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Preparing for Local Labor: Curricular Stratification across Local Economies in the United States

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Abstract

I investigate how the educational demands of local labor markets shape high school course offerings and student course taking. Using the Education Longitudinal Study of 2002 linked to the U.S. Census 2000, I focus on local economic variation in the share of jobs that do not demand a bachelor's degree. I find that schools in local labor markets with higher concentrations of subbaccalaureate jobs devote a larger share of their course offerings to career and technical education (CTE) courses and a smaller share to advanced college-preparatory courses compared to schools in labor markets with lower concentrations of subbaccalaureate jobs, even net of school resources. Students in labor markets with higher concentrations of subbaccalaureate jobs take greater numbers of CTE courses, and higher-achieving students in these labor markets are less likely to take advanced math and Advanced Placement/International Baccalaureate courses. These course-taking disparities are largely due to school course offerings. This study shows how local economic inequalities shape high school curricular stratification, and suggests that school curricula linked to the educational demands of local jobs delimits the college preparation opportunities of high-achieving students.

Keywords

labor markets; course taking; high school; college preparation; school curricula

What type of high school training fulfills national economic demands while also meritocratically preparing students for labor market success? This question has long fueled contentious academic and public debates, and its resolution is particularly complicated in today's polarized and rapidly evolving economy. Some call for further curricular intensification, arguing that advanced college-preparatory coursework promotes bachelor's degree completion and cultivates the analytic skills demanded by jobs in the knowledge-based economy (Carnevale and Desrochers 2003; Adelman 2006; National Academies of

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SUPPLEMENTAL MATERIAL

The supplemental materials are available in the online version of the article.

Portions of this study benefited from presentations at the annual meeting of the American Sociological Association and the workshop "Social Inequality in Local and Regional Context" at the Mannheim Centre for European Social Research (MZES).

RESEARCH ETHICS

This study reports results from analysis of deidentified restricted-access survey data, and it is exempt from institutional review board review as per section 45 CFR 46.101(b) of the Department of Health and Human Services regulations.

Sciences, Engineering, and Medicine 2010). Others prescribe a reemphasis on career and technical education (CTE) coursework to train students for specific skills demanded by subbaccalaureate jobs (e.g., Symonds, Schwartz, and Ferguson 2011; Stone and Lewis 2012), or encourage both career- and college-readiness (Deil-Amen and DeLuca 2010).

Academic debates have centered on which type of curricular focus would benefit lower-achieving students or marginalized status groups, and research on curricular stratification in general has primarily investigated how differential sorting into vocational and college-preparatory course-work (re)produces racial/ethnic, gender, and class stratification in the occupational division of labor. Yet a division of labor also exists at a spatial level (Massey 1984), and the unique demands of regional economies shaped differences in the vocational and academic emphases of late-nineteenth-century public schools (Rury 1991). Today, local economies are more polarized than they have been in a century (Moretti 2012), and across these labor markets, significant variation exists in the level of education that jobs demand. While some labor markets have higher shares of baccalaureate-demanding jobs, others rely more heavily on jobs that do not demand a four-year degree (Bozick 2009; Rothwell 2012). In this study, I highlight a local economic dimension of curricular stratification by investigating how the educational levels typically demanded by jobs in the local labor market shape high school college-preparatory and CTE course offerings and student course taking.

Although college-preparatory coursework may foster the achievement of certain national goals, like increasing the number of science, technology, engineering, and mathematics (STEM) professionals, these curricular investments may be neither financially feasible nor in the perceived economic interests of communities that largely depend on jobs that do not require a four-year degree. Schools serving places that rely heavily on subbaccalaureate jobs may offer a curriculum geared more toward career-specific training and less toward the academic skills that lead to four-year college matriculation and completion. Indeed, while major educational initiatives in the United States, have invoked national economic demands and the country's precarious global position in calls to intensify academic curricula, vocational educational initiatives since the Smith Hughes Act of 1917 have prioritized linking vocational curricula to locally available jobs. Furthermore, recent state legislation in several southern and midwestern states has bolstered CTE coursework aligned with local industries while relaxing academic graduation requirements.

In this research, I analyze whether the local share of jobs in subbaccalaureate-demanding occupations shapes the extent to which schools offer, and students take, college-preparatory coursework that facilitates bachelor's degree completion and CTE courses related to subbaccalaureate work. To do so, I use the Education Longitudinal Study of 2002 (ELS: 2002) linked to the U.S. Census 2000 in order to examine curricular stratification across diverse local economies.

First, I examine whether the educational requirements of jobs in the local labor market shape school course offerings. Do schools in local labor markets with higher concentrations of subbaccalaureate jobs devote a larger share of their curricula to CTE courses and a smaller share to advanced college-preparatory courses (e.g., advanced math and Advanced

Placement [AP]/International Baccalaureate [IB])? Drawing from previous work, I argue that school resources may partially, but not fully, underlie disparities in school course offerings across local labor markets. Indeed, scholars speculate or document that schools tie course offerings to local economic needs even independent of school resources (Ray and Mickelson 1990; Rury 1991; Roscigno and Crowley 2001; Roscigno, Tomaskovic-Devey, and Crowley 2006).

Next, I investigate whether local labor markets affect students' CTE and academic course taking. I first ask whether students attending schools in labor markets with higher concentrations of subbaccalaureate jobs take greater numbers of CTE courses and have lower odds of taking an advanced academic math course or an AP/IB course by the end of high school—two of the strongest predictors of college enrollment, success, and completion (Adelman 2006). I then examine whether advanced college-preparatory course-taking inequalities between local labor markets are widest among higher achievers—students who are more likely to enroll in these courses.

Other scholars have speculated that the local labor market affects students' educational outcomes by influencing their perceptions of local job opportunities. In this study, I focus on the role of an institutional mechanism—high school course offerings—in examining why local economies may affect students' course-taking patterns. The final step in my study analyzes whether inequalities in students' CTE and academic course taking across local economies are a function of differences in schools' CTE and advanced college-preparatory course offerings.

This research spotlights a local economic dimension of high school curricular stratification. Investigating how local labor markets shape school and student curricular constraints and investments is important for research on educational stratification and college-for-all debates. Given the long-run consequences of high school course taking, the findings from this study have implications for growing spatial inequalities and geographic disparities in individuals' chances for upward mobility (Lichter, Parisi, and Taquino 2012; Moretti 2012; Chetty et al. 2014).

BACKGROUND

A large body of literature has focused on how vocational and academic curricular sorting (re)produces status-group inequalities within the occupational structure. However, occupational structures vary widely across the United States' unevenly developed local economies. Instead of focusing on “who gets what” with respect to educational opportunities, I focus here on “who gets what where” (Lobao and Hooks 2007:2). Specifically, I examine whether differences in the educational demands of jobs across local economies shape the CTE and advanced college-preparatory emphases of high school course offerings and student course taking.

From research on early public schools (Kantor and Tyack 1982; Rury 1991) to studies assessing the success of federal vocational policies in training workers for local jobs (Werum 2002), analyzing the link between coursework and local economies is not a new endeavor.

Yet, to my knowledge, only one study—focused on physics course taking— has used a nationally representative sample of contemporary youth in the United States to investigate this linkage (Riegle-Crumb and Moore 2014). As a result, I draw heavily from qualitative work, research using historical data, and studies investigating rural–urban educational disparities to hypothesize why the local labor market may affect school course offerings and student course taking.

