007]	[0.007]	[0.008]
Differential trend ($t \times C_d$)	**-0.150**	**-0.150**	**-0.149**
	[0.194]	**[0.194]**	**[0.194]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.016
			[0.030]
Constant	-1.896	-2.629	-3.376
	[2.005]	[2.096]	[2.244]
Observations	27,000	27,000	27,000
R-square	0.004	0.011	0.012
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 10: Testing the parallel trends for new HEIs registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-2,176.095	-2,199.493	-2,183.460
	[2,065.555]	[2,120.631]	[2,109.730]
Time Trend (t)	0.061	0.061	0.110
	[0.072]	[0.072]	[0.085]
Differential trend ($t \times C_d$)	**8.586**	**8.586**	**8.603**
	[8.063]	**[8.068]**	**[8.076]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.467
			[0.486]
Constant	-6.357	-17.722	-33.491
	[20.587]	[20.836]	[25.505]
Observations	27,000	27,000	27,000
R-square	0.021	0.060	0.062
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 11: Testing the parallel trends for new tuition center registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-15.366	-15.113	-15.036
	[39.580]	[40.310]	[40.099]
Time Trend (t)	0.018*	0.018*	0.018*
	[0.011]	[0.011]	[0.011]
Differential trend ($t \times C_d$)	**0.075**	**0.075**	**0.075**
	[0.144]	**[0.144]**	**[0.145]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			-0.020
			[0.021]
Constant	-4.041	-5.219*	-4.975
	[2.925]	[3.134]	[3.117]
Observations	27,000	27,000	27,000
R-square	0.002	0.014	0.015
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 12: Testing the parallel trends for new school registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	11.806	11.307	11.968
	[19.867]	[19.797]	[20.316]
Time Trend (t)	0.007	0.007	0.010
	[0.007]	[0.007]	[0.008]
Differential trend ($t \times C_d$)	**-0.016**	**-0.016**	**-0.014**
	[0.057]	**[0.057]**	**[0.056]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.028
			[0.036]
Constant	-1.393	-1.956	-2.876
	[2.055]	[2.120]	[2.332]
Observations	27,000	27,000	27,000
R-square	0.001	0.009	0.009
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 13: Testing the parallel trends for new HEIs registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-396.282	-399.638	-387.894
	[574.680]	[579.167]	[569.869]
Time Trend (t)	0.112**	0.112**	0.165**
	[0.055]	[0.055]	[0.073]
Differential trend ($t \times C_d$)	**1.714**	**1.714**	**1.750**
	[2.218]	**[2.219]**	**[2.248]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.640
			[0.583]
Constant	-23.173*	-32.345**	-50.810**
	[13.883]	[15.776]	[23.144]
Observations	27,000	27,000	27,000
R-square	0.007	0.048	0.050
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 14: Testing the parallel trends for new tuition center registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-14.612	-17.245	-17.336
	[19.926]	[20.896]	[20.798]
Time Trend (t)	0.008*	0.008*	0.008
	[0.005]	[0.005]	[0.005]
Differential trend ($t \times C_d$)	**0.073**	**0.073**	**0.073**
	[0.073]	**[0.073]**	**[0.073]**
Population			0.000
			[0.000]
Share of Manufacturing [%]			-0.029
			[0.022]
Constant	-2.132*	-2.419*	-1.898
	[1.244]	[1.300]	[1.330]
Observations	27,000	27,000	27,000
R-square	0.003	0.014	0.014
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 15: Testing the parallel trends for new school registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-4.015	-6.852	-6.644
	[10.836]	[10.059]	[10.250]
Time Trend (t)	-0.002	-0.002	-0.000
	[0.004]	[0.004]	[0.005]
Differential trend ($t \times C_d$)	**0.029**	**0.029**	**0.029**
	[0.034]	**[0.034]**	**[0.034]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.021
			[0.033]
