



The gender gap in school-to-university transition in Italy: Insights from the integration between INVALSI and ANS data sources

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Da un secolo, oltre.

1. INTRODUCTION

- The issue of the gender gap in university enrollment is widely investigated all over the world;
- The long-increasing trend in women’s university enrollment (Adebayo, 2008) is stimulated by the well-known evidence that females outperform males, thus being advantaged during selection procedures (Conger, 2015);
- Nonetheless, studies about European countries show how this long-term trend has brought only a roughly equal representation in enrollment (Francesconi and Parey, 2018; Steinmann and Rutkowski, 2023).

2. THE ITALIAN FRAMEWORK

- Regarding Italy, females have higher enrollment and lower dropout rates, especially in the South of Italy (Contini et al., 2018);
- Female entry rate (2012-2021) reduced by one percentage point. Nevertheless, female enrollment in Italy is consistently above the European average, mainly driven by some fields of study such as Art and Humanities and Health Studies (ANVUR, 2024);
- Since 2018, Italy has exhibited a rate of enrollment above the European average for women in the STEM field, well-recognized for being crucial for the needs of the job market, but also traditionally overrepresented by men (D’Agostino et al., 2019;2021).

3. AIM OF THE RESEARCH

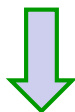
- We assess the school-to-university transition rate of upper secondary schools in Italy;
- Gender inequalities in access to the higher education system could derive from the persistence and transmission of gender disparities according to different students' socioeconomic conditions, territories, types of upper secondary schools and academic fields of study;
- The descriptive analysis proposed is a starting point for:
 - Identifying schools and university degree programs that show gender-balanced enrolments;
 - Verifying if they may depend on several factors, such as a same-sex peer effect from upper secondary school or the geographical location of the school;
- To attain our objectives, we will create school-level indicators that take into account the gender composition of students enrolled in the university.

4. DATA

High school database
423,261 students

INVALSI-2018

Grade 13th on graduates in 2018/19



ANS-2019

Anagrafe Nazionale Studenti
Enrolled in academic year 2019/20

University database
220,984 enrolled students



Students are aggregated into schools.

Schools with fewer than 15 observations available were excluded from the analysis (from 3,959 to 3,500; -1.9% observations).

All indicators are calculated at the school level.

5. INDICATORS

Entry rate

Overall entry rate

% of students enrolling in university

$$\%_{uni} = \frac{n_{uni}}{n} \times 100$$

Female entry rate

% of female students enrolling in university

$$\%_{uni}^{(F)} = \frac{n_{uni}^{(F)}}{n^{(F)}} \times 100$$

Male entry rate

% of male students enrolling in university

$$\%_{uni}^{(M)} = \frac{n_{uni}^{(M)}}{n^{(M)}} \times 100$$

Gender gap in the entry rate

Excess of % female students enrolled in university over % male students enrolled in university

$$-100\% < \frac{\%_{uni}^{(F)} - \%_{uni}^{(M)}}{\%_{uni}^{(F)} + \%_{uni}^{(M)}} \times 100 < +100\%$$

Concentration Index

Takes into account the number of students of a same school who choose the same university (S), as well as the relative abundance of universities chosen.

As many students enroll in the same university, so concentration increases.

