The Effect of Curriculum Breadth and General Skills on Unemployment

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Abstract

This paper examines whether individuals can insure against the risk of unemployment by studying a broader range of specific subjects or by taking a course intended to provide general skills. I use administrative data on university-bound students from English high schools between 1974 and 1989. Exploiting variation in curriculum breadth and course offerings across cohorts within schools, I find that greater curriculum breadth is associated with a lower probability of being unemployed after leaving university. Moreover, these benefits are larger in magnitude when labor market conditions are relatively weak. I find no corresponding effect of taking a course in "General Studies" that is intended to provide general skills.

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1 Introduction

There is popular consensus that a general education is important in developing a broad and flexible set of skills for today’s dynamic labor market.\(^1\) But some scholars, such as Bishop (1998), dispute this view. This paper examines whether more general education can reduce the risk of unemployment by evaluating two alternative approaches to general education: (i) taking a broader range of specific subjects to attain greater curriculum breadth, and (ii) studying a subject that imparts general skills which may be transferable to a wide range of fields. The English system of secondary education incorporates both of these distinct approaches to general education, and is therefore a valuable setting in which to examine their respective effects. During their final years of high school, English students can focus on a narrow range of subjects or study a broader range of subjects. In addition, some students in England have the opportunity to study a specific subject, General Studies, that explicitly provides for general skills. A lack of consensus about the benefits associated with different curricula has led to substantial differences across schools and over time. I exploit this variation in curriculum breadth and in offerings of courses in general skills between schools and across cohorts within schools to estimate the causal impact of these alternative approaches to general education on later unemployment.

Much of the recent research on the causal effect of high school curriculum on labor market outcomes has been stimulated by Altonji (1995). He estimates the effect of taking specific high school courses on wages by exploiting the variation in curricula across high schools in the United States.\(^2\) Altonji finds a surprisingly low return to additional courses in academic subjects, especially in light of the possible bias from unobserved school characteristics. Levine and Zimmerman (1995) examine the effect of math and science courses using a similar methodology for a later cohort of students who graduated from U.S. high schools. They find that the number of math and science courses has a positive effect on wages but only

\(^1\)The Economist has argued that “the case [for general education] is becoming more compelling still as jobs become less secure, the service sector expands” (1994, p. 26). A World Bank volume has noted that “more broadly educated and trained workers are better prepared to learn new skills” (IBRD, 1995, p. 2).

\(^2\)Specifically, Altonji uses the National Longitudinal Survey of the High School Class of 1972 (NLS-72) and instruments for the number of credit hours taken by each student in a particular subject with the average number of credit hours taken in that subject in the school.
for certain sub-populations. Rose and Betts (2004) extend this research by distinguishing between different math courses using high school transcripts.\(^3\) They find a large return to certain higher-level math courses such as algebra and geometry but not to other math courses. Dolton and Vignoles (2002a) also provide evidence for a large return to an advanced (A-level) math course in England. Most recently, Goodman (2009) takes advantage of exogenous changes in high school graduation requirements across U.S. states and estimates a large effect of compulsory math coursework on earnings for black students.

In a paper that specifically examines the effect of curriculum breadth on wages in the U.K., Dolton and Vignoles (2002b) find no evidence for a positive return to taking a broader set of courses during the final two years of high school.\(^4\) They also find no evidence that individuals who take a A-level General Studies earn higher wages than individuals who do not take the course. However, since students in English high schools are able to choose whether to take a course in general studies and the degree of curriculum breadth, these estimates may be affected by unobserved individual characteristics.\(^5\) Moreover, it is possible that the relevant margin on which curriculum breadth affects labor market outcomes is unemployment rather than wages.

This paper follows on the work of Dolton and Vignoles (2002b) by adapting and extending the empirical methodology used by Altonji (1995) to estimate the causal impact of curriculum breadth and A-level General Studies on unemployment after leaving university. I construct a 16 year longitudinal panel of college-going classes from English high schools between 1974 and 1989 using administrative data from university rosters in the U.K. With information on secondary school leaving exams, I calculate the average level of curriculum breadth among university-going students for each school over time and infer whether a school offered a course in General Studies in any given year. Variation in these measures is likely to depend on the idiosyncratic preferences of school administrators and teachers, and their ability to

\(^3\)Rose and Betts (2004) use data from the sophomore cohort of the High School and Beyond survey that graduated from high school in 1982. This survey is the same one used by Levine and Zimmerman (1995) except that they use the senior cohort that graduated in 1980.

\(^4\)They use data from the National Child Development Study (NCDS) and the National Survey of Graduates and Diplomates (NSGD).

\(^5\)Dolton and Vignoles (2002b) discuss using students’ 14–16 (CSE/O level) curriculum and their English and mathematics class size at age 16 as potential instruments for curriculum breadth. However, they conclude that their measures of curriculum breadth are exogenous and present only OLS results.
coordinate with other schools to increase course offerings. Indeed, I show that within-school measures of curriculum breadth and offerings of General Studies are generally uncorrelated with student characteristics. Consequently, I use these measures as instrumental variables to address the problems of endogenous choice and omitted variable bias.

While the focus on unemployment after leaving university is partially dictated by the availability of data, it serves as an important indicator of the ability to adjust to labor market shocks. Moreover, because university degrees in England are generally focused on a narrow field of study, it is the curricular breadth or general skill acquired in high school that is likely to be pivotal. I characterize the theoretical effect of general education on unemployment in the context of a simple job search model where curriculum breadth or general skills increases the arrival rate of job offers while reducing the mean of the wage offer distribution. To the extent that the benefits of a higher arrival rate outweigh the costs of a lower wage offer distribution, general education will help insure individuals against adverse labor market shocks.\footnote{Grossman and Shapiro (1982) argue that general training is a form of self-insurance by allowing a worker to select the more favorable sector after uncertainty is resolved. This is also an important feature of education in Charlot, et. al. (2005).}

This characterization of curriculum breadth is also related to previous work examining the return to general education versus vocational training (e.g. Malamud and Pop-Eleches 2009) and the specialization in training and higher education (e.g. Neal 1998, Malamud 2010).\footnote{In related work, Gathmann and Schönberg (2009) explore the transferability of skills across occupations.} In addition, the potential for general education in high school to alleviate future unemployment may have broader implications for classroom and job training programs that try to address adverse labor market shocks (Jacobson, Lalonde, and Sullivan, 2005).

I find that greater curriculum breadth in high school is associated with a lower probability of being unemployed 6 months after leaving university. In the preferred 2SLS specification using variation within schools over time, distributing one’s courses over an additional broad area of study (such as science or humanities) lowers the likelihood of unemployment by approximately 1 percentage point. This is about 25 percent larger in magnitude than estimates from the analogous OLS specifications, indicating the presence of upwards bias in the cross-sectional estimates, and consistent with the observed negative relationship between in-
dividual achievement and curriculum breadth. Moreover, the beneficial effect of curriculum breadth in lowering unemployment is larger in magnitude when labor market conditions are relatively weak. Evidence on the effect of taking A-level General Studies in addition to other subjects is less conclusive, but most estimates are clustered around zero. Together, these findings suggest that studying a broad range of specific subjects may help students insure against the risk of unemployment while no such benefit arises from taking an additional course meant to impart general skills.

The paper proceeds as follows. Section 2 presents a simple job search model to help motivate the empirical work. Section 3 introduces the English high school curriculum and traces the development of the A-level General Studies examination. Section 4 describes the data and the sample used for the empirical analysis. Section 5 explains the empirical strategies used to identify the effect of curriculum breadth and General Studies. Section 6 presents results from the regression analysis, and Section 7 concludes.

2 Theoretical Framework

I consider a simple partial equilibrium job search model to explore the effect of curriculum breadth and general education on unemployment. Assume individuals are risk-neutral and have discount rate $r$. Job offers are generated by a stationary Poisson process and arrive at a continuous rate, $\lambda$, from a known distribution, $F(w)$. Let $c$ denote the cost of search, and let $b$ denote the value of the time that could be spent in some other activity (and/or the value of unemployment insurance). If individuals accept a job offer with wage, $w$, they receive that wage forever. The standard solution to the problem of maximizing income is well-known, and can be expressed as a decision about the reservation wage (McCall, 1970). Individuals set a reservation wage, $w^*$, and continue to search until they receive a wage offer above it.\(^8\)

I incorporate curriculum breadth or general skills into this model by assuming that a greater level of curriculum breadth or general skills, $g$, is associated with a lower intensity of

\[^8\text{Under these assumptions, the reservation wage can be characterized as } w^* = b - c + \frac{1}{\lambda} \int_{w}^{\infty} (w - w^*) dF(w). \text{ See Mortenson (1986).}\]
skill in a broader range of fields/sectors. If employers in different sectors require a minimum level of skill in a related field of study, we might expect that greater breadth leads to a higher rate of “suitable” job offers. This is because individuals are more likely to meet the basic skill requirements for an arriving job offer. In other words, I assume that the rate of suitable job offers is \( \lambda(g) \), where \( \lambda'(g) > 0 \).\(^9\) However, individuals with greater breadth face a lower distribution of wage offers for each suitable job because they have a lower level of skill in any given field/sector. Therefore, I assume that the distribution of suitable wage offers is a translation of the wage offer distribution, \( F(w - \mu(g)) \), where \( \mu'(g) < 0 \).

Given this characterization of curriculum breadth or general skills, the equation for the reservation wage can be expressed as follows:

\[
 w^* = b - c + \frac{\lambda(g)}{r} \int_{w^*}^{\infty} (w - \mu(g) - w^*) dF(w)
\]

Furthermore, the escape rate of leaving unemployment can be written as \( \phi(g) = \lambda(g) \left[ 1 - F(w^* - \mu(g)) \right] \), the rate at which offers arrive times the probability that a random offer is acceptable. Note that a constant reservation wage model implies that the duration of unemployment is distributed as an exponential function with mean equal to the inverse of the escape rate, or \( 1/\phi \).

The effect of an exogenous increase in \( g \) on the escape rate of leaving unemployment is theoretically ambiguous:

\[
\frac{\partial \phi}{\partial g} = \lambda'(g) \left[ 1 - F(\cdot) \right] - \frac{\lambda(g)}{(\phi + r)} F'(\cdot) \left[ \psi \lambda'(g) - r \mu'(g) \right]
\]

where \( \psi = \int_{w^*}^{\infty} (w - \mu(g) - w^*) dF(w) \) and \( F(\cdot) = F(w^* - \mu(g)) \)

On the one hand, a higher \( g \) increases the likelihood of leaving unemployment directly

\(^9\)More formally, we can posit an economy consisting of a continuum of sectors of mass one. Assuming that individuals must search across all sectors, the arrival rate of “suitable” job offers is \( \lambda(g) = \lambda s(g) \) where \( \lambda \) is the exogenous arrival rate of offers and \( s(g) \) is the proportion of sectors in which workers can work based on the minimum skill requirements for a job, such that \( s(0) = 0, s(\infty) \leq 1, \) and \( s'(g) > 0 \). Alternatively, we can allow individuals to direct their search towards sectors for which they have sufficient skills, but assume that search intensity does not decline with the number or range of sectors. These are similar to assumptions in Charlot, Decreuse, and Graniera (2005).
through the higher arrival rate of suitable wage offers (captured by the first term above). On
the other hand, holding the reservation wage fixed, a higher $g$ lowers the probability that a
suitable wage offer is accepted because the distribution of wage offers is lower. However, the
reservation wage is also affected by the change in arrival rate and the shift in the distribution.
It is straightforward to show that $\frac{\partial w^*}{\partial g} = \frac{1}{r + \phi} [\lambda'(g) \psi + \mu'(g) \phi]$, which is ambiguous in sign
because an increase in the arrival rate raises the reservation wage while a downwards shift
in the distribution of wage offers lowers the reservation wage. Thus, the combined effects of
a higher $g$ on the likelihood of accepting a suitable job offer are negative (captured in the
second term above).