Local Labor Markets and School Course Offerings

The first goal of this study is to examine why local labor markets shape school course offerings. Roscigno et al. (2006) and Roscigno and Crowley (2001) suggest that rural, urban, and suburban inequalities in education, including AP/IB course-taking options, are a function of school resources (e.g., per-pupil expenditures and school socioeconomic composition) and differences in the types of “investments” schools make given their resources. The scholars suggest that local economic differences may underlie differences in school resources and investments by urbanicity. I draw upon this theoretical distinction between school resources and investments and posit that the local labor market may shape school course offerings through its impact on school resources and school curricular decision making, independent of actual resources.

Research shows that local labor markets affect family and community resources (Tomaskovic-Devey 1987; Wilson 1987), which in turn influence school resources, such as available funds and school socioeconomic composition. A portion of school revenue comes from ad valorem taxes, and given the four-year college wage premium, one might also expect schools in labor markets with higher concentrations of subbaccalaureate jobs to have fewer resources than schools in areas with higher concentrations of jobs that typically require a bachelor’s degree.

Schools with lower per-pupil expenditures and lower-socioeconomic status student bodies offer fewer advanced college-preparatory course offerings (Adelman 2006; Roscigno et al. 2006; Klugman 2013). Indeed, research suggests that more highly educated parents are more likely to act individually and collectively to procure educational advantages for their children (Lareau 1987; Lucas 2001), like demanding that schools offer more AP courses (Klugman 2013). For these reasons, I expect that schools in local labor markets with higher concentrations of subbaccalaureate jobs will devote a smaller share of their course offerings to advanced college-preparatory courses compared to schools in local labor markets with lower concentrations of these jobs, in part because these schools have fewer resources.

School resources will likely play an important role in explaining why local labor markets shape school course offerings, but school curricula may relate to the kinds of jobs in the local labor market even independent of school resources. Whereas large-scale curricular initiatives, like the Common Core State Standards, aim to standardize curricula across the nation, schools may also adopt course offerings that align with local economic demands. Roscigno et al. (2006:2124) speculate that administrators and school boards may “invest resources in a manner consistent with the perceived needs of the local population and local labor markets,” and they propose that these investment choices may explain urban-rural-suburban differences in AP courses. As Ainsworth and Roscigno (2005:266) suggest,

schools may emphasize particular types of coursework as a way of “training the future local labor pool.” Furthermore, in a study examining three high schools, Oakes and Guiton (1995) note that one of the district’s major goals was to offer vocational courses that aligned with local economic demands.

Local economic interests may also influence the character of school course offerings through business–school partnerships and economic stakeholders’ influence on community decision makers. From early-twentieth-century textile factory owners constructing a school dedicated to teaching factory skills (Bartlett et al. 2002) to a large computer firm directly shaping course offerings in a North Carolina school district (Mickelson 1999), alliances between local businesses and schools have a long history (Bowles and Gintis 1976; Shea, Kahane and Sola 1990). Today, state-level initiatives designed to link high school CTE training to jobs in local and regional industries have garnered public attention (e.g., Urban Skilled Trades Connection in Wisconsin and the Jump Start program in Louisiana).

It is possible for schools to emphasize CTE coursework without sacrificing higher-level academic courses, which would provide students with the opportunity to be both career- and college-ready. However, the studies discussed earlier suggest that course offerings may mirror the skill and education levels associated with local jobs. Therefore, I expect that schools in local labor markets with higher concentrations of workers employed in subbaccalaureate jobs devote a larger share of their curricula to CTE courses and devote a smaller share to advanced college-preparatory courses compared to schools in labor markets with lower concentrations of these workers, both as a function of, and independent of, school resources.

The Local Labor Market and Student Course Taking

In the second set of questions, I analyze why the local labor market matters for students’ course taking, with a particular focus on the role of school course offerings. If schools in areas with higher concentrations of subbaccalaureate jobs devote a larger share of their curricula to courses that reflect the related skills and lower educational requirements of these jobs, differences in students’ course taking may be a function of different course-taking options. While school course offerings may affect student course taking directly by circumscribing their course-taking options, they may also shape student course taking indirectly. For example, students may be less likely to take advanced college-preparatory courses in schools with more alternatives to these intensive courses (Lee, Smith and Croninger 1997). In addition, differences in school course offerings may cultivate different school climates (McDonough 1997) that influence students’ educational choices (Legewie and DiPrete 2014).

Student course taking may also be related to the local economy independent of school course offerings. For example, some scholars have argued that local economic opportunities shape students’ educational investments. Bozick (2009) found that students are more likely to attend college in metropolitan statistical areas (MSAs) where more jobs require bachelor’s degrees, positing that the local economy provides students with information about the level of education they need to gain employment. Consistent with this idea, Bozick and DeLuca

(2011) analyzed student reports of the reasons they did not attend college and found that perceptions of local job opportunities influenced their decisions to enter the labor force.

The local labor market may also shape course taking by circumscribing students' ideas about possible or desirable occupations. Along these lines, Riegle-Crumb and Moore (2014) found that young women were more likely to enroll in physics classes if they lived in places with more female STEM professionals. The scholars suggest that these labor markets may expand the range of occupations that young women perceive as possible for themselves.

Although the aforementioned studies did not consider the role of school course offerings in explaining the local economic variation in students' outcomes, I am particularly interested in whether school course offerings help explain any relationships I observe between the local labor market and student course taking. These results will demonstrate the extent to which an institutional constraint—school course offerings—underlies any remaining associations that might otherwise be interpreted as students' responses to the local economy. If school course offerings contribute to the relationships between the local share of subbaccalaureate jobs and student course taking, this finding has different (and likely more feasible) policy implications than students selecting coursework based on the kinds of occupations that employ local workers.

The Role of Achievement

Lastly, I examine whether student achievement levels moderate the association between the local labor market and advanced college-preparatory course taking. In their ethnographic study on brain drain in rural Iowa, Carr and Kefalas (2009) found that teachers and administrators encouraged and prepared academically talented students to attend college and seek high-skill jobs outside the community. If this occurs in communities with higher concentrations of subbaccalaureate jobs, differences in advanced course taking across local economies may be minimal among high-achieving students.

In contrast to this study on a rural community, I expect the relationship between student achievement and advanced college-preparatory course taking to be weaker in areas with higher concentrations of workers in subbaccalaureate jobs and stronger in areas with lower concentrations of workers in these jobs. High-achieving students have the skills required to take these courses, so they are most likely to be affected by a more limited availability of advanced coursework options.

In addition, Sewell (1964:25) found that the greatest rural–urban disparities in students' plans to attend college occurred among high achievers; he attributed the lower educational expectations of students from smaller communities to poorer “educational and cultural facilities, as well as occupational opportunities.” Along these lines, the course-taking enrollment decisions of those best positioned to take advanced college-preparatory coursework may depend on the extent to which students believe that advanced college-preparatory coursework facilitates upward mobility in their community. For example, Roscigno and Crowley (2001) found that rural students benefited less from parental and school educational investments than their urban and suburban counterparts and speculated that weaker returns to education in rural areas may explain why.

Achievement may also moderate the association between the share of local workers in subbaccalaureate jobs and student advanced math course taking due to institutional sorting processes. Although scholars have demonstrated that school sorting is not a meritocratic process, teachers and administrators attempt to sort students into more or less rigorous coursework by “ability,” typically measured by achievement tests. Teachers and counselors may be less likely to guide high achievers into advanced college-preparatory courses in schools that serve communities with greater shares of jobs that do not require a bachelor’s degree.

RESEARCH QUESTIONS

The overarching goal of this paper is to analyze how the educational demands of jobs that employ workers in the local labor market shape school course offerings and student course taking. Specifically, I ask the following:

1. (a) Do schools in local labor markets with higher concentrations of workers in subbaccalaureate jobs devote a larger share of their curricula to CTE courses and a smaller share to advanced college-preparatory coursework? (b) To what extent are these relationships a function of differences in school resources?
2. (a) Do students in local labor markets with higher concentrations of workers in subbaccalaureate jobs take greater numbers of CTE courses and have lower odds of taking advanced academic math and enrolling in an AP/IB course? (b) Are disparities in advanced college-preparatory course taking across local economies wider among higher academic achievers?
3. Do differences in school course offerings account for student course-taking inequalities across local labor markets?