Constant	0.799	0.518	0.001
	[1.298]	[1.278]	[1.473]
Observations	27,000	27,000	27,000
R-square	0.001	0.008	0.008
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 16: Testing the parallel trends for new HEIs registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-269.898	-314.837	-310.094
	[253.407]	[278.580]	[273.902]
Time Trend (t)	0.011	0.011	0.041
	[0.026]	[0.026]	[0.041]
Differential trend ($t \times C_d$)	**1.166**	**1.166**	**1.172**
	[0.980]	**[0.980]**	**[0.986]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.522
			[0.522]
Constant	0.389	-3.054	-15.556
	[7.535]	[7.586]	[14.564]
Observations	27,000	27,000	27,000
R-square	0.006	0.044	0.044
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 17: Testing the parallel trends for new tuition center registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-16.075	-18.928	-18.985
	[21.591]	[22.639]	[22.526]
Time Trend (t)	0.008*	0.008*	0.008*
	[0.004]	[0.004]	[0.005]
Differential trend ($t \times C_d$)	**0.080**	**0.080**	**0.080**
	[0.079]	**[0.079]**	**[0.079]**
Population			0.000
			[0.000]
Share of Manufacturing [%]			-0.024
			[0.022]
Constant	-2.081*	-2.361*	-1.955
	[1.214]	[1.269]	[1.303]
Observations	27,000	27,000	27,000
R-square	0.004	0.014	0.014
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 18: Testing the parallel trends for new school registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-4.267	-7.351	-7.100
	[11.733]	[10.875]	[11.089]
Time Trend (t)	-0.002	-0.002	-0.000
	[0.004]	[0.004]	[0.005]
Differential trend ($t \times C_d$)	**0.031**	**0.031**	**0.031**
	[0.037]	**[0.037]**	**[0.037]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.023
			[0.034]
Constant	0.780	0.506	-0.061
	[1.267]	[1.248]	[1.456]
Observations	27,000	27,000	27,000
R-square	0.001	0.008	0.008
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 19: Testing the parallel trends for new HEIs registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	*[1]*	*[2]*	*[3]*
Educationally Competitive District Indicator (C_d)	-293.480	-342.503	-336.969
	[274.600]	[301.976]	[296.695]
Time Trend (t)	0.010	0.010	0.042
	[0.026]	[0.026]	[0.041]
Differential trend ($t \times C_d$)	**1.267**	**1.267**	**1.277**
	[1.061]	**[1.062]**	**[1.070]**
Population			-0.000
			[0.000]
Share of Manufacturing [%]			0.561
			[0.533]
Constant	0.570	-2.848	-16.108
	[7.357]	[7.406]	[14.682]
Observations	27,000	27,000	27,000
R-square	0.007	0.044	0.045
State fixed effects	No	Yes	Yes

Note: Sample is January 2001 to December 2006. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 20: Effect of RTE on new tuition centers registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	55.324**	36.189**	37.605**	41.790**	57.021**	54.383**
	[26.741]	[16.304]	[17.244]	[18.695]	[26.400]	[24.334]
Post RTE Indicator (RTE_t)	1.630	1.026	1.303	1.380	-3.153*	-3.169*
	[2.756]	[2.843]	[2.781]	[2.769]	[1.612]	[1.620]
Differential Impact ($RTE_t \times C_d$)	**59.932***	**77.709***	**77.652***	**73.467***	**97.853**	**100.501**
	[33.178]	**[43.854]**	**[43.827]**	**[41.254]**	**[68.926]**	**[70.961]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.083		-0.082	-0.083	-0.090	-0.090
	[0.075]		[0.075]	[0.075]	[0.075]	[0.075]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				4.647		-1.288
				[2.861]		[3.057]
Constant	-2.282	-2.808	-1.965	-2.039	-2.025	-1.975
	[2.172]	[1.838]	[2.078]	[2.087]	[2.137]	[2.113]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.039	0.055	0.055	0.039	0.041	0.041
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 21: Effect of RTE on new school registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	41.570	23.685*	24.290*	28.163	42.596	46.695
