Labour market knowledge and choice of subject to study: A Pragmatic Cluster Randomized Controlled Trial

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Outline

Higher Education policies in Europe (Roberts 2002, European Commission 2002, 2003, HM Treasury 2004, DEST 200, HEFCE 2010) and the US (National Academy of Sciences 2006) have aimed to increase enrolment in STEM subjects. But the 'STEM pipeline' can become leaky when students choose which subjects to study in the final years of secondary school, in particular when students choose not to study mathematics. Mathematics is also the only advanced level subject which is associated with higher future earnings in the UK (Dolton and Vignoles 2002) or the US (Levine and Zimmerman 1995, Arcidiacono 2004, Rose and Betts 2004). Therefore, increasing enrolment in mathematics in the final years of schooling is good for individuals and nations.

If students' freedom to choose is encouraged, then the policy option is to try to influence choice by providing information. Interventions (e.g. Jensen 2010, McGuigan et al. 2012, Kerr et al. 2012)which provide students with information have had mixed effects on choices. One source of variation in studies is whether information is provided online or in regular classes. It may be that online information is less likely than information in class to be accessed by the students who are most likely to find it surprising. This study uses a randomised controlled trial to test the effect on upper secondary school subject choices of giving 15-16 year-old students information about variation in graduate salaries. The information was provided through a one hour lesson comprising two main activities which used data on graduate earnings from a studies by O'Leary & Sloane (2005, 2011). The activities drew attention to gender differences by undergraduate subject. Although there are minor differences between estimates of graduate salaries in the UK (cf. Walker & Zhu 2011, Chevalier 2011), each study indicates that Mathematics and Engineering are high wage premium subjects whilst graduates in pure science (e.g. physics and biology) earn no more than the average graduate.

Our total sample included 5597 students from 50 schools. Schools were randomly invited to join the trial from a large and diverse geographical area. The sample was stratified to include 30 state and 20 private schools. Only schools with large sixth forms were included. These criteria meant that high achieving students were over-represented in the sample. We gathered detailed background information on students including a range of indicators of socio-economic status and students' expectations of grades in public examinations in mathematics and English at age 16. We also matched these data with achievement scores at age 11 and 16 from the National Pupil Database. We were, therefore, able to take account of observable differences between our sample and the national sample at school and individual level. We carried out a multiple imputation to address missing data. Allocation of schools between the intervention and control arms was carried out independently by the Medical Trials Unit at the University of Birmingham.

We measured the effect of the intervention on the likelihood that students would choose to study any particular A level subject. Data on actual choices were provided by the schools. For each subject we measured the effect using a clustered logistic regression. Adjusting for control variables the intervention increased take up of mathematics by 10 percentage points. Conversely enrolment in

Biology and Art fell, in each case by roughly a quarter. These changes indicate that the intervention is highly cost effective in terms of increasing enrolment in mathematics with the opportunity cost falling largely on subjects (within and beyond STEM) that have much lower graduate premia in the UK. The study adds to the evidence about the potential role of information in influencing student behaviour in a broad framework of informed choice. Recent policy in England has increased the responsibility of schools for careers guidance, albeit against a backdrop of deep concern by school inspectors about the quality of advice in schools and a tendency for schools to bias advice according to schools' interest. At present, difference in graduate premia is largely absent from advice given to school students in England. If they get access to this information it changes behaviour in a direction which has long been advocated in higher education policy.

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