Under what conditions does greater curriculum breadth or more general skills lead to
lower unemployment? If we assume that the wage offer distribution satisfies certain func-
tional form assumptions in order to rule out the somewhat counter-intuitive possibility that
an increase in the arrival rate leads to lower escape rate out of unemployment (Burdett,
1981; van der Berg, 1994), these conditions can be characterized quite simply. For example,
assuming that $F(\cdot)$ is log-concave, we can show that:

$$\frac{\partial \phi}{\partial g} > 0 \text{ if } \lambda'(g) > -\mu'(g) \frac{F'(\cdot)}{1 - F(\cdot)} \frac{r \lambda(g)}{r + \phi [1 - \xi'(\cdot)]} > 0$$

where $\xi'(\cdot) = \int_{w^*}^{\infty} \frac{(w - \mu(g) - w^*) F'(\cdot)}{[1 - F(\cdot)]^2} dF \leq 1$

A sufficiently larger magnitude of $\lambda'(g)$ relative to $\mu'(g)$ will lead to a higher escape rate out
of unemployment (i.e. lower unemployment duration). In other words, greater curriculum
breadth will lead to lower unemployment if the positive benefits of a greater arrival rate
sufficiently outweigh the negative costs of the lower wage offer distribution.

It is also interesting to consider how the effect of curriculum breadth on unemployment
varies with macro-economic or local labor market conditions. Following Burdett and Ondrich
(1995) and others, I suppose that better labor market conditions, $\theta$, either increase the
arrival rate of job offers—i.e. $\lambda = \lambda(g, \theta)$ where $\lambda_\theta(g, \theta) > 0$—or improve the wage offer
distribution—i.e. $\mu = \mu(g, \theta)$ where $\mu_\theta(g, \theta) > 0$. Unfortunately, it is not possible to derive
unambiguous predictions using either characterization of labor market conditions:

\[
\frac{\partial}{\partial \theta} \left( \frac{\partial \phi}{\partial g} \right)_{\lambda=\lambda(g,\theta)} = \lambda_{g\theta}(g, \theta) \left[ 1 - F(\cdot) \right] - \left[ \lambda_g(g, \theta) \right]^2 F'(\cdot) \frac{\psi}{\phi + r} - \left( \frac{\partial R}{\partial \theta} \right)_{\lambda=\lambda(g,\theta)}
\]

and

\[
\frac{\partial}{\partial \theta} \left( \frac{\partial \phi}{\partial g} \right)_{\mu=\mu(g,\theta)} = -\mu_{g\theta}(g, \theta) \lambda'(g) F'(\cdot) - \left( \frac{\partial R}{\partial \theta} \right)_{\mu=\mu(g,\theta)}
\]

where

\[
R = \frac{\lambda(\cdot)}{(\phi + r)} F'(\cdot) \left[ \psi \lambda_g(\cdot) - r \mu_g(\cdot) \right]
\]

The last term in each of the expressions above, \( \frac{\partial R}{\partial \theta} \), expresses the effect of labor market conditions on the escape rate from unemployment due to changes in the reservation wage effect; it cannot be signed without further assumptions. However, these expressions do suggest that the effects of curriculum breadth or general skills on unemployment are larger in the context of a weak labor market as long as \( \frac{\partial R}{\partial \theta} > 0 \), and if \( \lambda_{g\theta}(g, \theta) < 0 \) in the case where \( \theta \) is assumed to affect the arrival rate of job offers.\(^{10}\) Intuitively, if an increase in the arrival rate of job offers is particularly valuable when the base arrival rate of job offers is low, the effect of curriculum breadth on unemployment is likely to be larger when the labor market is weak.

Note that I have focused throughout on exogenous changes in curriculum breadth or general skills because that is the variation I try to exploit in the empirical analysis. However, it is likely that individuals also choose their level of curriculum breadth or general skills. It is straightforward to derive the following first-order condition for the optimal \( g \):

\[
\lambda'(g) \int_{w^*}^{\infty} (w - \mu(g) - w^*) dF(w) = -\mu'(g) \lambda(g) [1 - F(w^* - \mu(g))]
\]

Individuals will choose \( g \) so as to equate the additional option value generated through greater curriculum breadth or general skills, \( \lambda'(g) \psi \), with the costs due to lower mean wages upon exiting unemployment, \( \mu'(g) \phi \).\(^{11}\) Moreover, allowing for heterogeneity in ability or discount rates across individuals would lead to a cross-sectional relationship between curriculum breadth and unemployment that is different from the effect of an exogenous

\(^{10}\)This latter condition implies that curriculum breadth and the ease of finding a job are not complements (as often assumed in models of search intensity). See Shimer (2004) for a model that highlights this possibility.

\(^{11}\)Note, there may also be additional psychic costs associated with studying a broader curriculum because learning a new subject can be difficult.
change in curriculum breadth derived above. It is also possible to derive the effects of labor market conditions, \( \theta \), on the escape rate from unemployment and the reservation wage with the endogenous choice of \( g \), but these are relegated to a mathematical appendix (along with derivations of all the other results in this section).

3 Background

3.1 Curriculum Breadth in England

Since the early 1950s, the English high school curriculum has largely been shaped by two sets of qualifications that together constitute the General Certificate of Education (GCE). Students would normally take examinations for the GCE Ordinary (O) level qualification in a relatively broad group of subjects at age 16.\(^{12}\) But during their final two years of high school, students usually study for the GCE Advanced (A) level examinations in only three or four different subjects.\(^{13}\) Even with such a restricted number of subjects, there is an opportunity to take a broad or a narrow curriculum. For example, students can take all three subjects in the sciences, or take a subject in each of the sciences, social sciences, and humanities. As Dolton and Vignoles (2002b) report, almost 20 percent of students in 1997 took all their A-level examinations in science and math courses, 5 percent took all their A-level examinations in the social sciences and 7 percent took all their A-level examinations in the arts.\(^{14}\)

The high degree of specialization imposed by the A-level system has long been recognized and there have been several attempts to introduce a broader curriculum.\(^{15}\) In 1968, the Headmaster’s Association proposed an Intermediate level examination that would increase

\(^{12}\)In the late 1980s, GCE O level examinations were merged with Certificate of Secondary Education (SCE) examinations to form the General Certificate of Secondary Education (GCSE).

\(^{13}\)Interestingly, the introduction of A levels in 1951 to replace the Higher School Certificates was a response to the criticism that these latter qualifications were denying opportunity to pupils with talent in individual subjects who were less successful in others. Indeed, the Higher School Certificates had attempted to ensure that pupils followed a sufficiently broad and balanced curriculum by requiring candidates to achieve a minimum standard in a range of subjects to pass.

\(^{14}\)See their Table 1 cited from the Department of Education and Employment (1997) Statistics of Education. These figures include students that passed three or more A level examinations.

\(^{15}\)A number of well-publicized reports – the Crowther Report (1959), the Higginson Report (1988), and the Dearing Report (1996) – have discussed the issue of specialization at A-level.
the number of subjects studied. Later years saw the Schools Council put forward plans for a two-stage system in which students would be examined in five subjects spread over two years. However, these proposals gained little support and were ultimately unsuccessful. In 1989, a new exam, the Advanced Supplementary (AS) examination level was introduced to broaden the curriculum; it was to be the same standard as an A-level, but half the content. Students were encouraged to substitute two AS levels for one of their A-levels but most universities did not regard these examinations as commensurate alternatives and it did little to change the character of English secondary school education. More recently, some progress in broadening the A-level curriculum has been made as a result of an influential government inquiry (Dearing, 1996). With the introduction of Curriculum 2000, A-levels now consist of several modules that comprise an Advance Subsidiary (AS) level in the first year and an A2 level in the second year. However, even if they take a larger number of subject in the first year, students can still choose a relatively narrow curriculum.

Schools administrators and teachers are free to select which A-level subjects are to be offered at their school, although the examinations themselves are graded against a national standard by outside examiners. The number of A-level subjects offered by a school depends on several factors. As mentioned in a review of secondary schools from 1993-1997, “the number of GCE A-level subjects taught tends to depend on the size of sixth form, but can vary from as low as 5 up to more than 30.” (Ofsted, 1998) School size might well be correlated with other school characteristics and the types of students who attend the school. However, some schools are able to coordinate with nearby schools to offer a broader curriculum:

“Some schools enhance their sixth-form curriculum provision through links with other institutions. There are clear advantages to the schools, both in terms of breadth of curriculum and economies of scale. The extent of such co-operative arrangements varies considerably. There are some integrated sixth-form consortia with joint planning and publicity, shared resources and timetables and jointly delivered programs...In other areas, co-operative arrangements are frequently on more of an ad-hoc basis.” (Ofsted, 1998)

While schools that succeed in organizing such co-operative arrangements may also be ones that are well-managed, the feasibility of cooperation depends on having neighboring schools nearby. Moreover, such cooperation may vary over time as certain school administrators tackle these issues more forcefully than others: “Some head-teachers remain skeptical about
such arrangements, principally because of the difficulties involved in harmonizing timetables, arranging transport, and agreeing on financial terms.” (Ofsted, 2000)

The degree of curriculum breadth in sixth form is also a direct function of the preferences of school administrators and teachers. Some schools strongly promote the value of curriculum breadth. For example, a prospectus for one school declares that “students at the Weald School are encouraged to keep some breadth in their choice of A Level subjects when entering the Sixth Form.” Other schools may place less emphasis on curriculum breadth. Since there is little agreement on the benefits of a broad curriculum among teachers and administrators, these differences are usually idiosyncratic. Furthermore, inducements for students to take a broad curriculum may change within a school over time as certain teachers are hired and school administrators decide to place greater emphasis on curriculum breadth. Thus, there is a substantial element of exogenous variation in curriculum breadth across and within schools over time due to idiosyncracies among teachers and school administrators.