	[26.758]	[14.237]	[14.713]	[17.522]	[26.745]	[30.815]
Post RTE Indicator (RTE_t)	1.362	0.881	1.043	1.114	-0.082	0.169
	[1.244]	[1.007]	[1.127]	[1.150]	[0.914]	[1.103]
Differential Impact ($RTE_t \times C_d$)	**-11.947**	**5.342**	**5.334**	**1.461**	**-29.600**	**-33.709**
	[21.549]	**[11.543]**	**[11.507]**	**[13.557]**	**[33.500]**	**[37.717]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.020		-0.019	-0.019	-0.019	-0.019
	[0.034]		[0.034]	[0.034]	[0.034]	[0.034]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				4.603		-0.462
				[3.183]		[1.675]
Constant	-2.153**	-2.037***	-1.843***	-1.911**	-2.184**	-2.276**
	[0.903]	[0.508]	[0.695]	[0.740]	[0.951]	[1.044]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.019	0.059	0.059	0.021	0.041	0.019
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 22: Effect of RTE on new HEIs registrations per billion persons – competitive districts defined as IIT before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	334.823	368.148	371.240	350.109	341.170	333.138
	[226.837]	[276.057]	[281.208]	[257.662]	[226.635]	[214.218]
Post RTE Indicator (RTE_t)	-3.738	-3.575	-3.063	-3.456	-12.477	-12.553*
	[11.483]	[10.614]	[12.110]	[11.828]	[7.593]	[7.552]
Differential Impact ($RTE_t \times C_d$)	**-153.445**	**-189.704**	**-189.866**	**-168.732**	**-252.833**	**-244.748**
	[181.789]	**[239.732]**	**[239.499]**	**[215.644]**	**[212.575]**	**[199.596]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.212		-0.214	-0.213	-0.195	-0.195
	[0.251]		[0.251]	[0.251]	[0.252]	[0.253]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				-5.248		3.697
				[11.962]		[5.861]
Constant	16.159	13.294	15.494	15.884	16.724	16.873
	[11.073]	[10.787]	[11.738]	[11.430]	[11.059]	[10.902]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.065	0.069	0.069	0.065	0.072	0.067
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 23: Effect of RTE on new tuition centers registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	43.029**	27.346**	29.293**	32.362**	44.820**	42.698**
	[20.026]	[11.752]	[13.088]	[14.233]	[20.376]	[18.813]
Post RTE Indicator (RTE_t)	1.388	0.559	1.028	1.109	-3.398**	-3.423**
	[2.767]	[2.861]	[2.788]	[2.777]	[1.558]	[1.564]
Differential Impact ($RTE_t \times C_d$)	**58.206****	**71.900****	**71.952****	**68.881****	**80.933***	**83.060***
	[23.733]	**[31.107]**	**[31.152]**	**[29.361]**	**[44.170]**	**[45.754]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.078		-0.077	-0.077	-0.083	-0.083
	[0.074]		[0.074]	[0.073]	[0.074]	[0.075]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				3.665*		-0.222
				[2.065]		[2.210]
Constant	-2.171	-2.601	-1.819	-1.898	-1.933	-1.876
	[2.178]	[1.833]	[2.081]	[2.091]	[2.166]	[2.137]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.039	0.050	0.050	0.040	0.041	0.040
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 24: Effect of RTE on new school registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	31.594	19.155*	19.987*	22.578*	33.239*	36.139
	[19.540]	[10.160]	[10.768]	[12.799]	[20.156]	[23.096]
Post RTE Indicator (RTE_t)	1.301	0.756	0.997	1.065	-0.043	0.142
	[1.263]	[1.013]	[1.142]	[1.166]	[1.146]	[1.310]
Differential Impact ($RTE_t \times C_d$)	**-3.146**	**8.429**	**8.470**	**5.878**	**-15.120**	**-18.024**
	[15.982]	**[8.828]**	**[8.753]**	**[10.203]**	**[25.045]**	**[28.015]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.018		-0.017	-0.017	-0.018	-0.018
	[0.032]		[0.032]	[0.032]	[0.032]	[0.032]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				3.097		-0.354