DATA AND METHODS

Data

The school- and student-level analyses use data from ELS:2002, a nationally representative study of about 750 schools and 16,000 students designed by the National Center for Education Statistics (NCES; see Ingels et al. 2002). These data offer rich sociodemographic, high school, postsecondary, and early labor market profiles of a nationally representative group of sophomore students in 2002, who were followed up in 2004, 2006, and 2012. ELS: 2002 is ideal for this study because NCES collected student high school transcripts and school course catalogs, and it is the most recent dataset offering course catalogs and transcripts in which one-year local labor market estimates are available for all represented counties. The temporal alignment between the U.S. Census 2000 local labor market measure and students’ freshman year of high school also makes the ELS:2002 analytically attractive.

The first research question pertains to the relationship between local labor markets and school course offerings. For this analysis, the school sample is limited to schools that provided course catalogs (about 93 percent) and to public schools to obtain school district fiscal information from the Common Core of Data (CCD; $n = 540$). In the second and third

research questions, I investigate the relationship between the local labor market and student course taking. The student sample is restricted to high school sophomores attending these 540 public schools in the base-year survey who also had available transcript information ($n = 11,030$). Course offerings and course taking were identified within the school course catalog and high school transcripts by their Classification of Secondary School Courses code—a hierarchical, six-digit code that indicates a course's main area of study, the subcategory of study, and specific name.

Local labor market information is obtained from the U.S. Census 2000 and linked to the county in which the respondent attends school.

School Measures

Dependent Variables

Subbaccalaureate-related CTE courses: To capture the career/technical emphases of school curricula, I create a measure of the percentage of total course offerings that are CTE courses ($[\text{number of CTE courses} / \text{total course offerings}] \times 100$).¹

I include only CTE courses that align with or relate to the subbaccalaureate occupations included in the local labor market measure (described below), which include family and consumer science, agricultural business, natural resources, consumer/personal/miscellaneous services, business and office, marketing and distribution, engineering and engineering-related technologies, vocational home economics, industrial arts, mechanics, precision production, and transportation coursework. CTE courses related to occupations that do not align with the subbaccalaureate occupations in the labor market measure and that typically require a bachelor's degree are excluded. These include courses in computer and information science, education (e.g., school psychology, teacher education), business and management (e.g., organizational behavior, investments and finance), architecture and environmental design, and library and archival sciences. Results including these courses are consistent with those reported here. For simplicity, I often refer to this measure as “CTE course offerings/course taking” instead of “subbaccalaureate-related CTE course offerings/course taking.”

Advanced academic course offerings: I measure the advanced college-preparatory coursework emphasis of the school curricula with two indicators of advanced college-preparatory course offerings. The first is the percentage of math course offerings above Algebra 2 ($[\text{number of math courses above Algebra 2} / \text{total math course offerings}] \times 100$). Four schools had missing values for all math courses and are excluded from the math course offerings analysis. I provide detail on measuring advanced math in the description of the student-level dependent variables below.

The second measure is AP/IB course offerings, a more selective indicator of advanced college-preparatory courses and the overall academic climate. It is measured as the

¹Analyses using the percentage of students' total coursework dedicated to career and technical education (CTE) courses yield consistent results.

percentage of total course offerings that are AP/IB ($[\text{number of AP/IB courses} / \text{total course offerings}] \times 100$).

Independent Variables

Local labor market: No consensus exists on the best way to empirically capture the “local labor market.” Studies operationalize local labor markets using MSAs, counties, commuting zones, and census blocks. I focus on the percentage of workers in lower-education jobs in the local labor market. This measure is intended to capture the general level of education and types of skills typical of jobs in the area, but is not industry or occupation specific.

Therefore, I operationalize the local labor market at the commuting-zone level, consistent with recent work that classifies local labor markets by the share of workers employed in occupations associated with broad tasks (Autor and Dorn 2013). Commuting zones were developed by the Economic Research Service of the U.S. Department of Agriculture and are groups of counties that are economically linked through strong commuting ties; they are considered superior to arbitrarily delineated counties and to MSAs, which exclude a substantial portion of rural communities.² In ancillary analyses, I characterized the local labor market at the school district and county levels. These results yield similar substantive conclusions to those presented here.

I seek to examine whether students in labor markets with larger shares of jobs that do not require a bachelor’s degree are more likely to take CTE courses and less likely to take the college-preparatory courses that promote bachelor’s degree completion (as a function of their school course offerings). To capture the share of jobs that typically require less education than a bachelor’s degree within a local labor market, I aggregate county-level occupational data from the U.S. Census 2000 to the commuting-zone level. I then construct a measure of the share of workers in the commuting zone who are employed in occupations that typically require less than a four-year degree ($[\text{number of employed civilians 16 years of age and older working in subbaccalaureate occupations} / \text{total number of employed civilians 16 years of age and older}] \times 100$).

The Census 2000 classified occupational groups based on the 2000 Standard Occupational Classification (SOC) codes, and I define the following SOC code categories as subbaccalaureate occupations: health care support (SOC 31-0000); protective service workers, except the public service occupations of law enforcement and firefighters (SOC 33-0000); food preparation and serving (SOC 35-0000); building and grounds cleaning and maintenance (SOC 37-0000), personal care and service (SOC 39-0000), cash and retail sales occupations (SOC 41-2000), office and administrative support (SOC 43-0000); production, construction, and extraction (SOC 47-0000); transportation and material moving (SOC 53-0000)³; installation, maintenance, and repair (SOC 49-0000); and farming, fishing, and

²Other work examining the relationship between the percentage of local baccalaureate workers and student college-going outcomes (Bozick 2009) used the Bureau of Labor Statistics occupational projections and training data to capture the educational demands of local jobs. However, metropolitan statistical areas (MSAs) are the smallest geographic unit of analysis for these data; linking to these data would require excluding all students outside of MSAs (a little over 20 percent in the Education Longitudinal Study of 2002) from the analysis and would render rural students empirically invisible.

³I exclude air transportation workers due to BA entry requirements or substantial portions of these workers with BA degrees, but results including this small occupational group are consistent.

forestry occupations (SOC 45-0000). I provide more details on this measure in the online supplement.

I transform the continuous measure of the share of workers employed in subbaccalaureate occupations described above into quintiles due to nonlinearities and for ease of interpretation, but results are consistent without this transformation. The percentages of workers employed in subbaccalaureate occupations within each quintile are as follows: first quintile = 51.89 percent, second quintile = 57.04 percent, third quintile = 59.37 percent, fourth quintile = 63.28 percent, and fifth quintile = 67.49 percent.

All analyses also control for the percentage of civilians in the labor force 16 years of age and older who are unemployed in the commuting zone (also calculated from the Census 2000 county-level data).

School resources: The primary school resources of interest are educational spending and school socioeconomic composition. Previous research has linked both to advanced college-preparatory course offerings (Adelman 2006; Roscigno et al. 2006; Klugman 2013). I include student–teacher ratio as an additional indicator of school resources, but its inclusion does not alter the results.

I measure per-pupil expenditures with the CCD school district measure of the total dollars from local, state, and federal sources spent per child. The student–teacher ratio measure is available in the ELS data set, which NCES procured from the CCD. School socioeconomic composition is measured with two indicators: the percentage of students eligible for free or reduced-price lunch (obtained from the CCD) and the average socioeconomic status of students' parents within the school, which I construct by calculating the school average of the NCES-constructed measure of respondents' parental socioeconomic status.

