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Estimates based on National-level Household Survey (PLFS-3), India

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Research Cell on Education

Research Cell for Studies in Education Policy, Planning and Governance (RSEPPG) in Telangana State at the **Centre for Economic and Social Studies** (CESS) is set up in July 2020 with the support of **Telangana State Council for Higher Education** (TSCHE). The predominant objective of the *Research Cell on Education* (RSEPPG) is to comprehensively study the gamut of issues and challenges in the education system/sector at all levels in a holistic perspective while *focusing on higher education* in the state and in the country. Research studies are to be thematically organized around five dimensions or foundational pillars of education system: *Access, Quality, Equity, Affordability and Accountability*. The impact of *state policy*, *funding*, *regulatory framework, educational standards* and *governance* on achieving these five dimensions of education system would be the focus of research studies. The Research Cell while providing policy inputs and support derived from evidence-based policy-oriented research output, assists the *TSCHE* and thereby the *Telangana State Government* in their endeavour for educational development in the state.

Activities:

- To organize seminars, workshops, discussions and conferences on topical issues related to Education;
- To conduct research studies focusing on education policy, funding, and governance;
- To conduct assessment and evaluation studies on initiatives and programmes with respect to education development; and
- To bring out research reports, policy briefs, and working papers along with research publications

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Participation Disparities in Post-Secondary Education

Estimates based on National-level Household Survey (PLFS-3), India

Venkatanarayana Motkuri and E. Revathi [1]

Abstract

According to AISHE 2019-20, the Gross Enrolment Ratio (GER) at the post-secondary education level for India is 27 percent. Such GER is an underestimation because a national-level large-scale household survey, i.e. Periodic Labour Force Survey (PLFS-3) estimate indicates a higher percent for the same year. The discrepancy between the two estimates is explained and modified estimates based on household-survey are presented. The paper also analyses the disparities in various higher education indicators among population groups based on their identity and characteristics of their location, gender, social and religious group, economic class and occupational group. An analysis of regional disparities across states is presented. These changes have been assessed for the 'transformation process in higher education' as put forth first by Martin Trow in the 1970s. Moreover, the possibility of achievement of the NEP 2020 target for GER at 50% by 2035 is examined at both aggregate and disaggregated levels

Key Words: Higher Education, Post-Secondary Education, Tertiary Education, India, Gross Enrolment Ratio, Gross Attendance Rate, College-Age Population.

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I. Context

Higher education in India has rapidly expanded since the turn of 21st century. The country's higher education system has shifted to a more broad-based one from one restricted to or catering to the elite. Over the last two decades, the Indian higher education system has moved to the trajectory of *massification* (Trow, 1973; 1974; 2007; Brennan, 2004; Varghese, 2015; Varghese & Sabharwal, 2022). Massification is about transforming the higher education system from that belonging to the elite, to a broad-based one. This massification of higher education is in line with the fast- increasing access to elementary and secondary school education and the resultant rise in participation rates among the school-age population to reach a state of near universalization. The GER in Indian higher education which was less than one percent at the time of Independence, increased to just eight percent till the turn of the 21st century (Varghese, 2015; Agarwal, 2007; 2009; Ravi *et al*., 2019). Remarkable expansion happened during the first two decades of 21st century, where GER increased three times to 25.6 percent as recorded in 2019-20 (AISHE). Third National Policy on Education (NEP) 2020 aims at doubling the Gross Enrolment Ratio (GER) to 50 percent during the next one-and-half decade period, i.e. by 2035 (GoI, 2020).

Specific issues and challenges have, however, accompanied the *massification* trajectory of higher education in India (Agarwal, 2007; 2009; Tilak, 2013; Altbach, 2014; Varghese, 2015; Ravi *et al*., 2019). The foremost cause of concern is that of the quality of education delivered in Higher Education Institutions (HEIs) which may have been compromised due to rapid expansion in quantity (Umashankar & Dutta, 2007; Dukkipati, 2010; Tilak, 2013; Agarwal, 2007; 2009; Ravi *et al*., 2019). Closely associated with quality is the employability of graduates (Khare, 2020; Tilak, 2023). Besides, there exist disparities in participation rates owing to unequal access to the socially backward and marginalised (Benjamin, 2008; Basant & Sen, 2010; 2014; 2020; Thorat & Neuman, 2012; Thorat, 2022; Borooah, 2012; Varghese *et al.*, 2019). Growing privatisation of higher education is another cause of concern (Tilak, 2012; 2014; 2013; 2019). There are also specific issues with the regulatory framework and governance within the higher education system and at the institutional levels (Malik, 2017; Ravi *et al.*, 2019).

Against this backdrop, research questions regarding the higher education system in India are many. The present paper, however, addresses two primary research questions. First, what is the actual extent of participation among the college-age population in post-secondary education? Second, what is the extent of disparities in post-secondary

education participation rates across population groups based on household survey-based estimates? GER, based on the All India Survey of Higher Education (AISHE), is underestimated in India. An estimate based on a national-level large-scale household survey, i.e., Period Labour Force Survey (PLFS-3, third in annual series), indicates a higher percent of the country's Gross Attendance Rate (GAR) in 2019-20. In this paper, a discrepancy between these two data sources is explained and modified estimates based on household-survey are presented.

There is a discussion in the recent past on relevance of GER for higher education in general (Mittal *et al.*, 2020; Mallish, 2020). But they are not specific on shortcomings of GER estimation based on AISHE. Moreover, there could be certain reservations concerning the Eligible Enrolment Ratio (EER) proposed by Pankaj Mittal and others (Mallish, 2020). The post-secondary education participation rate measures discussed and presented in the present paper are based on household survey estimates and are thus, more comprehensive and comparable across population groups and states. The national-level-household-survey based estimates of participation rates for post-secondary education have been used in previous research studies also (UGC, 2008; 2011; Srivastava and Sinha; 2008; Sinha & Srivastava, 2008; Dubey, 2008; Agarwal, 2009; Thorat, 2022; Varghese *et al.*, 2019).

For the second question, the paper analyses the disparities in participation rates among population groups in India based on their identity and characteristics like location, gender, social and religious group, economic class and occupational group. An analysis of regional disparities across states is also presented.

Further, the paper also examines and analyses the standing or trajectory of these population groups and states on Martin Trow's transformation path (elite, mass and universal). It will be shown that all the population groups identified and major states in India considered for the analysis have been on the trajectory of *massification* of higher education. Some of the groups and states have even moved to *a universal phase of the trajectory*. Again, in the context of NEP 2020 and its target GER of 50% by 2035, some groups and states have already achieved or are on the verge of achieving such a target, and many others are trailing. Policy implications of the observations would be explicit in initiating measures to improve the conditions of the groups and the states that are lagging.

II. Higher Education Participation Rate, Disparities and Trajectories: Methodological Nuances

According to the All India Survey of Higher Education (AISHE) 2019-20, the country's gross enrolment ratio (GER) is 27 percent. It is an underestimate because a similar estimate based on the Period Labour Force Survey (PLFS-3), the large-scale national-level household survey, indicates a higher GAR for 2019-20.

The reasons for the discrepancy are first, the net migration of students. At the country level, if the number of Indian students studying abroad is higher than international students studying in India, enrolment for GER in India is an underestimate. If it is vice-versa, it would be an overestimate. According to an estimate[1], around 0.44 million Indian students were studying abroad in 2016, and it increased to 0.77 million in 2019. Besides, the Ministry of External Affairs (MEA), Government of India (GOI), estimate[2] in its report indicated that there are 1.34 million Indian students pursuing education abroad in 2022. While the household survey considers all these students studying abroad as enrolled in higher education, they get excluded in the AISHE.

On the other hand, the number of international students pursuing their education in India is far less than Indian students studying abroad. According to the Ministry of Education, Government of India, based on its AISHE, less than 0.05 million (<50,000) such students were reported in India in 2019-20. They are captured in the AISHE and in the national-level large-scale household survey (PLFS), especially the latter, given its sample frame consisting of those residing in the country (temporarily or permanently). Therefore, AISHE excludes all the native students in overseas-HEIs while capturing a small chunk of international students in Indian institutions. Household survey estimate would be overestimated because it captures Indian students pursuing education overseas and international students in India. But the magnitude of such overestimation is not so great, given the number of foreign students in India.

The same logic applies to discrepancy reflected in the state-level estimate within the country owing to the net in-/ outflow of students across states[3]. AISHE does not consider the nativity of the student but the location or state-level political/ administrative jurisdiction of educational institutions. GER based on AISHE considers the ratio of all the students (irrespective of their nativity) enrolled in institutions located in a territorial-political jurisdiction of a state to the college-age population (18-23 years) in the state. The household survey-based estimate, both national and State, in contrast, counts the students enrolled and attending institutions inside and/or outside the country/state

on the basis of their or their parents' residential status (or ***nativity of the student***). For instance, for Telangana, it counts all the students who are natives of Telangana enrolled in post-secondary programmes/courses offered by institutions located within the State and anywhere in India or in any country in the world.

The second factor leading to a discrepancy in GER estimates is the shortfall in coverage of AISHE. The survey did not cover educational institutions offering post-secondary educational programmes (UG/ PG/ Research/ Diploma/ Certificate) offered by institutions other than those recognised by UGC or other bodies like AICTE, ICMR, ICAR, BCI, NCTE etc. While a good number of institutions in India are not recognised by the regulatory bodies mentioned above, the industry/job market recognises graduates from these institutions. For instance, the Indian School of Business (ISB) at Hyderabad/ Mohali has not received any recognition from the country's higher education regulatory bodies. However, its graduates are well recognised by the industry and global job markets. Further, registration with the Ministry of Education, Government of India, is mandatory for participating in AISHE and whether all the recognised institutions have complied duly with the registration, is a questionable fact.

