

Gender Gaps in Elementary Education in India in the post Right to Education Act Period: Implications for Policy

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Abstract

While the gender gaps in elementary education in India have almost been eliminated, we obtain somewhat different picture when adjusting the gaps to the appropriate school-age children (6-14 years) and the number of the child population. We calculate gender gaps in enrolment, transition rate (from primary to upper primary level), achievement in the examination, and test scores in different subjects in the post Right to Education Act period and obtain that girls are ahead of the boys in almost all aspects. The age-adjusted gender gap in enrolment has improved, implying that over time girls are more likely to enrol in schools within the appropriate school-age. Also, fewer girls are expected to remain out of schools compared to boys within the appropriate school-age. Perhaps, this progress in enrolment has resulted in better performances of girls in transition rate, achievement in examinations and test scores in individual subjects. The rising girls' performance on different indicators of elementary education indicates the potential impacts of female share on future labour market.

Keywords: Enrolment Ratio; Transition Rate; Labour Market; Human Rights; Gender Parity Index; India

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Introduction

Since the inception of the Universal Declaration of Human Rights in 1948, reduction in the gender gap, especially in elementary education, has remained a top priority in world education policies. The third Millennium Development Goals (MDGs) 2000 aimed at achieving gender equality in education by the year 2015. Likewise, the Sustainable Development Goals (SDGs) set in 2015 (Goals 4 and 5) have explicitly targeted to ensure gender equality in education (UNESCO, 2016b). Like many other countries, India has also been striving to reduce the persistent gender gaps in early school grades such as elementary education. Accordingly, achieving gender equality in primary or elementary education has remained one of the key focuses of many education policies and programs. The National Education Policy (NEP) 1968, 1986, and 2016; District Primary Education Program (DPEP), 1994; the Sarva Shiksha Abhiyan (SSA) Mission, 2001; or the Right to Education (RTE) Act, 2009 are some of the major ones.

The recently announced NEP 2020 (GOI, 2020) also pays adequate attention to bridging the persistent gender gaps in education. The NEP 2020 proposes to constitute a 'Gender-Inclusion Fund' to provide equitable quality education for all girls as well as transgender students. In essence, this policy aims to eliminate disparity in access to education for children from any gender and socio-economically disadvantaged group. For this, the policy plans to provide adequate and safe infrastructure, including clean drinking water, working toilets, electricity, computing devices, internet, libraries, clean and attractive spaces, and sports and recreational resources to all schools to ensure that teachers and students from all genders and with disabilities, receive an inclusive, effective, and safe learning environment.

While there are many root causes of the gender gap in education such as family background (Buchmann and DiPrete, 2006), socio-economic

factors (Varughese and Bairagya, 2020), teacher-student relationship (Hajovsky et al., 2017), educational access and opportunities (Lacour and Tissington, 2011; Tesema and Braeken, 2018), culture and religion (Cooray and Potrafke, 2011), other things remaining same, the gender gap in the early school grades tends to explain much of the gender differences in secondary or higher education. The reduction in the gender gap in education is crucial for changing the permanent component of gender inequality in the labour market, that is, abilities or productive capacities of workers (Arabage and Souza, 2019).

The conventional measures of the gender gap in education like gender parity index (GPI) or enrolment ratio provide a crude measure of gender differences as they do not take into account the age structure of school children and the share of the child population. The enrolment ratio adjusted for the school-age and the share of child population may be more effective in explaining the potential gender gap in enrolment. This is because a country or a state that has gender inequality in the child population of a specific age group may typically experience gender inequality in enrolment within the age group. We present here an analysis that explains age and child population-adjusted gender gap in elementary education across states and union territories (UTs) in India in the post Right to Education (RTE) Act, 2009 period.¹

While the conventional measures show a declining GPI in India, we obtain somewhat different results when adjusting it to appropriate school-age (6-14 years) children and the number of child population (6-14 years). Our analysis is similar in spirit to that of the observation made by Bandyopadhyay and Subrahmanian (2008), who examine the trend and pattern of gender inequality in education in India. Bandyopadhyay and Subrahmanian (2008) found that although the proportionate share of girls' enrolment has increased rapidly during

¹ The RTE Act, 2009 specifies the right of all children to free and compulsory education irrespective of gender, caste, place of residence, and social group (The Gazette of India, 2009).