				[2.346]		[1.227]
Constant	-2.122**	-1.995***	-1.825***	-1.892***	-2.165**	-2.253**
	[0.895]	[0.502]	[0.681]	[0.729]	[0.974]	[1.065]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.018	0.047	0.047	0.020	0.034	0.019
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 25: Effect of RTE on new HEIs registrations per billion persons – competitive districts defined as IIT and premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	252.214	267.581	272.040	258.206	260.050	255.218
	[165.105]	[197.624]	[203.799]	[186.997]	[169.910]	[160.631]
Post RTE Indicator (RTE_t)	-3.963	-4.459	-3.440	-3.806	-12.378	-12.420
	[11.587]	[10.628]	[12.225]	[11.937]	[7.829]	[7.766]
Differential Impact ($RTE_t \times C_d$)	**-79.706**	**-99.635**	**-99.544**	**-85.702**	**-147.240**	**-142.370**
	[131.714]	**[173.381]**	**[172.769]**	**[155.721]**	**[161.272]**	**[151.663]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.196		-0.197	-0.197	-0.189	-0.188
	[0.238]		[0.237]	[0.237]	[0.241]	[0.241]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				-2.059		3.530
				[8.501]		[4.148]
Constant	16.268	13.736	15.749	16.115	16.840	16.965
	[11.125]	[10.792]	[11.803]	[11.488]	[11.231]	[11.060]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.064	0.066	0.066	0.064	0.068	0.065
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 26: Effect of RTE on new tuition centers registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	18.034**	12.006***	14.337**	15.201**	18.654**	18.200**
	[8.634]	[4.415]	[6.599]	[6.972]	[8.704]	[8.291]
Post RTE Indicator (RTE_t)	1.317	0.147	0.941	1.029	-3.290**	-3.302**
	[2.779]	[2.885]	[2.792]	[2.779]	[1.455]	[1.455]
Differential Impact ($RTE_t \times C_d$)	**18.977****	**22.397****	**22.697****	**21.829****	**26.624***	**27.082***
	[7.850]	**[9.639]**	**[9.979]**	**[9.470]**	**[13.884]**	**[14.317]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.019		-0.017	-0.017	-0.017	-0.017
	[0.089]		[0.090]	[0.090]	[0.091]	[0.091]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.978		0.043
				[0.607]		[0.548]
Constant	-2.627	-2.428	-2.259	-2.348	-2.482	-2.438
	[2.380]	[1.830]	[2.271]	[2.282]	[2.381]	[2.350]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.033	0.036	0.036	0.034	0.034	0.034
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 27: Effect of RTE on new school registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	10.913	7.176**	8.249*	8.848*	11.535*	12.561*
	[6.713]	[3.342]	[4.331]	[4.875]	[6.838]	[7.563]
Post RTE Indicator (RTE_t)	1.078	0.407	0.806	0.868	-0.191	0.045
	[1.309]	[1.024]	[1.176]	[1.203]	[1.119]	[1.239]
Differential Impact ($RTE_t \times C_d$)	**3.011**	**5.516****	**5.693****	**5.090***	**-0.915**	**-1.950**
	[4.161]	**[2.551]**	**[2.443]**	**[2.741]**	**[6.604]**	**[7.355]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	0.008		0.010	0.010	0.006	0.005
	[0.036]		[0.036]	[0.036]	[0.035]	[0.035]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.713		0.032
				[0.654]		[0.339]
Constant	-2.244**	-1.876***	-1.979**	-2.040**	-2.273**	-2.388**
	[0.990]	[0.503]	[0.777]	[0.826]	[1.041]	[1.121]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.016	0.022	0.022	0.016	0.020	0.016
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 28: Effect of RTE on new HEIs registrations per billion persons – competitive districts defined as premier institutions before 2001

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	98.220*	92.251	99.283	95.624	97.675*	97.222*
	[55.805]	[57.162]	[65.385]	[61.087]	[56.225]	[54.107]