$$0\% < \left(\frac{\sum S(S-1)}{N(N-1)} \right) \times 100 < +100\%$$

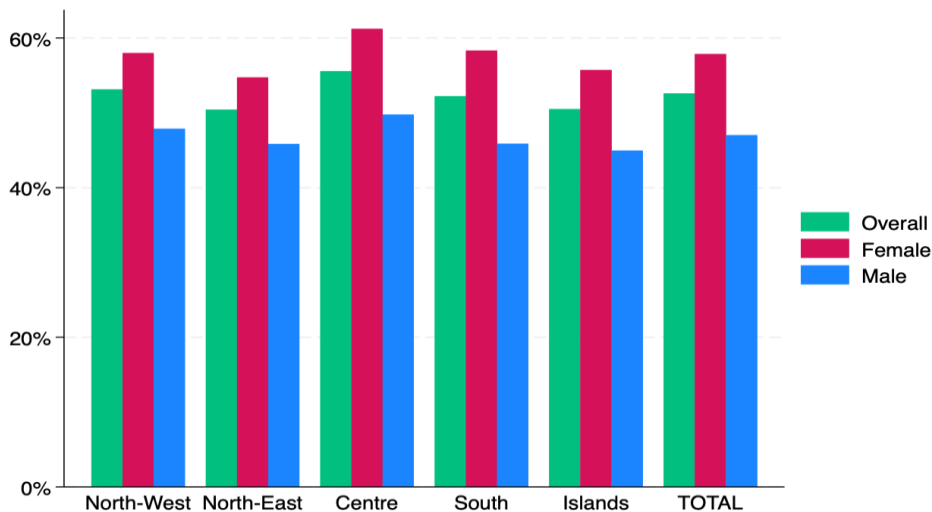
Gender gap

Concentration Index (CI)