1990-2005, substantial gender gap still exists with persistently high dropout rates of girls. We extend the calculation to the age and child population-adjusted enrolment and witness that girls are outperforming boys in both cases, with a few exceptions. Perhaps, girls' advantage in enrolment has led to the declining or reverse gender ratio in transition rate, achievements in examinations, and test scores in individual subjects over time. Our findings, that is, the overall improvement of girls in elementary education can provide not only useful complementary information to the existing literature on gender gaps in elementary education, but also has significant implications in reducing gender inequality in secondary or higher education and thus gender inequality in the future labour market.

The rest of the study is structured as follows. The next section provides an overview of gender gaps in the world as well as India, followed by a brief description of data used in the study. The method of calculating the gender gap in each dimension and results are discussed in the subsequent section. The concluding remarks are given in the final section.

Overview of Gender Inequality

Usually, the gender gap is defined as the state of unequal ease of access to resources and opportunities or basic social services by men and women. Gender inequality acknowledges that gender affects individuals' living experiences that arise from the differences in biology, psychology and cultural norms. Worldwide, there are significant differences in the types of inequality faced by women. In many countries, women do not have equal legal rights as men. A recent World Bank's report in 2019 on Women Business and the Law reveals that only six countries (Belgium, Denmark, France, Latvia, Luxembourg and Sweden) give women equal legal rights as men (World Bank, 2019).

The size of the gender gap would be more apparent if we go through a few examples where women share the unequal burden. Globally, a substantial number of women are still bearing the burden of teenage pregnancy (around 12 million girls are married off before they reach 18

years) (UNICEF, 2020). In terms of illiteracy, women makeup world's more than two-thirds of the illiterate adults, showing the extent of gender inequality in access to education opportunities (World's Women Report, 2015). Women also share a higher burden of family work (UN Women, 2015; Rubiano-Matulevich and Viollaz, 2019). According to the United Nation's 2012 report on MGDs, *over 70 per cent of the burden of collecting water for households in sub-Saharan Africa falls on women and girls* (United Nations, 2012).

Several efforts have been made to measure the extent of gender inequality across countries. As a more recent effort, the Global Gender Gap Index (GGGI) published by the World Economic Forum (WEF) since 2006 include four key areas namely health, education, economy and politics to gauge the state of gender equality (WEF, 2006). India's position in GGGI is not satisfactory. GGGI value in India has improved marginally from 0.601 in 2006 (ranked 98th out of 115 countries) to 0.668 in 2020 (ranked 112th out of 153 countries), signifying the persistent higher levels of gender inequalities within the country (WEF, 2020).

Overwhelmingly, India has some higher levels of gender discrimination at birth, more commonly preferences for boys (Clark, 2000; Dahl and Moretti, 2008; Echavarri and Ezcurra, 2011; Kugler and Kumar, 2017; Jayachandran and Pande, 2017) that lead to unequal gender ratio across all age groups. The postnatal discrimination against girls leading to excess women mortality is a cause of skewed sex ratio in India (Guilmoto et al., 2018). The Ministry of Statistics and Program Implementation, Government of India (GOI) 2018 reports that the country has been experiencing a declining gender ratio among the child population in the last few years. For the age group 6-10 years, the gender ratio has declined from 0.914 in 2011-12 to 0.905 in 2016-17, whereas the gender ratios were 0.915 and 0.861, respectively, for the age group 11-13 years. For the age group 14-15 years, the gender ratio has declined from 0.901 to 0.885 during the same period. The declining gender ratio is also observed for all age groups.

As per 2011 Census, the overall gender ratio in India was 0.943 (0.949 in rural and 0.929 in urban areas). According to a recent estimate of GOI, the gender ratio in 2020 has declined to 0.924.

However, perhaps not too surprisingly, the inequality or the declining gender ratio among the child population has led to the gender differences in enrolment in elementary education. We, therefore, adjust enrolment rates in elementary education by the number of the child population and the appropriate school-age to estimate the potential gender difference in enrolment. While doing this, we get some ideas about how the gender differences in child population can lead to the gender differences in enrolment rates in elementary education in India. The following section discusses about the data sources and methods.

Data Sources and Methods

We consider all states and UTs to calculate the gender gap in various dimensions of elementary education in India during 2012-17. However, due to constraints relating to data, some states or UTs, or both have been excluded from the calculation. We calculate gender gaps in four dimensions: enrolment rate (actual and adjusted for age and child population), transition rate, achievement in examination (pass percentage), and test scores in individual subjects. Data on enrolment, transition rate and achievement in examinations are taken from State Report Cards (SRC) of District Information System for Education (DISE), various issues, managed and published by National University of Educational Planning and Administration (NUEPA), New Delhi, Ministry of Human Resource Development (MHRD), GOI; data on test scores in individual subjects are taken from National Achievement Survey, MHRD, GOI, various rounds; and child population data are taken from population projection by MHRD, GOI.