Controls: The school analyses control for urbanicity, the percentage of students attending the school who are members of racial/ethnic minority groups (American Indian, Alaskan Native, Asian/Pacific Islander, non-Hispanic Black or Hispanic), and vocational and magnet school flags. As a proxy for four-year college access, I include a dichotomous indicator of whether there is a four-year college in the county where the student attends high school.

Student Measures

Dependent Variables: CTE and Advanced Math Course Taking

Subbaccalaureate-related CTE course taking: This measure includes the same courses as those in the CTE course offerings variable and is measured as the total number of CTE courses related to subbaccalaureate jobs that students enrolled in by the end of high school.⁴ This variable is logged to accommodate its skewed distribution.

Advanced math: I measure advanced math with a dichotomous indicator of whether a student attempted an academic math course beyond Algebra 2 by the end of high school,

⁴Due to small within-school samples, measuring CTE course taking as the share of CTE course enrollments of all course enrollments is not possible.

consistent with other operationalizations (Riegle-Crumb and Grodsky 2010; Byun, Irvin, and Bell 2015). Taking one math course beyond Algebra 2 increases math achievement and constitutes a “tipping point” at which students’ odds of college enrollment and completion drastically increase (Adelman 2006:xvii–xix; Byun et al. 2015). To construct this indicator, I use an ordinal measure of the highest math course a student attempted by the end of high school (0 = no math, 1 = basic/ remedial math, 2 = general/applied math, 3 = prealgebra, 4 = algebra 1, 5 = geometry, 6 = algebra 2, 7 = advanced math/precalculus, 8 = calculus; for detailed information, see Riegle-Crumb and Grodsky 2010). This measure is the dichotomous analog to the measure of advanced academic math course offerings.

AP/IB course taking: This is a dichotomous measure indicating whether a student attempted at least one AP/IB course by the end of high school (0 = none, 1 = at least one).

Controls: Control measures include sociodemographic factors, including race/ethnicity, sex, family socioeconomic status (based on parental educational attainment, occupational status, and family income), and family structure. Analyses also include base-year (10th-grade) academic background measures, including math achievement test score (math item response theory estimated number correct), math course level (see ordinal math measure discussed above), academic grade point average, and educational expectations. I also control for the total number of courses on a student’s transcript in an attempt to account for differences in the availability of transcript years among students with transcripts. Analyses include flags for whether a student dropped out of high school or transferred to a new school between the base-year and first follow-up surveys. Student analyses adjust for the school controls discussed earlier that are included in the school analysis.

Table A1 in the appendix shows means and proportions for control measures used in the school and student analyses. Table 1 shows the means and proportions for the dependent variables by the local labor market quintiles. For the sample of public schools, the share of total course offerings devoted to subbaccalaureate-related CTE coursework for schools in labor markets with the largest concentrations of workers in subbaccalaureate occupations (fifth quintile) is about twice that (28 percent vs. 14 percent) of schools in labor markets with the smallest concentrations of these workers (first quintile). Schools with larger concentrations of workers in subbaccalaureate occupations also devote a smaller share of their math course offerings to math courses beyond Algebra 2 and a smaller share of their course offerings to AP/IB courses relative to schools with smaller concentrations of these workers. For students, those attending high schools in labor markets with higher concentrations of workers in subbaccalaureate occupations take greater numbers of CTE courses. About 55 percent of students attending high school in labor markets with the lowest shares of workers employed in subbaccalaureate occupations (first quintile) take a math course beyond Algebra 2 by the end of high school compared to about 41 percent and 39 percent of students attending high school in labor markets falling within the fourth and fifth labor market quintiles, respectively. We observe a similar pattern for AP/IB course taking. The multivariate analyses will examine these disparities conditioning on background characteristics.

Analytic Approach

The first research question examines whether local labor markets shape school course offerings, focusing on the extent to which observed relationships between the local labor market and school course offerings operate through and independent of school resources. To address this question, I analyze the sample of public high schools and use ordinary least squares (OLS) regression to predict the association between the percentage of local workers employed in subbaccalaureate jobs and the share of school course offerings devoted to CTE and advanced college-preparatory courses.⁵ The first model adjusts for basic school and labor market controls, and the second model introduces school resources.

The goal of the second and third research questions is to analyze whether the local labor market shapes student course taking and to examine the extent to which school course offerings attenuate any observed relationships. I begin with an OLS regression predicting the total number of CTE courses students took in high school (logged). The first model conditions on sociodemographic, academic, and school controls, and the second model introduces school course offerings. For advanced college-preparatory course taking, I examine whether disparities in course taking are widest among higher achievers and whether school course offerings reduce any observed gaps. I use logistic regressions to predict students' odds of taking a math course beyond Algebra 2 and taking at least one AP/IB course by the end of high school. After conditioning on sociodemographic, academic, and school controls, the second model introduces an interaction term between the local labor market measure and students' math achievement test score.⁶ The final model introduces school course offerings to assess whether differences in school curricula reduce any observed disparities. I graphically present the average marginal effects (AMEs) for the interaction terms for ease of interpretation for the advanced math and AP/IB course-taking analyses. I also reference the average predicted probabilities (APPs), shown in Table A2 of the appendix as an extra aide for interpretation.

Both school- and student-level analyses are weighted; I use the survey command ("svy") in Stata 14.0 to incorporate the appropriate student sample weight and adjust for clustering within schools. I use multiple imputation to handle missing data on the independent variables and average estimates across 30 imputed data sets.⁷

In an attempt to address time-invariant, unobserved heterogeneity between the states in which schools were located, the school and student analyses include state fixed effects. This strategy captures variation in school course offerings and student course taking that are a function of local labor markets and limits variation that arises from state-level characteristics. Results with and without state fixed effects are consistent.

⁵In ancillary analyses, CTE and advanced college-preparatory course offerings and CTE student course taking were measured as count variables and estimated with Poisson, negative binomial, and zero-inflated negative binomial (10 percent of schools offer no Advanced Placement/International Baccalaureate courses) regressions. Results from these analyses were consistent with those reported here.

⁶Ancillary analyses predicting student CTE course taking indicate no statistically significant interactions between the local labor market and math achievement.

⁷No school or student variable had missing values exceeding 10 percent.

I report logit coefficients in the form of AMEs. Tables with selected coefficients are shown in the text, and full models are available in the online supplement. Ancillary analyses discussed here are available upon request.

FINDINGS

Local Labor Market and School Course Offerings

Models 1 and 2 of Table 2 present selected coefficients from an OLS regression estimating the relationship between the percentage of local workers employed in subbaccalaureate jobs and the percentage of school course offerings dedicated to subbaccalaureate-related CTE courses. Model 1 shows that schools in the fifth labor market quintile devote 9 percentage points more of their course offerings to CTE courses (nearly one standard deviation) than schools in labor markets with the lowest concentrations of workers in subbaccalaureate occupations (first quintile), on average and conditioning on state fixed effects and other controls. This difference translates into about 12 more CTE courses for a school with an average number of total course offerings. The course offering disparity is about 8 and 7 percentage points for the third and fourth quintiles (relative to the first quintile), respectively. Accounting for differences in school resources in Model 2 reduces the coefficient for the fifth quintile by about 40 percent and slightly reduces the coefficients for the third and fourth quintiles. Net of controls, these relationships remain statistically significant.