### 3.2 A-level General Studies

A-level General Studies was introduced in 1959 by the Joint Matriculation Board, an examination boards formed by a consortium of universities in northern England. The number of students taking the General Studies A-level has grown from 1,530 candidates in 1959 to almost 85,000 in 1999.\(^{16}\) Indeed, by 1999, A-level General Studies accounted for the largest fraction of GCE A-level examinations taken by students. (DfEE Statistical First Release, Table 8, 1999) The 1999-2000 Annual Report of Her Majesty’s Chief Inspector of Schools states that “in some cases the only form of curriculum extension is the A-level or AS level in general studies. In 1999, about a third of all advanced GCE candidates took the general studies A-level and a fifth the general studies AS.” (Ofsted, 2000) Most universities do not accept A-level General Studies in lieu of A-levels in specific subjects when admitting stu-

\(^{16}\)In recent years, additional examining boards have begun offering A-level General Studies. But the majority of candidates take the General Studies exam offered by the Assessment and Qualifications Alliance (AQA), the successor to the Joint Matriculation Board and several other examining boards. More recently, another A-level in Critical Thinking has been introduced by the AQA.
udents for specific courses of study.\footnote{There are a few exceptions, especially among some universities in northern England which have recognized the A-level General Studies examination in their admission criteria (Darby, 2002).} Hence, students usually take A-level General Studies in addition to the normal load of three A-levels in specific subjects. This implies that courses in General Studies do not crowd out subject-specific A-level examinations, although they can crowd out the time spent on other courses.

According to the current guidelines, courses in General Studies “should provide opportunities for students to demonstrate breadth of knowledge, depth of knowledge, an ability to transfer skills and make connections, integrate ideas and develop concepts, use arguments, make judgments and evaluate evidence, and examine questions from a broader standpoint than that of a single discipline.” The original examinations tested students on their knowledge of current affairs, their mathematical and reasoning abilities, and their understanding of English prose. In particular, these examinations required students to interpret numerical tables, complete verbal analogies, and write essays on topics of social and scientific import. Sample questions from a 2000 specimen examination are presented in Appendix A. More recently, courses in General Studies have also stressed the development of skills such as writing essays, solving problems, and creating Microsoft PowerPoint presentations (Swatridge, 2004).

Not all schools offer their students the option of taking the A-level General Studies examination. As with other A-level subjects, school administrators and teachers are free to choose whether General Studies will be offered at the sixth form level. The question of which schools tend to offer a course in General Studies and what induces a school to offer a course in General Studies is an extremely relevant one for the purposes of this paper. As a prospectus for one school explains:

“One of the drawbacks of the A Level system is that students are encouraged to follow a relatively narrow curriculum and that many students tend to be deficient in certain skill areas [St Anselm’s Catholic School] favored solution, and that of many other schools, has been to introduce General Studies for all A-level students, in addition to their other subjects.”

These changes may be idiosyncratic to a particular headmaster who decides to introduce a new course. Or there may be a new teacher who is willing to teach such a course. Since the
benefits of A-level General Studies have been widely debated, it is likely that a change in offering does not represent a major shift in school policy.

As with other subjects, deciding on how to prepare students for the A-level General Studies examination is left for teachers and school administrators. The majority of schools that offer it have a specific course for teaching these skills, although usually for only 2 hours a week instead of the standard 8 hours associated with most other A-level subjects. There are some schools that do not offer any preparation for the examination. However, one prominent scholar of English secondary education has argued that, “there is no doubt that where schools make [A-level examinations in General Studies] the basis of their general studies program, they seem to be tackled with seriousness.” (Holt, 1980, p. 158)

4 Data

The main source of data for this paper comes from the archival records of the Universities Statistical Record (USR). The USR contains rich information on the university experience, early labor market outcomes, and prior educational qualifications for all students who were enrolled in U.K. universities between 1972 and 1993. Demographic variables include sex, marital status, age, and socioeconomic status based on parental occupation. Details about prior educational qualifications include the type of school attended and the subject and grade in all school leaving examinations that correspond to courses taken in high school. I use these to construct variables that measure the total number of courses taken at A-level and the average A-level score across all subjects (which ranges from 1 to 15). I also calculate the average size of the university-going class, and the average A-level score, number of courses, and sex ratio of the university-going class in each school and each school-graduation year.

Based on the information on prior educational qualifications, I code a binary variable that equals 1 if the student took the A-level General Studies examination, and 0 if not. The measure of curriculum breadth is derived from counting the number of different subject areas covered by an individual’s A-level examinations. Following the classification proposed by Dolton and Vignoles (2002b), I consider five curriculum groupings that include mathematics/computing, science, social science, humanities, and others. According to this classi-
ication, the measure of curriculum breadth would take on a value of 1 if all A-levels were in one particular category and, for example, a value of 3 if each of three A-levels was in a different category. The measure of curriculum breadth therefore ranges from 1 to 5. In the USR samples described below, about 20 percent of students study all their A-level courses in just one category, 54 percent study courses in two different categories, 23 percent study courses in three different categories, and 3 percent study courses in four different categories (with only a negligible fraction studying courses in five categories).

Since this measure of curriculum breadth imposes a strong assumption of linearity. I also consider using indicator variables for each value of curriculum breadth as a robustness check. Furthermore, I provide an alternative measure of curriculum breadth in which I categorize students according to whether they (i) took all their courses in math and/or science, (ii) took all their courses in humanities and/or social science, or (iii) took a “mixed curriculum” which included math and/or science courses as well as humanities and/or social science. The fraction of students in each of these categories are 34 percent, 40 percent, and 26 percent respectively, according to the USR samples described below.

Information about early labor market outcomes was collected with a follow-up survey approximately 6 months after graduation. I focus on unemployment as the main outcome variable, which takes on a value of 1 if an individual is unemployed six months after graduation from university, and 0 if employed. This measure excludes individuals who are enrolled in further study or otherwise outside the labor force. Consequently, I also consider a variable measuring nonemployment, which takes on a value of 1 if an individual is unemployed or out of the labor force, and 0 if employed. Unfortunately, the USR does not contain information on wages or any later labor market outcomes.

The base sample includes all students who attended university between 1975 and 1993 after completing high school between 1974 and 1989. Since we are specifically interested in the English high school curriculum, I restrict attention to students who attended high school in England and completed the English school GCE A-level examinations. Finally, I only consider students who entered directly from high school and took all their examinations at graduation, excluding those who continued onto further education before entering univer-

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18Unfortunately, subject codes are not coded consistently in the first two years of the USR data.
These restrictions yield an initial sample of about 620,000 students. Table 1 presents the summary statistics associated with this broad sample of students, as well as a restricted sample of some 260,000 students from schools that sent at least 10 students to university in each school-year.

The principal limitation of the USR data is that we only observe students who continue to university. Although the majority of students who complete their A-level examinations enter university, it is possible that either curriculum breadth or taking A-level General Studies is correlated with the propensity to attend university. However, as mentioned earlier, most universities did not consider A-level General Studies in their admissions decisions during the study period. Moreover, although entry to certain fields of study did require students to take a relevant subject at A-level, many admission offers were based on the total grades achieved at A-level, regardless of the specific subjects taken in conjunction with the primary subjects. I use the National Child Development Study (NCDS) to show that curriculum breadth is uncorrelated with the propensity to attend university after conditioning on the number of A-level subjects.

## 5 Empirical Strategy

### 5.1 Baseline OLS

The baseline estimates of curriculum breadth and general studies are generated by cross-sectional regressions using OLS. Table 2 indicates that a broader curriculum is clearly associated with lower rates of unemployment, while taking A-level General Studies is associated with higher rates of unemployment. But the characteristics of students who choose different levels of curriculum breadth, and whether or not to take General Studies, also appear quite different. Students who choose a broader high school curriculum and those who take General Studies are slightly younger and more likely to be male, with lower parental SES, lower A-level scores and a greater number of A-level courses. Since these variables may be correlated with unemployment, it is important to control for them in the regression analysis.

\[ \text{Note that this restriction retains “gap” year students who delayed entry from high school to university.} \]
Dolton and Vignoles (2002b) include dummy variables for each type of category delineated by their measure of curriculum breadth. But it is difficult to interpret the coefficient on curriculum breadth when this set of dummy variables is included because the measure of curriculum breadth is, in fact, equivalent to the sum of these dummy variables. Moreover, insofar as these variables are determined simultaneously with curriculum breadth and General Studies, there is also an argument to omit them from the regressions.\[^{20}\] Instead, I present an alternative measure of curriculum breadth in which I compare students who took a “mixed curriculum” to those who took all their courses in math/science and those who took all their courses in humanities/social science/other.

Finally, I always include controls for the year of graduation because this may affect the particular labor market opportunities available over time. As a result, I focus on the following baseline regression equation for estimating the effect of curriculum breadth on unemployment:

\[
\text{unemp}_{ist} = \beta' \mathbf{X}_{ist} + \lambda \text{CurBreadth}_{ist} + \phi_t + \varepsilon_{ist}
\]

where \(\text{unemp}_{ist}\) is unemployment after leaving university for student \(i\) in high school \(s\) who graduated at time \(t\), \(\mathbf{X}_{ist}\) is the set of control variables described above, \(\text{CurBreadth}_{ist}\) is a measure of curriculum breadth, \(\phi_t\) is a set of dummy variables for the year of graduation, and \(\varepsilon_{ist}\) is the disturbance term. The baseline regression equation for estimating the effect of taking A-level General Studies is essentially identical:

\[
\text{unemp}_{ist} = \beta' \mathbf{X}_{ist} + \gamma \text{GenStudies}_{ist} + \phi_t + \varepsilon_{ist}
\]

where \(\text{GenStudies}_{ist}\) is an indicator for taking A-level General Studies for student \(i\) in high school \(s\) at time \(t\), and all other variables are as defined above.

The only difference in the specification for General Studies is that I do not control for the number of A-level courses. As mentioned, most students take A-level General Studies as an extra course so I am interested in the effect of taking A-level General Studies in addition

\[^{20}\text{Indeed, the same argument applies to the average A-level score which is included to proxy for student ability. Unfortunately, the USR does not have an earlier measure of ability so I rely on this imperfect proxy. However, I have verified that the main results remain essentially unchanged when excluding average A-level score from the regressions.}\]
to, rather than instead of, other subjects. However, controlling for the number of A-level courses is important in the specifications for curriculum breadth since the relationship is at least partially mechanical (i.e. the number of courses is a constraint on the maximum level of curriculum breadth).

5.2 Variation between schools

Although controlling for observable characteristics can alleviate some of the bias in the raw correlation, other unobservable factors may still pose a problem. To address this issue, I first consider an analogue of Altonji’s (1995) identification strategy by instrumenting for individuals’ curriculum breadth with the average curriculum breadth in their school. Obviously, this strategy is only valid if average curriculum breadth in a school is uncorrelated with other school characteristics that affect unemployment. The first two columns of Appendix Table 1 provide a somewhat coarse comparison between schools that offer a level of curriculum breadth that is either above (high) or below (low) the median curriculum breadth in a school.\(^{21}\) Similar to the individual-level differences by curriculum breadth, schools with a broader curriculum have, on average, younger and more male students, with lower parental SES, lower A-level scores, and more A-level courses. But surprisingly, in contrast to the pattern across students, the average level of unemployment among schools with a relatively broader curriculum is higher than in schools with a relatively narrow curriculum. In the regression analysis, I consider specifications that control for school size and school-averages of these demographic variables.