The study integrates both education and demographic variables in analysing gender

differences in various dimensions of elementary education. We use simple statistical tools for calculating gender ratios and adjusting them to age and child population. For each dimension, the details of the calculation process, the results and discussions associated with the calculation are summarised in the following sub-sections.

Analysis and Discussion

Gender Gap in Enrolment

Usually, the gender gap in enrolment, that is, Gender Parity Index (GPI) is measured by the ratio of the number of girls enrolled per 100 boys enrolled. We call it an actual gender gap or actual GPI. This actual GPI, however, sometimes may mislead because of at least two reasons. First, if a state or UT has a child sex ratio less than 1, there may be a chance of getting actual GPI value less than 1 even if all girls are enrolled in schools. Second, actual GPI value includes both under-aged and over-aged enrolment, and hence it may fail to reflect the potential gender gap within the specific school-age population.²

Since actual GPI provides a crude measure of the gender gap in enrolment, we adjust it by appropriate school-age and the number of the child population. The age-adjusted GPI is calculated by subtracting both under-aged and over-aged students from total enrolment. Thus, we get a ratio of the number of girls enrolled per 100 boys enrolled within the age group of 6-14 years. Figure 1 depicts both actual and age-adjusted GPI in 2011-12 and 2016-17. We see that with a few exceptions, age-adjusted GPI is much higher across states and UTs. The gap is highest in Meghalaya (0.720), followed by Haryana (0.796) and Punjab (0.809). In short, the actual GPI understates the gender gap by around 0.06 percentage point than the age-adjusted GPI. The lower age-adjusted GPI in Meghalaya is not surprising. Although Meghalaya is a matrilineal society, the overall enrolment in 2011-12 was accompanied with higher girls' share of under-aged and over-aged enrolment (73.54 per cent) than the boys (61.78 per cent).

² Under-aged students are those who are younger than the official school-age range for the educational programme they are enrolled in, whereas over-aged students are

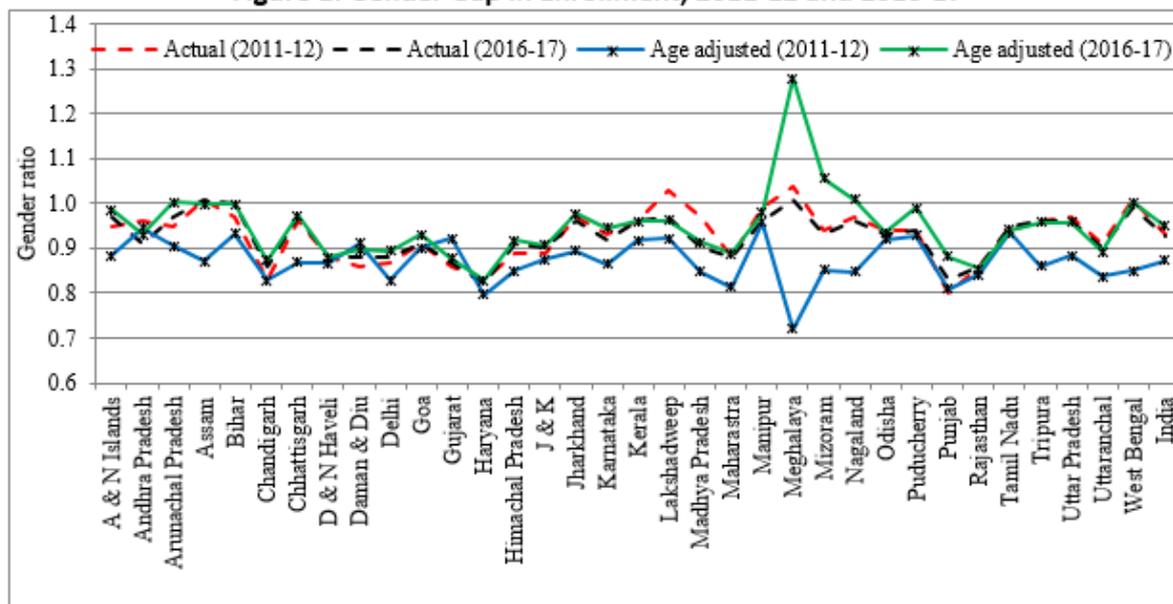
those who are older than the official school-age range for the educational programme they are enrolled in.

The reverse was the case in 2016-17, where boys share of under-aged and over-aged enrolment (79.65 per cent) overtook the girls' share (74.33 per cent).