Do schools in labor markets with higher concentrations of workers employed in subbaccalaureate occupations devote a smaller share of their course offerings to advanced college-preparatory coursework? Turning to the second set of columns, the percentage of math courses that schools in labor markets within the fifth quintile devote to advanced academic math (higher than Algebra 2) is about 11 percentage points lower compared to schools in the first quintile, on average; this disparity is about 90 percent of a full standard deviation. This gap for schools in the fourth quintile relative to the first quintile is about 6 percentage points. Controlling for school resources in the following model—specifically, school average socioeconomic status—renders the coefficient for the fourth quintile nonsignificant. Yet, the difference in the percentage of math courses devoted to coursework beyond Algebra 2 between schools in the first and fifth quintiles is still about 7 percentage points on average (about half of a standard deviation) and remains statistically significant.

The final two columns present results predicting the share of a school's curricula devoted to AP/IB courses. Schools in all local labor markets above the second quintile for local workers employed in subbaccalaureate occupations dedicate lower shares of their course offerings to AP/IB courses relative to schools in labor markets with the lowest shares of these workers. The percentage of course offerings that are AP/IB decreases as the concentration of local subbaccalaureate workers increases, and the difference between schools in the fifth quintile compared to schools in the first quintile is about 4.2 percentage points. For a school with an average number of course offerings, one would expect schools in the fifth quintile to offer about five fewer AP/IB courses than schools in the first quintile. Accounting for differences in the average parental socioeconomic status across these schools substantially attenuates the size of these gaps, but the coefficients remain statistically significant.

In sum, I observe a linkage between the percentage of subbaccalaureate jobs in the local labor market and the CTE and advanced academic emphases of school curricula, partially due to school resources. Accounting for resources, schools in local labor markets within the top three quintiles for the local share of workers in subbaccalaureate occupations devote a larger share of their course offerings to subbaccalaureate career-related coursework and a smaller share to AP/IB courses. Independent of school resources, only schools in labor markets with the very highest concentrations of workers in subbaccalaureate occupations (fifth quintile) devote a smaller share of math course offerings to courses beyond Algebra 2 relative to schools in labor markets with the lowest concentrations of these workers.

Local Labor Market and Student Course Taking

Table 3 presents selected coefficients from an OLS regression predicting the relationship between the percentage of local workers employed in subbaccalaureate jobs and the number of CTE courses students took (logged) by the end of high school. The pattern of results mirrors that predicting CTE course offerings. On average, students attending high school in local labor markets falling within the third, fourth, and fifth labor market quintiles take more CTE courses than their counterparts in the first quintile, but these differences are small in magnitude. Model 2 adjusts for school course offerings. The share of course offerings devoted to CTE courses is positively related to student CTE course taking ($p < .001$), and the share of math course offerings that are advanced math is negatively related ($p < .05$) to the number of CTE courses students take. Adjusting for differences in school course offerings reduces the magnitude of the associations shown in Model 1 by between about 40 percent and 50 percent, leaving no statistically significant association between the local labor market and CTE course taking. Taken together, students in local labor markets with higher shares of subbaccalaureate jobs take greater numbers of subbaccalaureate-related CTE coursework largely due to the stronger CTE and weaker advanced college-preparatory curricular emphases of their schools.

The first three columns in Table 4 present selected average marginal effects from a logistic regression predicting the association between the local labor market and the likelihood that a student will have taken advanced math by the end of high school. Relative to students in the first quintile, Model 1 shows that only students attending schools in labor markets with the highest percentages of workers in subbaccalaureate jobs are statistically significantly less likely to take advanced math, independent of base-year academic, family, and school controls. To examine whether the relationship between the local labor market and advanced college-preparatory course-taking varies for higher- and lower-achieving students, I include an interaction term between the local labor market and math achievement test score in Model 2.⁸ This interaction is negative and statistically significant for students in labor markets with the highest shares of workers in subbaccalaureate jobs (fifth quintile), which indicates that the relationship between advanced math course taking and math achievement is weaker in areas with higher concentrations of subbaccalaureate jobs.

⁸The main effects of the labor market quintiles are calculated holding math test score at the sample mean. The math test score main effect represents the relationship between math test score and course taking for students in the first labor market quintile (reference).

Figure 1 shows the AMEs for students within each local labor market quintile (reference is first quintile) at different points across the math achievement test score distribution, holding all other variables in Model 2 at their observed values. AMEs are the differences in the APPs. In addition to interpreting the AMEs depicted in the graphs, I also reference the APPs, which are shown in Table A2 of the appendix.

Among students whose math achievement test scores fell within the 25th percentile for the ELS:2002 sample of public high school students, there is little variation in the advanced math course taking between students attending high schools in the second to fifth quintiles relative to students attending high schools in the first quintile. However, disparities in course taking across local labor markets emerge for higher achievers, with the widest disparities occurring among above-average-achieving students.

Students with math scores in the 75th percentile who attended high school in labor markets with the highest shares of workers in subbaccalaureate jobs (fourth and fifth quintiles) are less likely to take an advanced math course by the end of high school than their counterparts from schools in the first labor market quintile ($p < .01$). Among students scoring in the 90th percentile, the difference in the APPs of students in the first and fourth labor market quintiles is about 8 percentage points (APP = .637 vs. .552), on average. These high-achieving students from schools in the fifth quintile are 13 percentage points less likely to take advanced math compared to their counterparts in places with the lowest concentration of workers in subbaccalaureate jobs (APP = .637 vs. .507). Put differently, holding all other control variables at their observed values, one would estimate that about 63.7 percent of the highest-achieving students would have enrolled in advanced math if they had all attended schools in the first labor market quintile versus about 50.7 percent if they had all attended schools in the fifth labor market quintile. Notably, students scoring in the 90th percentile from schools in places with the highest shares of workers employed in subbaccalaureate occupations have a similar estimated probability of taking advanced academic math as do students scoring in only the 50th percentile in labor markets with the lowest concentrations of these workers (APP = .507 vs. .487).

Model 3 of Table 4 introduces course offerings and shows that the share of course offerings that are CTE is negatively associated with taking an advanced math course, while the share of math course offerings devoted to advanced math courses is positively associated with taking advanced math. Turning back to Figure 1, the light gray bars alone show the estimated AMEs after adjusting for school course offerings. Conditioning on differences in school course offerings reduces the advanced college-preparatory course-taking gap for students scoring within the 75th percentile by about 40 percent, or from about an 11-percentage-point disparity to about a 6-percentage-point disparity.

After adjusting for differences in course offerings, the disparity between students in the first and fifth labor market quintiles for students with math scores in the 90th percentile is reduced by about 30 percent. However, these high-achieving students remain about 9 percentage points less likely to take advanced math relative to their high-achieving counterparts in schools from the first labor market quintile ($p < .05$).

The last three columns of Table 4 show the AMEs predicting whether a student takes at least one AP/IB course by the end of high school. Net of controls, there are no statistically significant associations. The interaction introduced in Model 2 shows that the relationship between the local labor market and taking an AP/IB course differs for students with lower and higher math test scores. Figure 2 graphically depicts this interaction, showing statistically significant labor market differences among the highest-achieving students. Among students scoring in the 90th percentile, those attending high school in labor markets with the highest shares of workers in subbaccalaureate jobs have about an 8-percentage-point lower probability of taking an AP/IB course relative to their counterparts in labor markets with the lowest concentrations of these workers ($APP = .398$ vs. $.315$). Adjusting for school course offerings, and for AP/IB course offerings in particular, reduces this gap by about half.

DISCUSSION

The mix of occupations and share of jobs that demand a college degree vary widely across the local economies in which high school students prepare for college or for work. Drawing on this local economic diversity and inequalities in high school coursework, I examined how the educational demands of jobs in the local labor market shape the extent to which schools offer and students take courses that prepare them to earn a bachelor's degree or enter the workforce. I found that students attending high school in labor markets with higher shares of subbaccalaureate jobs take greater numbers of CTE courses than students in labor markets with lower shares of subbaccalaureate jobs. Inequalities in college-preparatory course taking across these places were found only among higher-achieving students. The results suggest that these spatial differences in student course taking are partially due to an alignment between school course offerings and the educational demands of locally prevalent jobs.