Post RTE Indicator (RTE_t)	-4.017	-6.385	-3.905	-4.281	-11.762	-11.852
	[11.909]	[10.612]	[12.537]	[12.271]	[8.055]	[8.000]
Differential Impact ($RTE_t \times C_d$)	**-4.961**	**-7.026**	**-6.022**	**-2.347**	**-17.822**	**-17.362**
	[34.470]	**[46.394]**	**[44.826]**	**[40.453]**	**[42.199]**	**[40.037]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.007		-0.007	-0.006	-0.009	-0.009
	[0.272]		[0.268]	[0.269]	[0.272]	[0.273]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.896		2.107*
				[2.242]		[1.210]
Constant	14.910	14.746	14.794	15.167	15.800	15.851
	[11.624]	[10.776]	[12.310]	[12.006]	[11.595]	[11.456]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.058	0.058	0.058	0.058	0.059	0.058
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 29: Effect of RTE on new tuition centers registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	3.972	0.613	1.259	1.575	4.515	4.311
	[2.752]	[2.668]	[2.591]	[2.673]	[2.812]	[2.776]
Post RTE Indicator (RTE_t)	-1.982	-2.838	-2.629	-2.553	-3.163***	-3.235***
	[2.583]	[2.694]	[2.585]	[2.592]	[1.216]	[1.213]
Differential Impact ($RTE_t \times C_d$)	**19.453*** **	**22.141*** **	**22.174*** **	**21.858*** **	**22.600*** **	**22.800*** **
	[4.996]	**[5.684]**	**[5.761]**	**[5.619]**	**[7.329]**	**[7.538]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.065		-0.065	-0.065	-0.070	-0.070
	[0.085]		[0.085]	[0.085]	[0.085]	[0.085]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.825***		0.601**
				[0.310]		[0.301]
Constant	-1.055	-1.079	-0.412	-0.487	-0.928	-0.874
	[2.197]	[1.683]	[2.081]	[2.086]	[2.172]	[2.141]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.032	0.033	0.033	0.032	0.032	0.032
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 30: Effect of RTE on new school registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	3.278*	1.092	1.277	1.536	3.623**	4.144**
	[1.757]	[0.876]	[1.030]	[1.161]	[1.821]	[2.067]
Post RTE Indicator (RTE_t)	0.403	-0.155	-0.074	-0.012	-0.266	-0.045
	[1.267]	[1.045]	[1.135]	[1.165]	[1.049]	[1.154]
Differential Impact ($RTE_t \times C_d$)	**2.738**	**4.731*** **	**4.745*** **	**4.485*** **	**0.946**	**0.426**
	[2.197]	**[1.517]**	**[1.494]**	**[1.605]**	**[2.992]**	**[3.256]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.010		-0.010	-0.010	-0.011	-0.011
	[0.035]		[0.035]	[0.035]	[0.036]	[0.036]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.599*		0.057
				[0.323]		[0.172]
Constant	-1.906*	-1.529***	-1.431*	-1.493*	-1.963*	-2.103*
	[0.978]	[0.475]	[0.743]	[0.797]	[1.043]	[1.126]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.014	0.019	0.019	0.015	0.016	0.014
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 31: Effect of RTE on new HEIs registrations per billion persons – competitive districts defined as any prior registrations

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	31.996**	32.136**	32.876*	30.175*	31.877**	32.915**
	[14.167]	[14.593]	[17.625]	[15.981]	[14.019]	[13.401]
Post RTE Indicator (RTE_t)	-9.620	-9.493	-9.408	-10.054	-6.204	-6.036
	[11.311]	[10.725]	[11.896]	[11.656]	[4.202]	[4.153]
Differential Impact ($RTE_t \times C_d$)	**10.786**	**9.905**	**9.906**	**12.613**	**-2.318**	**-3.353**
	[16.418]	**[21.196]**	**[20.777]**	**[18.969]**	**[17.077]**	**[16.243]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.140		-0.139	-0.139	-0.143	-0.143
	[0.258]		[0.258]	[0.258]	[0.262]	[0.262]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.627		2.443**
				[1.009]		[1.095]
Constant	17.586	15.929	17.370	18.018	18.074	17.812
	[11.389]	[10.694]	[12.126]	[11.802]	[11.334]	[11.221]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.052	0.053	0.053	0.052	0.053	0.052