In 2016-17, the age-adjusted (0.949) GPI outweigh the actual (0.926) GPI. The greatest improvement in age-adjusted GPI is observed in Meghalaya (1.279) followed by Mizoram (1.057) and Nagaland (1.009). In the same vein, Arunachal Pradesh, Assam and Bihar have

achieved age-adjusted gender equality in enrolment. The age-adjusted GPI in 2016-17 has improved, indicating that over time girls are more likely to enrol in schools within the appropriate age (6-14 years). However, in 2016-17, Andhra Pradesh (0.931), Daman & Diu (0.896) and Gujarat (0.878) have experienced higher age-adjusted gender gap than in 2011-12, where the values were 0.946, 0.912 and 0.922 respectively.

Figure 1: Gender Gap in Enrollment, 2011-12 and 2016-17



Source: Authors' calculation based on State Report Cards (SRC) of District Information System for Education (DISE) and population projection by Ministry of Human Resource Development (MHRD), Government of India (GOI)

Although the age-adjusted gender gap in enrolment has decreased over time, but the variation across states and UTs has increased at an annual rate of 9.35 per cent during 2011-12 and 2016-17. That is, girls' performances are comparatively lagging behind in some states and UTs that need more strategic intervention. The increasing variation across states and UTs is also evident from the ratio of top five to bottom five performing states and UTs (an increase from 1.185 to 1.240 during the same period).

We then adjust the age-adjusted GPI to the number of child population.³The age and child

population-adjusted GPI gives us the ratio of relative share of girls to boys' enrolment within the age group 6-14 years. We see that within the age group 6-14 years, the share of girls' enrolment has improved than the boys. In 2016-17, most of the states and UTs have experienced age, and child population-adjusted GPI value higher than 1 (see Figure 2). That is, the gender gap has reversed in terms of age and child population-adjusted GPI. The age and child population-adjusted GPI values in both 2011-12 and 2016-17 are higher than their actual and age-adjusted GPI values.

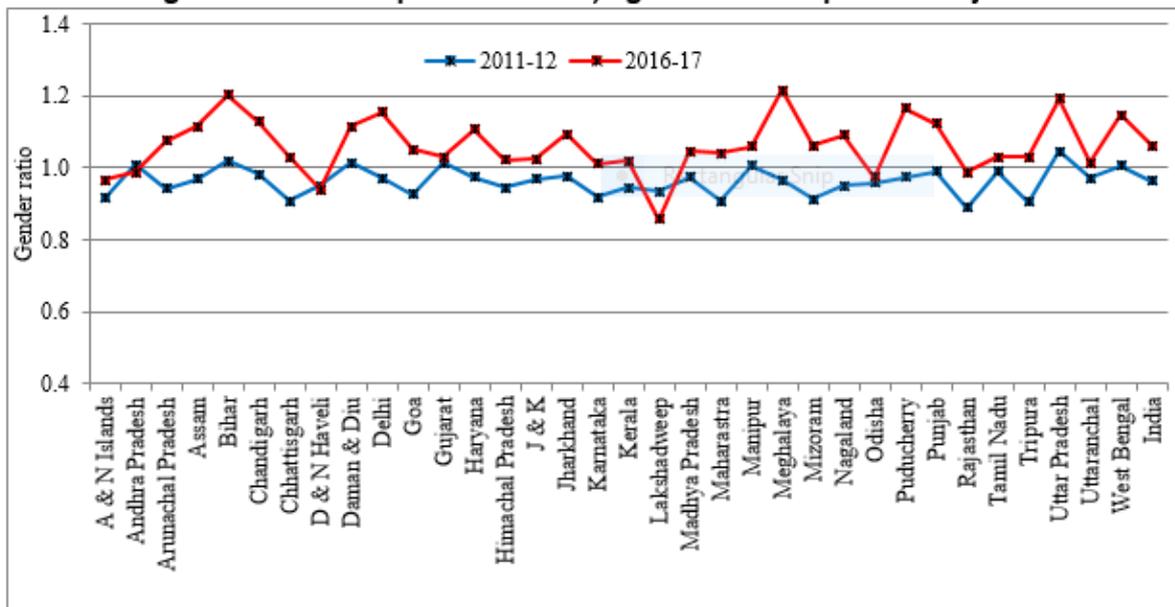
³ Population estimation made by MHRD is available under six broad categories of age groups: 6-10, 11-13, 14-15, 16-17, 18-22, and 18-23 years. To get the number of children within the age group of 6-14 years, we calculate the

average number of children in a single year between age group '6-15' and then this average is added to the number of 6-10 and 11-13 years age group.