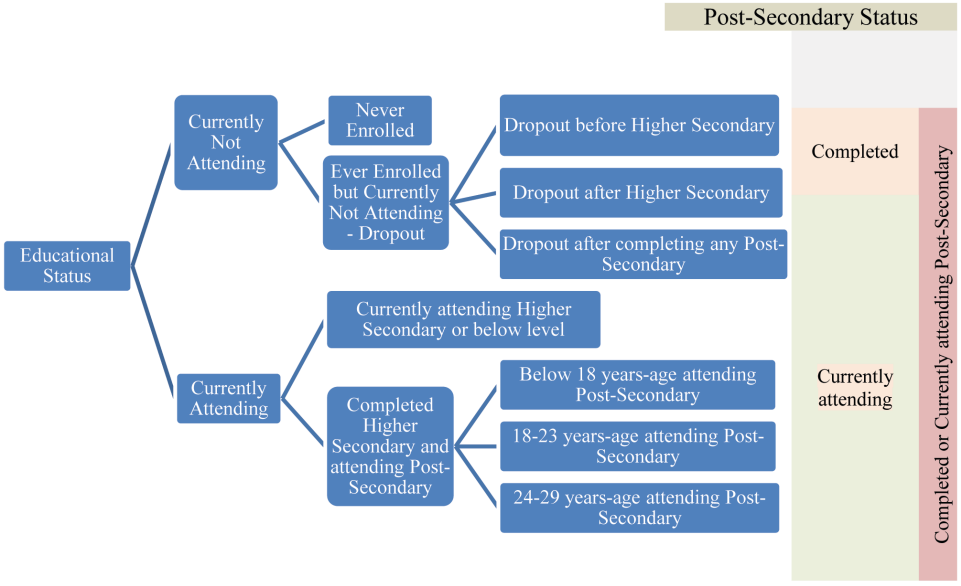
Again, all registered institutions, may not report in the annual AISHE. For example, the latest report of AISHE (2019-20) shows that of more than 55000 HEIs in India listed for AISHE, only around 47700 HEIs, comprising 87.5 percent have reported for the survey[4] while 7440 HEIs constituting 12.5 percent of the listed, could not report in the survey. Such a short-fall in survey coverage is more in case of standalone institutions; 95 percent of university-level institutions listed that have reported for the survey and it covered 90 percent for colleges but only 73.3 percent for standalone institutions.

As noted above, the household-survey-based estimate counts all those students studying outside the state or country based on nativity including those omitted by AISHE. It is essential to understand the scope of the household survey to appreciate the estimates based on it. The national-level large-scale household surveys like the PLFS collects information on ***educational levels of all age groups in the population*** along with ***enrolment/ current attendance status of the population below 30 years of age***. In this respect, in any school or college-age cohort (6-17 or 18-23 years) one can classify children/population in that cohort as those attending and those not attending educational institutions. Again, those not attending can be classified as those who have never enrolled and who have ever enrolled but are currently not attending (or dropouts). In the case of the school-age (6-17) population and their attendance in educational insti-

tutions, it is simple as they fit neatly into the above mentioned mutually exclusive categories. Moreover, universal school participation of 6-17 years of age is non-negotiable in compliance with the global norm. Not only that, successful completion of each grade/ class (class 1 to 12) within the duration and graduating higher secondary by the time child attains 18 years of age is desirable.

With reference to population belonging to college-age and their status of post-secondary education, one may reconstruct the variables and indicators based on the household survey data. First, a certain portion of the currently attending among the college-age (18-23 years) population may be attending different levels of education that could be at higher secondary or below. Those currently attending educational institutions for an educational level at higher secondary or below should be excluded from the indicators reflecting participation in post-secondary/ higher education. Second, it is to be noted that some of those currently attending post-secondary educational programmes may be outside the age cohort of the college-age (18-23) population. On one side, there may be persons below 18 years of age but enrolled for post-secondary programmes. It could be due to underreporting of age or otherwise in special cases wherein such a person could have completed higher secondary very early in age and enrolled for post-secondary programmes or courses. The flip side is that, as there is no age limit for education in general and higher education in particular, persons may continue to pursue post-secondary programmes, including particularly that of research, after crossing 24 years of age.

Chart-1: Educational (Attendance) Status of population below 30 years of age



***Source**: Authors.*

The third and most obvious situation is that of those currently attending post-secondary educational programmes among the college-age (18-23) population. It can be considered a Net Post-Secondary Education Attendance Rate (NAR-PS). Nevertheless, the post-secondary gross attendance considers all those currently attending post-secondary/higher education programmes irrespective of their age (either within college age or outside the age bracket). It is considered ***a Gross Attendance Rate for Post-Secondary Education*** (GAR-PS). The count ***excludes*** those pursuing higher secondary or below among the college-age (18-23). GAR-PS estimate based on household survey is almost similar to Gross Enrolment Ratio (GER) for Higher Education (HE) as estimated in AISHE. For both indicators, the numerator is all those pursuing (enrolled or attending) post-secondary education programmes, irrespective of age. The standardised denominator is the college-age (18-23 years) population, which applies to both indicators. Although both the GER and GAR for post-secondary education have the same denominator, data for their numerators are derived from two different sources, hence the difference in the estimation of the participation rate. GER-HE is based on information collected from educational institutions, and the GAR-PS is based on the household survey.

Fourth, and most importantly, among the college-age population, there is always a chance that some of them have reached the last mile of their education, i.e. completing post-secondary under-graduation and, in some cases, post-graduation with nothing more to pursue. One argues that we must also consider this segment of the college-age population to reflect participation in higher education. Therefore, the ***Modified Gross Attendance Rate for Post-Secondary Education*** (GARM-PS) that one can construct considers not only those who are currently attending post-secondary education programmes among the population below 30 years (which includes those below 18 years, if any, and above 23 along with those in 18-23 years attending such programmes) but also those who have completed the post-secondary education (UG or PG) and not pursuing any other programme among the college-age population. Similar is the ***Modified Net Attendance Rate for Post-Secondary Education*** (NARM-PS). NARM-PS is strictly within the college-age population; along with those currently attending post-secondary programmes, it also counts those who have already completed the same. The denominator for both the GAR-PS and GARM-PS remains the same, i.e. the college-age (18-23 years) population.

Overall, the household survey (PLFS-3) based modified estimate is justified as it reflects more comprehensively the educational status of a college-age population which is the standard reference group, as a performance indicator of participation in higher education. Among the college-age population, one should include those who have completed post-secondary education as they have reached the last mile of the educational system. When compared to the GER-HE of AISHE, the household survey (PLFS-3) based estimate on the percentage of those currently pursuing post-secondary education programmes/courses (NAR-PS or GAR-PA) at regional/state level is higher because of the coverage and count of students based on nativity, for those studying outside the state (both within and outside the country). Thus, the modified indicators such as NARM-PS and GARM-PS (that includes those who completed post-secondary) present a further higher rate of participation in higher education.

The analysis in this paper is based on the unit record data of the Periodic Labour Force Survey (PLFS-3) 2019-20 for estimating the Post-Secondary Education Participation Rates (PSPR) and analysing disparities across population groups and states. Unit record data consists of a few non-reporting cases for current attendance status among the population below 30 years of age in general and for the college-age population in particular. The usual activity status variable was used to derive the attendance status

for post-secondary education in all such cases after checking for completing a higher secondary level of education.

Table-1: Re-constructed Variables/Indicators of Post-Secondary Education Participation Rate based on National-Level Large-Scale Household Survey (i.e. PLFS-3)

S.No	Variable/Ind	Description
1	CA18t23	Currently Attending (any level or programme of education) among the College-age (18-23 years) Population
2	CA18t23HSb	Currently Attending Higher Secondary (HS) or below among the College-age (18-23 years) Population
3	CAPS18t23	Currently Attending Post-Secondary Programme/courses among the College-Age (18-23 Years) Population (It is excluding the CA18t23HSb from CA18t23)
4	CAPSot18t23	Currently Attending Post-Secondary Programme/courses among those below 18 years and also those in the age bracket of 24-29 years (It is nothing but excluding CAPS18t23 from CAPSb30)
5	CAPSb30 (GAR-PS)	Currently Attending Post-Secondary Programme/courses among those all below 30 years of age (CAPS18t23 or NAR-PS becomes part of this)
6	CmPS18t23	Post-Secondary Completed among the College-age (18-23 years) Population
7	NAR-PS	Net Attendance Rate for Post-Secondary Education (NAR-PS), considering only CAPS18t23 (indicator serial number 3)
8	GAR-PS	Gross Attendance Rate for Post-Secondary Education (GAR-PS), considering the CAPSb30 (indicator serial number 5). In other words, it includes both CAPS18t23 (NAR-PS) and CAPSot18t23
7	NARM-PS	Modified Net Attendance Rate for Post-Secondary Education, considering CAPS18t23 (NAR-PS) and CmPS18t23
9	GARM-PS	Modified Gross Attendance Rate for Post-Secondary Education, considering CAPSb30 (GAR-PS) and CmPS18t23
10	Denominator	Standard denominator for post-secondary education participation rate is College-age (18-23 years) Population

***Source**: Authors.*

In estimating the post-secondary participation rate, the population below 30 years of age who completed higher secondary and pursuing post-secondary education programmes were considered. It gives the GAR-PS, which corresponds with the International Standard Classification of Education (ISCED) and UNESCO's broadest measure of attendance in post-secondary education, covering ISCED level 4 and above. The ISCED level 4 is post-secondary non-tertiary education, while the ISCED level 5 and above is post-secondary tertiary education (UNESCO-UIS, 2012). Our concern is participation in post-secondary education among the college-age population. Post-secondary participation is after graduating the higher secondary level (12 class/ grade).

