Is the IIT JEE a conundrum?

The Joint Entrance Examination (JEE) to the Indian Institutes of Technology (IITs) is anything but a conundrum[1]. The IIT JEE in its present form is not unlike many accelerated competitive tests based on objective multiple choice questions (MCQs). Such tests favour a particular constituency: male, urban, English-medium educated and affluent. By the same token, female, rural, vernacular-medium educated and poor candidates are greatly disadvantaged. This is why the JEE continues in its present form. It favours one very privileged group at the expense of everyone else.

This is also why in the fierce debate recently, the emphasis was on the definition of 'merit', and never on 'fairness'. By fairness, and justice, I adhere to the Rawlsian position. Any intervention should be such that no one, especially the most vulnerable and most excluded, should be worse off. Note that here I am not talking about 'democratization' as Mehra does[1]. It is about a sense of fairness and justice.

Many years ago, as a student at IIT Madras, I was part of a team that studied the academic conditions there. A question was asked to roughly gauge the socio-economic class of the respondents, all undergraduate and postgraduate students. Nearly 85% of the students sampled came from the top 5% of society. This implied an 80% displacement. In a system where intrinsic 'merit' is believed to be independent of social class, only 5% of the students selected through the entrance examination should have come from the top 5% of society.

Nothing has changed since then. A few years ago, when I was at the Cochin University of Science and Technology (CUSAT), I had a chance to look critically at how the local version of the professional entrance exam worked. There was anecdotal wisdom that 95% of the so called 'merit' seats in the 'open' category went to a tiny slice of the population – candidates from families that had an annual income of more than 4–5 lakhs of rupees, and most of whom were enrolled in premier English-medium schools, and were able to afford expensive, specialized coaching. As this privileged group could not have constituted more than 5% of the population, the implied displacement is about 90%.

The gender bias of such competitive tests is well documented at the anecdotal level and also from serious academic studies. At school (i.e. board)-level, female students perform better than males, but in competitive tests perform far worse than males[2–4]. This is attributed to better and more systematic work habits and better language abilities that females have. Social-economic backgrounds may also be a factor; Young and Fisler[5] noted that males who come from better socio-economic status perform better in the SAT-M achievement test. Unlike qualifying examinations, which are usually of subjective and essay type, placement/entrance examinations are of multiple choice, objective type and are usually speeded up – thus these differences in content and administration probably favour males[6]. Again, beyond admission and at the higher education/collegiate level, the common understanding that is emerging now is that women outperform men (neatly summarized by Dayioglu and Turut-Asik[7]).

At CUSAT, I had live data from a speeded-up competitive examination and could study in critical detail, the relative performance of students across genders and social classes. It was possible to see the differentiation at this level of social stratification. Admission to professional colleges in Kerala is done through a Centralized Allotment Process (CAP) based on marks obtained at a highly competitive Common Entrance Examination (CEE) conducted every year. The CEE database after allotment to all engineering colleges was completed for 2008 (i.e. CAP 2008 based on CEE 2008 was available). This database records in meticulous detail, ranks obtained in the test (up to 66,150) for those who appeared for the allotment process, as well as their gender and caste categories. Of those assigned CEE ranks (i.e. numbering about 66,150), not all finally accept admission. In all, about 13,876 were admitted – of these, 8,306 were male and 5,570 were female.

Of the first 21 positions to be allotted, boys outnumbered girls in the ratio 6 : 1. This implies a high degree of inequality at this level of performance. This calculation can be continued for the first 101 ranks and it is seen that admission was shared by 81 boys and 20 girls (Table 1). It is clear that overall boys have greater advantages due to gender-linked factors, whereas girls are underserved because of these same factors. Parents are more likely to invest in expensive specialized coaching for boys. Boys are probably favoured by speeded-up competitive examinations. Boys are probably freer to go to distant (and better) coaching schools, whereas girls are more likely to be home-bound and school-bound.

From my various studies with this dataset, it was clear that there was considerable inequality in opportunity, not only based on gender but also on class considerations. So far, we have not considered the role of population share. For this, the relative sizes of the population of the various groups are also needed. To demonstrate this in a graphical way, the Lorenz curve used by economists to study wealth and income inequalities can be profitably utilized. For our immediate purpose, we shall disaggregate the total population into three groups that reflect the basic socio-economic division of the population in Kerala. The first group comprises the upper class category, and in the absence of more precise data, we shall assume that this comprises approximately 25% of the state's population (say, 13% of the total population are upper-female and 12% are upper-male). The middle or intermediate group can be taken to be approximately 50% of the population and the lower group will make up the rest of the 25% of the population. We shall take competition for the top 101 ranks as indicative of the extent of inequality of opportunity in competing for these prestigious ranks. Table 1 shows in a systematic fashion, the ordering required to display the information on a Lorenz curve. We see that a boy belonging to the upper group has a 66 times (i.e. 5.28/0.08) greater chance of finding a place in the top 101 ranks than a girl from the lower group. Similarly, a girl from the upper group has twice as much chance as a boy from the middle group (i.e. 1.07/0.54). From all these, the conclusive inference is that social and cultural capital plays a much greater role in determining 'merit' than true intrinsic ability or intelligence. The results from Table 1 are displayed in Figure 1 as a Lorenz curve.