Similar to age-adjusted GPI, the variability of age and child population-adjusted GPI has also increased across states and UTs. This time, the variability across states and UTs have increased

more rapidly (15.25 per cent annually) than in the case of age-adjusted GPI (9.35 per cent annually).

Figure 2: Gender Gap in Enrollment, Age and Child Population Adjusted



Source: Authors' calculation based on SRC of DISE and population projection by MHRD, GOI

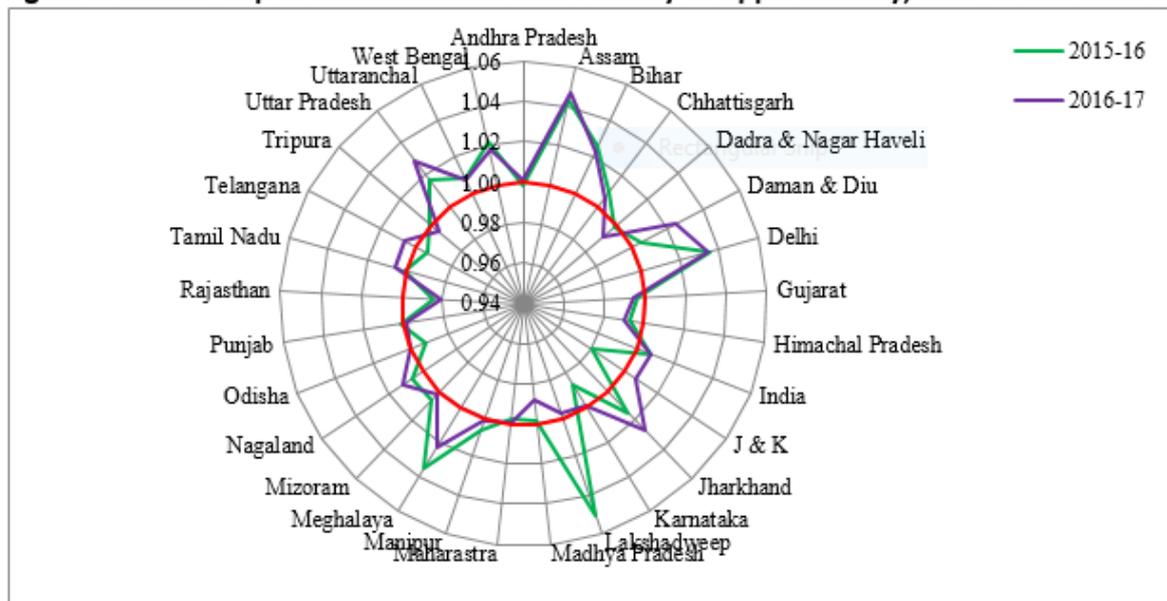
Gender Gap in the Transition Rate

While the position of girls in age and child population-adjusted enrolment has been most impressive, there has also been a considerable improvement of girls in terms of transition rate from primary to upper primary level. Due to the lack of data, we calculate the gender ratio of transition rate only for all enrolled students irrespective of their ages. The transition rates for boys and girls are separately available for 2015-16 and 2016-17 (see Figure 3).

In both periods, transition rates of the girls are higher in majority of the states and UTs than that

of the boys. Some states are continuously experiencing higher gender gap in transition rates. At the other end in Assam, Delhi, Uttar Pradesh, West Bengal, Jharkhand transition of the girls is far better than the boys. The average transition rate and variation across states and UTs in terms of transition rate in these two periods have remained almost unchanged. Girls are continuously outperforming boys in transition rate, suggesting fewer girls are likely to leave schools during the primary education cycle than boys.

Figure 3: Gender Gap in Transition Rate from Primary to Upper Primary, 2015-16 and 2016-17



Note: Red line shows gender equality.