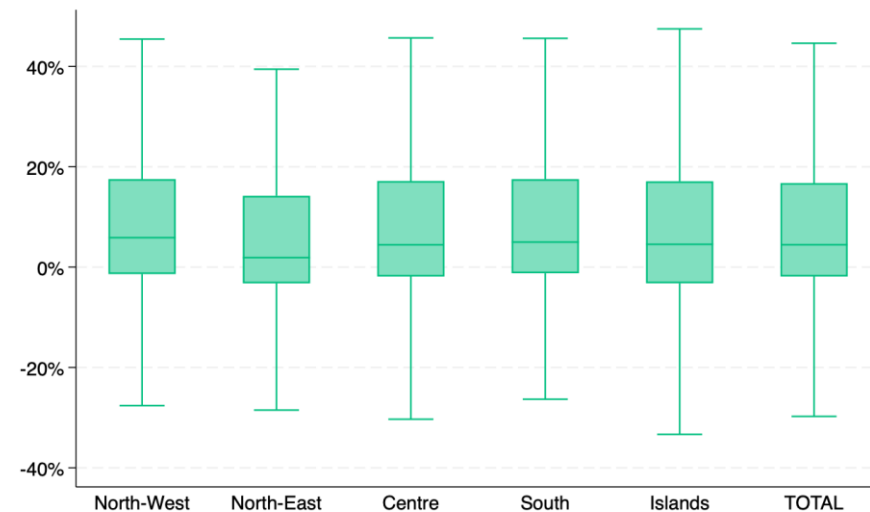
5. RESULTS

ENTRY RATE AND GENDER GAP BY MACRO-REGION OF HIGH SCHOOL

ENTRY RATE



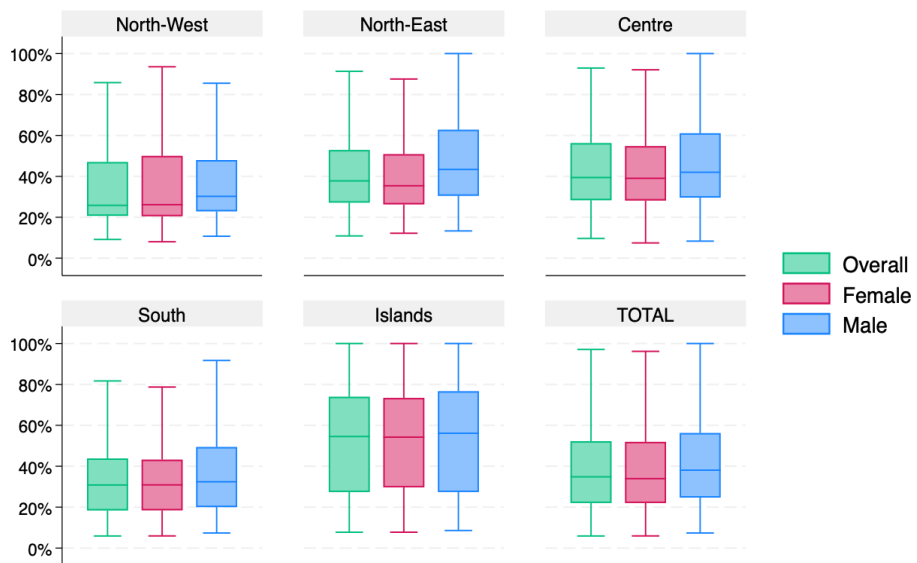
GENDER GAP



- The university entry rate is higher in the central and northern regions, and lower in the South and Islands;
- Across all macro-regions, the entry rate value is higher for females than for males;
- The highest Female entry rates show up for the Centre of Italy.
- High-school Gender Gaps are quite homogeneous across macro-regions. Nonetheless, on average North-West (*Mean = 8.89%*) and South (*Mean = 8.40%*) exhibit the highest value w.r.t the overall value (*Mean = 7.63%*).