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 32: Effect of RTE on new tuition centers registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	4.568	0.763	1.624	1.965	5.137*	5.001*
	[2.913]	[2.820]	[2.722]	[2.811]	[2.974]	[2.920]
Post RTE Indicator (RTE_t)	-1.769	-2.760	-2.415	-2.340	-3.745***	-3.810***
	[2.575]	[2.692]	[2.575]	[2.583]	[1.370]	[1.368]
Differential Impact ($RTE_t \times C_d$)	**20.768*** **	**23.659*** **	**23.725*** **	**23.383*** **	**24.486*** **	**24.620*** **
	[5.392]	**[6.120]**	**[6.221]**	**[6.068]**	**[7.905]**	**[8.132]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.043		-0.042	-0.042	-0.048	-0.048
	[0.084]		[0.084]	[0.084]	[0.084]	[0.084]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.897***		0.534*
				[0.335]		[0.311]
Constant	-1.316	-1.109	-0.674	-0.749	-1.141	-1.106
	[2.208]	[1.683]	[2.088]	[2.094]	[2.184]	[2.153]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.032	0.033	0.033	0.032	0.032	0.032
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 33: Effect of RTE on new school registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	3.711*	1.255	1.533	1.820	4.072**	4.642**
	[1.912]	[0.923]	[1.109]	[1.256]	[1.981]	[2.254]
Post RTE Indicator (RTE_t)	0.453	-0.160	-0.026	0.038	-0.258	-0.028
	[1.268]	[1.044]	[1.134]	[1.165]	[1.047]	[1.163]
Differential Impact ($RTE_t \times C_d$)	**2.997**	**5.154*** **	**5.184*** **	**4.896*** **	**1.051**	**0.481**
	[2.373]	**[1.634]**	**[1.606]**	**[1.727]**	**[3.231]**	**[3.518]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.003		-0.002	-0.002	-0.004	-0.004
	[0.035]		[0.035]	[0.035]	[0.035]	[0.035]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.652*		0.068
				[0.349]		[0.186]
Constant	-1.983**	-1.526***	-1.508**	-1.571*	-2.035*	-2.176*
	[0.982]	[0.475]	[0.746]	[0.801]	[1.048]	[1.131]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.014	0.020	0.020	0.015	0.016	0.014
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 34: Effect of RTE on new HEIs registrations per billion persons – competitive districts defined as any prior investments

Independent Variables	RTE = 1 after August 2009				RTE = 1 after state enactment	
	[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Educationally Competitive District Indicator (C_d)	35.163**	34.685**	35.951*	33.084*	35.020**	36.101**
	[15.409]	[15.601]	[19.220]	[17.419]	[15.281]	[14.581]
Post RTE Indicator (RTE_t)	-9.164	-9.462	-8.989	-9.621	-6.465	-6.249
	[11.326]	[10.725]	[11.909]	[11.669]	[4.218]	[4.172]
Differential Impact ($RTE_t \times C_d$)	**11.472**	**10.601**	**10.685**	**13.560**	**-2.586**	**-3.666**
	[17.716]	**[22.972]**	**[22.434]**	**[20.474]**	**[18.439]**	**[17.520]**
Population	-0.000		-0.000	-0.000	-0.000	-0.000
	[0.000]		[0.000]	[0.000]	[0.000]	[0.000]
Share of Manufacturing	-0.080		-0.079	-0.079	-0.085	-0.085
	[0.255]		[0.254]	[0.254]	[0.259]	[0.260]
Anticipatory 24-month Trend ($t^{24} \times C_d$)				0.716		2.635**
				[1.090]		[1.192]
Constant	16.936	15.937	16.755	17.388	17.460	17.206
	[11.422]	[10.693]	[12.153]	[11.830]	[11.381]	[11.266]
Observations	64,125	64,125	64,125	64,125	64,125	64,125
R-square	0.052	0.053	0.053	0.052	0.053	0.053
Monthly anticipatory indicators in competitive districts (24 month)	No	Yes	Yes	No	Yes	No

Note: Sample is January 2001 to March 2015. All regressions include state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. 2. The joint test of dummies for 24-month anticipatory effects in Column 3 and 5 is statistically significant at 5 percent respectively.