The school-level analyses reveal that disparities in per-pupil expenditures and school average parental education help explain why local economies with greater concentrations of subbaccalaureate jobs devote a larger share of their curricula to CTE course offerings relative to places with lower shares of these jobs. Differences in the average parental socioeconomic status of schools appear to contribute most to the observed variation in advanced college-preparatory course offerings. Overall, these findings are consistent with the hypothesis that the local labor market shapes the share of courses devoted to CTE and advanced college-preparatory courses partially through its relationship to school resources—linkages that prior studies have suggested (e.g., Roscigno et al. 2006) but have not directly observed.

However, given similar resources, schools in local labor markets with higher concentrations of subbaccalaureate jobs had stronger CTE and weaker advanced college-preparatory emphases relative to schools in labor markets with lower concentrations of these jobs. This residual relationship could suggest that schools invest in coursework related to local labor market demands, as other work shows or intimates, but I cannot empirically test this hypothesis. Analyses control for school socioeconomic composition, but it is also possible that schools' curricular decisions are influenced by cultural orientations that are “embedded in community histories and especially stratification histories” (Roscigno et al. 2006: 2139).

The relationships may also capture practical considerations that schools face if schools in local labor markets that rely more heavily on subbaccalaureate jobs encounter challenges attracting qualified teachers or have an easier time filling CTE positions.

In any case, these differences in school course offerings appear to have significant consequences for the CTE, advanced math, and AP/IB course taking of high school students living in these diverse economies. Indeed, the findings indicate that course-taking disparities across labor markets are largely explained by differences in school course offerings. Schools' stronger CTE and weaker advanced college-preparatory curricular emphases may limit student course taking directly by restricting their course-taking options and indirectly by providing more alternatives to academically challenging coursework or cultivating a weaker college-going climate (McDonough 1997).

Through the character of their school curricula, schools in communities with larger shares of subbaccalaureate jobs appear more likely to encourage course taking related to subbaccalaureate occupations and less likely to prepare university-capable students for the demands of a four-year college education. In ancillary analyses, I found that the relationship between math test score and the local labor market does not statistically significantly differ by race/ethnicity, gender, or social class. This finding suggests that the link between local jobs and high school curricula affects talented individuals from both privileged and marginalized groups. Interestingly, and in contrast to advanced college-preparatory course taking, another ancillary analysis suggests differences in CTE course taking across local economies do not statistically significantly vary for higher- and lower-achieving students.

I found limited support that the local labor market affected students' course taking net of the availability of course offerings. While some research suggests that students make educational decisions based on their perceptions of local economic opportunities, the results in this particular case align more with a structural explanation. Independent of course offerings, significant local economic disparities persisted only in math course taking and among the very highest achievers. Given that high school course offerings are easier to change than are the types of jobs in local economies, this finding has a more straightforward policy implication. It is important that future research consider whether high school course offerings help explain associations between the local labor market and educational outcomes before attributing "leftover" associations to students' responses to local job opportunities.

I relied on previous literature and argued that the local labor market shapes high school course offerings, both through and independent of school resources. However, the relationship between the local labor market and high school course offerings is likely recursive over the long run. Indeed, schooling affects individuals' work outcomes, and schools with a weaker college-preparatory orientation may produce higher shares of local subbaccalaureate workers over time. A steady supply of subbaccalaureate workers may attract more jobs that do not require a four-year degree. In turn, schools may further invest in course offerings related to these local jobs.

Previous literature, educational policies, and evidence from the current analysis provide support that the associations between the local labor and school course offerings during this

short time period are primarily driven by labor market factors. First, this directionality aligns with a large body of scholarship that theoretically and empirically outlines how communities and neighborhoods affect school and student outcomes. Relevant to this study, scholars articulate how local economic characteristics shape family, school, and student outcomes, partially as a function of institutional resources and investments (for a review, see Roscigno et al. 2006). Research discussed earlier and recent state legislation explicitly designed to align curricular programs with regional and local industries suggest that these relationships persist.

Analytic factors provide further evidence that local labor markets likely shape school course offerings, rather than school course offerings luring particular employers or industries to the area. In addition to course offerings and student course taking being measured *after* the measurement of local labor market conditions, the school associations hold when controlling for the percentage of local residents with a bachelor's degree. The robustness to this control inspires greater confidence that variation in residents' education levels across these local economies is not driving the associations.

The reasons outlined above provide evidence that the local labor market shapes course offerings and course taking. However, access to both local labor market and coursework data over time or an instrumental variable could allow researchers to assess the degree to which the local labor market shapes high school course offerings and vice versa. These analytic strategies would also help address omitted variable bias concerns. While I control for a wide range of student-, school-, and community-level factors that could confound the relationships among the local labor market, school course offerings, and student course taking, the observed relationships could also be a function of factors that I cannot account for with these data.

I concentrated on how the educational demands of jobs in the local labor market shape high school training in this study. However, there has been much discussion at the federal, state, and local levels of ensuring that both high schools and two-year colleges provide training that aligns with local mid-skill jobs in fields like health and manufacturing. Future research should investigate the linkage between local jobs that typically require a postsecondary certificate or associate's degree and training programs at two-year colleges.

CONCLUSION

As the nation attempts to sustain economic vitality in the face of rapidly changing technology, curricular proposals emerging out of the college-for-all ethos exist alongside initiatives to strengthen high school technical training for subbaccalaureate jobs. Results from this study suggest that the relative college-for-all emphasis of schools—at least as measured by course offerings—may vary across local economies with higher and lower concentrations of jobs in subbaccalaureate occupations. In addition, while it has been observed or assumed that the coupling between schools and the labor market is weaker in the United States than in many European countries, the results documented here suggest that the strength of this connection may vary across local economies within the United States. By highlighting a local economic dimension of high school curricular stratification, this study

raises questions about what schools should teach students who will go on to work in diverse local economies.

Is the link between the local labor market, school course offerings, and student course taking beneficial or costly? How might the answer to this question differ among individual, local, and national stakeholders? It is possible that the link between school curricula and local work in places with higher shares of subbaccalaureate jobs may benefit some students through facilitating a stronger and more fluid school-to-work transition. Indeed, a recent study found that young men attending school in communities with higher shares of blue-collar workers had higher rates of blue-collar employment in their mid-20s than young men in non-blue-collar communities, partially as a function of high school course offerings and course taking (Sutton, Bosky, and Muller 2016). However, the authors found this stronger school-to-work link for men only.

It is also worth noting that the link between coursework and local subbaccalaureate jobs may benefit students only to the extent that these jobs are “good” jobs. Yet, male-dominated, blue-collar occupations are some of the last remaining employment options for workers without a college degree to earn a living wage (Carnevale et al. 2011). Furthermore, even though CTE coursework provides a buffer against unemployment in early adulthood (Arum and Shavit 1995), scholars show that the early benefits of vocational degrees (compared to general degree) are short-lived and predict employment *disadvantages* in later adulthood (Forster, Bol, and van de Werfhorst 2016).

Students attending school in labor markets with higher shares of subbaccalaureate jobs have greater access to technical training that may facilitate the transition from high school to work. However, they have less access to academic courses that predict earning a bachelor’s degree, attending a selective university, and gaining access to occupations with the greatest earning potential. Even students who do not enroll in college stand to reap economic rewards from taking advanced math. For example, Rose and Betts (2001) found that taking more advanced math courses predicts higher productivity and earnings for individuals across levels of educational attainment, positing that these courses cultivate cognitive skills and teach students how to learn. These valuable skills may not only predict greater productivity and occupational advancements, but they may also enhance workers’ abilities to adapt during economic downturns and pivot if technology upskills or replaces their jobs.