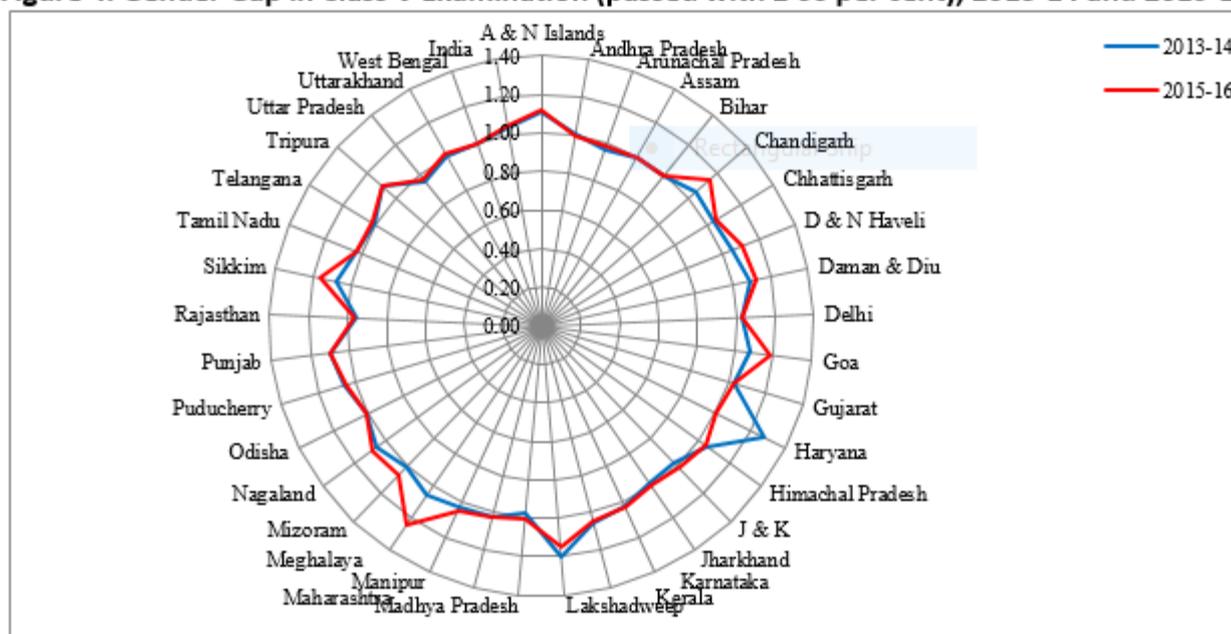
Source: Authors' calculation based on SRC of DISE and population projection by MHRD, GOI

Gender Gap in Achievement in the Examination

While the gender gaps in enrolment and transition rate show the comparative analysis of boys and girls in attaining schools and promotion rate from a lower level to a higher level, an analysis is also needed to demonstrate the relative learning achievements of boys and girls. Based on available data, we calculate gender

differences in achievement in examination (without adjusting for age and child population) as a proxy for learning achievement for Class V and Class VIII students in 2013-14 and 2015-16 (please refer to Figure 4 and Figure 5). The average pass percentages of boys and girls in all states and UTs are nearly 100 (ranges between 98.2 and 98.8 per cent) in both Class V and Class VIII examinations (data not shown in the figure).

Figure 4: Gender Gap in Class V Examination (passed with ≥ 60 per cent), 2013-14 and 2015-16