If the estimate is strictly confined to the college-age population who have completed higher secondary and are currently pursuing post-secondary education programmes, one arrives at the NAR-PS. The modified measures of NAR-PS and GAR-PS consider those among the college-age (18-23 years) population who have completed post-secondary education. A modified measure of GAR-PS is GARM-PS, and that of NAR-PS is NARM-PS. These modified measures (GARM-PS and NARM-PS) would take the count of those among the college-age population who have completed post-secondary education. The standard denominator used for all the post-secondary education participation rate measures is the college-age (18-23 years) population[5]. Further, for all the measures of post-secondary participation rates, the coverage of ISCED levels is the same.

A research study in the recent past has indicated that a measure of Eligible Enrolment Ratio (EER) instead of GER for higher education needs to be considered because, as mentioned above, higher education enrolment depends upon higher secondary graduation (Pankaj *et al.*, 2020). Certain concerns have already been raised (Mallish, 2020). Our concern here is that EER indicates the transition from higher secondary to post-secondary, and it is affected by performance in the school education of the country/state or population group. There is a chance that a state or a population group with a low participation rate in school education can have a better transition from higher secondary to post-secondary and vice-versa. EER in higher education would be more than the GERs in different levels of school education. Therefore the comparability of population groups, states and countries on the measure of EER would be problematic. Nevertheless, the measures discussed above reflect more comprehensively the performance of the population groups/states in post-secondary education. Also, they are comparable in a better way.

Chart-2: Trajectories in Martin Trow's Transformation Path of Higher Education

***Note**: GER - Gross Enrolment Ratio*
***Source**: Trow (1973) and Brennan (2004).*

Further, the household survey estimates for participation rates (NAR-PS / GAR-PS) across the population groups and states in India give ample scope to examine the trajectory of each population group in the transformation path of higher education applicable to all the social systems across the globe as envisaged by Martin Trow (Trow, 1973; 1974; 2007; Brennan, 2004). In other words, the group or state-specific participation rates in higher education for all the population groups and for major states in India have been assessed for the Martin Trow typology of transformation of higher education (Chart-2).

It also conforms to the targeted GER of 50% by 2035 set in NEP 2020, focusing on disaggregated levels for the population groups and major states. It highlights the gap across population groups and states in achieving the target GER. The findings enable us to formulate a suitable policy ensuring a conducive ecosystem for the further progress of those who have already achieved the target or are close to achieving the target and strategic action improving the conditions of those groups and states which are lagging.

III. Participation in Post-Secondary Education in India: Estimates for the Country

An estimate based on the PLFS-3 (2019-20) for participation rate among school-age population indicates that national average for the country is 96% and 82% of children in 6-14 and 15-17 years of age respectively. It is a constitutional mandate for the country and its provinces (states) to ensure that all the children 6-14 years of age attend formal schooling. Further, it is a global norm that all the children below 18 years of age attend educational institutions and complete school education (class 1 to class 12). While the country is close to achieving the constitutional mandate in case of 6-14 years, it still faces considerable gap in achieving the global norm for 6-17 years.

Table-2: Distribution (%) of College-Age (18-23) Population in India by their Current Attendance Status, PLFS-3 (2019-20)

Reference Age-Group	Never Enrolled	Dropout			Currently Attending	
		Below Higher Secondary	at Higher Secondary	After Post-Secondary	HS or Below	Post-Secondary
1	*2*	*3*	*4*	*5*	*6*	*7*
College-age (18-23 years) Population	5.7	36.3	10.9	8.5	9.3	29.2

Note: *percentage distribution of college-age population.*
Source*: Authors' estimate based on PLFS-3 (2019-20) unit record data.*

Estimates based on PLFS-3 indicate that among the college-age population (18-23 years-age) only a 5.7% have never enrolled at any age so far in any educational institutions, but nearly 55.7% of them have ever enrolled earlier but are currently not attending (dropped out of the educational system), while 38.5% of them are currently attending educational institutions (Table-2). When the dropouts segment is dissected to understand at what level of education they discontinued, it reveals that 36.3% of college-age population in India dropped-out before completing higher secondary, 11.9% after completing higher secondary and the remaining 8.5% have completed higher secondary and pursued post-secondary (UG and/or PG) education as well. Similarly the dissection of currently attending indicates that 9.3% of college-age population in India is still pursuing (currently attending) higher secondary level or below and the remaining 29.2% of them have completed higher secondary and are currently pursuing post-secondary education.

One should notice that the estimate based on household survey of PLFS-3 (2019-20) for percentage of college-age (18-23 years-age) population pursuing post-secondary or higher education in India, is 29.2% which is two percentage points higher than GER-HE (27.1%) estimate of AISHE (2019-20). Further, as argued above, we should also count those pursuing post-secondary but not in the college-age-bracket which is 6.5 percent in calculating ratio of college-age population. Like GER for higher education, the Gross Attendance Rate[6] (GAR-PS) of post-secondary education is based on taking into account, all those below 30 years of age pursuing (currently attending) post-secondary education. Indeed, conceptually, GAR-PS is equivalent to GER-HE. GAR-PS in India is 35.6 percent (29.2% among college-age and 6.5% among other-age-cohorts) and it is 8.5 percentage points higher than GER-HE (27.1%) of AISHE.

Again, one should not leave out the percentage of college-age population who have completed post-secondary educational programme (UG and/or PG). In this regard, the percentage of college-age (18-23 years) population in the country that either completed or is currently pursuing (attending) any post-secondary education strictly among the same age-cohort is nearly 37.7% (29.2% currently pursuing and 8.5% completed) which is conspicuously high (Table-3). If we add to it those outside college-age cohort (i.e. those of below 18 years and those in 24-29 years) but pursuing the post-secondary education, the post-secondary participation rate in India shoots up to 44.1 percent (Table-4).

Table-3: Size of College-Age (18-23) Population (in millions) in India and by their Current Attendance Status, estimate based on PLFS-3 (2019-20)

Total Population	College-age (18-23 years) Population	College-Age Population						Others age-cohorts pursuing Post-Secondary
		Never Enrolled	Dropout			Currently Attending		
			Below Higher Secondary	at Higher Secondary	Completed Post-Secondary	HS or Below	Post-Secondary	
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1346.5	152.7	8.7	55.4	16.6	13.0	14.2	44.5	9.9

Note: *Distribution of college-age population in Millions.*
Source*: Authors' estimate based on PLFS-3 (2019-20) unit record data.*

In terms of absolute numbers, total estimated population (all-ages) in India for the year 2019-20 is around 1346.5 million. College-age (18-23 years) population of the country is about 152.7 million comprising around 11.3% of its total population (Table-3). Household-survey-based (PLFS-3) estimate indicates that nearly 44.5 million of college-age population have completed higher secondary and are currently pursuing (attending) post-secondary education programmes and courses. Besides, another 9.9 million of other age-cohorts (below 18 or 24-29 years of age) have also completed higher secondary and pursuing post-secondary education. Together, the persons/students below 30 years of age currently pursuing (attending) post-secondary education programmes are 54.4 million (44.5 + 9.9 million).

In comparison, AISHE estimate indicates an enrolment of nearly 38.54 million for higher education in India. The difference in estimates based on the two sources (AISHE and PLFS-3) is huge (nearly 15.86 million). While the AISHE is omitting the Indian student enrolled in post-secondary education institutions abroad, the household survey (say, PLFS-3) takes them into account. In this regard, the Ministry of External Affairs, Government of India has, in fact, made an estimate that there are 1.324 million such students[7] for the year 2022. Further, as the PLFS-3 estimates indicate, 13.0 million among the college-age (18-23 years) population have completed post-secondary (UG or PG) level programmes. Taking all these into consideration there are around 67.4 million persons are either currently pursuing (attending) post-secondary education or have completed the same.

Disparities: Rural-Urban, Gender, Socio-Religious, Quintiles, and Occupation Groups

All the above indicators regarding post-secondary participation rates (PSPR) in India, display disparities across population groups based on their socio-economic, gender, location or regional identities or characteristics (Table-4). The four key indicators (NAR-PS, GAR-PS, NARM-PS, and GARM-PS) have shown such differences.

To begin with, the net attendance rate for post-secondary education (NAR-PS: percentage of college-age population in India pursuing/ attending post-secondary education programmes), is 24.4% in rural areas and 38.3% in urban areas; with a gap of nearly 14 percentage points (Table-4). By gender, there is a 5.4 percentage point-gap and by social group NAR-PS is highest (41.8%) among the Hindu other castes (HOth) and lowest (17.2%) among Muslims OBCs followed by STs (19.4%), Muslim others (MOth - at 20.3%) and SCs (22.7%). The gap between the Socio-Religious Groups (SRGs) is 24.6 percentage points with Hindu upper castes (HOth) on the top and Muslim OBCs (MOBCs) at the bottom.