Appendix Table 35: Summary of differential trend **(** $t \times C_d$ **)** to test the parallel test assumption under alternative definitions of competitive districts

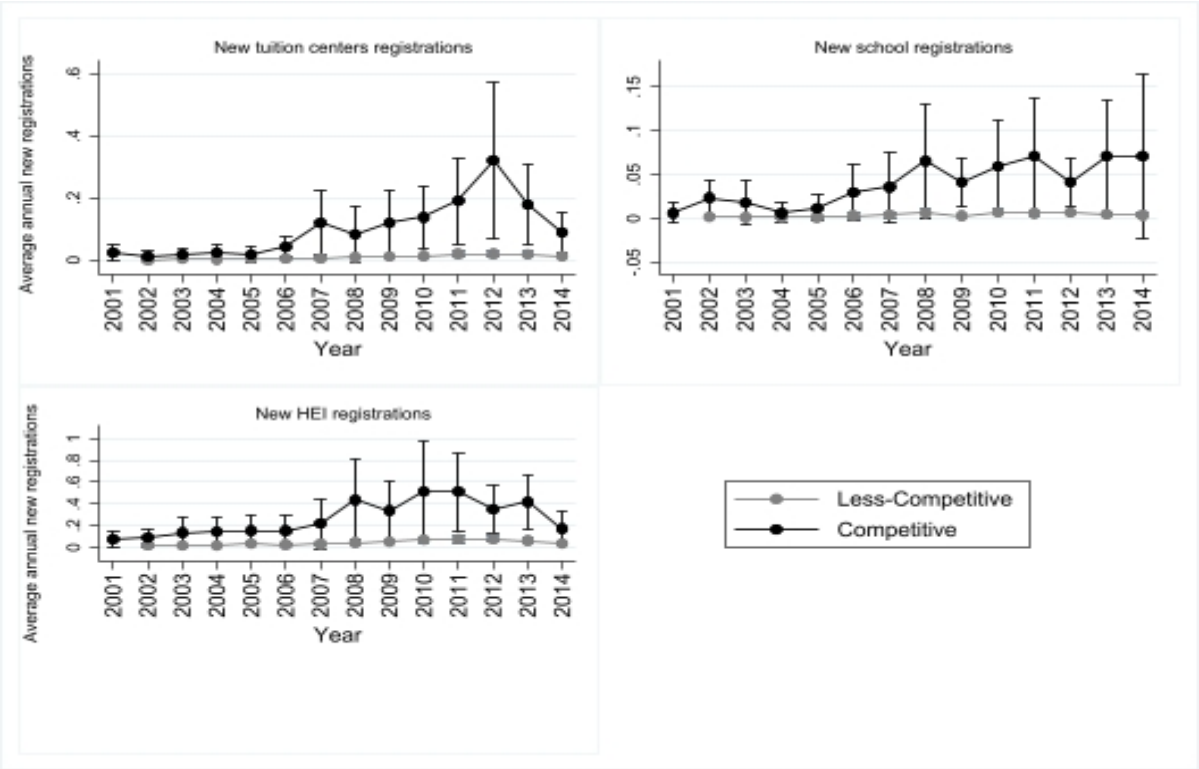
Differential trend **(** $t \times C_d$ **)** by definitions of competitive districts	N. of competitive districts	*DV: New Tuition registrations*	*DV: New School registrations*	*DV: New HEIs registrations*
		[1]	*[2]*	*[3]*
IIT established before RTE	14	0.000	0.000	0.001
		[0.000]	[0.000]	[0.001]
IIT established before 2001	7	0.001	0.000	0.003
		[0.000]	[0.000]	[0.002]
IIT and premier institutions established before 2001	10	0.000	0.000	0.002
		[0.000]	[0.000]	[0.001]
Premier institutions established before 2001	39	-0.000	0.000	0.000
		[0.000]	[0.000]	[0.001]
Any prior registrations	90	0.000	0.000*	0.001*
		[0.000]	[0.000]	[0.000]
Any prior investments	83	0.000	0.000*	0.001*
		[0.000]	[0.000]	[0.000]

Note: Sample is January 2001 to December 2006. All regressions include population, share of manufacturing and software firm registrations, and state fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01.

Appendix Table 36: Summary of differential impact **(** $RTE_t \times C_d$ **)** under alternative definitions of competitive districts

Differential Impact **(** $RTE_t \times C_d$ **)** by definitions of competitive districts	N. of competitive districts	RTE = 1 after August 2009			RTE = 1 after state enactment		
		DV: New Tuition registrations	*DV: New School registrations*	*DV: New HEIs registrations*	*DV: New Tuition registrations*	*DV: New School registrations*	*DV: New HEIs registrations*
		[1]	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