I also exploit differences across schools by instrumenting for taking a course in A-level General Studies with whether a course in General Studies is ever offered in a school. Although there are no data available on whether a school formally offered this course, I can infer whether General Studies was offered based on the record of individual examinations taken by students from the school. Since the record of individual examinations only includes students who attended university, it is possible that a course in general studies was offered

\(^{21}\)It is important to remember that the regressions exploit the entire variation in curriculum breadth across schools, not just the high and low levels shown in Appendix Table 1.
in a school but the students who attended university chose not to take it.\textsuperscript{22} I attempt to minimize this measurement error by restricting the analysis to schools with more than 10 students going on to university in each school-year observation. With a large enough university-going class, observing that no students took A-level General Studies is very likely to indicate that General Studies was not offered.\textsuperscript{23} Again, in order for this instrument to be valid, whether A-level General Studies is offered at a school must be uncorrelated with other school characteristics.

The last three columns of Appendix Table 1 show average schools characteristics depending on whether they always offered General Studies, never offered General Studies, or introduce General Studies at some point from 1974 to 1989. Schools that always offer general studies tend to have younger and more male students, with lower average A-level scores and lower parental SES than schools that never offer general studies. Furthermore, schools that always offer general studies have higher unemployment. Again, the regression analysis includes specifications that control for school size and school-averages of these demographic variables.

Finally, I consider another IV specification for curriculum breadth in which I instrument for an individual’s curriculum breadth with the availability of different A-level courses in their school. Specifically, I use a full set of indicator variables for whether the school offered each A-level subject as instruments for curriculum breadth. As with the variable indicating whether General Studies is offered in a school, these instrument are inferred from the course-taking behavior of students in a school (with more than 10 students going on to university in each school-year observation).

5.3 Variation across cohorts within schools

An alternative empirical strategy for estimating the effect of curriculum breadth on unemployment exploits changes in curriculum breadth and offerings of General Studies within

\textsuperscript{22}However, based on data from the National Child Development Study (NCDS), the majority of students who took A levels ended up attending university. This suggests that such inferences are likely to be reasonable.

\textsuperscript{23}Most results remain unchanged if I relax this restriction or impose alternative restrictions (e.g. school with more than 5, 15, or 20 students going on to university in each school-year observation).
schools over time. Using the USR data to construct a longitudinal panel of students from English high schools. I can include school fixed effects and instrument for individuals’ curriculum breadth with the average curriculum breadth among other students that graduated in the same year. This fixed-effects two-stage least squares (FE-2SLS) specification can be expressed as follows:

\[
\text{unemp}_{ist} = \beta'\mathbf{X}_{ist} + \lambda \text{CurBr} \text{eadth}_{ist} + \phi_t + \varphi_s + \varepsilon_{ist} \tag{3}
\]

where \( \varphi_s \) are school fixed effects, \( \text{CurBr} \text{eadth}_{ist} \) is curriculum breadth for student \( i \) in high school \( s \) at time \( t \) instrumented by the average curriculum breadth in that school in that year, and all other variables are as defined in equation 1.

In order to identify the within-school effect of General Studies, I focus on the 169 schools that appeared to introduce A-level General Studies into their curriculum at some point from 1974 to 1989. Figure 1 shows the number of students taking A-level General Studies in these 169 schools, normalized by the year in which the school began offering General Studies. As with curriculum breadth, I implement the empirical strategy described above using fixed-effects two stage least squares (FE-2SLS) – i.e. including school fixed effects while instrumenting for taking A-level General Studies with whether the school offered the course in that particular school-year.

I also consider an IV specification for curriculum breadth in which I instrument for curriculum breadth with the availability of different A-level courses over time within a school. In particular, I use a full set of indicator variables for whether a school offered each A-level subject in a particular year. Note that, although I restrict attention to schools with at least 10 students going on to university in each year, these instrument are inferred from the course-taking behavior of students in a given school and year which leads to some measurement error (especially among less popular subjects).

\[\text{In particular, I consider schools in which I observe that students from a certain school-year have begun taking A-level General Studies while no students from prior cohorts at the same school had taken A-level General Studies. There is also a small set of schools that introduce and then stop offering General Studies.}\]
6 Results

6.1 Curriculum Breadth: Main results

OLS estimates for the effect of curriculum breadth on unemployment are presented in the first three columns of Panel A in Table 3.\(^{25}\) Column (1) shows the correlation between curriculum breadth and unemployment, controlling only for the number of courses taken. It suggests that distributing one’s courses over an additional area of study, such as sciences or humanities, is associated with a -0.7 percentage point change in unemployment. Accounting for changes over time with year fixed effects in column (2) leads to an effect that is smaller in magnitude, but still significant. However, including controls for demographic characteristics in column (3), the effect of curriculum breadth on unemployment is -0.8 percentage points.\(^{26}\) On a base of 9.1 percent, this represents a 9 percent decrease in the probability of being unemployed after leaving university. This is consistent with the fact that more able students choose to specialize in a narrow range of subjects, and indicates the presence of substantial upwards bias in the raw correlation.

Between-school 2SLS estimates for the effect of curriculum breadth, instrumented with average curriculum breadth in a school over all years, are presented in the remaining three columns of Panel A. Columns (4) and (5) indicate extremely large and significant positive effects of curriculum breadth on unemployment. But once I control for school-level averages of all student demographic characteristics in column (6), the estimates become insignificant. This suggests that the positive estimate in the preceding column is driven by differences in average observed characteristics between schools that offer more or less curriculum breadth to their students. If the unobserved school characteristics which affect these estimates are as large as the observed ones, it is likely that these between-school estimates are not very credible.

Within-school OLS and 2SLS estimates for the effect of curriculum breadth are presented

\(^{25}\)All regressions are restricted to schools who send at least 10 students to university in every year (to make results comparable to those on General Studies) and all estimates are clustered at the school level.

\(^{26}\)The coefficients on most observed characteristics are consistent with intuition: Students with higher GPAs, higher SES level, and taking more courses have significantly lower rates of unemployment. Being male or married is also associated with lower unemployment, although age at entry to university has no significant effect.
in Panel B of Table 3. All these regressions include both school and year fixed effects, thereby isolating the variation within school over time. The estimates in columns (1), (2) and (3) of Panel B indicate that OLS regressions which include school fixed effects yield results almost identical to those without them in Panel A. However, instrumenting for curriculum breadth with the average breadth in a given school-year in columns (4), (5), and (6) reveals FE-2SLS estimates with somewhat larger effect sizes. An additional unit of curriculum breadth – e.g. taking courses in two different fields rather than just one specific field – significantly reduces the likelihood of being unemployed by 1.1 percentage points in the preferred specification. This represents a 12 percent decrease in the probability of being unemployed after leaving university. Interpreted within the context of the simple job search model presented earlier, the benefits of greater curriculum breadth due to a higher arrival rate of job offers, \( \lambda'(g) \), appear to outweigh the potential costs due to a wage offer distribution, \( \mu'(g) \).

The difference in magnitude between the OLS and within-school 2SLS estimates, although not significant, is broadly consistent with the pattern of observable characteristics across levels of curriculum breadth. As explained above, the change in OLS estimates after controlling for these characteristics implies the presence of upwards bias in the raw correlation. In other words, it appears that students who choose to specialize in a narrow range of subjects would have a lower propensity for unemployment in any case due to their favorable characteristics. If selection on observed and unobserved characteristics is similar, we would expect the IV estimates to correct for any of the remaining upwards bias due to unobserved characteristics.

### 6.2 Curriculum Breadth: Additional results

Table 4 examines the effect of curriculum breadth on unemployment allowing for non-linear measures of curriculum breadth and an alternative classification of curriculum breadth. In Panel A, I define indicator variables for each value of curriculum breadth between 1 and 3 (or more). The OLS estimates in columns (1), (2), and (3) reveal a pattern that is generally monotonic: higher levels of curriculum breadth are associated with lower levels of unemployment, although the largest marginal benefit appears to be associated with the increase of curriculum breadth from two to three fields. The FE-2SLS specifications in columns (4), (5),
and (6) which use variation within schools over time are largely consistent with the linear specification. Higher levels of curriculum lead to significantly lower unemployment, with magnitudes that are substantially larger than those estimated through OLS.

In Panel B, I replace the standard measure of curriculum breadth with indicator variables for whether a student took all their courses in math/science, or took all their courses in humanities/social science/other (where the omitted category is whether students took a “mixed curriculum”). The raw OLS estimates in column (1) indicate that students who take all their courses in math/science are significantly less likely to be unemployed as compared to students who took a “mixed curriculum”. On the other hand, students who take all their courses in humanities/social science/other are significantly more likely to be unemployed than students who took a “mixed curriculum”. The same broad pattern of coefficients holds after controlling for year fixed effects and demographic characteristics in columns (2) and (3). Of course, it is quite likely that students who specialize in math and/or science are different on observed and unobserved characteristics from other types of students. In order to account for such omitted bias, columns (4), (5), and (6) instrument for each curriculum category with the proportion of students in each curriculum category in a school-year. For all these FE-2SLS specifications, the likelihood of unemployment now appears higher for students who specialize in math/science or in humanities/social science than for students who take a “mixed curriculum”. The magnitudes are fairly large, suggesting that students who specialize are 1.4 to 1.9 percentage points more likely to be unemployed than those who take a mixed curriculum.

Table 5 presents alternative IV specifications in which curriculum breadth is instrumented with the inferred availability of different courses for students. In columns (1), (2), and (3), I instrument for the standard measure of curriculum with a full set of indicator variables for whether a school ever offers each A-level subject. As with the between-school 2SLS in Table 3, some of these estimates are positive and significant, although they are negative in sign after controlling for average school characteristics. In columns (4), (5), and (6), I include school-fixed effects and instrument for the standard measure of curriculum with a full set of indicator variables for whether a school offers each A-level subject in a particular school year. The effects of curriculum breadth on unemployment in these FE-2SLS specifications
are negative and significantly different from zero. Indeed, they are more than twice as large in magnitude as compared to the corresponding estimates in Table 3, although not significantly different from them due to the large standard errors.\textsuperscript{27}

\subsection*{6.3 General Studies}

OLS estimates for the effect of taking A-level General Studies on unemployment are presented in Table 6. Column (1) shows the raw correlation between General Studies and unemployment. It suggests that taking A-level General Studies (in addition to other courses) is associated with a 1.9 percentage point increase in unemployment. Including year fixed effects in column (2), the magnitude of the coefficient declines markedly. This is not surprising given that both unemployment and the popularity of General Studies increased over much of the period of analysis. Adding controls for demographic characteristics in column (3) yields a coefficient that is essentially zero. As with OLS estimates on curriculum breadth, these differences suggest the presence substantial upwards bias in the raw correlation. Note that region of prior residence drives much of the unconditional relationship between General Studies and unemployment.\textsuperscript{28}

Columns (4), (5), and (6) of Panel A show 2SLS estimates among schools that \textit{always} or \textit{never} offer A-level General Studies to their students. Specifically, I instrument for whether individuals take General Studies with whether A-level General Studies is always or never taken by students in a particular school. These estimates indicate negative effects of taking General Studies on unemployment, which are insignificant in column (5) and (6). Again, as with the corresponding specifications on curriculum breadth, these estimates are likely to be affected by differences in average characteristics between schools that offer and don’t offer A-level General Studies.

Panel B of Table 6 is restricted to the set of schools which introduce A-level General Studies at some point between 1974 and 1989. Furthermore, all the regressions include

\textsuperscript{27}The large magnitude of these estimates may be due to greater measurement error in inferring the availability of less popular subjects based on student course-taking behavior.