Table-4: Post-Secondary Education Participation Rates (PSPR) in India by Location, Gender and across Socio-Religious Groups (SRGs), PLFS-3 (2019-20)

Location/ Sex/ SRGs	Currently Attending among 18-23 Years			other age-cohorts attending Post-sec	CAPS b30	Completed PS (18-23)	Modified NAR-PS	Modified GAR-PS
	Total	HS or Below	Post-Sec (PS)					
	CA18 t23	CA18 t23HSb	NAR-PS	CAP-Sot18 t23	GAR-PS	CmPS18 t23	NARM-PS	GARM-PS
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
Overall	38.5	9.3	29.2	6.5	35.6	8.5	37.7	44.1
Location								
Rural	34.2	9.8	24.4	5.1	29.5	6.4	30.7	35.9
Urban	46.6	8.4	38.3	9.0	47.2	12.6	50.8	59.8
Gender								
Male	42.6	10.8	31.7	7.1	38.8	7.5	39.2	46.3
Female	34.0	7.6	26.3	5.7	32.0	9.6	35.9	41.7
Socio-Religious Groups (SRGs)								
ST	29.7	10.3	19.4	4.4	23.8	3.5	22.9	27.3
SC	31.5	8.8	22.7	5.2	27.9	7.0	29.7	35.0
HOBC	41.3	9.5	31.9	6.9	38.7	9.5	41.3	48.2
HOth	51.3	9.5	41.8	9.6	51.4	11.7	53.6	63.2
MOBC	25.7	8.5	17.2	3.5	20.6	7.7	24.9	28.3
MOth	30.1	9.9	20.3	4.2	24.5	3.5	23.7	27.9
Others	49.7	7.4	42.3	8.0	50.3	14.2	56.5	64.5
Economic Class – MPCE Quintiles (QC)								
1st QC	29.4	10.2	19.2	4.8	24.0	4.8	24.0	28.7
2nd QC	32.7	10.4	22.3	4.9	27.2	6.6	28.9	33.8
3rd QC	35.3	8.7	26.6	5.9	32.6	8.4	35.0	40.9
4th QC	41.1	8.9	32.2	6.3	38.5	10.3	42.5	48.8
5th QC	51.9	8.6	43.3	10.0	53.3	11.7	55.0	65.0
Occupational Class (Major Source of Livelihood)								
R-CL	24.5	7.9	16.6	3.4	20.0	3.7	20.3	23.7
R-SE	37.1	10.8	26.3	5.6	31.9	6.7	32.9	38.5

R-RWS	35.9	8.5	27.4	6.1	33.5	9.2	36.6	42.6
R-Others	44.5	10.9	33.7	5.4	39.1	8.4	42.1	47.5
U-CL	28.4	6.1	22.3	4.7	27.0	7.3	29.6	34.3
U-SE	49.3	9.1	40.2	8.5	48.7	11.3	51.5	60.0
U-RWS	42.5	8.1	34.4	8.9	43.3	14.8	49.2	58.2
U-Others	74.2	9.6	64.6	15.6	80.3	13.5	78.2	93.8

***Notes**: Other age-cohorts attending Post-Secondary (CAPSot18t23) educational programmes refers that about all those below 18 years of age and those in the age-bracket of 24-29 years of age; SC – Scheduled Castes; ST – Scheduled Tribes; HOBC; Hindu OBC; HOth – Hindu Other/Upper Castes; MOBC – Muslim OBC; MOth – Muslim Others; QC – Quintile Class; R- Rural; U – Urban; CL – Casual Labour; SE – Self-employed; RWS – Regular Wage/Salaried.*
***Source**: Author's estimates*

The rural-urban differences, along with gender, socio-religious group, economic and occupational group disparities tend to be higher in respect of gross attendance rate for post-secondary education (GAR-PS). There is a 17.7 percentage points-gap in respect of GAR-PS between rural (29.5%) and urban areas (47.2%). Rural-urban difference in GAR-PS is almost four percentage points higher than the NAR-PS. Such rural-urban difference is higher also in modified attendance rates (NARM-PS and GARM-PS); there is a 20 percentage points-gap for NARM-PS and 24 percentage points-gap in GARM-PS.

Gender gaps in all these constructed measures of post-secondary education participation rates of NAR-PS, GAR-PS and their modified versions appear to be relatively smaller. While the gender-gap in NAR-PS is 5.4 percentage, it is little higher at 6.8 percentage points for the measure of GAR-PS (Table-4). For the modified measures of NARM-PS and GARM-PS, gender gaps of 3.6 and 4.6 percentage points respectively are observed. Further, unlike the case of rural-urban differences, the modified measures of participation rates in higher education (NARM-PS and GARM-PS) show that the gender-gap is even little lesser than their non-modified measures (NAR-PS and GAR-PS).

The gender-gap, though at a lower level, elicited in household-survey based estimates, is in contrast to the estimates of AISHE 2019-20 that indicate not only that the GER-HE for girls is higher than that of boys but also that girls outnumber the boys for enrolment in higher education institutions in the country (Table-5). It appears that presence of girls in higher education institutions (HEIs) covered in AISHE is more than boys but

in institutions outside the coverage of AISHE it could be that boys outnumber the girls. These aspects could explain the difference between GER-HE and GAR-PS that is higher for male than for female. Household survey-based estimate of GAR-PS demystifies the gender parity in GER-HE of AISHE.

Table-5: Differences in Estimates of GER-HE based on AISHE and GAR-PS based on Household Survey (PLFS-3) for the years 2019-20 by gender, social groups and religion

Indicator	All	Gender		Social Group					Religion	
		Male	Female	ST	SC	OBC and Others			Muslim	Hindu (excl. ST/SC)
						OBC	Others	Combined		
GER-HE	25.6	24.8	26.4	17.0	22.3	20.0	47.1	29.0	10.6	34.6
GAR-PS	35.6	38.8	32.0	23.8	27.9	35.5	45.6	39.4	22.2	43.2
Difference	*10.0*	*12.0*	*6.4*	*6.8*	*5.6*	*15.5*	*-1.5*	*10.4*	*11.6*	*8.6*

***Notes**: 1. Estimates of GER-HE are derived based on their population proportion and their contribution to Total Enrolment; 2. Muslims (including OBC and Others in Muslims); Hindu excluding ST/SC but including OBC and others among them.*

***Source**: Authors' estimates based on AISHE and PLFS-3: 2019-20.*

Disparities across Socio-Religious Groups (SRGs) in India show that along with Muslims (OBCs and Others), STs and SCs are far behind when compared to the Hindu other/upper castes (Table-4). In all the measures of participation / attendance rates the HOBCs have twice or more than that of MOBC, STs and SCs. As regards SCs/STs students, research studies have shown that exclusionary unequal access, entry barriers and certain discriminatory practices in higher education institutions affect their academic performance ultimately resulting in their dropout from the system (Thorat, 2022; Sukumar, 2022; Subramanian, 2019; Varghese and Mallish, 2018; Thorat and Neuman, 2012; Benjamin, 2008; Deshpande, 2006). Affirmative action of the state with certain provisions of reservations in educational institutions has provided them an opportunity and access to higher education (Weisskopf, 2001; 2004; 2006; Basant and Sen, 2012; 2014; 2020). Nonetheless, institutional level discriminatory practices are either restricting their entry or forcing them to leave (Thorat, 2022; Sukumar, 2022).

An observation from the present analysis is that Muslim-OBCs are lagging behind even compared to SCs and STs in respect of non-modified measures (NAR-PS and GAR-PS) of post-secondary participation/ attendance rates. In the modified measures (NARM-

PS and GARM-PS), the performance of Muslim OBCs in India is better than STs, but below the SCs. NAR-PS for Muslim OBCs at 17.2 percent is found to be the lowest among Socio-Religious Groups (SRGs) and farthest from (24.7 percentage points below) the Hindu others (41.8%). Such a gap between Muslims OBC and Hindu Others has increased further in other measures; wherein the gap is 30.8, 28.7 and 34.9 percentage points respectively for the measures GAR-PS, NARM-PS and GARM-PS. These observations of disadvantage of Muslims in higher education are in consonance with previous studies (Basant, 2012; Borooah, 2012).

Again, similar to observation made in gender dimension, the difference in estimates of GER-HE and GAR-PS is varying in socio-religious dimension as well (Table-5). Such difference is low for SCs and STs as compared to combined 'others' (including OBC and others). Although the difference between GER-HE and GAR-PS appears to be highest for OBCs, one should recognise that OBC count in AISHE is underreporting because many a times the reporting higher education institutions (HEIs) could not exactly count and classify all the OBCs students as it is somewhat complicated. Therefore, the GER-HE estimate for OBCs is itself an underestimate. While noting the above observation, the difference in GER-HE between SC/ST and combined others (OBC and others) is found to be lower than a similar difference in GAR-PS. Difference in GER-HE between ST (18%) and all 'Others' (29.0%) is 11 percentage points whereas such difference in GAR-PS (between ST at 23.8% and all others at 39.4%) is 25.6 percentage points. While the difference in GER-HE between SC (23.4%) and all 'Others' is 5.6 percentage points, the difference in GAR-PS (SC at 27.9%) is double at 11.5 percentage points. Higher difference in GAR-PS as compared to GER-HE could be due to two factors mentioned above: missing count of migrant students and low coverage of AISHE. In other words, although the SC and ST students represent relatively low in AISHE covered institutions, their representation is further low in those institutions outside its coverage among those studying abroad.

Difference between GER-HE and GAR-PS for Muslims is 11.6 percentage points which is higher than that for Hindu (excluding SC/ST) at 8.6 percentage points (Table-5). This difference is 3 percentage points higher for Muslims than Hindu. GAR-PS for Muslims is more than double their GER-HE. Again, the difference in GER-HE (24 percentage points) between Muslims and Hindu (excl. SC/ST) is higher than that of GAR-PS (21 percentage points). Hindu-Muslim difference in GER-HE is two percentage points higher than that of GAR-PS. When compared to AISHE covered institutions, Muslims students are relatively less-under-represented in institutions outside the

coverage of AISHE and among the Indian students studying abroad. It indicates that Muslim participation in higher education, a measure based on GER-HE of AISHE, is far lower than their actual representation in terms of population. Nonetheless, the concern is that, as in the above case, Muslims' participation rate in post-secondary education based on household survey is also below that of SC/ST (Table-4).