5. RESULTS

HIGH-SCHOOL CONCENTRATION INDEX BY MACRO-REGION

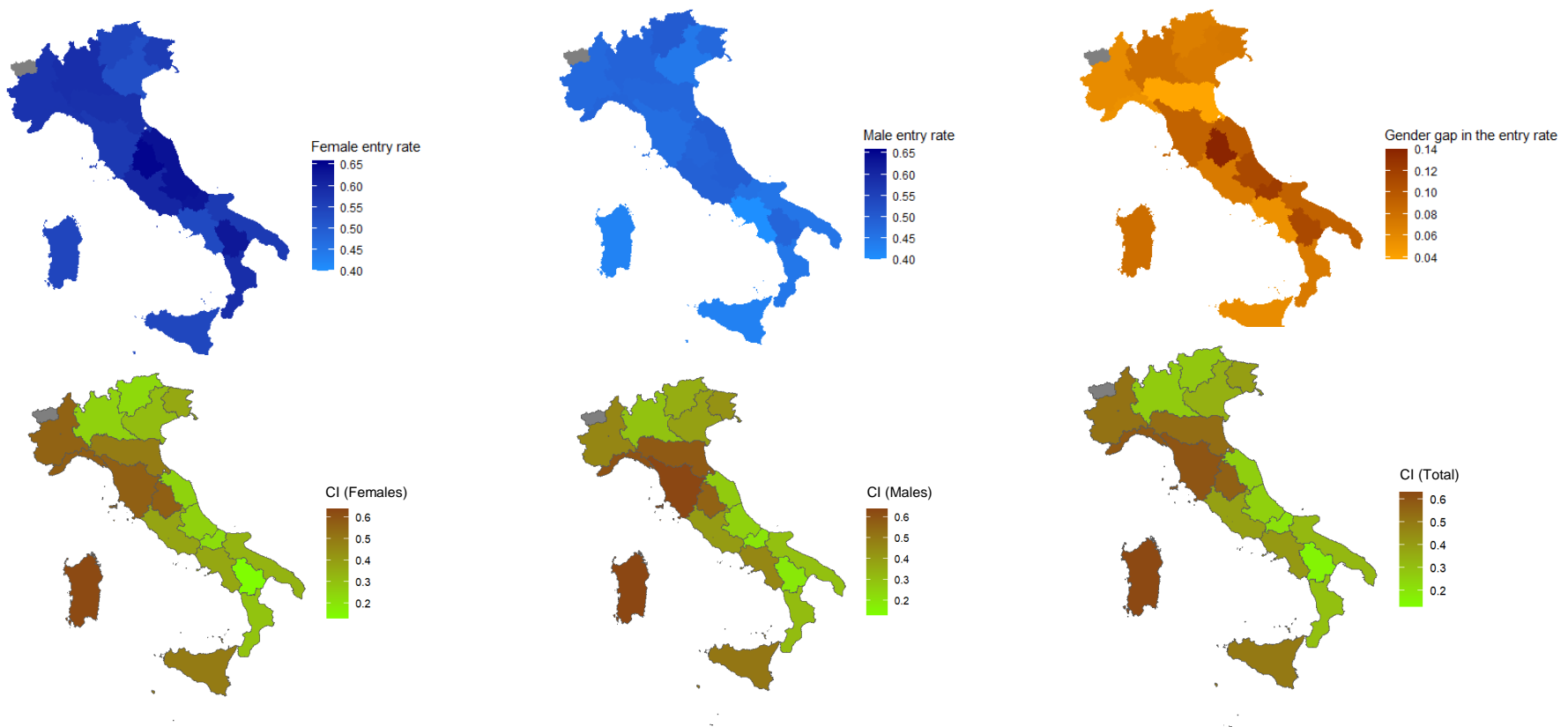


- The Concentration Index is consistently higher for males than for females;
- Particularly high the concentration for students from Islands, who probably prefer the most accessible universities;
- On the contrary, southerners are those who seem to be less affected by the choices of their peers from the same school.

Macro-region	Concentration Index														
	Overall					Female					Male				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
North-West	54096	35,1%	20,7%	9,14%	100,0%	30659	36,8%	22,8%	8,0%	100,0%	23437	37,1%	19,3%	10,7%	100,0%
North-East	38347	41,5%	18,5%	10,87%	100,0%	21472	38,9%	17,5%	12,2%	100,0%	16875	47,2%	20,1%	13,3%	100,0%
Centre	45524	43,1%	20,0%	9,67%	100,00%	25413	42,9%	19,8%	7,5%	100,0%	20111	46,1%	21,2%	8,3%	100,0%
South	60224	32,8%	18,0%	5,91%	100,00%	34244	32,8%	17,4%	5,9%	100,0%	25980	36,3%	19,7%	7,4%	100,0%
Islands	22793	51,8%	26,0%	7,73%	100,00%	12958	52,3%	25,8%	7,7%	100,0%	9835	53,6%	27,2%	8,6%	100,0%
TOTAL	220984	39,0%	20,9%	5,91%	100,00%	124746	38,9%	21,1%	5,9%	100,0%	96238	42,2%	21,7%	7,4%	100,0%

