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Collegio Carlo Alberto, INVALSI, University of Torino, and University of Trento

JOINT WORKSHOP ON GENDER AND EDUCATION

BOOK of ABSTRACTS

September 30-October 1, 2022 – Collegio Carlo Alberto – Torino

September 30

Session 1

- **Patrizia Falzetti** (INVALSI), **Patrizia Giannantoni** (INVALSI): “Studying educational outcomes with INVALSI data: the potential of matching multiple sources”

INVALSI is a public National Research Institute designated to the evaluation of the Educational System. The major activity is the construction of cognitive test for the evaluation of competencies at different grades (primary, lower and upper secondary school) for the entire student population on a yearly basis.

The main goal of research activity is targeted to the study of inequalities in the educational system, particularly focusing on causes of students' low performances and drop out from school and on the estimation of “added value” provided by the school on their students.

The advancement of research in these last years has been characterized by a stable interest in the integration of data from different sources, both for the construction of complex indicator (e.g. those to target “school with difficulties”), and to generate big dataset for research with combined information from administrative and public research entities. The statistical matching of these data is an important new area of activity and the integrated data system generated will constitute the base for development of research project that have the strong potential of connecting information about students from different perspectives (school, university, familial characteristics, geographical administrative data, ...).

We illustrate one of this research projects in which INVALSI data are matched with University Office data: students from the II and V year of upper secondary school in INVALSI test are matched with data on their university enrolment and career from Ministerial Registry. Particularly, we present preliminary results of the use of this INVALSI-University matched dataset in the perspective of gender inequalities in the access to STEM courses. Given the population nature of the data, we had the possibility to study a small subgroup of population, girls attending Scientific Lyceum. Those girls attending Scientific school should be in principle naturally addressed to STEM courses, however, a larger part of them with respect to boys select not to pursue the scientific path at University, in a sort of “STEM drop out”. We decided to target the girls that “drop out from STEM” and detect how they differ from their peers in class, particularly looking at the role of math skills assessed by standardized tests and evaluated by class teachers.

- **Pietro Biroli** (University of Bologna), **Amalia Di Girolamo**, **Carla Nasti**, **Vincenzo Paolo Senese**, **Ida Sergi**: “Gender differences in spatial abilities and personality traits in early childhood”

Gender differences in spatial ability have long been reported and debated by cognitive psychology and social scientists, with the difference usually in favor of men. However, there is not yet a unified theory explaining the roots of gender differences in spatial ability, as there is no clear evidence of their biological and social influences. To explore the



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origin of these differences, the present study examines whether a gender difference in spatial ability is observable since childhood, and whether fluid intelligence or personality traits moderate these gender gaps. On a sample of 790

schoolchildren aged 5 to 11 years old, we administered three tests of spatial ability: Mental Rotations, Complex Figures Identification, and Embedded Figures. We find that gender differences in mental rotation can be detected since early childhood, with boys performing slightly better than girls. However, the magnitudes of these gender differences are very small and do not appear to be increasing with age. Personality traits moderate these differences but do not close the gap: the personality traits Conscientiousness and Openness to experience are slightly higher in girls and strongly linked to all the cognitive tasks, with the only exception of the Complex Figure task. In particular, mental rotation is negatively correlated with conscientiousness and positively correlated with openness. Our findings shed new light on the role that personality traits have on the performance of cognitive abilities starting from childhood.

- **Cheti Nicoletti, Almudena Sevilla, Valentina Tonei** (University of Southampton): “Gender stereotypes in the family: the role of information”
This paper documents gender-stereotyped beliefs of parents, using a natural experiment which relies on the comparison of parental assessments of the child’s skills with blindly graded standardized test scores in Australia. For mathematics, a male-dominated subject, parents overestimate boys’ skills more than girls’, while there are no gender differences when evaluating children reading skills. We exploit exogenous variation in parents’ interview dates to compare beliefs between parents who were interviewed before and after receiving the information on their child’s standardized test scores. We find that the gender bias disappears for parents interviewed soon after receiving the information shock, and we conclude that parental beliefs are influenced by information frictions and a unconscious cognitive biases. We also provide evidence that the parental gender bias in favor of boys in mathematics in grade 3 helps explaining the widening of the gender gap in standardized test scores in mathematics in grade 5, supporting the hypothesis that gender stereotypes negatively influence girls’ ability to achieve their full potential.
- **Francesca Borgonovi** (University College London and OECD) “A worm’s eye view of gender gaps in academic achievement” (Keynote speech)
Data from international large-scale assessments (ILSAs) indicate that boys have considerably poorer literacy skills than girls and that, on average, girls have poorer math skills than boys. The speech will take a micro-approach to the measurement of gender gaps in achievement in ILSAs and detail how these are shaped by when gender gaps are measured, how they are measured, and where they are measured. It will argue that the variation in measurements of gender gaps can help analysts, educators, and policymakers better appreciate differences and similarities across genders in educationally relevant dimensions. Finally, the presentation will detail opportunities (and challenges) that could arise from the shift of ILSAs from paper-based to computer-based administration to identify differences and commonalities in the problem-solving process of boys and girls in different achievement domains.

Session 2

- **Aino-Maija Aalto** (Stockholm University), J. Lucas Tilley: “Peer gender composition and student outcomes in high school and beyond”



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We document descriptive statistics of individuals who choose to enter gender-atypical high school programs and how they differ from those entering gender-typical programs. Additionally, we analyze the importance of having same-

gender peers in these programs. We focus on vocational programs with extreme gender segregation as these programs also lead to very different wage trajectories. Beyond completion of a high school degree and academic performance, we study the importance of gender composition in high school class for later labor market outcomes. Our initial results show that girls and boys who enter gender-atypical programs are very differently selected groups. We also find that having same-gender peers matters more for boys than for girls.