Further, the difference in all the four measures of post-secondary education participation rates across economic (quintile) classes is at a considerable level (Table-4). Participation rate in the fifth (highest) quintile class is three times higher than that of first (lowest) quintile. The difference in NAR-PS between lowest (first) quintile (19.2%) to highest (fifth) quintile (43.3%) is about 24.1 percentage points-gap. The disparity has increased in other measures of post-secondary participation rate: 29.3, 31.0 and 36.3 percentage points-gap between lowest and highest quintile on GAR-PS, NARM-PS and GARM-PS respectively. Further, on any of these measures, the difference in last two (fourth and fifth) quintile classes is higher than that of the first three.

Differences in participation rates across occupational groups[8] are clearly visible (Table-4). The Net Attendance Rate in Post-Secondary education (NAR-PS) is observed to be the lowest (16.6%) among the casual labour households in rural areas followed by urban casual labour households (22.3%) whereas the highest is observed among the urban 'others' households (64.6%), followed by urban self-employed (40.2%). The difference in NAR-PS for the groups having highest (U-Other) and lowest (R-CL) is a 48.0 percentage points-gap. While these occupational groups remain the same for highest and lowest participation rate in all the other measures, the difference between them increases for GAR-PS with 60.3 percentage points-gap, and 57.9 and 70.1 percentage points-gap respectively in NARM-PS and GARM-PS.

Based on the participation or attendance rates in post-secondary education, one can observe group-specific trajectory of population groups in line with the Martin Trow's transformation path of higher education. It can be found that all the population groups identified for the analysis in this paper have moved from elite to *massfication* trajectory. All the groups have participation / attendance rate of more than 15 percent (Table-4). Certain advantaged population groups residing in urban areas, self-employed, those belong to Hindu others/upper castes and those in in highest two quintiles have moved or are moving towards universal trajectory of higher education.

Similarly, it may be interesting to assess where the population groups stand vis-à-vis the NEP 2020 target GER at 50% by 2035. As noted above, certain population groups in India which have already moved or are moving towards universal trajectory of higher education can be considered to have achieved or are achieving the NEP 2020 target. To be specific, GAR-PS of college-age population in urban areas in general and those among the urban households with other occupations or self-employed in particular, those belonging to Hindu others and in the highest two quintiles have already achieved the NEP-2020 target (Table-4). Certain other population groups such as the lowest two quintile classes, Muslims (OBCs and others) along with STs and SCs, are far from the NEP-2020 target for GER. In this respect, unless the group-disparities are reduced while improving GER of population groups with low participation rates, the national average of GER at 50 percent would be difficult to achieve. As these population groups constitute bulk of the population, their low participation rates will pull the average of the country downwards.

Historical Burden of SRGs: Post-Secondary Completion Rate by Decennial Age-Cohorts

All the measures of post-secondary education participation rates (NAR-PS, GAR-PS and their modified versions) discussed above present the current situation – current attendance rate at post-secondary level. The post-secondary education completion rate in the population is indicative of the situation with respect to such participation rates, in the past. In this regard, post-secondary completion rates among the decennial age-cohorts across Socio-Religious Groups (SRGs) would be more illustrative of the historical burden of educational backwardness of socially backward and marginalised groups. SRG-wise differences are ubiquitous in post-secondary education completion rate. For all the 18 years and above age population, the completion rates are four times higher among Hindu-others (or upper castes) than that of STs and three times higher than SCs and twice that of Hindu-OBCs (Table-6). Muslim-OBCs and Muslim-Others have post-secondary education completion rates nearly one-third to that of Hindu-others.

Table-6: Post-Secondary Education Completion Rate among Decennial Age-Cohorts in India across Socio-Religious Groups (SRGs), PLFS-3 (2019-20)

Socio-Religious Groups (SRGs)	Age-Cohort (Group)						
	18 to 25	26 to 35	36 to 45	46 to 55	56 to 65	66 and above	All (18+)
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
ST	7.8	9.5	5.1	3.5	2.4	1.8	6.1
SC	12.8	12.2	6.1	3.9	2.6	1.8	8.3
Hindu-OBC	17.6	18.3	9.5	6.8	4.7	4.1	12.0
Hindu-Others	25.7	34.1	23.5	19.5	16.2	17.8	24.2
Muslim-OBC	11.3	11.0	4.0	3.3	2.4	2.7	7.3
Muslim-Others	9.3	14.0	6.5	5.2	3.3	8.7	8.7
Others	26.8	37.9	22.6	15.0	15.0	14.8	23.2
Total	16.5	19.5	11.4	9.0	7.2	8.2	13.4

***Source**: Authors' Estimate based on PLFS-3 (2019-20) unit record data.*

Post-secondary completion rate for each decennial age-cohort is indicative of the cohort's attendance rate for the same during its transit through the college-age. In this regard, post-secondary completion rate for each decennial age-cohort represents the post-secondary attendance rate at different points of time in the past (Table-6). Post-secondary education completion rate, for instance, among the 26-35 years decennial age-cohort represents their enrolment and attendance rates during their college-age (when they were in 18-23 years of age) in the past. Post-secondary completion rate estimates by age-cohorts indicate that there is a huge variation across SRGs in each decennial age-cohort (Table-6). But post-secondary completion rate for each decennial age-cohort is higher than its preceding younger age-cohort; it is so across SRGs. It is, in fact, indicating improvement in participation rate leading to completion rate, over a period. In such process of improvement, one also expects the decline in levels of social-group disparities, particularly in a progressive and inclusive system of education concerned with equity. But the differences across SRGs have not witnessed any decline, if one passes through older to younger cohorts. Increase in differences between Hindu-Others and other SRGs particularly ST, SC and Muslims, from the older decennial cohort (66 years and above) to a younger cohort (26 to 35 years) is indicating in fact the increasing social-group disparity. Increasing social group disparity in completion rate despite the declining disparity in enrolment or attendance rate is due to high dropout rate and low survival rate among the disadvantaged.

Regional Disparities: across States

The relative performance of the states indicates regional disparities in various indicators of higher education. The southern states particularly Kerala, Tamil Nadu, Telangana, along with Maharashtra, Goa and Delhi fare better in this context (Table-7). Percentage of college-going age (18-23 years) population currently pursuing (attending) post-secondary education (NAR-PS) is highest in Kerala (45.1%) followed by Telangana (41.6%), Maharashtra (40.9%), Tamil Nadu (40.7%) and Goa (39.5%). The modified measure (NARM-PS) covering post-secondary attending and completed among the college-going age (18-23 years) population, is the highest in Tamil Nadu (62.2%) followed by Kerala (57.7%), Telangana (55.8%), Goa (53.5%) and Delhi (50.9%) across major states. The Gross Attendance Rate in Post-Secondary education (GAR-PS) - counting all those pursuing post-secondary education among the population below 30 years) - is the highest in Kerala (53.0%) followed by Delhi (51.1%), Tamil Nadu (50.3%), Telangana (50.0%) and Maharashtra (47.5%). In its modified measure (GARM-PS), the participation (attending or completed) rate in post-secondary education is the highest in Tamil Nadu (71.8%), followed by Kerala (65.7%), Telangana (64.2%), Delhi (63.8%) and Goa (56.1%).

Table-7: Post-Secondary Education Participation Rates in India across Major States, PLFS-3 (2019-20)

States	Currently Attending among 18-23 Years			other age-cohorts attending Post-Sec	CAPS b30	Completed PS (18-23)	Modified NAR-PS	Modified GAR-PS
	Total	HS or Below	Post-Sec (PS)					
	CA18t23	CA18t23HSb	NAR-PS	CAP-Sot18t23	GAR-PS	CmPS18t23	NARM-PS	GARM-PS
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
J & K	49.1	14.3	34.9	8.2	43.0	5.2	40.1	48.3
H P	40.8	4.8	36.1	11.1	47.2	7.3	43.4	54.5
Punjab	30.9	7.9	23.0	6.7	29.7	7.4	30.4	37.1
Uttaranchal	40.3	9.8	30.5	7.0	37.5	7.8	38.3	45.3
Haryana	44.4	12.8	31.6	7.2	38.8	7.4	39.0	46.2
Delhi	51.1	12.9	38.2	12.9	51.1	12.7	50.9	63.8
Rajasthan	39.9	10.4	29.5	9.6	39.1	6.3	35.8	45.4
U P	35.9	11.0	24.9	6.5	31.4	9.0	33.9	40.4
Bihar	42.8	16.7	26.1	6.4	32.5	4.1	30.2	36.6
Assam	37.9	13.5	24.4	4.9	29.3	3.5	28.0	32.8
W B	31.5	7.3	24.2	4.3	28.5	5.9	30.2	34.4