5. RESULTS

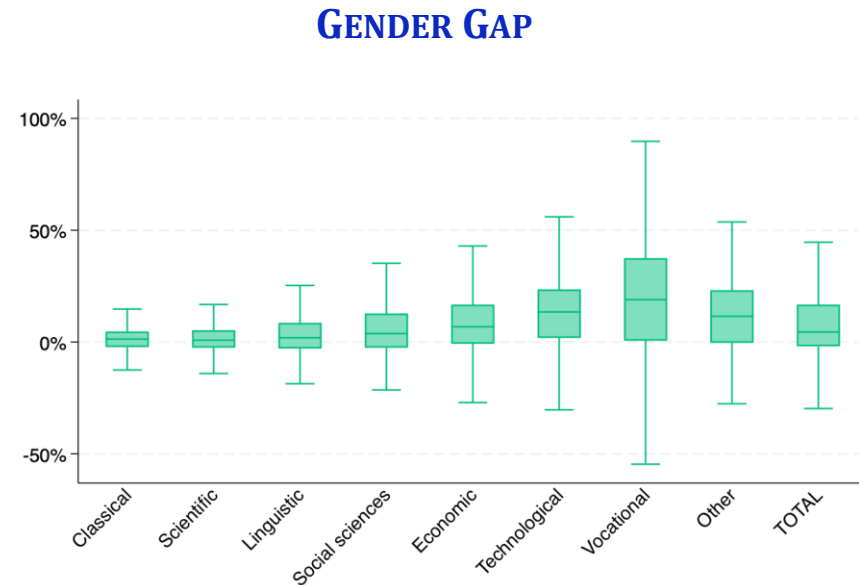
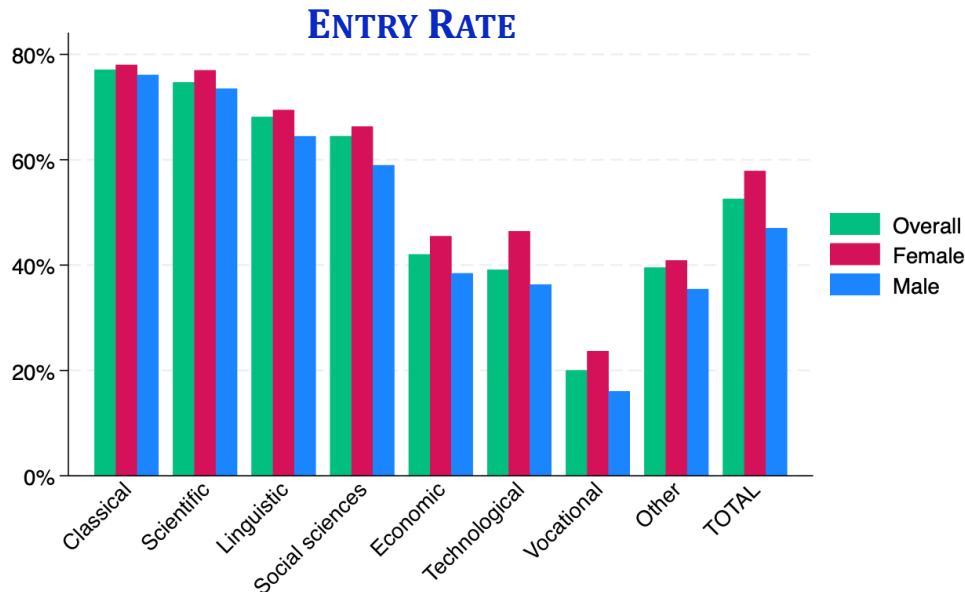
ENTRY RATE, GENDER GAP, AND CONCENTRATION INDEX BY REGION OF HS



- The picture is quite homogeneous across regions, with the Central ones characterized both for the highest entry rates, gender gap and concentration indices.

5. RESULTS

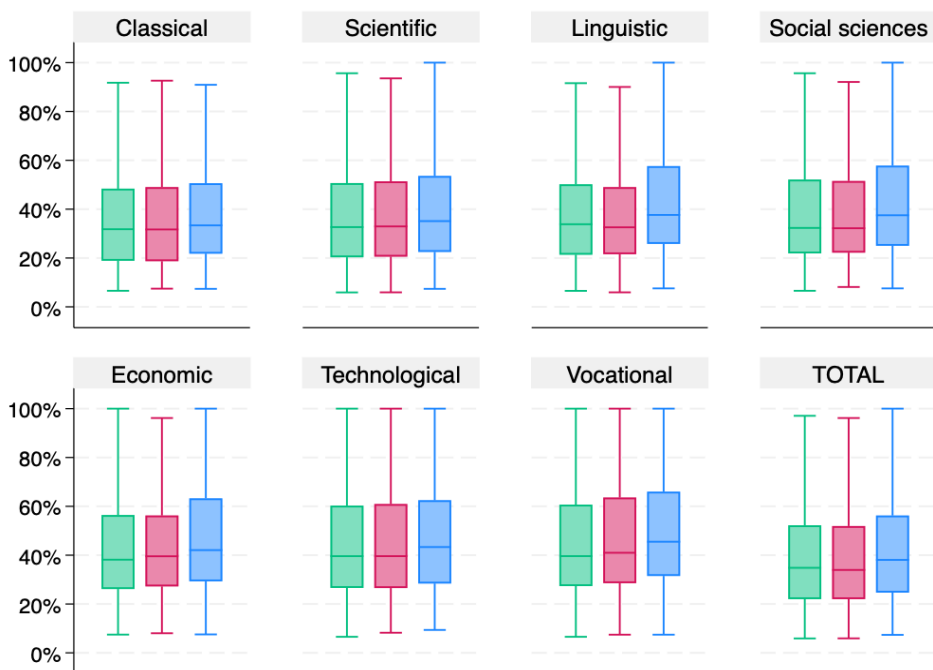
ENTRY RATE AND GENDER GAP BY HIGH SCHOOL CURRICULUM