\textsuperscript{28}As explained earlier, most of the students taking General Studies are from the northern regions of England, which also suffer from higher unemployment. In the absence of geographic controls, the positive effect of General Studies on unemployment in the OLS specifications remains even with the other controls.
school fixed effects to isolate the variation within schools over time. Columns (1), (2), and (3) show results that are similar to those in Panel A, although the coefficient is no longer significant in column (2) that includes year fixed effects. Columns (4), (5), and (6) of Panel B present FE-2SLS estimates for the set of schools which introduce A-level General Studies. I instrument for taking A-level General Studies with whether I infer the school to have offered General Studies in that particular school-year. Based on these specifications, there is no significant effect of taking A-level General Studies on the probability of being unemployed after leaving university. This finding is also reinforced by Figure 1 which shows the proportion of individuals unemployed over time normalized by the year in which a course in A-level General Studies was introduced. On average, there appears to be no change in the rate of unemployment before and after the introduction of General Studies.

6.4 Labor Market Conditions

The impact of curriculum breadth and General Studies on unemployment may itself be affected by prevailing labor market conditions. As discussed in the context of the theoretical framework, the effects of curriculum breadth or general skills on unemployment are ambiguous. However, if an increase in the arrival rate of job offers is particularly valuable when the base arrival rate of job offers is low, the effect of curriculum breadth on unemployment is likely to be larger when the labor market is weak.

In order to examine this possibility, I consider specifications which interact curriculum breadth and General Studies with a measure of labor market conditions based on the fraction of people claiming Job Seekers Allowance and National Insurance Credits. JSA claimant counts are available by region and gender for each year in the USR data and can be expressed as a fraction of local residents or workforce jobs.29 Table 7 presents results separately for the interaction of JSA claimant rates with curriculum breadth and General Studies in an OLS framework. As expected, the effect of JSA claimant rates on reported unemployment rates in the USR is extremely strong and highly significant in all specifications. In columns (1), (2), and (3), which mirror our earlier specifications, the interaction effect of JSA claimant

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29These data are available from the Office for National Statistics (ONS) at www.nomisweb.co.uk.
rate and curriculum breadth is negative, and highly significant once year fixed effects are included. This suggests that curriculum breadth lowers unemployment to a greater extent in a weak labor market, so that the coefficient declines by about 0.09 percentage points for each additional percentage point increase in the claimant rate. In contrast, columns (4), (5), and (6) suggests that the effect of General Studies on unemployment does not vary significantly across different labor market conditions.

In Figure 2, I present a graphical relationship between coefficients on curriculum breadth or General Studies and the JSA claimant rate by region, year, and gender.\textsuperscript{30} Panel A, which depicts the correlation between the impact of curriculum breadth on unemployment and regional labor market conditions over time, reveals a clear negative relationship. In Panel B, which depicts the analogous correlation between the impact of General Studies on unemployment and regional labor market conditions over time, there is no discernable relationship. These results confirm the regression analysis which indicates that the benefits of curriculum breadth are especially important when the labor market is particularly weak.

### 6.5 Robustness checks

Appendix Table 2 presents a specification test for the 2SLS and FE-2SLS strategies used to estimate the effect of curriculum breadth in Table 3. Panel A examines whether observed student characteristics are uncorrelated with differences in curriculum breadth as instrumented by average curriculum breadth in a school. The presence of large and significant coefficients attests to potential problems with this identification strategy. Panel B examines whether observed students characteristics are uncorrelated with the differences in curriculum breadth as instrumented by average curriculum breadth in a school-year. In this case, most of the coefficients are small and insignificant, suggesting that this identification strategy is likely to be more credible. The negative marginally significant coefficient of curriculum breadth on the A-level score may actually provide some suggestive evidence for the possibility that

\textsuperscript{30}Specifically, I use coefficients taken from OLS regressions of unemployment on curriculum breadth or General Studies and demographic characteristic (corresponding to column 2 of Panel A in Tables 3) by region, year, and gender.
taking a broader curriculum is more difficult.\textsuperscript{31}

Appendix Table 3 presents the analogous specification test for the 2SLS and FE-2SLS strategies used to estimate the effect of General Studies in Table 4. Here, panel A examines whether student characteristics are uncorrelated with General Studies as instrumented by whether a school always or never offers the course while Panel B examines whether students characteristics are uncorrelated with General Studies as instrumented by whether a school offers or doesn’t offer General Studies in particular \textit{school-year} (among schools that introduce General Studies). Again, the within-school variation in the offerings of General Studies appears more credible since it exhibits less correlation with observable characteristics.

Appendix Table 4 presents the effect of curriculum breadth and General Studies on a measure of nonemployment that includes individuals who are enrolled in further study or otherwise outside the labor force. This is important because a relatively large fraction of students continue onto graduate studies. Nevertheless, the results using the alternative outcome of non-employment are very similar as those associated with unemployment. An additional unit of curriculum breadth reduces the likelihood of being nonemployed by -0.7 percentage points, according to the most parsimonious OLS specification. Conditioning on further covariates yields an effect size of -1.1, or about 9 percent on base of 23 percent. The FE-2SLS estimates indicate that distributing one’s courses over an additional area of study is associated with a -0.14 percentage point change in nonemployment, or an 11 percent decline. There are no significant effects of General Studies on nonemployment according to any of the specifications in Appendix Table 4.

As mentioned previously, one limitation of the USR data is that we only observe students who continue to university. To alleviate concerns about selection into the sample of university students, I use the National Child Development Study (NCDS), a representative sample of individuals born during a single week in 1958, to show that curriculum breadth is uncorrelated with the propensity to attend university. I construct analogous measures of curriculum breadth and indicators for attendance at university collected in follow-up surveys of NCDS respondents at ages 23 and 33 respectively. Appendix Table 5 indicates that, after

\textsuperscript{31}Note that the effects on region of prior residence (not shown for conciseness) in FE-2SLS specification tests are all insignificant except for the one.

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controlling for the number of A-levels, there does not appear to be any significant relationship between curriculum breadth and the likelihood of attending university.\footnote{Unfortunately, although the NCDS has a variable that indicates whether students took A level General Studies, it appears that no one in the sample took this course. This may not be so surprising given that A level General Studies was much less prevalent in 1974-76 and that only about 2,000 out of the 14,000 individuals sampled took any A levels at all.}

I also verify that the main results are robust to a number of alternative sample restrictions and definitions. These include (1) restricting to students in schools that send at least 5, 15, or 20 or any number of students to university in each school-year, (2) restricting to students that have at least 2 or 3 A-levels, and (3) restricting to students who were only aiming for a first degree (as opposed to other certifications). These additional results are available upon request. Finally, the effects do not appear to be substantially different by gender or parental SES.

7 Conclusion

This paper examines the benefits associated with two distinct approaches to general education in the context of the English secondary school system: studying a broader range of specific subjects to achieve curriculum breadth and studying A-level General Studies, a subject that is explicitly intended to provide general skills. In contrast to previous research that focused on the variation in curriculum breadth and general skills across students, I exploit the variation between schools and across cohorts within schools to address the problems associated with omitted variables and endogenous choice. In my preferred estimates, based on variation within schools over time, I find that greater curriculum breadth—i.e. studying an additional broad field, such as science or humanities—lowers the likelihood of unemployment six months after leaving university by approximately 1 percentage point, or 12 percent. Moreover, this effect is especially pronounced in weak labor market conditions. Results from the standard OLS specifications yield slightly lower estimates. Taking A-level General Studies actually appears to raise unemployment in the unconditional OLS estimates, although the effect is insignificant and close to zero in all other specification.

The findings in this paper suggest that studying a broad range of specific subjects can
help insure recent graduates against adverse labor market shocks upon entry to the labor market. To the extent that the negative effects of such shocks persist over time (Neumark 2002; Oreopoulos, von Wachter, and Heisz 2012), the benefits of curriculum breadth may also remain important in later years. On the other hand, despite the popularity of A-level General Studies, there is no evidence that taking this additional subject helps to alleviate the risk of early unemployment. That greater curriculum breadth reduces unemployment after graduation from university may not be particularly surprising. Undergraduate education in England is extremely specialized with students usually studying a specific field of study and exposed to few if any other subjects. Interpreted within the context of the simple job search model introduced in this paper, the benefits of greater curriculum breadth in increasing the arrival rate of job offers appear to outweigh the potential costs due to a lower intensity of skills in any given subject. In other words, entering the labor market with a broader high school education may substantially increase the range of alternatives open to young university graduates.
References


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A Appendix: Sample Questions from A-level General Studies Examinations

The following contains a sample of questions from the 2000 Specimen Paper in General Studies for the A-level examination. Supporting materials (such as graphs and passages) excluded. Note that in the actual examination, there is often a choice among the questions.

Basic numerical analysis

1. The graph shows the results of an investigation into the variation in dry mass of 100 peas. The total mass of the sample was 27.48 g. [Graph not shown here]
   (a) (i) What was the mass of the heaviest pea? [2]
       (ii) State the mean mass of the peas. [4]
       (iii) What was the modal mass of the peas? [4]
   (b) Sketch a pie graph of the experimental data showing the percentage of sampled peas with dry masses in the following classes:
      • less than 0.24 g
      • 0.24 g to less than 0.32 g
      • 0.32 g or greater [6]
   (c) The results in the class labeled 'X' appear to be anomalous.
      (i) What is meant by an anomalous result? [2]
      (ii) Suggest how such an anomaly might arise in this instance [2]

Social and Economic Issues

1. Pop stars, TV personalities, sports stars and directors of large companies are often paid huge salaries. ‘Inadequate pay’ is often said to be a reason why there is a shortage of nurses and teachers. Millions of people in service sector jobs in shops receive very low wages. Those who risk their lives to crew the boats for the Royal National Lifeboat Institution are all volunteers and work for nothing. Now, the government has introduced a National Minimum Wage.
   (a) What do you understand by the term National Minimum Wage and why might it be necessary? [10]
   (b) Why are there such wide differences between what people are paid and why is it so difficult for people to reach an agreement on what each job is worth? [40]

2. Until the 1990s, railways in the United Kingdom were nationalized. The Conservative government favored a policy of privatization. Regulations governing the operation of buses were changed to allow more competition. Responsibility for railway lines, signals and stations passed to Railtrack and train services became the responsibility of 25 separate companies.
   (a) What is the difference between nationalization and privatization? [10]
   (b) Using specific examples of bus and railway operation from areas known to you, consider whether more competition has been a good thing. [40]

3. In recent years, ‘league tables’ of school and university performance have been published in the newspapers. Some people have argued that this publicity has led to an improvement in many schools and colleges. Others have argued that the tables are unfair to
educational institutions in areas of social and economic disadvantage, and that schools and colleges can be successful in ways that cannot be easily measured.