Jharkhand	37.4	13.9	23.5	5.7	29.2	6.2	29.7	35.4
Odisha	25.2	5.2	20.0	5.1	25.1	9.4	29.3	34.4
Chhattis-garh	35.2	6.9	28.3	4.2	32.5	5.6	33.9	38.1
M P	28.9	8.9	20.0	3.1	23.2	5.0	25.1	28.2
Gujarat	33.1	3.7	29.4	5.9	35.4	7.5	37.0	42.9
Maharash-tra	48.4	7.5	40.9	6.6	47.5	7.4	48.4	54.9
A P	35.9	4.3	31.6	7.0	38.6	13.9	45.5	52.5
Karnataka	36.1	7.3	28.9	4.1	33.0	11.5	40.4	44.5
Goa	45.1	5.6	39.5	2.5	42.1	14.0	53.5	56.1
Kerala	51.3	6.1	45.1	7.9	53.0	12.6	57.7	65.7
Tamil Nadu	42.7	2.0	40.7	9.6	50.3	21.4	62.2	71.8
Telangana	51.7	10.1	41.6	8.5	50.0	14.2	55.8	64.2
NESs	51.2	20.0	31.2	9.0	40.1	4.3	35.4	44.4
UTs	33.7	4.2	29.5	9.0	38.5	11.5	40.9	50.0
All India	38.5	9.3	29.2	6.5	35.6	8.5	37.7	44.1

***Notes**: 1. Other age-cohorts attending Post-Secondary (CAPSot18t23) educational programmes refers that about all those below 18 years of age and those in the age-bracket of 24-29 years of age; 2.* ***NESs** – North-Eastern States excluding Assam;* ***UTs** – Union Territories excluding Jammu and Kashmir.*

***Source**: Author's estimates.*

The state-specific trajectory mapped in accordance with the Martin Trow's transformation path of higher education, has observed that all the states in India have already moved from elite to *massfication* phase as they have a participation/ attendance rate that crossed 15 percent reference point (Table-7). The least NAR-PS across states is 20 percent and GAR-PS is 23 percent. Although NAR-PS of all the states is below 50 percent, the GAR-PS of two states (Kerala and Delhi) has crossed the 50 percent reference point for universal trajectory and two other states (Tamil Nadu and Telangana) are exactly on the border line. Based on the modified participation rate, GARM-PS, all these four states are outright into the universal phase with a few more states (Goa, Maharashtra, Andhra Pradesh and Himachal Pradesh) joining them. Similarly, one may also look into where the states stand with reference to the NEP 2020 target GER at 50% by 2035. The states in India which have already moved or moving towards universal trajectory of transformation path in higher education are considered as achieved or achieving the NEP 2020 target.

Table-8: Difference between GAR-PS and GER-HE across Major States in India and their Rankings, 2019-20

S no	State	GAR-PS	Rank	GER-HE	Rank	Difference	Rank	HEIs-Density	HEIs-Average Enrolment
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1	Jammu & Kashmir	43.0	7	25.1	13	17.9	2	26	721
2	Himachal Pradesh	47.2	6	40.8	3	6.4	15	49	541
3	Punjab	29.7	18	27.1	12	2.6	18	35	521
4	Uttaranchal	37.5	12	36.4	4	1.1	21	38	634
5	Haryana	38.8	10	28.2	11	10.6	12	34	590
6	Delhi	51.1	2	49.0	1	2.1	19	8	1620
7	Rajasthan	39.1	9	23.8	14	15.3	5	37	517
8	Uttar Pradesh	31.4	17	22.5	16	8.9	13	31	692
9	Bihar	32.5	15	12.1	23	20.4	1	7	1703
10	Assam	29.3	19	16.5	22	12.8	9	15	870
11	West Bengal	28.5	21	20.6	18	7.9	14	13	1179
12	Jharkhand	29.2	20	18.1	20	11.1	11	8	1938
13	Odisha	25.1	22	20.5	19	4.6	16	24	659
14	Chhattisgarhi	32.5	16	17.8	21	14.7	7	26	557
15	Madhya Pradesh	23.2	23	23.0	15	0.2	23	27	771
16	Gujarat	35.4	13	20.8	17	14.6	8	31	528
17	Maharashtra	47.5	5	32.6	8	14.9	6	34	670
18	Andhra Pradesh	38.6	11	35.1	6	3.5	17	51	547
19	Karnataka	33.0	14	32.0	9	1.0	22	59	415
20	Kerala	53.0	1	35.9	5	17.1	3	48	575
21	Tamil Nadu	50.3	3	49.0	1	1.3	20	38	872
22	Telangana	50.0	4	34.3	7	15.7	4	53	545
23	Goa	42.1	8	30.3	10	11.8	10	31	670
	All India	35.6		25.6		10.0		30	680

***Notes**: 1. Difference is between GAR-PS and GER-HE; 2. North-Eastern and Union Territories are exempted in the table; 3. GER-HE along with HEIs-Density and HEIs-Average Enrolment are based on AISHE Report Estimations.*

***Source**: Author's calculations using AISHE and PLFS-3 based estimates.*

When we compare the estimates of conceptually equivalent GER-HE based on AISHE with that of GAR-PS based on the large-scale national-level household-survey (PLFS-3), across states for the year 2019-20 we can observe a difference between these two

measures, wherein GAR-PS is greater than GER-HE across the states in varied degrees (Table-8). For some states the difference between them is as higher as 15%-20%, while for other states it is as low as just one percent. While Madhya Pradesh, Karnataka, Uttaranchal, Tamil Nadu have the least difference (just about one percentage point) followed by Delhi (2.1%) and Punjab (2.6%), the highest differences is observed for Bihar (20.5%) followed by J&K (18%), Kerala (17%), Telangana (15.7%), Rajasthan (15.3%) and Maharashtra (14.9%). Ranking of the states are changing as one switches between GAR-PS and GER-HE estimates. For some states, change in ranking is very drastic: for instance Kerala, it is 5th best one on GER-HE but it is the best one on GAR-PS; Telangana is 7th best on GER-HE but fourth best on GAR-PS. Bihar is in the least 23rd position on GER-HE but its position switches to 15th position on GAR-PS; correspondingly Madhya Pradesh stands 15th on GER-HE, but pushed down to the least 23rd position on GAR-PS. Difference between GAR-PS and GER-HE can be explained by two factors: under-coverage and ignoring migration status of students in AISHE estimates. The count of students for a state based on the nativity of students and jurisdictional nativity of the institutions (HEIs) influences the differences in these two estimates, besides the under-coverage of institutions in AISHE. GAR-PS, for which numerator count is based on the nativity, is far higher than GER-HE in some states that could be largely due to out-migration for higher studies.

For the states with low difference between the two estimates, their inflow and outflow of the students might have been cancelling out. Tamil Nadu case could be interpreted as the number of students enrolled in higher education institutions (HEIs) under the administrative jurisdiction of Tamil Nadu state is almost same as the native students of the state pursuing post-secondary education in the institutions located in the state as well as those outside the state (including outside the country). In other words, in-migration of students pursuing post-secondary education in Tamil Nadu is almost equivalent to out-migration of native students for the same purpose[9].

Some states have high difference between GAR-PS and GER-HE, which could be due to out-migration for post-secondary education exceeding their inflow which in other words implicates the case of **Excess Demand** versus **Differentiated Demand**[10]. Such a situation of high difference is prevalent not only in (relatively) educationally backward states like Bihar and Rajasthan, but also educationally developed states like Maharashtra, Telangana and Kerala. Excess demand is the case where the demand of a state that is not served within the state but has to be served by HEIs outside the state. Differentiated Demand is preference for the institutions outside the state over those inside it. It could

be quality or any other factor (including placement/career-guidance services) driving such preference. For Bihar, J&K and to some extent for Kerala it is understandable, **supply** of higher education services available within the state is less than the growing **demand** of aspiring youth of the state for it. While considering the case of Bihar, the development of institutions for higher education does not match the growing demand for post-secondary education; hence, aspiring students from Bihar might be enrolling in institutions (HEIs) outside the state. With a very high average enrolment per institution, the HEIs-Density in Bihar is very low. The number of native students from Bihar pursuing post-secondary education is more than those enrolled in institutions located in the state or under state jurisdiction. It is excess demand-led out-migration.

It is different in case of Telangana state which is having second highest ***density of colleges*** per lakh population in India, next to Karnataka. But the average size of the HEIs in the state is one of the lowest. It could be that students in the state show a preference to institutions outside the state/country over those available within the state. Such preference could be associated with the ***quality factor*** that is directing the state's demand for higher studies towards institutions outside the state/country. Excess demand is understandable. Differentiated demand implicates the quality and credibility of institutions available in the state! The reason could be the increasing quality-concerns of parents and students along with brand name or popularity of institutions and thereby the preference for/ choice of institutions irrespective of their location (within the state or outside the state). Economically sound upper-middle class and the rich definitely prefer elite/ premier institutions across the country or even across the globe.

In this respect, Tamil Nadu is an exemplar case because higher education institutions (HEIs) in the state are able to cater not only to the demands of native students but also to the students from other states. Capacity utilisation of the institutions in the state is over and above serving the demand of native students. It indicates the quality and credibility of higher education institutions in the state. Bihar case is understandable wherein the growth of higher education institutions in the private and public sector is almost stagnant or moving at a snail pace. In Kerala as well, private sector engagement is strictly controlled and expansion of HEIs under public management is slow. But in the case of other states like Maharashtra and Telangana, they have abundant institutions. Telangana particularly ranks second highest in number of colleges per lakh population. However, that does not translate into serving the growing demand of native students. Based on household survey, estimated number of students from Telangana pursuing post-secondary education is nearly 22.8 lakhs but the AISHE estimate is nearly 14 lakh.

Nearly eight to nine lakh are pursuing post-secondary education in institutions outside the state including outside the country. It can be said as a case of differentiated demand for higher education.

Determinants of Participation in Post-Secondary: Logit and Probit Model Estimates

Further to the above analysis, an econometric exercise conducted enables in understanding the features and their determining nature of the household and personal characteristics of the college-age population in their chances of participating in post-secondary education. In this exercise logit and probit regression models are applied as they are suitable given the binary/dichotomous categorical nature of the dependent variable (see Appendix for discussion). The binary response/outcome variable of interest is stated as either attending or completed post-secondary education as 1 and otherwise as 0. Such identification of persons is strictly among the college-age (18-23 years) population.