- The proportion of female students enrolling in university is consistently higher than that of male students;
- The average entry rate varies considerably, ranging from a minimum in the Vocational track, with a proportion of 20.02%, to a maximum in the Classical track, with a proportion of 77,11%;
- The highest values of the Gender Gap (Vocational, 16.74%; Other, 12.40%) are consistent with the lowest absolute proportions of students enrolled.

5. RESULTS

CONCENTRATION INDEX BY HIGH SCHOOL CURRICULUM



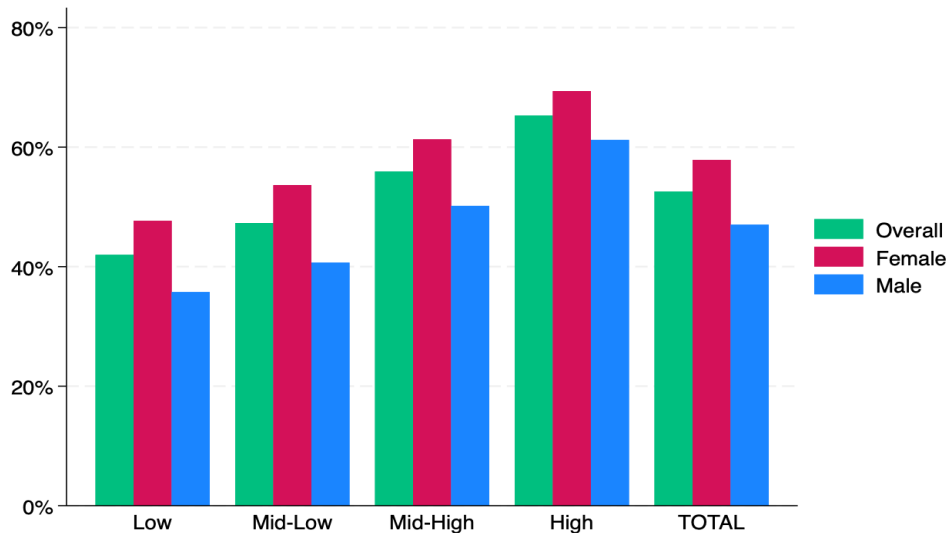
■ Overall
■ Female
■ Male

Curriculum	Concentration Index				
	Overall				
	N	Mean	SD	Min	Max
Classical	22952	34,9%	18,6%	6,6%	100,0%
Scientific	86565	37,1%	20,3%	5,9%	100,0%
Linguistic	26609	37,7%	19,9%	6,5%	100,0%
Social sciences	21381	38,1%	20,9%	6,6%	100,0%
Economic	22827	43,2%	21,1%	7,5%	100,0%
Technological	25436	45,1%	22,5%	6,6%	100,0%
Vocational	9103	45,9%	22,8%	6,6%	100,0%
Other	6111	37,6%	20,4%	6,6%	100,0%
Female					
	N	Mean	SD	Min	Max
Classical	15913	35,2%	18,8%	7,4%	100,0%
Scientific	38298	37,5%	20,6%	5,9%	100,0%
Linguistic	22357	37,5%	20,0%	5,9%	100,0%
Social sciences	18311	38,4%	21,1%	8,1%	100,0%
Economic	13800	44,1%	21,8%	8,0%	100,0%
Technological	5710	45,8%	23,8%	8,2%	100,0%
Vocational	5680	47,8%	23,8%	7,5%	100,0%
Other	4677	38,0%	21,2%	8,4%	100,0%
Male					
	N	Mean	SD	Min	Max
Classical	7039	37,4%	19,4%	7,4%	100,0%
Scientific	48267	39,4%	20,7%	7,4%	100,0%
Linguistic	4252	43,0%	22,0%	7,6%	100,0%
Social sciences	3070	43,0%	22,5%	7,6%	100,0%
Economic	9027	46,7%	22,1%	7,6%	100,0%
Technological	19726	46,9%	22,5%	9,4%	100,0%
Vocational	3423	50,4%	23,8%	7,4%	100,0%
Other	1434	43,3%	21,7%	7,4%	100,0%
TOTAL	96238	42,2%	21,7%	7,4%	100,0%