(a) What do you understand by the term educational league tables and why might the information they provide be helpful? [10]

(b) In what ways, and for what reasons, can it be claimed that attempts to measure what schools and colleges have achieved have both advantages and disadvantages? [40]

Science in Society
1. "Scientific advance is by a series of revolutionary jumps, interspersed by long periods of relatively slow development." Discuss some of the possible explanations for the uneven rate of scientific progress. [50]

2. Using examples from throughout the twentieth century, discuss whether the scientist has done more harm than good for the human race. [50]

Essays on the Arts
1. "Let there be respect for the earth, peace for its people, love in our lives, delight in the good, forgiveness for past wrongs, and from now on a new start." The words above form the text of the Millennium Resolution. How far would they be acceptable as a prayer for a believer in one of the world’s religions such as Buddhism, Christianity, Hinduism, Islam or Judaism? [50]

2. If you have been actively involved in or have been to any art exhibition, dramatic performance or concert, what discoveries have you made about yourself and the creative process? You should concentrate on those aspects of the event that made the most impact on you and analyze your reactions to them. [50]

Reading comprehension
1 Explain briefly the meaning of the following, giving examples where appropriate. [Passages and figures not shown here]

(a) ‘third party MPs’ (Passage A line 5) [2]
(b) ‘the electorate has become more volatile’ (Passage A line 12) [2]
(c) ‘spin doctors’ (Passage A line 15) [2]
(d) ‘to vote tactically’ (Passage A line 17) [2]
(e) ‘the nationalists’ (Passage B line 7) [2]
(f) A ‘referendum’ and how it might be linked to the ‘Referendum Party’
(g) The ‘North-South divide’ (Passage B line 14) [3]
(h) ‘a sobering counter to the euphoria generated by Labour’s landslide victory’ (Passage B line 23) [4]

2. Both Passages A and B refer to the lower turnout of voters in the 1997 general election. Using your own words, give five reasons why nearly 30% of those registered to vote failed to do so. [10]

3. (a) By referring to Fig. 1 and Fig. 2, say which of the polls was most accurate in predicting the performance of each of the three main parties in the 1997 general election.

(b) Passage B refers to the relative failure of the opinion polls in the 1992 general election. Summarize the reasons why opinion polls, and their methods, have sometimes been criticized by social scientists and other people. [14]
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<td></td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>0.456</td>
<td>0.498</td>
<td>588,417</td>
<td>0.495</td>
<td>0.500</td>
<td>250,517</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.203</td>
<td>0.402</td>
<td>588,417</td>
<td>0.200</td>
<td>0.400</td>
<td>250,517</td>
</tr>
<tr>
<td>Non-manual skilled</td>
<td>0.131</td>
<td>0.338</td>
<td>588,417</td>
<td>0.126</td>
<td>0.332</td>
<td>250,517</td>
</tr>
<tr>
<td>Manual skilled</td>
<td>0.121</td>
<td>0.327</td>
<td>588,417</td>
<td>0.102</td>
<td>0.303</td>
<td>250,517</td>
</tr>
<tr>
<td>Partially/ Unskilled</td>
<td>0.089</td>
<td>0.284</td>
<td>588,417</td>
<td>0.076</td>
<td>0.265</td>
<td>250,517</td>
</tr>
<tr>
<td><strong>Region of Prior Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>0.110</td>
<td>0.312</td>
<td>620,308</td>
<td>0.123</td>
<td>0.328</td>
<td>263,309</td>
</tr>
<tr>
<td>East Midlands</td>
<td>0.071</td>
<td>0.256</td>
<td>620,308</td>
<td>0.063</td>
<td>0.242</td>
<td>263,309</td>
</tr>
<tr>
<td>Northeast</td>
<td>0.035</td>
<td>0.185</td>
<td>620,308</td>
<td>0.024</td>
<td>0.152</td>
<td>263,309</td>
</tr>
<tr>
<td>Northwest</td>
<td>0.157</td>
<td>0.364</td>
<td>620,308</td>
<td>0.135</td>
<td>0.341</td>
<td>263,309</td>
</tr>
<tr>
<td>Southeast</td>
<td>0.206</td>
<td>0.404</td>
<td>620,308</td>
<td>0.273</td>
<td>0.445</td>
<td>263,309</td>
</tr>
<tr>
<td>Southwest</td>
<td>0.091</td>
<td>0.287</td>
<td>620,308</td>
<td>0.083</td>
<td>0.276</td>
<td>263,309</td>
</tr>
<tr>
<td>West Midlands</td>
<td>0.100</td>
<td>0.300</td>
<td>620,308</td>
<td>0.093</td>
<td>0.290</td>
<td>263,309</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>0.107</td>
<td>0.309</td>
<td>620,308</td>
<td>0.086</td>
<td>0.280</td>
<td>263,309</td>
</tr>
<tr>
<td>London</td>
<td>0.124</td>
<td>0.329</td>
<td>620,308</td>
<td>0.122</td>
<td>0.328</td>
<td>263,309</td>
</tr>
<tr>
<td><strong>High school breadth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum breadth</td>
<td>1.948</td>
<td>0.630</td>
<td>620,211</td>
<td>1.966</td>
<td>0.639</td>
<td>263,276</td>
</tr>
<tr>
<td>General Studies</td>
<td>0.243</td>
<td>0.429</td>
<td>620,307</td>
<td>0.203</td>
<td>0.402</td>
<td>263,309</td>
</tr>
<tr>
<td>Only Math/Science</td>
<td>0.362</td>
<td>0.481</td>
<td>620,211</td>
<td>0.343</td>
<td>0.475</td>
<td>263,276</td>
</tr>
<tr>
<td>No Math/Science</td>
<td>0.384</td>
<td>0.486</td>
<td>620,211</td>
<td>0.392</td>
<td>0.488</td>
<td>263,276</td>
</tr>
<tr>
<td>Mixed curriculum</td>
<td>0.254</td>
<td>0.435</td>
<td>620,211</td>
<td>0.265</td>
<td>0.442</td>
<td>263,276</td>
</tr>
<tr>
<td><strong>High school curriculum</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Math</td>
<td>0.446</td>
<td>0.497</td>
<td>620,307</td>
<td>0.440</td>
<td>0.496</td>
<td>263,309</td>
</tr>
<tr>
<td>Any Science</td>
<td>0.533</td>
<td>0.499</td>
<td>620,307</td>
<td>0.515</td>
<td>0.500</td>
<td>263,309</td>
</tr>
<tr>
<td>Any Social Science</td>
<td>0.359</td>
<td>0.480</td>
<td>620,307</td>
<td>0.373</td>
<td>0.484</td>
<td>263,309</td>
</tr>
<tr>
<td>Any Humanities</td>
<td>0.459</td>
<td>0.498</td>
<td>620,307</td>
<td>0.474</td>
<td>0.499</td>
<td>263,309</td>
</tr>
<tr>
<td>Any Other</td>
<td>0.151</td>
<td>0.358</td>
<td>620,307</td>
<td>0.163</td>
<td>0.369</td>
<td>263,309</td>
</tr>
<tr>
<td>Nonemployed</td>
<td>0.236</td>
<td>0.425</td>
<td>492,871</td>
<td>0.228</td>
<td>0.420</td>
<td>208,619</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.097</td>
<td>0.296</td>
<td>416,410</td>
<td>0.091</td>
<td>0.288</td>
<td>176,869</td>
</tr>
</tbody>
</table>

Notes: The full sample includes individuals from England who completed secondary school and took their A-levels between 1974 and 1989. The restricted sample includes students who attended schools which had 10 or more students entering university in each year. Age corresponds to age at entry to university. A-level score indicates grades averaged over all A-level examinations, scaled from 1 to 15. Parental SES is based on father’s occupation. Curriculum breadth indicates number of distinct fields, ranging 1 to 5. All variables for high school curriculum (including General Studies) are coded as dummy variables to indicate whether the student was examined in a particular subject. Unemployed is an indicator variable that takes on value 1 if unemployed, and 0 if currently employed. Non-employed is an indicator variable that takes on value 1 if not in the labor force, and 0 if currently employed.
Table 2: Selected Summary Statistics by Curriculum Breadth and General Studies

<table>
<thead>
<tr>
<th></th>
<th>Curriculum Breadth: number of fields</th>
<th>Taking General Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>0.459</td>
<td>0.334</td>
</tr>
<tr>
<td>Married</td>
<td>0.011</td>
<td>0.008</td>
</tr>
<tr>
<td>Age</td>
<td>18.679</td>
<td>18.598</td>
</tr>
<tr>
<td># of A-level subjects</td>
<td>3.077</td>
<td>3.280</td>
</tr>
</tbody>
</table>

**Parental SES**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
<td>0.516</td>
<td>0.490</td>
<td>0.488</td>
<td>0.503</td>
<td>0.467</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.199</td>
<td>0.203</td>
<td>0.193</td>
<td>0.200</td>
<td>0.200</td>
</tr>
<tr>
<td>Non-manual skilled</td>
<td>0.122</td>
<td>0.127</td>
<td>0.130</td>
<td>0.129</td>
<td>0.116</td>
</tr>
<tr>
<td>Manual skilled</td>
<td>0.089</td>
<td>0.104</td>
<td>0.113</td>
<td>0.096</td>
<td>0.127</td>
</tr>
<tr>
<td>Partially/ Unskilled</td>
<td>0.073</td>
<td>0.077</td>
<td>0.076</td>
<td>0.072</td>
<td>0.090</td>
</tr>
</tbody>
</table>

**Region of Prior Residence**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>0.120</td>
<td>0.126</td>
<td>0.122</td>
<td>0.149</td>
<td>0.024</td>
</tr>
<tr>
<td>East Midlands</td>
<td>0.055</td>
<td>0.065</td>
<td>0.063</td>
<td>0.057</td>
<td>0.083</td>
</tr>
<tr>
<td>Northeast</td>
<td>0.022</td>
<td>0.025</td>
<td>0.021</td>
<td>0.028</td>
<td>0.008</td>
</tr>
<tr>
<td>Northwest</td>
<td>0.131</td>
<td>0.129</td>
<td>0.155</td>
<td>0.076</td>
<td>0.364</td>
</tr>
<tr>
<td>Southeast</td>
<td>0.272</td>
<td>0.277</td>
<td>0.262</td>
<td>0.328</td>
<td>0.058</td>
</tr>
<tr>
<td>Southwest</td>
<td>0.084</td>
<td>0.084</td>
<td>0.074</td>
<td>0.098</td>
<td>0.018</td>
</tr>
<tr>
<td>West Midlands</td>
<td>0.100</td>
<td>0.089</td>
<td>0.097</td>
<td>0.066</td>
<td>0.200</td>
</tr>
<tr>
<td>Yorkshire</td>
<td>0.079</td>
<td>0.084</td>
<td>0.099</td>
<td>0.052</td>
<td>0.216</td>
</tr>
<tr>
<td>London</td>
<td>0.138</td>
<td>0.121</td>
<td>0.109</td>
<td>0.146</td>
<td>0.029</td>
</tr>
</tbody>
</table>