Predictor variables in the model are combination of continuous scale and categorical variables consisting of household and personal characteristics: sector (rural-1, urban-2), household size, socio-religious group (ST-1, SC-2, Hindu-OBC-3, Hindu-Others-4, Muslim-OBC-5, Muslim-Others-6, and Other-Minority-7), occupation or type of the household based on major livelihood source (rural self-employed – 1, rural regular wage/salaried – 2, rural casual labour -3, urban self-employed – 4, urban regular wage/salaried – 5, and rural casual labour -6), educational level of the household head (illiterate-1, literate through non-formal-2, primary-3, middle-4, secondary-5, higher secondary-6; graduate and above - 7), quartile economic class of the household (QEC-1, 2, 3, and 4), female headed household (female headed-1, otherwise – 0), gender (male-1, female-2), age, marital status (never married – 1, otherwise -0) as given below. For the estimation, PLFS-3 (2019-20) sample population in college-age (18-23) is used. The sample size or total observations used for the estimation is around 50,000.

S no	Variable/Indicator	Type	Categories	Reference
1	Age	Scale	-	-
2	Age^2	Scale	-	-
3	Household Size	Scale	-	-
4	Gender	Categorical	1 Female; 0 Otherwise	0
5	Location	Categorical	1 Rural; 0 Otherwise	0
6	Socio-Religious Groups	Categorical	1 ST; 2 SC;3 H-OBC; 4 H-Oth; 5 M-OBC; 6 M-Oth; 7 Oth-Min	4
7	Household Type/ Occupational Group	Categorical	1R-SE; 2 R-RWS; 3 R-CL; 4 U-SE; 5 U-RWS; 6 U-CL	1
8	Economic/Quartile Class	Categorical	1 -Q1; 2 - Q2; 3 - Q3; 4 - Q4	4
9	Female Headed Household	Categorical	1 Female; 0 Otherwise	0
10	Educational Level of the Household Head	Categorical	1 Illiterate; 2 Literate through NF; 3 Primary; 4 Middle; 5 Sec; 6 HS; 7 Grad	1
11	Marital Status	Categorical	1 Never Married; 0 Otherwise	0

This econometric exercise is conducted using SPSS and R Programming. Results of estimation based on the logit and probit regression models, along with their marginal effects (of both the models) are presented below. Given the challenge of interpreting the beta-coefficient of both the logit and probit regression model (see Appendix for discussion), estimating and interpreting marginal effects makes better sense of the effect or impact of predictor variables. It can be observed that most of the variables included in the model exhibit their significance at <1% or <5%, except the sector variable.

It can be observed that among the two scale variables, ***age*** has positive and ***household size*** has negative impact on the participation in post-secondary education among the college-age population (Table-9). Although it appears to be counterintuitive, a desired outcome that is observed in estimation of the models is that gender being female and rural children does not have any disadvantage in participating in post-secondary education. Rather they have certain marginal advantage over their counterparts (male and urban). Such relative advantage or less disadvantage observed for female gender of college-age over their male counterparts is seen as we have controlled for marital status in the model wherein females of college-age are more likely to be ever-married than their male counterparts and the ever-married are less likely to participate in post-secondary education than that of the never married. It also reveals that if unmarried, female is more likely to participate in post-secondary education. Otherwise the pattern as exhib-

ited in Table-4 that relatively more disadvantage of female would be seen if we omit the marital status in the model. Similar is the case of the rural advantage observed in the model which is because the occupational status is controlled separately for rural and urban areas. One should note these nuances while reading the advantage of rural and female gender in college-age.

Table-9: Logit and Probit Estimates and their Marginal Effects

Dependent/response Variable: 1- Currently participating in Post-secondary education or completed the same, among college-age (18-23) population; 0 - otherwise					
Variables	**Logit**		**Probit**	**Marginal Effects**	
	b	**Exp(b)**	**b**	**Logit**	**Probit**
1	***2***	***3***	***4***	***5***	***6***
(Intercept)	-32.82 ***		-19.58 ***		
Age	2.82 ***	16.83	1.685 ***	0.031	0.031
Age^2	-0.07 ***	0.94	-0.039 ***	0.000	0.000
Sex (Female)	0.34 ***	1.40	0.192 ***	0.063	0.060
Sector (Rural)	0.07	1.07	0.043	0.013	0.014
Household Size	-0.02 ***	0.98	-0.011 **	-0.004	-0.003
srg1R1 (ST)	-0.44 ***	0.65	-0.262 ***	-0.082	-0.083
srg1R2 (SC)	-0.23 ***	0.79	-0.137 ***	-0.044	-0.044
srg1R3 (Hindu-OBC)	0.13 ***	1.13	0.074 ***	0.025	0.024
srg1R5 (Muslim-OBC)	-0.44 ***	0.65	-0.264 ***	-0.082	-0.083
srg1R6 (Muslim-Others)	-0.49 ***	0.61	-0.298 ***	-0.091	-0.093
srg1R9 (Other Minority)	-0.08	0.92	-0.041	-0.015	-0.013
hhtyp4R2 (Rur-RWS)	-0.02	0.98	-0.012	-0.005	-0.004
hhtyp4R3 (Rur-CL)	-0.23 ***	0.80	-0.137 ***	-0.042	-0.043
hhtyp4R4 (Urb-SE)	0.33 ***	1.39	0.201 ***	0.064	0.065
hhtyp4R5 (Urb-RWS)	0.23 ***	1.25	0.141 ***	0.044	0.046
QCIndR1 (QEC-1)	-0.18 ***	0.83	-0.106 ***	-0.034	-0.033
QCIndR3 (QEC-2)	0.21 ***	1.24	0.127 ***	0.041	0.041
QCIndR4 (QEC-3)	0.57 ***	1.77	0.349 ***	0.112	0.115
fhdhhR1 (Fem Headed HH)	0.22	1.25	0.138 .	0.042	0.044
hdedn2R1(HH-Head-Illiterate)	-0.20 ***	0.82	-0.114 ***	-0.038	-0.036

hdedn2R6(HH-Head-Primary)	0.09 *	1.10	0.056 *	0.018	0.018
hdedn2R7(HH-Head-Middle)	0.35 ***	1.41	0.207 ***	0.069	0.069
hdedn2R8(HH-Head-Sec)	0.56 ***	1.76	0.336 ***	0.114	0.113
hdedn2R10(HH-Head-HS)	1.02 ***	2.77	0.615 ***	0.208	0.209
hdedn2R12(HH-Head-Graduate)	1.49 ***	4.45	0.893 ***	0.301	0.301
mrtstR1(Marital Status)	2.12 ***	8.31	1.225 ***	0.349	0.347
Number of Observation			49890		

***Note**: *** significant at <0.001; ** significant at <0.01; *** significant at <0.05*
***Source**: Authors' estimates.*

As compared to the *Hindu upper castes*, the other socio-religious groups (SRGs) particularly Muslims are the most disadvantaged. Such disadvantage in post-secondary participation rate is prevalent among the *lower economic classes* (quintiles) over the *upper ones* and among the *female headed households*. Occupation of the household is also an important determinant wherein the disadvantage is observed for rural children belonging to households that depend on casual labour and regular wage/salaried (rural areas). Marital status especially the unmarried boys and girls in the college-age have more chances of participating in post-secondary education as compared to their married counterparts. Besides, education level of household head is an important determinant in participation rates for post-secondary education. The result of the econometric exercise using probit and logit regression models display pattern similar to the above and hence corroborate disparities in estimated participation rates by population groups based on such household and personal characteristics as observed in the Table-4. On the whole, certain population groups such as Muslims, lower economic classes, female headed households, rural casual labour and regular wage/salaried household are seen to be lagging behind in participating in post-secondary education. A policy focus on these groups may enhance the enrolment. However, the overarching issue of quality of post-secondary level education needs to be addressed across the board.

IV. Conclusions

The GER as estimated by the AISHE is an underestimate as it is only limited to data culled out from the institutions, while household data collected by the PLFS captures enrolment at the household level and hence is a broad net resulting in higher estimates of education variables at post-secondary level. The discrepancy between the two modes of estimations has been explained and modified estimates based on household survey are presented. The household estimates are higher due to netting in students enrolled in education institutions other than the location of the household. This is of particular importance across states due to the variation in net students enrolled in higher education institutions based on nativity and jurisdiction of states within the country and outside.

While focussing on disparities, the analysis of post-secondary education participation rates (PSPRs) found stark differences among population groups based on their identity and characteristics of their location, gender, social and religious group, economic class and occupational group. Further, analysis of post-secondary participation rates exhibited regional disparities as well, across states.

The analysis also made an attempt to examine where the population groups and states stand vis-à-vis the Martin Trow's three key (elite, mass and universal) trajectories of transformation path in higher education. In this regard, it is observed that although all the population groups and states have moved towards *massfication* trajectory of post-secondary education, some of them (population groups and/or states) have reached the *universal* trajectory as well. The paper also assessed the possibility of achieving the NEP-2020 target of GER by 2035 for the various population groups and states.

The findings state that the groups and states which are on the universal trajectory have already achieved the NEP-2020 target for GER. The analysis and findings have important policy implications for population groups and states with a shortfall in achieving the NEP targets and /or to focus on quality issues of higher education institutions across states.