The greater CTE and weaker college-preparatory curricular focus of schools in labor markets with higher shares of subbaccalaureate jobs may effectively “cool out” high-achieving students with the potential to excel at a four-year university. These local economies might benefit in the short term to the extent that they retain talented youth. At the same time, the connection between local work and high school course offerings in these places may stifle upward mobility and undermine progress toward national economic goals, like filling shortages in high-skill fields. Future research and debates on high school training should consider the complex short- and long-term trade-offs of a more career and technical- and college-preparatory-focused curriculum for youth, local labor markets, and the national economy.

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Appendix

Appendix Table A1

Weighted Means/Proportions of Control Variables.

Variable	<i>M</i>	<i>SD</i>
Sample of public high schools (<i>n</i> = 540)		
Percentage unemployed civilians in local labor market	5.86	1.74
Urbanicity		
Urban	0.13	
Suburban	0.42	
Rural	0.46	
Magnet school flag	0.10	
Vocational school flag	0.03	
% Racial/ethnic-minority students in school	23.91	27.98
Four-year college in county	0.50	
School resources		
Per-pupil total expenditures in dollars, 2000–2001	8748.42	3099.44
Student–teacher ratio	15.18	4.19
% Free or reduced-cost lunch	23.55	17.79
School average parental socioeconomic status	–0.08	0.35
Sample of public high school students (<i>n</i> = 11,030)		
Race/ethnicity		
Non-Hispanic white	0.60	
Black	0.14	
Latino	0.16	
Asian/Pacific Islander	0.04	
Other	0.05	
Female	0.50	
Family socioeconomic status composite	–0.04	0.70
Lives with both biological parents	0.57	

Variable	<i>M</i>	<i>SD</i>
Base-year academic background		
10th-grade academic GPA	2.44	0.96
10th-grade math course level	4.72	1.64
10th-grade math achievement test	37.08	11.80
Student educational expectations		
No college	0.08	
Some college	0.11	
Four-year degree	0.37	
Advanced degree	0.35	
Don't know	0.09	
Dropped out between base year and follow-up	0.05	
Transferred schools between base year and follow-up	0.10	
Total no. of courses on transcript	42.88	13.18
Local labor market and school measures		
% Unemployed civilians in local labor market	5.94	1.69
Urbanicity		
Urban	0.26	
Suburban	0.52	
Rural	0.22	
Four-year college in county	0.73	
% Racial/ethnic-minority students in school	33.39	29.57
Magnet school flag	0.13	
Vocational school flag	0.05	
Per-pupil total expenditures in dollars, 2000–2001	8611.06	2386.26
Student–teacher ratio	17.45	3.98
% Free or reduced-cost lunch	20.56	17.25
School average parental socioeconomic status	–0.06	0.35
School course offerings		
CTE course offerings (as % of total courses)	22.01	9.23
Advanced math course offerings (as % of math courses)	34.04	11.74
AP/IB course offerings (as % of total courses)	5.85	3.66

Note: Data drawn from the Education Longitudinal Study of 2002 and U.S. Census 2000. Sample of schools is limited to public schools with course catalogs. Sample of students is restricted to high school sophomores attending these public schools with available transcript information. Missing data are multiply imputed. GPA = grade point average; CTE = career and technical education; AP/IB = Advanced Placement/International Baccalaureate.

Appendix Table A2

Average Predicted Probabilities and Standard Errors for Taking Advanced College-preparatory Courses by Quintiles for the Share of Local Workers in Subbaccalaureate Occupations and Math Achievement Test Score Percentile.

Math achievement test score	Without course offerings					With course offerings				
	Labor market quintile					Labor market quintile				
	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
Dependent variable: took math course beyond Algebra 2										
25th percentile	.406 (.027)	.417 (.024)	.369 (.024)	.374 (.025)	.372 (.029)	.386 (.027)	.396 (.022)	.376 (.025)	.390 (.025)	.395 (.029)
50th percentile	.487 (.024)	.493 (.019)	.439 (.019)	.435 (.019)	.418 (.023)	.468 (.024)	.470 (.018)	.445 (.018)	.451 (.018)	.442 (.023)
75th percentile	.577 (.026)	.577 (.021)	.517 (.022)	.504 (.020)	.470 (.022)	.559 (.027)	.554 (.021)	.523 (.020)	.518 (.019)	.495 (.023)
90th percentile	.637 (.031)	.633 (.026)	.572 (.028)	.552 (.025)	.507 (.026)	.620 (.032)	.610 (.026)	.577 (.026)	.565 (.024)	.531 (.026)
Dependent variable: took at least one AP/IB course										
25th percentile	.159 (.022)	.157 (.017)	.178 (.020)	.186 (.021)	.183 (.033)	.147 (.020)	.153 (.018)	.184 (.019)	.192 (.021)	.204 (.035)
50th percentile	.229 (.021)	.217 (.015)	.225 (.016)	.230 (.017)	.225 (.026)	.212 (.019)	.212 (.015)	.231 (.015)	.238 (.017)	.244 (.027)
75th percentile	.324 (.022)	.296 (.016)	.286 (.018)	.286 (.018)	.276 (.022)	.301 (.020)	.291 (.016)	.291 (.017)	.296 (.018)	.294 (.021)
90th percentile	.398 (.026)	.357 (.021)	.332 (.024)	.328 (.022)	.315 (.025)	.371 (.025)	.353 (.022)	.336 (.023)	.340 (.022)	.332 (.024)

Note: Average predicted probabilities estimated from Models 2 and 3 shown in Table 4. Average marginal effects shown in Figures 1 and 2. AP/IB = Advanced Placement/International Baccalaureate.

*

$p < .05$.

**

$p < .01$.

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Biography

April Sutton is a Frank H. T. Rhodes Postdoctoral Fellow at the Cornell Population Center at Cornell University. She will join the Department of Sociology at the University of California, San Diego, as an assistant professor in the summer of 2017. Sutton investigates how schools and communities shape gender and racial/ethnic inequalities in education, work, and family formation outcomes.

Figure 1.

Average marginal effects (AMEs) for taking advanced math by subbaccalaureate workers in local labor market (reference: first quintile) and math achievement score.

Note: AMEs estimated from Models 2 and 3 of Table 4. P values are obtained from the “margins” suite in Stata 14.0. * $p < .05$. ** $p < .01$.

Figure 2.

Average marginal effects (AMEs) for taking at least one Advanced Placement/International Baccalaureate course by subbaccalaureate workers in local labor market (reference: first quintile) and math achievement score.

Note: AMEs estimated from Models 2 and 3 of Table 4. P values are obtained from the “margins” suite in Stata 14.0. * $p < .05$. ** $p < .01$.

Table 1
Weighted Means and Proportions for Dependent Variables by Quintiles for Share of Local Workers in Subbaccalaureate Occupations.

Variable	Local Labor Market Quintile						
	Total	SD	1st	2nd	3rd	4th	5th
Sample of public high schools (<i>n</i> = 540)							
CTE course offerings (as % of total courses)	23.76	(09.79)	14.36	19.00	24.28	25.29	28.04
Advanced math course offerings (as % of math courses)	30.73	(12.62)	34.44	35.49	34.79	29.04	26.73
AP/IB course offerings (as % of total courses)	03.83	(03.67)	07.46	05.31	04.33	02.34	02.78
Sample of public high school students (<i>n</i> = 11,030)							
Total number of CTE courses taken (logged)	0.78	(01.37)	0.34	0.59	0.76	1.07	1.23
Took advanced math course by end of high school	0.47		0.55	0.49	0.47	0.41	0.39
Took at least one AP/IB course by end of high school	0.26		0.32	0.28	0.26	0.21	0.22

Note: Data drawn from the Education Longitudinal Study of 2002 and U.S. Census 2000. Sample of schools is limited to public schools with course catalogs. Sample of students is restricted to high school sophomores attending these public schools with available transcript information. CTE = career and technical education; AP/IB = Advanced Placement/ International Baccalaureate.