**High school curriculum**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Math</td>
<td>0.016</td>
<td>0.527</td>
<td>0.669</td>
<td>0.429</td>
<td>0.491</td>
</tr>
<tr>
<td>Any Science</td>
<td>0.346</td>
<td>0.554</td>
<td>0.593</td>
<td>0.506</td>
<td>0.555</td>
</tr>
<tr>
<td>Any Social Science</td>
<td>0.079</td>
<td>0.383</td>
<td>0.695</td>
<td>0.379</td>
<td>0.352</td>
</tr>
<tr>
<td>Any Humanities</td>
<td>0.555</td>
<td>0.395</td>
<td>0.633</td>
<td>0.484</td>
<td>0.428</td>
</tr>
<tr>
<td>Any Other</td>
<td>0.004</td>
<td>0.141</td>
<td>0.428</td>
<td>0.188</td>
<td>0.067</td>
</tr>
<tr>
<td>Non-employed</td>
<td>0.225</td>
<td>0.234</td>
<td>0.211</td>
<td>0.225</td>
<td>0.238</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0.098</td>
<td>0.091</td>
<td>0.079</td>
<td>0.086</td>
<td>0.105</td>
</tr>
</tbody>
</table>

Notes: The sample is restricted to students that attend schools which have 10 or more students that enter university in every graduating class from 1974-1989. All variables are defined as in Table 1.
Table 3: The Effect of Curriculum Breadth on Unemployment

**dependent variable: unemployed**

### Panel A: Across-school variation

<table>
<thead>
<tr>
<th></th>
<th>OLS (1)</th>
<th>OLS (2)</th>
<th>OLS (3)</th>
<th>2SLS (4)</th>
<th>2SLS (5)</th>
<th>2SLS (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum breadth</td>
<td>-0.007***</td>
<td>-0.004***</td>
<td>-0.008***</td>
<td>0.103***</td>
<td>0.037***</td>
<td>0.014</td>
</tr>
<tr>
<td>[0.001]</td>
<td>[0.001]</td>
<td>[0.001]</td>
<td>[0.015]</td>
<td>[0.013]</td>
<td>[0.009]</td>
<td></td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.011</td>
<td>0.021</td>
<td>0.012</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>Mean of dep. variable</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
</tr>
</tbody>
</table>

### Panel B: Within-school variation

<table>
<thead>
<tr>
<th></th>
<th>FE-OLS (1)</th>
<th>FE-OLS (2)</th>
<th>FE-OLS (3)</th>
<th>FE-2SLS (4)</th>
<th>FE-2SLS (5)</th>
<th>FE-2SLS (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum breadth</td>
<td>-0.008***</td>
<td>-0.004***</td>
<td>-0.008***</td>
<td>-0.009*</td>
<td>-0.010**</td>
<td>-0.011**</td>
</tr>
<tr>
<td>[0.001]</td>
<td>[0.001]</td>
<td>[0.001]</td>
<td>[0.005]</td>
<td>[0.005]</td>
<td>[0.005]</td>
<td></td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>School-year controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
<td>168,887</td>
</tr>
<tr>
<td>R²</td>
<td>0.002</td>
<td>0.012</td>
<td>0.019</td>
<td>0.012</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>Mean of dep. variable</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Columns 4, 5, and 6 of Panel A instrument for curriculum breadth with the average curriculum breadth in a school. Columns 4, 5, and 6 of Panel B instrument for curriculum breadth with the average curriculum breadth in a school-year. Demographic controls include gender, age, marital status, average A-level score, and parental SES level. School and school-year controls include size, proportion of girls, proportion married, proportion of students at each SES level, average A-level score, average number of A-level subjects at the school and school-year level respectively. All regressions include a control for the number of A-level courses, and regressions in Panel B also include school fixed effects.
Table 4: Alternative Measures of Curriculum Breadth

**dependent variable: unemployed**

### Panel A: Non-Linear Measures of Curriculum Breadth

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>FE-2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>2 Fields</td>
<td>-0.006***</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>[0.002]</td>
<td>[0.002]</td>
</tr>
<tr>
<td>≥3 Fields</td>
<td>-0.015***</td>
<td>-0.008***</td>
</tr>
<tr>
<td></td>
<td>[0.002]</td>
<td>[0.002]</td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>School controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>168,887</td>
<td>168,887</td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.011</td>
</tr>
<tr>
<td>Mean of dep. Variable</td>
<td>0.091</td>
<td>0.091</td>
</tr>
</tbody>
</table>

### Panel B: Specific Curriculum Groupings (relative to a Mixed Curriculum)

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>FE-2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>All Science/Math</td>
<td>-0.006***</td>
<td>-0.009***</td>
</tr>
<tr>
<td></td>
<td>[0.002]</td>
<td>[0.002]</td>
</tr>
<tr>
<td>All Humanities/Social Studies/Other</td>
<td>0.007***</td>
<td>0.008***</td>
</tr>
<tr>
<td></td>
<td>[0.002]</td>
<td>[0.002]</td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>School controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>168,887</td>
<td>168,887</td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.012</td>
</tr>
<tr>
<td>Mean of dep. Variable</td>
<td>0.091</td>
<td>0.091</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Columns 4, 5, and 6 of Panel A instrument for the level of curriculum breadth with the proportion of students experiencing each level of curriculum breadth in a school-year. Columns 4, 5, and 6 of Panel B instrument for each curriculum category (Science/Math, Humanities/Social Science, Mixed Curriculum) with the proportion of students experiencing the curriculum category in a school-year. Demographic, curriculum, school and school-year controls are as defined in Tables 3 and 4. All regressions include a control for the number of A-level courses, and regressions in columns 4, 5, and 6 of Panels A and B also include school fixed effects.
Table 5: Alternative IV Estimates for Curriculum Breadth

<table>
<thead>
<tr>
<th>dependent variable: unemployed</th>
<th>2SLS (1)</th>
<th>2SLS (2)</th>
<th>2SLS (3)</th>
<th>FE-2SLS (4)</th>
<th>FE-2SLS (5)</th>
<th>FE-2SLS (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum breadth</td>
<td>0.026*</td>
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<td>-0.028**</td>
<td>-0.028**</td>
<td>-0.028**</td>
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</tr>
<tr>
<td>Demographic controls</td>
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<tr>
<td>School controls</td>
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<td>School-year controls</td>
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<tr>
<td>Observations</td>
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<td>168,887</td>
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<tr>
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<td>0.091</td>
<td>0.091</td>
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</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Columns 1, 2, and 3 instrument for the level of curriculum breadth with a set of dummy variables indicating whether or not each A-level subject was offered in a school. Columns 4, 5, and 6 instrument for the level of curriculum breadth with a set of dummy variables indicating whether or not each A-level subject was offered in a given school-year. Demographic, curriculum, school and school-year controls are as defined in Tables 3 and 4. All regressions include a control for the number of A-level courses, and regressions in columns 4, 5, and 6 also include school fixed effects.
Table 6: The Effect of General Studies on Unemployment

*dependent variable: unemployed*

**Panel A: Across schools offering/not offering General Studies**

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
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<th>2SLS</th>
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<td>(6)</td>
</tr>
<tr>
<td><strong>General Studies</strong></td>
<td>0.019***</td>
<td>0.009***</td>
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<td>-0.025**</td>
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<td>-0.030</td>
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<tr>
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<td>[0.003]</td>
<td>[0.011]</td>
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<tr>
<td><strong>Year fixed effects</strong></td>
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<td><strong>Demographic controls</strong></td>
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<td><strong>School controls</strong></td>
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<td>168,897</td>
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<td>58,752</td>
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<td>0.011</td>
<td>0.020</td>
<td>0.001</td>
<td>0.012</td>
<td>0.022</td>
</tr>
<tr>
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<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
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**Panel B: Within schools that introduce General Studies**

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<th>FE-2SLS</th>
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<td><strong>General Studies</strong></td>
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<td>-0.001</td>
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<td>[0.005]</td>
<td>[0.013]</td>
<td>[0.013]</td>
<td>[0.018]</td>
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<td><strong>Year fixed effects</strong></td>
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<td><strong>Demographic controls</strong></td>
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<td><strong>School controls</strong></td>
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<td><strong>Observations</strong></td>
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<td>49,951</td>
<td>49,951</td>
<td>49,951</td>
<td>49,951</td>
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<tr>
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<td>0.012</td>
<td>0.022</td>
<td>0.001</td>
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<tr>
<td><strong>Mean of dep. Variable</strong></td>
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<td>0.091</td>
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</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Panel A further restricts the sample to schools that either always offer or never offer General Studies. Panel B further restricts the sample to schools that introduce General Studies over time. Columns 4, 5, and 6 of Panel A instrument for General Studies with an indicator for whether a school offered General Studies. Columns 4, 5, and 6 of Panel B instrument for General Studies with whether a school offered General Studies in a particular school-year. Demographic controls include gender, age, marital status, average A-level score, the number of A-level subjects, and parental SES level. School and school-year controls include size, proportion of girls, proportion married, proportion of students at each SES level, average A-level score, and average number of A-level subjects at the school and school-year level respectively. Regressions in Panel B also include school fixed effects.
Table 7: Effect of Curriculum Breadth and General Studies by Labor Market Conditions

**dependent variable: unemployed**

<table>
<thead>
<tr>
<th></th>
<th>Curriculum breadth</th>
<th></th>
<th></th>
<th>General Studies</th>
<th></th>
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<tr>
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<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
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<td>JSA claimant rate</td>
<td>0.810***</td>
<td>0.744***</td>
<td>0.659***</td>
<td>0.704***</td>
<td>0.492***</td>
<td>0.490***</td>
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<tr>
<td></td>
<td>[0.077]</td>
<td>[0.080]</td>
<td>[0.089]</td>
<td>[0.040]</td>
<td>[0.047]</td>
<td>[0.070]</td>
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<tr>
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<td>0.001</td>
<td>-0.002</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>[0.002]</td>
<td>[0.002]</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Breadth*claimant rate</td>
<td>-0.037</td>
<td>-0.078**</td>
<td>-0.071**</td>
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</tr>
<tr>
<td></td>
<td>[0.034]</td>
<td>[0.034]</td>
<td>[0.033]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Studies</td>
<td></td>
<td></td>
<td></td>
<td>0.003</td>
<td>-0.010*</td>
<td>-0.009</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>[0.005]</td>
<td>[0.006]</td>
<td>[0.006]</td>
</tr>
<tr>
<td>General* claimant rate</td>
<td></td>
<td></td>
<td></td>
<td>-0.057</td>
<td>0.093</td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[0.064]</td>
<td>[0.065]</td>
<td>[0.061]</td>
</tr>
<tr>
<td>Year fixed effects</td>
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<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Demographic controls</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,897</td>
<td>168,897</td>
<td>168,897</td>
</tr>
<tr>
<td>R²</td>
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<td>0.008</td>
<td>0.014</td>
<td>0.021</td>
</tr>
<tr>
<td>Mean of coefficients</td>
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<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
<td>0.091</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Demographic controls include gender, age, marital status, average A-level score, the number of A-level subjects, and parental SES level.
### Appendix Table 1: School Statistics by Curriculum Breadth and General Studies Offerings