- **Massimiliano Bratti, Enrico Lippo** (University of Milan): “Covid-19 and the gender gap in university student performance”

The gendered impact of the COVID-19 pandemic has been observed in many domains, such as labor market outcomes and mental health. One sector that was particularly disrupted by the pandemic was education, owing to the need to close educational institutions and move all learning activities online. In this paper, we investigate the gender gap in university student performance, focusing on a large public university located in one of the European regions most affected by the first pandemic wave (Lombardy, in Northern Italy). Despite concerns that the pandemic might have had a heavier toll on the educational performance of female students, our empirical analysis shows that the gender gap in student progression (number of credits earned) was not affected by the pandemic and that in some college majors (social sciences and humanities) women even improved their GPA relative to men.

Session 3

- **Graziella Bertocchi** (University of Modena and Reggio Emilia, EIEF), Luca Bonacini, Marina Murat: “Adams and Eves: The Gender Gap in Economics Majors”

Why so few women graduate in Economics? We investigate the gender gap among Italian university graduates in Economics between 2010 and 2019. With 27 missing women for every 100 males, the estimated gap is larger than in Business and even STEM. The association between the gender gap and the mathematical content of high school curricula is especially strong in Economics, relative to other fields. A triple difference analysis of a high school reform shows that a raise in the mathematical content of traditionally low math curricula caused a decline in treated females' enrollments and an increase in the gender gap.

- **Pelin Akyol, Kala Krishna, Sergey Lychagin** (Central European University): “Deconstructing the Placement Gender Gap: Performance versus Preferences”

When good primary and secondary education is free, and at the university level, is heavily subsidized, and admissions are transparent and performance based, one might expect there to be little gender bias in placement at the university level. Yet, the college major choice decisions of students vary considerably by gender. Using Turkish data, we examine what lies behind these differences. Two channels seem to dominate: performance differences by gender and differences in preferences across majors. We then estimate a state-of-the-art model of preferences and run counter-factual simulations to evaluate the role of these two channels on the placement gender gap. Finally, we show that policy measures, such as giving women preference in STEM subjects, will not work as well as expected and show that more directed policies are needed.



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October 1

Session 4

- **Valentina Contreras** (London School of Economics and Political Science): “Policy evaluation of gender affirmative action in engineering schools”

This paper evaluates the impact of two separate but contemporaneous efforts to increase female participation in engineering schools by two leading universities in Chile (Universidad de Chile and PUC-Chile). I use a difference in difference approach to estimate the effectiveness of the policies and a peer effects model to explore further consequences of the reform on students’ academic performance and drop-out rates. The paper finds that (i) both policies were successful in increasing women’s enrollment and attendance at their engineering courses; (ii) they did not change the average academic ability of accepted students (as measured by their average composite application scores); (iii) The UCH policy led to lower first-year drop-out rates among women; improved performance in collaborative projects by both men and women, and had no significant effect on other first-year educational outcomes.

- **Catarina Calsamiglia** (IPEG Barcelona): “Gender differences in high-stakes performance and college admission policies” (Keynote speech)

We investigate the effect of increasing the weight of standardized high-stakes exams at the expense of high school grades for college admissions. Studying a policy change in Spain, we find a negative effect of the reform on female college admission scores, driven by students expected to be at the top. The effect on admission scores does not affect enrolment, but the percentage of female students in the most selective degrees declines, along with their career prospects. Using data on college performance of pre-reform cohorts, we find that female students most likely to lose from the reform tend to do better in college than male students expected to benefit from the reform. The results show that rewarding high-stakes performance in selection processes may come along with gender differences unrelated to the determinants of subsequent performance.

Session 5

- Carlo Cambini, Lorian Sabatino, **Sarah Zaccagni** (University of Copenhagen): “The faster the better? Advanced internet access and student performance”

In this paper, we study the impact of high-speed internet access on student performance. Our empirical analysis leverages a unique dataset that combines information on ultra-broadband (UBB) diffusion in Italy with data on student performance in 2nd, 5th, and 8th grades for the period 2012-2017. We exploit the staggered roll-out of UBB, starting from 2015. Through an event study approach, we find evidence of endogeneity between student performance and broadband diffusion. We deal with this issue through an instrumental variable approach that exploits plausibly exogenous variation in the diffusion of the essential UBB input. Our results suggest that advanced internet connections significantly decrease student performance in Mathematics and Italian language in the 8th grade. In contrast, we do not find any significant effect in the 2nd and 5th grades. Male students from low-educated parental backgrounds are those more adversely affected, especially if they attend schools with a low IT usage.



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- **Margaux Suteau** (CY Cergy Paris Université THEMA): “Early exposure to ICT and post-secondary educational choices: evidence from France”

Despite the rising use of information and communication technologies in schools, very few studies have been looking at its effect on students' educational choices. This paper analyzes public programs launched in five counties of France aiming at giving 6th to 9th graders a personal computer to use both at home and at school. First, I demonstrate that the programs significantly increased access to a computer. Second, using a difference-in-differences methodology, I show that the programs had an impact on post-secondary educational choices: women are one percentage point more likely to be enrolled in computer science following the programs, while men are slightly more likely to enter less gender-biased fields (natural sciences, biology...etc.). Finally, this paper shed light on two possible channels: a change in preferences for less gender-biased choices, or an effect on academic achievement that differs for girls and boys leading them to enter different fields.