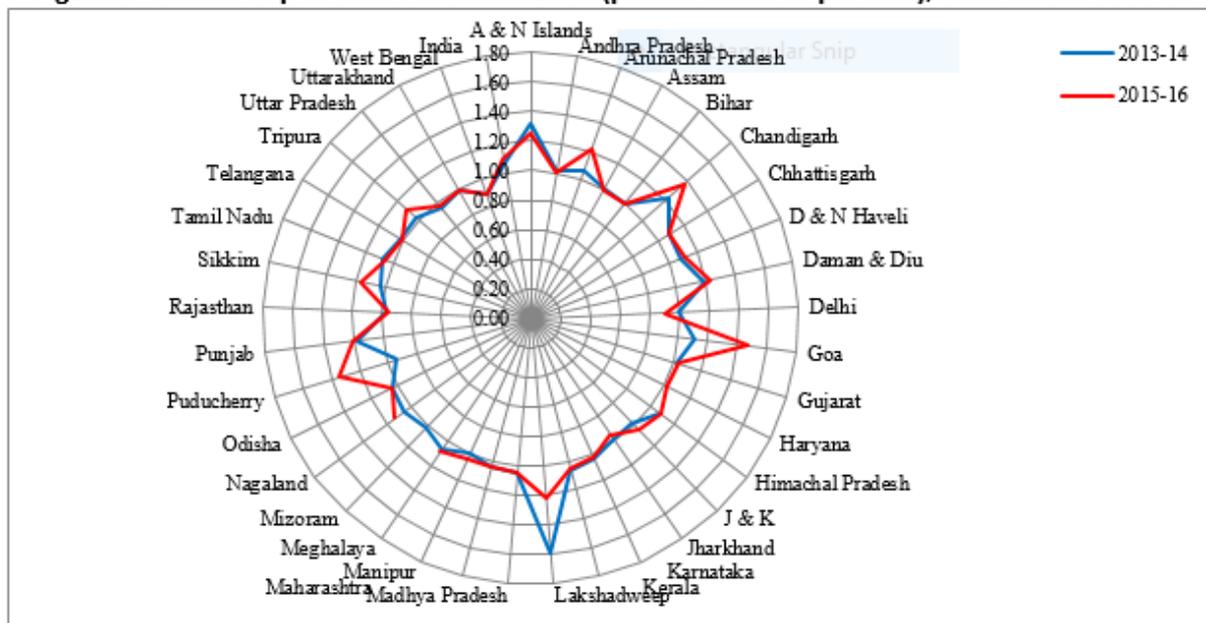


Source: Authors' calculation based on SRC of DISE

There has been a mild increase in the pass percentage of boys and girls during 2013-14 and 2015-16. These data indicate achievement of the 'no-detention' policy (NDP) of the RTE Act, 2009.⁴ However, the NDP was changed in 2016, where the RTE Act permits schools to detain children in Class V and Class VIII they fail an annual exam twice. Since the pass percentages for boys and girls are almost equal, the gender ratios of pass percentages are closely equal to 1.

Girls, on an average, are doing better in examinations than boys if we consider the pass percentages with 60 per cent or more marks. Accordingly, gender ratios of pass percentages (60 per cent or more) are higher than 1. In Class VIII examination, the highest gender ratio is observed in Lakshadweep (1.588) in 2013-14, followed by Goa (1.468) and Chandigarh (1.382) in 2015-16.

Figure 5: Gender Gap in Class VIII Examination (passed with ≥ 60 per cent), 2013-14 and 2015-16



Source: Authors' calculation based on SRC of DISE

Surprisingly, the percentages of boys and girls passed with 60 per cent or more marks have declined during the study period, albeit at a low rate. This declining rate, however, is slightly higher for boys leading to an increase in gender ratio over time.⁵ The average gender ratio (passed with 60 per cent or more) for class V has increased from 1.042 in 2013-14 to 1.054 in 2015-16, whereas the same figures are 1.064 and 1.093 respectively for Class VIII. One of the reasons for this decline may be because of the declining quality of government schools in recent years.⁶ Lakshadweep, which has no private schools, is an exception to this, that is,

government schools in Lakshadweep are doing better.

Gender Gap in Test Scores

Even if girls' performance in overall achievement in the examination is quite impressive; we made an attempt to examine the relative performances of boys and girls in Class VIII test scores of individual subjects namely Reading Comprehension, Language, Mathematics, Science and Social Science in 2014 and 2017. These test scores, however, are restricted to the students of government and government-aided elementary schools. Table 1 summarizes the

⁴ The 'no-detention' policy of the RTE Act deems that no student should be failed from school until they complete their elementary education (The Gazette of India, 2009).

⁵ Factors affecting unequal learning achievements of boys and girls are discussed by Lai (2010), Voyer and Voyer (2014), UNESCO (2016a).

⁶ Scholars like Kundu (2019) observe the declining quality of government schools in India in recent years.

gender ratios of Class VIII test scores. We see that, on average, girls' are performing better than boys. Girls are outperforming boys in Reading Comprehension, Language and Social Science in both 2014 and 2017, whereas the gender gaps in test scores in Mathematics and

Science disappeared in 2017. In contrast to the increasing variability of the age and child population-adjusted GPI, the variation across states and UTs in terms of test scores came down in 2017 than in 2014 (see standard deviation values).