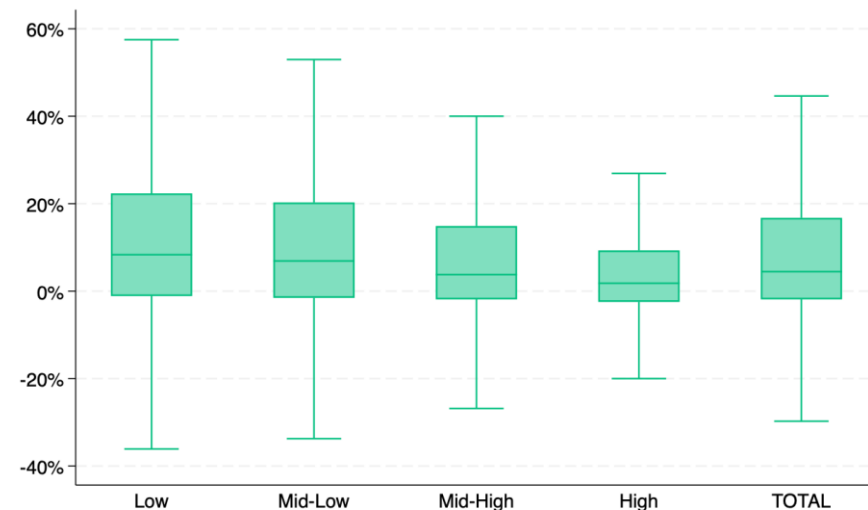
5. RESULTS

ENTRY RATE AND GENDER GAP BY ESCS QUARTILE

ENTRY RATE



GENDER GAP

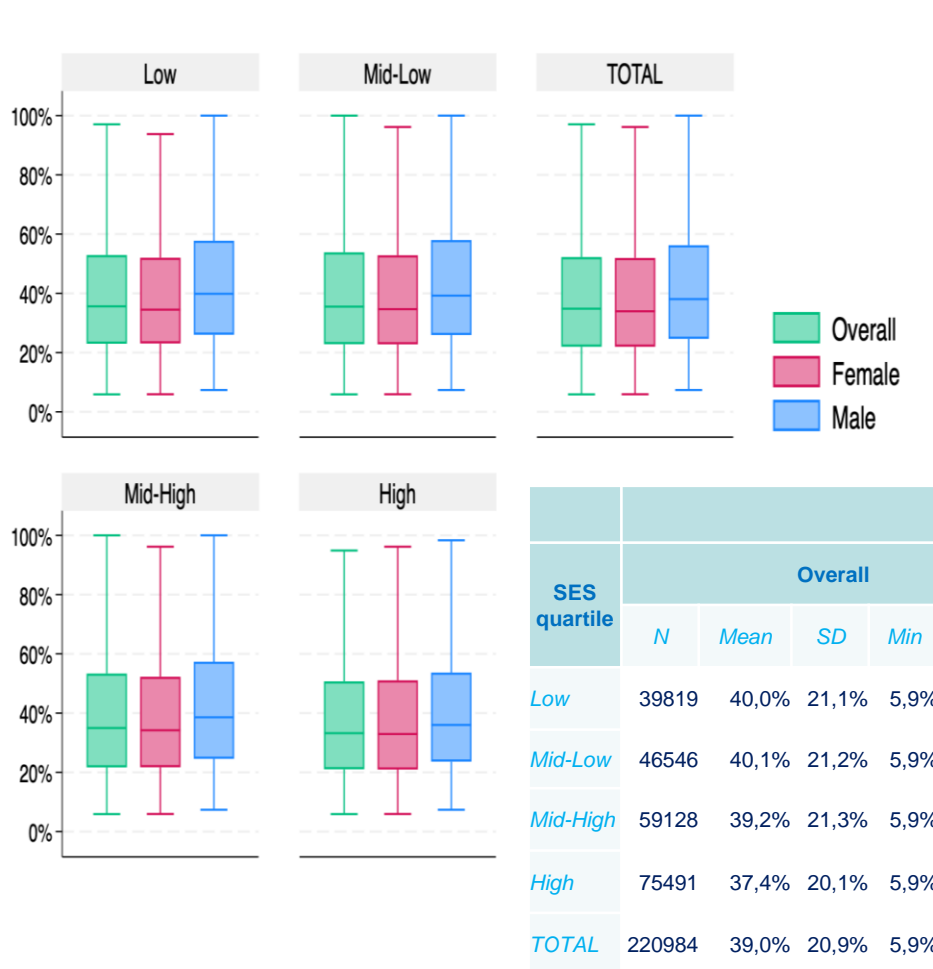


- The ESCS indicator – Economic, Social, and Cultural Status – defines the social, economic, and cultural status of the families of students participating in the INVALSI tests;
- The entry rate for both females and males decreases as lower the ESCS is;
- On the contrary, the higher the ESCS, the lower the Gender Gap at enrolment.

5. RESULTS

CONCENTRATION BY ESCS QUARTILE

- The Concentration Index remains higher for men independently from the ESCS quartile;
- Remarkably, the concentration is consistently lower as much as higher the ESCS quartile is, but differences are very small (around 3 p.p. on average)



SES quartile	Concentration Index														
	Overall					Female					Male				
	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Low	39819	40,0%	21,1%	5,9%	100,0%	23941	40,0%	21,6%	5,9%	100,0%	15878	43,8%	21,9%	7,4%	100,0%
Mid-Low	46546	40,1%	21,2%	5,9%	100,0%	27251	40,0%	21,5%	5,9%	100,0%	19295	43,9%	22,1%	7,4%	100,0%
Mid-High	59128	39,2%	21,3%	5,9%	100,0%	33600	39,1%	21,5%	5,9%	100,0%	25528	42,6%	22,0%	7,4%	100,0%
High	75491	37,4%	20,1%	5,9%	100,0%	39954	37,4%	20,2%	5,9%	100,0%	35537	40,3%	21,1%	7,4%	100,0%
TOTAL	220984	39,0%	20,9%	5,9%	100,0%	124746	38,9%	21,1%	5,9%	100,0%	96238	42,2%	21,7%	7,4%	100,0%

6. CONCLUDING REMARKS

- The persistence of a higher propensity of females to enrol in university compared to males does not seem to be highly influenced by geographical factors concerning the school curriculum undertaken;
- However, a general pattern can be observed, with higher values on average in the Centre and lower values in the North and the South of Italy;
- University participation is less common within certain educational pathways, with a noticeable amplification of the gender gap in the entry rate;
- The same stratifications exhibiting lower university participation are those showing the higher values of concentration, namely the highest chances to enrol in a university chosen by peers from the same school;
- Further development will investigate if these dynamics could result from multiple factors, including socio-cultural perceptions related to career opportunities, family expectations, economic dynamics, and teaching and career guidance methods.

7. THE BIBLIOGRAPHY

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