IIT established before RTE	14	0.129**	0.039**	0.189**	0.132***	0.028	0.100
		[0.052]	[0.018]	[0.095]	[0.044]	[0.018]	[0.071]
IIT established before 2001	7	0.128	0.045	0.147	0.111*	0.015	-0.073
		[0.089]	[0.028]	[0.169]	[0.064]	[0.013]	[0.053]
IIT and premier institutions established before 2001	10	0.170**	0.051**	0.244*	0.165***	0.037	0.111
		[0.068]	[0.024]	[0.128]	[0.056]	[0.024]	[0.093]
Premier institutions established before 2001	39	0.068***	0.026***	0.189**	0.062***	0.019**	0.124*
		[0.023]	[0.008]	[0.079]	[0.021]	[0.008]	[0.068]
Any prior registrations	90	0.056***	0.017***	0.115***	0.048***	0.011***	0.066**
		[0.013]	[0.004]	[0.036]	[0.011]	[0.004]	[0.030]
Any prior investments	83	0.060***	0.018***	0.125***	0.052***	0.012***	0.071**
		[0.014]	[0.004]	[0.039]	[0.012]	[0.005]	[0.032]

Note: Sample is January 2001 to March 2015. All regressions include population, share of manufacturing and software firm registrations, 24-month anticipatory effects, state and month fixed effects. Standard errors clustered at the district level. * p < 0.10, ** p < 0.05, *** p < 0.01. The joint test of dummies for 24-month anticipatory effects is statistically significant at 5 percent.



Appendix Figure 1: Graphical representation of parallel trends of new tuition centers, school and HEIs

Note: The estimates were derived from regressing the new tuition centers, school and HEIs registrations on dummy for competitive districts interacted with dummies for year. Standard errors clustered at the district level. Competitive districts have an IIT located in them before the enactment of RTE in August 2009 by Government of India. The bandwidths represent the 95 percent confidence interval.