	Reading Comprehension		Language		Mathematics		Science		Social Science	
	2014	2017	2014	2017	2014	2017	2014	2017	2014	2017
A & N Islands	1.029	1.061	1.000	1.030	1.015	1.057	1.028	1.088		
Andhra Pradesh	1.017	1.017	0.987	1.000	1.008	1.021	0.987	1.000		
Arunachal Pradesh	0.996	0.978	1.004	1.000	0.980	1.000	1.004	1.029		
Assam	-	1.000	-	1.000	-	1.000	-	0.980		
Bihar	0.960	0.966	0.985	0.978	0.988	0.978	1.000	1.000		
Chandigarh	1.027	1.033	0.992	1.044	1.000	1.020	1.008	1.038		
Chhattisgarh	0.984	1.018	1.008	1.028	1.012	1.023	1.000	1.000		
D & N Haveli	1.004	1.069	1.016	1.045	0.989	1.063	0.996	1.078		
Daman & Diu	1.045	1.078	1.016	1.000	0.993	1.030	1.000	1.091		
Delhi	1.058	1.057	0.996	1.000	1.017	1.000	1.043	1.059		
Goa	1.040	1.052	1.008	0.971	1.027	0.974	1.036	1.083		
Gujarat	1.025	1.065	0.991	1.043	0.992	1.020	1.017	1.038		
Haryana	1.020	1.036	0.984	1.056	1.000	1.000	1.004	1.049		
Himachal Pradesh	0.988	1.017	0.953	0.972	0.972	0.977	0.972	1.000		
J & K	0.967	0.955	0.959	0.974	0.980	1.000	0.988	0.971		
Jharkhand	1.000	1.017	1.020	1.020	1.032	1.000	1.030	1.000		
Karnataka	1.021	1.032	1.008	1.040	0.992	1.019	1.004	1.020		
Kerala	1.095	1.082	1.017	1.000	1.023	1.000	1.052	1.000		
Lakshadweep	-	1.085	-	0.970	-	0.970	0.000	1.034		
Madhya Pradesh	1.000	1.037	0.989	1.026	0.996	1.023	0.985	1.000		
Maharashtra	1.023	1.049	0.992	1.025	0.976	0.976	0.996	1.000		
Manipur	1.000	1.000	1.004	1.000	1.004	1.000	0.992	1.024		
Meghalaya	1.000	1.021	1.000	1.029	1.009	1.029	1.027	1.027		
Mizoram	1.008	1.070	1.029	1.086	0.996	1.000	1.004	1.063		
Nagaland	0.988	1.000	1.004	1.030	0.988	1.029	0.988	1.000		
Odisha	0.996	1.019	0.976	1.000	0.969	0.977	0.979	1.000		
Puducherry	1.048	1.091	1.013	1.067	1.026	1.000	1.037	1.036		
Punjab	1.043	1.077	1.000	1.032	1.004	1.000	1.008	1.029		
Rajasthan	1.008	1.000	1.008	1.000	1.000	1.000	1.016	1.000		
Sikkim	0.992	1.040	0.979	1.000	0.996	1.027	0.988	1.000		
Tamil Nadu	1.038	1.073	1.022	1.029	1.013	1.000	1.022	1.030		
Telangana	-	1.019	-	1.000	-	0.974	-	1.000		
Tripura	1.013	1.000	1.023	0.974	0.981	0.976	1.004	1.000		
Uttar Pradesh	1.008	1.000	1.004	1.025	1.004	1.000	0.967	1.024		
Uttarakhand	0.992	0.983	0.992	0.976	0.984	0.958	0.992	0.939		
West Bengal	0.981	0.964	0.984	0.950	0.962	0.952	0.976	0.974		
India	1.012	1.018	0.996	1.000	0.996	1.000	1.004	1.023		
SD	0.285	0.037	0.280	0.031	0.280	0.025	0.282	0.034		

Source: Authors' calculation based on National Achievement Survey, various rounds

It is evident that girls are outperforming boys in transition rates, examination results, and test scores in individual subjects in most of the states

and UTs. Our results are similar to the findings of many previous studies that observe the reverse gender gap in academic or learning

achievements from favouring boys to favouring girls (Pomerantz et al., 2002; Houtte, 2004; Mickelson and Greene, 2006; Lai, 2010; Goldin et al., 2006; Hajovsky et al., 2017). While girls' dominances in schools are common findings in education research which extend to most of the subjects such as Mathematics, Science, and Language (Voyer and Voyer, 2014), our results also hold true for Social Science or Reading Comprehension. If this trend continues in elementary education, it can help in reducing the gender gap in higher education and thereby reducing persistent gender gaps in society as a whole. However, still, there is no universal consensus regarding how to quantify gender differences and their moderator variables (Voyer and Voyer, 2014).

Conclusion

This study made an attempt to find out potential gender differences in various aspects of elementary education in India. The findings demonstrate that the ratios of boys to girls in some indicators of elementary education have reversed in the post-RTE Act period. Typically, the reverse gender differences in transition rates, achievements in examinations, and test score in individual subjects of elementary education have important implications for better performance of girls in secondary and higher education. The rising girls' advantages in different indicators of elementary education will also have important implications in explaining the potential impact of gender on labour market. Further analysis that links the relation between gender gap in elementary education and labour force participation rate would be more fruitful.

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Conflict of Interest

The authors declare no conflict of interest

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Author Contribution Statement

N. Hoque and R. Mahanta conceptualised the research and methodology. N. Hoque conceived as well as designed the formal analysis and prepared the whole paper.