Coefficients from Ordinary Least Squares Regressions Predicting Career and Technical Education (CTE), Advanced Math, and AP/IB School Course Offerings.

Table 2

Variable	% CTE (of total courses)		% Advanced math (of total math courses)		% AP/IB (of total courses)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Local labor market						
Percentage of workers in subbaccalaureate occupations (ref: first quintile)						
Second quintile	2.174 (2.119)	1.483 (1.835)	0.468 (2.933)	1.071 (2.767)	-1.441 (0.775)	-1.162 (0.696)
Third quintile	7.811*** (2.283)	6.550** (2.048)	-0.710 (2.985)	0.961 (2.930)	-2.763*** (0.714)	-1.828** (0.645)
Fourth quintile	6.757* (3.009)	6.308** (2.323)	-6.215* (3.054)	-3.239 (3.036)	-3.868*** (0.677)	-2.341*** (0.677)
Fifth quintile	9.149** (2.775)	5.801* (2.55)	-11.328*** (3.380)	-7.157* (3.518)	-2.206*** (0.694)	-2.160** (0.719)
School resources						
Per-pupil total expenditures (in \$ 100s), 2000–2001		-0.107*** (0.022)		0.006 (0.023)		-0.002 (0.005)
Student-teacher ratio		-0.195 (0.17)		0.134 (0.290)		0.179 (0.100)
% Free or reduced-cost lunch		-0.013 (0.057)		-0.158 (0.096)		-0.028 (0.022)
Average parental socioeconomic status		-5.497** (1.803)		6.204* (2.991)		4.183*** (0.718)
Observations	540		530		540	

Note: Data drawn from the Education Longitudinal Study of 2002 and U.S. Census 2000. Sample of schools is limited to public schools with course catalogs. Missing data are multiply imputed. All models include state fixed effects and also control for percentage unemployed civilians in the local labor market, urbanicity, magnet and vocational school flags, percentage racial/ethnic minority students, and four-year college in county. Robust standard errors in parentheses. CTE = career and technical education; AP/IB = Advanced Placement/International Baccalaureate.

* $p < .05$.

** $p < .01$.

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Table 3

Selected Coefficients from Ordinary Least Squares Regression Predicting Number of CTE Courses Taken (logged).

Variable	Model 1	Model 2
Local labor market		
Percentage of workers in subbaccalaureate occupations (ref: first quintile)		
Second quintile	.100 (.123)	.041 (.111)
Third quintile	.266 [*] (.108)	.109 (.103)
Fourth quintile	.359 ^{**} (.111)	.204 (.107)
Fifth quintile	.344 ^{**} (.126)	.155 (.121)
School resources		
Per-pupil total expenditures (in \$100s), 2000–2001	–.003 [*] (.002)	–.002 (.002)
Student–teacher ratio	–.007 (.012)	.001 (.012)
% Free or reduced-cost lunch	.001 (.003)	–.002 (.003)
School average parental socioeconomic status	–.461 ^{***} (.123)	–.247 [*] (.124)
School course offerings		
School CTE offerings as % of total course offerings		.025 ^{***} (.004)
Advanced math course offerings (as % of math courses)		–.005 [*] (.002)
School AP/IB offerings as % of total course offerings		–.014 (.009)

Note: Observations = 11,030. Data drawn from the Education Longitudinal Study of 2002 and U.S. Census 2000. Sample of students is restricted to public high school sophomores with available transcript information. Missing data are multiply imputed. All models also include state fixed effects and control for race/ethnicity, sex, family socioeconomic status, family structure, 10th-grade academic grade point average, 10th-grade math course level, student educational expectations, dropout status, transfer status, total number of courses on transcript, urbanicity, percentage minority in school, four-year college in county, magnet and vocational school flags, and percentage unemployed civilians in local labor market. Robust standard errors in parentheses. CTE = career and technical education; AP/IB = Advanced Placement/International Baccalaureate.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.

Table 4
Selected Average Marginal Effects from Logistic Regression Predicting Advanced College-preparatory Course Taking.

Variable	Advanced academic math			AP/IB	
	Model 1	Model 2	Model 3	Model 1	Model 2
Local labor market					
Percentage of workers in subbaccalaureate occupations (ref: first quintile)					
Second quintile	.006 (.026)	.005 (.030)	.002 (.031)	-.018 (.022)	-.014 (.026)
Third quintile	-.043 (.028)	-.050 (.032)	-.024 (.032)	-.022 (.022)	-.006 (.026)
Fourth quintile	-.048 (.029)	-.048 (.033)	-.019 (.033)	-.020 (.026)	-.002 (.031)
Fifth quintile	-.068 [*] (.034)	-.073 (.039)	-.029 (.040)	-.029 (.030)	-.008 (.036)
Base-year controls					
Math Achievement Test Score	.007 ^{***} (.001)	.008 ^{***} (.001)	.008 ^{***} (.000)	.007 ^{***} (.000)	.008 ^{***} (.001)
Math Achievement Test Score × % Workers in Subbaccalaureate Occupations					
Second quintile		-.000 (.001)	-.001 (.001)	-.001 (.001)	-.001 (.001)
Third quintile		-.001 (.001)	-.001 (.001)	-.003 [*] (.001)	-.002 (.001)
Fourth quintile		-.002 (.001)	-.002 (.001)	-.003 [*] (.001)	-.002 [*] (.001)
Fifth quintile		-.003 [*] (.001)	-.003 [*] (.001)	-.003 [*] (.001)	-.003 (.001)
School resources					
Per-pupil total expenditures (in \$100s), 2000–2001	.000 (.000)	.000 (.000)	.000 (.000)	-.000 (.000)	-.000 (.000)
Student-teacher ratio	.003 (.003)	.004 (.003)	.004 (.003)	.002 (.003)	.001 (.003)

Variable	Advanced academic math			AP/IB		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
% Free or reduced-cost lunch	-.000 (.001)	.000 (.001)	.001 (.001)	.001 (.001)	.001 (.001)	.001 (.001)
School average parental socioeconomic status	.039 (.032)	.036 (.032)	.011 (.030)	.071** (.023)	.070** (.023)	.026 (.023)
School course offerings						
School CTE offerings as % of total course offerings			-.003** (.001)			.001 (.001)
Advanced math course offerings (as % of math courses)			.004*** (.001)			.000 (.001)
School AP/IB offerings as % of total course offerings			-.001 (.003)			.014*** (.002)
Observations		10,980			11,030	

Note: Data drawn from the Education Longitudinal Study of 2002 and U.S. Census 2000. Sample of students is restricted to public high school sophomores with available transcript information. Missing data are multiply imputed. Models also include state fixed effects and control for race/ethnicity, sex, parental socioeconomic status, family structure, 10th-grade academic grade point average, 10th-grade math course level, student educational expectations, dropout status, transfer status, total number of courses on transcript, urbanicity, percentage minority in school, four-year college in county, magnet and vocational school flags, and percentage unemployed civilians in local labor market. Robust standard errors in parentheses. AP/IB = Advanced Placement/International Baccalaureate; IRT = item response theory; CTE = career and technical education.

* $p < .05$.

** $p < .01$.

*** $p < .001$.