* * *

Appendix

Logit and Probit Regression Models and Marginal Effects

It is well established that linear regression models are appropriate for dependent (or response/ outcome) variable being a continuous scale variable. In fact, scale of measurement varies across variables either being nominal (categorical), ordinal (ranking/ ordering), interval or ratio scale depending on the phenomenon of investigation. While linear regression models accommodate independent variables (predictors) with any type of scale of measurement, it is considered to be technically inappropriate applying linear model to nominal-categorical or ordinal/ordered-categorical dependent variable. Particularly for binary or dichotomous dependent variable, the linear regression models are not appropriate. The assumption of linear probability model about conditional probability function to be linear would not restrict the probability that P (Y=1, given X) to lie between 0 and 1. Generalised Linear (GenLin) regression models are non-linear alternatives. Among them, widely used alternatives for modelling a phenomenon with such binary dependent variable are Logistic or Probit regression models. While the linear regression model is based on standard normal distribution, the distribution functions of these models of non-linear alternatives vary. Generalised linear models are estimated using appropriate link functions (such as logit, probit) in estimating/predicting the changes in outcome variable. Link functions in econometric models, connects/ links the actual Y (non-linear or binary dependent variable) with an estimated Y' while transforming such binary or non-linear dependent variable into continuous scale (linear) variable.

Logistic Regression Model

In a logistic regression model the binary response/dependent variable following the Binomial distribution, is modelled on relating it to linear combination of predictors. Binary outcomes are response of 'yes' or 'no', or an outcome events of success or failure, coded as 1 or 0. If 'Y' is an expected outcome event, it is about p(Y=1) or [1-{p(Y=1)}]. Scale of estimation generally made in the logit model is log-odds. Odds is simply a ratio of probability of success to probability of failure [p/(1-p)]. Log of odds is a logarithmic transformation of the value of odds [log {p/(1-p)}]. This log of odds is referred to as logit, hence the reference of logit regression model. Predicted probability in the logistic regression model is the expected proportion of success-event (or 'yes' outcomes). If Z = log [p/(1-p)], the logit, the change predicted in it is estimated on log-odds estimation scale while relating it to linear combination of predictor(s) as

$$Z = b_0 + b_1.X_1 + b_n.X_j$$

Estimation in a simple odds-scale, without logarithmic transformation, it would be expressed as[11]

$$[p/(1-p)] \text{ or odds} = \exp [b_0 + b_1.X_1 + b_n.X_j] = e^{[b0 + b1.X1 + bn.Xj]}$$

On the direct response/outcome probability scale, it would be expressed as,

$$P(Y=1 \mid X) = [\exp (b_0 + b_1.X_1 + b_n.X_j)] / \{1+ [\exp (b_0 + b_1.X_1 + b_n.X_j)]\}$$

or

$$p(Y=1 \mid X) = [e^{(b0 + b1.X1 + bn.Xj)}] / \{1+ [e^{(b0 + b1.X1 + bn.Xj)}]\}$$

In another way, using odds it is expressed as: $p(Y=1) = \text{odds} / (1+\text{odds})$

Above equation can be expressed in direct response/outcome probability scale as:

$$p(Y=1 \mid X) = 1 / \{1+ [\exp -(b_0 + b_1.X_1 + b_n.X_j)]\}$$

or

$$p(Y=1 \mid X) = 1/\{1+ [e^{-(b0 + b1.X1 + bn.Xj)}]\}$$

Logistic regression is about non-linear transformation of the linear regression wherein log of odds is in a linear form. Parameters or the beta coefficients in the logistic regression model equation are estimated using *iterative maximum likelihood procedure*. In the logistic regression models, normally it is 'Z' (log of odds) that is predicted, not the 'p'. One should note that probability and odds are different. For instance, probability of getting 5 while throwing a six-sided dice is 1/6 or 16.7% whereas the odds of getting 5 is equivalent to [(1/6)/{1-(1/6)}] or [(1/6)/(5/6)] or 20%. As indicated in the above equation, Z is a linear function of predictors (Xs). Logistic regression model estimates of beta coefficients in the equation indicate the change in log of odds (Z) as a result of change (increase) in value of predictors (Xs) i.e. the independent variables. There is always possible, however, for translating the prediction on log-odds scale to odds scale and to the probability scale (i.e. predicted probability).

Probit Regression Model

Probit is another alternative along with logistic regression model, relating the binary response outcomes of dependent variable to linear combinations of predictors. It relates the binary response/outcome variable to predictor through *cumulative standard normal distribution function*. Like that of logistic regression model, the parameters (beta coefficient) of the probit model are estimated following *iterative maximum likelihood pro-*

cedure. Probit model especially its coefficient reflect the change in the z-score or probit index along the change in value of the predictor variable.

$P(Y = 1|X) = \Phi(Z)$

where $\Phi(.)$ being the cumulative standard normal distribution function, the probit specification in fact would be as follows

$Z = b_0 + b_1X_1 + b_2X_2 + ….. + b_nX_n$

or

$E(Y|X) = P(Y= 1| X) = \Phi(b_0 + b_1X_1 + b_2X_2 + ….. + b_nX_n)$

Again in probit model, as is the case of logit, it is z that is predicted not the p. Here, as a latent variable 'z' or z-score of normal distribution is considered as probit index and thereby beta-coefficient of probit regression model estimation would be indicating effect on 'z' of the unit change in predictor variables (X). In other words, beta-coefficient is change in z-score due to a unit change in independent (Xs) variables.

Challenge in Interpreting the Coefficients of Logit and Probit Regression Model

Although both Logit and Probit regression models are considered to be robust alternatives for binary outcome variables, interpretation of beta coefficients estimated through model-fitted is a little difficult. Both models capture the non-linearity better than linear models, and produce predicted probabilities that lie between 0 and 1. However, unlike linear model estimates of beta coefficients which are straightforward in interpreting magnitude of effect of regressor /predictor on the outcome variable, beta coefficients of Logit and Probit regression model estimates indicate direction of change (positive/ negative) but not the magnitude of change or effect of the predictor on the outcome variable. In other words, the parameters estimated (beta-coefficients) in both the Logit and Probit models indicate constant effect of predictor on the latent variable (z or z-scores of Probit and log-odds in Logit) but not on the original dependent variable (Y) in binary scale. Unlike the linear models, marginal effect/impact of change in the value of independent variables (Xs) in these models is not constant; it varies with the value of X. In this respect capturing such marginal effect and interpretation of same makes better sense.

Marginal Effects and Predictive Margins

Marginal effects of predictors indicate that while holding all the other predictors/regressors constant at some value, a change in the value of a particular predictor/regressor causes a degree change in the conditional probability of the outcome variable. Predicted probability that outcome event would be Y=1 increase with a unit-change in predictor variable.

* * *

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Endnotes

1 Strategy Consultant, ***redseer,*** in its report on "What lies ahead for the Overseas Education Sector?" (Aditya Agarwal: on 17 April 2022). See https://redseer.com/newsletters/what-lies-ahead-for-the-overseas-education-sector/

2 See https://www.mea.gov.in/Images/CPV/lu3820-1-mar-25-22.pdf

3 If the number of students from a state (for instance, Telangana) enrolling in any post-secondary educational programmes in institutions located outside the state or in jurisdictional coverage of the other states are more than those students from the other states enrolled in institutions in the state (Telangana), the GER based on AISHE is an underestimate for that state (Telangana).

4 There are 100 institutions in Telangana have not reported; some of the welfare Residential Degree Colleges (RDCs) are not yet reporting for AISHE.

5 If a child enters the formal education system at the age of six years into Class/Grade 1 and gets promoted to a subsequent higher class/grade (and level) after completing each class/grade (and level) successfully, he/she would be able to complete all twelve-years school education when the child attain 17 years of age. Successful ones in school education (graduates of higher secondary) would be able to enter post-secondary education at 18 years of age. One can pursue most of the post-secondary education programmes (UG/PG/Research/diploma) during the period when a person is in 18-23 years of age. It includes three or four-year undergraduate (UG) and two-year post-graduate (PG) programmes. Therefore, 18-23 years of age is considered as college age. There may be a certain deviation in the process of the age-appropriate education cycle. All the children or students may not be in age-appropriate classes, and there are under and over-aged children/students in each class/grade or level of education. It could be due to initial late entry, stagnation, or re-entry of dropouts. Nonetheless, we always use the population size of reference age cohort to estimate the participation rate (enrolment or attendance rate). The standard reference age cohort for school and college education is those aged 6-17 and 18-23.

6 It may also be referred to as ***gross post-secondary participation rate*** (GPSPR).

7 See https://www.mea.gov.in/Images/CPV/lu3820-1-mar-25-22.pdf

8 We defined occupational groups separately for rural and urban areas but same as – self-employed (SE), regular wage/salaried (RWS), casual labour (CL) and all others. It is based on major source of livelihood of the household. Considering differences in standards of livings and educational development in same category of occupational groups residing rural and urban areas, occupation groups classified by location. Indeed, in respect of all the four measures for post-secondary education participation rates (NAR-PS, GAR-PS, NARM-PS and GARM-PS), rural-urban difference is considerable in each occupational group (Table-4).

9 Assuming that deficit in coverage of AISHE is same across states in the country. Also assume that the broad measures of post-secondary participation rate considered in this note also covered those who are attending post-secondary non-tertiary education (ISCED level 4) programmes, is same across states. In fact, the contribution of enrolment in such post-secondary non-tertiary education to that of total enrolment in post-secondary (tertiary and non-tertiary) education is negligible.

10 On this see review in Motkuri and Revathi (2023a).

11 Mathematically it is proved that log(x) = y would be equivalent to x = exp(y) and vice versa.

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