



Motivation Tarantelli Prize – Year 2016

STEM Graduates and High School Curriculum: Does Early Exposure to Science Matter?

by

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The paper written by Marta De Philippis explores how the exposure to more science in British high school affects post-16 educational outcomes, namely enrollment and persistency in Science, Technology, Engineering and Math (STEM) majors, the quality of the university attended and the probability of dropping out of high school.

The theme is relevant and actual in the globalized and innovation-driven economy, where the labour demand for high skilled and, particularly, STEM-skilled workers is increasing, and the income distribution is widening because of job polarization. Recently, the European institutions emphasized the importance of STEM studies in relation to labour market needs. In addition, understanding how differences in high schools and in the curriculum explain later educational choices would be essential to promote effective reforms of the school system.

When identifying the impact of more science in high school on later educational outcomes, two sources of endogeneity may be at work. The first one because of selection of students into different schools based on the curriculum they offer; the second one because of the selection of students into different courses within the school they chose. The paper by Marta De Philipps has the merit of addressing both sources of endogeneity, first, by collapsing the analysis at the school level and, second, by exploiting the 2004 reform in UK, which increased the supply of advanced science courses in high schools at age 14.

Even disentangling the contribution of peer composition, results indicate that offering more science in high school improves educational outcomes in many domains. In particular, taking advanced science in high school increases the probability of both choosing science at age 16 by 30% and enrolling in STEM majors by 25%. Importantly, the provision of more science-oriented curriculum in high schools determines lasting impacts, by increasing the probability of graduating in STEM majors and scientific majors at university, and shifting high ability students towards high quality ivy-league universities. Low income/high ability students particularly benefited from the 2004 reform, while gender differences exist not because girls are less exposed to science courses, but because when exposed to more science in high school are more likely to take the most female-dominated majors, like medicine.

The AIEL executive board feels that the paper is highly deserving of the Tarantelli Prize because of its careful estimation strategy when identifying the impact of providing more science in high school. In addition, albeit the necessary differences, the British experience would be important also for Italy, where STEM graduates are under-represented.