<table>
<thead>
<tr>
<th></th>
<th>Low Breadth</th>
<th>High Breadth</th>
<th>Never offers GS</th>
<th>Always offers GS</th>
<th>Introduces GS</th>
</tr>
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<tbody>
<tr>
<td><strong>Number of schools</strong></td>
<td>168</td>
<td>229</td>
<td>150</td>
<td>15</td>
<td>136</td>
</tr>
<tr>
<td><strong>Number of students</strong></td>
<td>75,107</td>
<td>93,790</td>
<td>53,362</td>
<td>5,390</td>
<td>49,951</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>0.453</td>
<td>0.283</td>
<td>0.455</td>
<td>0.232</td>
<td>0.400</td>
</tr>
<tr>
<td><strong>Married</strong></td>
<td>0.009</td>
<td>0.008</td>
<td>0.010</td>
<td>0.007</td>
<td>0.010</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>18.614</td>
<td>18.602</td>
<td>18.621</td>
<td>18.528</td>
<td>18.515</td>
</tr>
<tr>
<td><strong>A-level score</strong></td>
<td>10.790</td>
<td>10.639</td>
<td>10.817</td>
<td>10.464</td>
<td>10.386</td>
</tr>
<tr>
<td><strong># of A-level subjects</strong></td>
<td>3.190</td>
<td>3.346</td>
<td>3.057</td>
<td>3.829</td>
<td>3.603</td>
</tr>
<tr>
<td><strong>Parental SES</strong></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Professional</td>
<td>0.518</td>
<td>0.477</td>
<td>0.505</td>
<td>0.445</td>
<td>0.452</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.205</td>
<td>0.196</td>
<td>0.204</td>
<td>0.204</td>
<td>0.171</td>
</tr>
<tr>
<td>Non-manual skilled</td>
<td>0.122</td>
<td>0.130</td>
<td>0.136</td>
<td>0.132</td>
<td>0.130</td>
</tr>
<tr>
<td>Manual skilled</td>
<td>0.085</td>
<td>0.116</td>
<td>0.087</td>
<td>0.126</td>
<td>0.147</td>
</tr>
<tr>
<td>Partially/ Unskilled</td>
<td>0.069</td>
<td>0.081</td>
<td>0.068</td>
<td>0.093</td>
<td>0.100</td>
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<td><strong>Region of Prior Residence</strong></td>
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<tr>
<td>East</td>
<td>0.130</td>
<td>0.119</td>
<td>0.220</td>
<td>0.025</td>
<td>0.051</td>
</tr>
<tr>
<td>East Midlands</td>
<td>0.049</td>
<td>0.074</td>
<td>0.026</td>
<td>0.016</td>
<td>0.081</td>
</tr>
<tr>
<td>Northeast</td>
<td>0.022</td>
<td>0.025</td>
<td>0.018</td>
<td>0.001</td>
<td>0.021</td>
</tr>
<tr>
<td>Northwest</td>
<td>0.105</td>
<td>0.157</td>
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<td>0.577</td>
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<tr>
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<td>0.278</td>
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</tr>
<tr>
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<td>0.078</td>
<td>0.117</td>
<td>0.005</td>
<td>0.026</td>
</tr>
<tr>
<td>West Midlands</td>
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<td>0.025</td>
<td>0.147</td>
<td>0.171</td>
</tr>
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<td>0.105</td>
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<td>0.161</td>
<td>0.200</td>
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<td>0.079</td>
<td>0.193</td>
<td>0.002</td>
<td>0.032</td>
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<td><strong>High school breadth</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Curriculum breadth</td>
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<td>0.389</td>
<td>0.354</td>
<td>0.389</td>
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<td>0.273</td>
<td>0.268</td>
<td>0.258</td>
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<tr>
<td><strong>High school curriculum</strong></td>
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</tr>
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<td>0.530</td>
<td>0.518</td>
<td>0.553</td>
<td>0.529</td>
</tr>
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<td>Any Social Science</td>
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<td>0.096</td>
<td>0.083</td>
<td>0.102</td>
<td>0.099</td>
</tr>
</tbody>
</table>

Notes: The sample is restricted to students that attend schools which have 10 or more students that enter university in every graduating class from 1974-1989. All variables are defined as in Table 1.
## Appendix Table 2: 2SLS Specification Checks for Curriculum Breadth

### Panel A: Across-school variation (2SLS)

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<td>(5)</td>
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<td>(7)</td>
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<td>0.202***</td>
<td>0.059***</td>
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<td>[0.083]</td>
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<td>[0.022]</td>
<td>[0.033]</td>
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</tr>
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<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
</tr>
</tbody>
</table>

### Panel B: Within-school variation (FE-2SLS)

<table>
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<td>(2)</td>
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<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
</tr>
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<td>0.001</td>
<td>-0.024</td>
<td>-0.105*</td>
<td>-0.009</td>
<td>0.011</td>
<td>0.007</td>
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<tr>
<td></td>
<td>[0.012]</td>
<td>[0.002]</td>
<td>[0.015]</td>
<td>[0.055]</td>
<td>[0.009]</td>
<td>[0.006]</td>
<td>[0.006]</td>
<td>[0.005]</td>
<td>[0.005]</td>
</tr>
<tr>
<td>Observations</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
<td>168,876</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Panel A instruments for curriculum breadth with the average curriculum breadth in a school. Panel B instruments for curriculum breadth with the average curriculum breadth in a school-year. All regressions include the number of A-level courses, and regressions in Panel B also include school fixed effects.
Appendix Table 3: 2SLS Specification Checks for General Studies

**Panel A: Across-school variation (2SLS)**

<table>
<thead>
<tr>
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<tbody>
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<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td></td>
</tr>
<tr>
<td>General Studies</td>
<td>-0.311***</td>
<td>-0.003*</td>
<td>-0.125**</td>
<td>-0.610***</td>
<td>-0.064</td>
<td>-0.019</td>
<td>-0.008</td>
<td>0.052***</td>
<td>0.039**</td>
</tr>
<tr>
<td></td>
<td>[0.092]</td>
<td>[0.002]</td>
<td>[0.051]</td>
<td>[0.201]</td>
<td>[0.041]</td>
<td>[0.012]</td>
<td>[0.015]</td>
<td>[0.019]</td>
<td>[0.017]</td>
</tr>
</tbody>
</table>

| Observations | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 |

**Panel B: Within-school variation (FE-2SLS)**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
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<td></td>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td></td>
</tr>
<tr>
<td>General Studies</td>
<td>-0.011</td>
<td>0.003</td>
<td>0.042</td>
<td>-0.340**</td>
<td>0.028</td>
<td>-0.003</td>
<td>-0.014</td>
<td>-0.005</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>[0.021]</td>
<td>[0.005]</td>
<td>[0.040]</td>
<td>[0.158]</td>
<td>[0.032]</td>
<td>[0.024]</td>
<td>[0.018]</td>
<td>[0.016]</td>
<td>[0.015]</td>
</tr>
</tbody>
</table>

| Observations | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 | 168,876 |

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Panel A instruments for taking General Studies with whether a school always or never offers General Studies. Panel B instruments for taking General Studies with whether schools that introduce General Studies over time offer General Studies in a particular school-year. Regressions in Panel B also include school fixed effects.
Appendix Table 4: The Effect of Curriculum Breadth and General Studies on Nonemployment

*dependent variable: non-employed*

**Panel A: Curriculum Breadth**

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>FE-2SLS</th>
<th>FE-2SLS</th>
<th>FE-2SLS</th>
</tr>
</thead>
<tbody>
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<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Curriculum breadth</td>
<td>0.013***</td>
<td>-0.000</td>
<td>-0.002</td>
<td>-0.013*</td>
</tr>
<tr>
<td></td>
<td>[0.004]</td>
<td>[0.004]</td>
<td>[0.004]</td>
<td>[0.007]</td>
</tr>
<tr>
<td>Year fixed effects</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>School-year controls</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>199,161</td>
<td>199,161</td>
<td>199,161</td>
<td>199,161</td>
</tr>
<tr>
<td>R²</td>
<td>0.001</td>
<td>0.011</td>
<td>0.015</td>
<td>0.022</td>
</tr>
<tr>
<td>Mean of dep. Variable</td>
<td>0.228</td>
<td>0.228</td>
<td>0.228</td>
<td>0.228</td>
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</tbody>
</table>

**Panel B: General Studies**

<table>
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<tr>
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<th>FE-2SLS</th>
<th>FE-2SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>General Studies</td>
<td>0.013***</td>
<td>-0.000</td>
<td>-0.002</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>[0.004]</td>
<td>[0.004]</td>
<td>[0.004]</td>
<td>[0.017]</td>
</tr>
<tr>
<td>Year fixed effects</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Demographic controls</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>School-year controls</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>199,185</td>
<td>199,185</td>
<td>199,185</td>
<td>58,311</td>
</tr>
<tr>
<td>R²</td>
<td>0.000</td>
<td>0.011</td>
<td>0.015</td>
<td>0.228</td>
</tr>
<tr>
<td>Mean of dep. Variable</td>
<td>0.228</td>
<td>0.228</td>
<td>0.228</td>
<td>0.228</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors, clustered by school in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. The sample is restricted to students that attend schools which have 10 or more students who enter university in every graduating class from 1974-1989. Columns 4, 5, and 6 of Panel A instrument for curriculum breadth with the average curriculum breadth in a school-year. Columns 4, 5, and 6 of Panel B instrument for General Studies with whether a school offered General Studies in a particular school-year. Demographic controls include gender, age, marital status, average A-level score, and parental SES level. School-year controls include size, proportion of girls, proportion married, proportion of students at each SES level, average A-level score, average number of A-level subjects at the school-year level. Regressions in Panel A also include a control for the number of A-level courses; and regressions in columns 4, 5, and 6 of Panels A and B also include school fixed effects.
Appendix Table 5: The Effect of Curriculum Breadth on Attending University (NCDS)

**dependent variable: attending university**

<table>
<thead>
<tr>
<th></th>
<th>NCDS Sweep IV (Age 23)</th>
<th></th>
<th>NCDS Sweep V (Age 33)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>Curriculum breadth</td>
<td>-0.001</td>
<td>0.002</td>
<td>0.000</td>
<td>-0.022</td>
</tr>
<tr>
<td></td>
<td>[0.022]</td>
<td>[0.022]</td>
<td>[0.022]</td>
<td>[0.025]</td>
</tr>
<tr>
<td>Demographic controls</td>
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<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>Ability controls</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1,122</td>
<td>1,119</td>
<td>1,119</td>
<td>927</td>
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<tr>
<td>R²</td>
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<td>0.200</td>
<td>0.212</td>
<td>0.121</td>
</tr>
<tr>
<td>Mean of dep. variable</td>
<td>0.65</td>
<td>0.65</td>
<td>0.65</td>
<td>0.63</td>
</tr>
</tbody>
</table>

Notes: Huber-White standard errors in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. Demographic controls include gender, average A-level score, parental SES level, and region at age 16. Ability controls include reading and math test scores at age 16. All regressions include controls for number of A-level courses.
Notes: The sample is restricted to students that attend schools that introduce General Studies over time and which have 10 or more students who enter university in every graduating class from 1974-1989. The x-axis indicates the year since the introduction of General Studies in a school. Unemployment is detrended by year.
Notes: The coefficients on curriculum breadth and General Studies respectively are derived from OLS regressions of unemployment on curriculum breadth and General Studies and demographic characteristics by gender, year and region. JSA claimant rates reflect the ratio of JSA claimants to working population by gender, year and region.