Thus, speeded-up competitive tests if used as the sole criterion for admission

Table 1. Possible disaggregation into three groups required to prepare a Lorenz curve for the top 101 ranks

All admitted					
Upper		Middle		Lower	
F	M	F	M	F	M
2779	4226	1610	2607	1181	1473
7005		4217		2654	
13876					
Top 101 ranks					
14	64	5	13	1	4
78		18		5	
% Distribution within 101 ranks					
13.9	63.4	5.0	12.9	1.0	4.0
% Distribution within overall state population					
13	12	26	24	13	12
Effectivity ratio					
1.07	5.28	0.19	0.54	0.08	0.33
Cumulative % table for Lorenz curve for top 101 ranks					
	%	% cum	%	% cum	Ratio
		0		0	
Lower-F	13	13	1	1	0.08
Middle-F	26	39	5	6	0.19
Lower-M	12	51	4	10	0.33
Middle-M	24	75	12.9	22.9	0.54
Upper-F	13	88	13.9	36.8	1.07
Upper-M	12	100	63.4	100.2	5.28

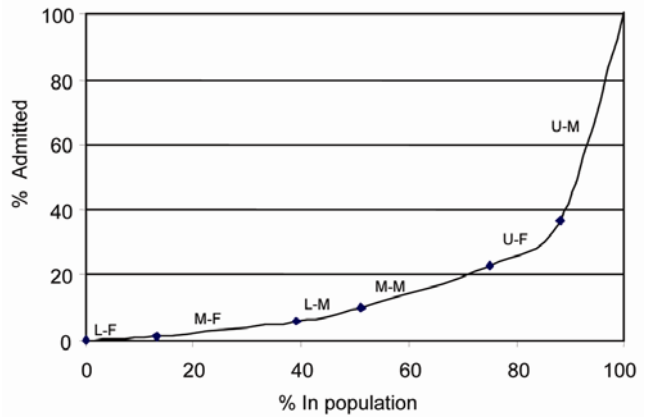

Figure 1. The inequality in admission to the top 101 ranks is shown in a Lorenz curve. Upper-male has 66 times greater chances than lower-female in getting admission to a favoured seat.

to professional courses favour boys over girls, and the rich over the poor. Some groups are favoured in an unfair way (many undeserving get in), whereas some other groups are underserved (many deserving are screened out). Girls from the upper privileged group are twice as likely as boys from the middle group to make it to a much favoured seat (top 101 ranks, say). Boys from the upper group are 66 times as likely as girls from the lower group to earn this same distinction.

These lessons were already known and corrected for in neighbouring Tamil Nadu, which took the exemplary step of banishing their own entrance examination altogether. Instead, the marks from the standard XII were the sole criterion for admission. The system is more inclusive than the older system it replaced. Students who are multiply disadvantaged, because they are poor or are from weaker sections, or come from rural schools, or are educated in the vernacular medium, or do not receive specialized coaching, or some or all of these, are not now more vulnerable.

'Merit' is multidimensional and cannot be measured by a single exam which is now evidently seen to favour a small privileged group. I do not believe that the 'best' in any one socially cohesive group (by class, or caste, or community, or region, or whatever) is significantly cleverer than the corresponding cohort from any other group. So let a 100 school boards flourish, and let the results from a 100 board examinations be used to fill up the seats in a 100 IIT-class institutions.

1. Mehra, A., *Curr. Sci*., 2012, **103**, 29–36.
2. Lao, R. C., *J. Psychol.*, 1980, **104**, 119–127.
3. Kimball, M. M., *Psychol. Bull.*, 1989, **105**, 198–214.
4. Wilberg, S. and Lynn, R., *Pers. Individ. Differ*., 1999, **27**, 1221–1229.
5. Young, J. W. and Fisler, J. L., *Res. Higher Educ*., 2000, **41**, 401–416.
6. Bridgeman, B. and Wendler, C., *J. Educ. Psychol.*, 1991, **83**, 275–284.
7. Dayioglu, M. and Turut-Asik, S., *Higher Educ*., 2007, **53**, 255–277.

GANGAN PRATHAP

CSIR National Institute of Science Communication and Information Resources,
New Delhi 110 012, India
e-mail: gp@niscair.res.in