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## Credits that count: High school vocational education from sibling comparisons

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# Credits that Count: High School Vocational Education from Sibling Comparisons

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School of Business & Economics

Discussion Paper

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# Credits that Count: High School Vocational Education from Sibling Comparisons \*

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## Abstract

Using data from the National Longitudinal Survey of Youth 1997, this paper exploits within-sibling differences in vocational coursework credits taken during high school to estimate their effects on educational and labor market outcomes. I find that additional vocational coursework reduces four-year college attendance without affecting college graduation among those who enroll, and is associated with higher annual earnings that persist into the mid-thirties. This evidence suggests that vocational education helps students realize their comparative advantage and sort into different educational paths, which benefit their labor market outcomes. The findings point to high school vocational education providing sustained economic benefits without compromising overall educational attainment, and benefiting students with diverse educational trajectories.

**Keywords:** Vocational Education, Career and Technical Education, Labor Market Outcomes, Human Capital, NLSY97.

*JEL: I21, I28, J24, J26*

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# 1 Introduction

In 2024, among Americans aged 25 to 34, 58 percent held less than a college degree (U.S. Census Bureau (2024)). High school is therefore a critical stage at which curricular choices may influence both postsecondary educational paths and subsequent labor market outcomes. In this context, vocational coursework has attracted renewed policy attention: the Perkins Act has redefined the term for vocational education as CTE (career and technical education), emphasizing not only the skill foundation for vocational education, but also linking the academic preparation for postsecondary education. Given the worsening outcomes for non-college-educated workers (Autor, 2019) and the persistent demand for well-paying middle-skill jobs (Autor et al., 2003a), vocational education in high school may represent an important pathway that shapes students' future opportunities. The estimation of these returns, however, is challenging, as students self-select into different courses in ways that are correlated with their later life outcomes.

This paper addresses the selection issue by using data from the National Longitudinal Survey of Youth 1997, comparing within family differences in the outcomes for siblings who take different credits in secondary vocational classes. Educational choices are influenced not only by family background but also shared peer and community environments—the neighborhood students live next to, the friends they grow up with, and the broader community atmosphere — factors often shared by siblings and usually unobserved and difficult to measure. By exploiting within-family variation, the analysis helps account for such common unobserved influences that could make students who take more vocational coursework systematically different from those who take less. However, this method does not capture

within-family confounding factors, such as differential parenting or individual shocks, and relies on variation that is not entirely exogenous, so the results should be interpreted with caution.

I examine how differences in secondary vocational coursework credits are associated with educational and labor market outcomes across all students, including high school graduates and high school non-completers. The results show that high school vocational classes significantly reduce the likelihood of attending a four-year college by 2.6 percentage points, with no significant association with other educational outcomes. This finding suggests that high school vocational classes may serve as a sorting system, helping students recognize their comparative advantage and adjust their educational paths accordingly. Students who discover their strengths in vocational education appear more likely to opt for non-four-year college paths. Importantly, additional vocational coursework taken during high school does not reduce students' likelihood of graduating from college, whether from a two-year or four-year institution. Regarding labor market outcomes, vocational coursework is positively associated with annual earnings, and contrary to common expectations, these effects are not short-lived but persist into individuals' mid-thirties.

To understand who benefit most from vocational education, I conduct the analysis separately for subgroups defined by gender, race, ability level, and mother's educational attainment. The results show that positive effects of vocational education mainly accrue to males with lower ability levels (ASVAB scores) from families where mothers do not have a college degree. To investigate the mechanism behind the sustained positive effects on annual earnings, I explore three possibilities: better job match, college wage premium, and compar-

ative advantage. I do not find suggestive evidence that vocational education improves job match, nor do the earnings gains appear to result from a college wage premium. The likely mechanism is comparative advantage: students who build skills early through vocational coursework may choose not to attend college, allowing them to accumulate occupational-specific human capital, tenure, and experience, which then contributes to higher earnings.

This paper contributes to the study of educational returns to secondary vocational education. Earlier studies find that vocational tracking, as opposed to academic (or general) tracking, may delay college enrollment or reduce college attendance (Cellini, 2006; Joyce and Neumark, 2001; Neumark and Rothstein, 2006). More recent work emphasizes the effects of selective vocational programs and technical schools, often finding positive impacts on in-school outcomes. Dougherty (2018) exploits admission cutoffs to oversubscribed CTE programs in Massachusetts and finds increased on-time high school graduation. Brunner et al. (2023) apply a similar design in Connecticut technical high schools, and Hemelt et al. (2019) use lottery-based enrollment in North Carolina vocational programs, finding positive effects on high school graduation and college enrollment for males. However, these estimates represent local average treatment effects for students who selectively apply to specific programs. By contrast, this paper examines average effects for a broader population of students, including those who do not complete high school and those who later attend college. In this respect, the paper is closest to Cellini (2006) in using within-family comparisons, but rather than focusing on participation in a specific program, I analyze vocational education as a continuous measure based on the number of vocational credits taken.

This paper also contributes to the literature on the economic returns to vocational ed-

ucation. Early descriptive studies from the 1990s document positive labor market effects of vocational education, primarily during the short-run school-to-work transition (Bishop and Mane, 2004; Eichhorst et al., 2015; Gustman and Steinmeier, 1982; Kang and Bishop, 1989; Mane, 1999). In contrast, studies examining longer-term or life-cycle outcomes suggest that the relative advantages of vocational education may diminish over time, as vocational skills potentially become obsolete more quickly than general skills (Golsteyn and Stenberg, 2017; Hanushek et al., 2017). Moreover, increasing general education requirements within vocational tracks does not appear to improve earnings or reduce unemployment risk (Hall, 2016), nor does vocational tracking increase employment in occupations vulnerable to technological substitution or offshoring (Silliman and Virtanen, 2022). Within this literature, the closest study to this paper is Kreisman and Stange (2020), who treat vocational education as a continuous choice using the NLSY97 and find that advanced-level vocational classes contribute to higher wages among high school graduates. While their analysis relies on variation across states, regions, and schools, I exploit within-family variation to address selection and examine average effects for a broader population of students. My findings, which document positive and increasing earnings effects extending into individuals' mid-thirties, therefore provide additional evidence that vocational education generates positive average labor market returns.

This paper proceeds as follows. Section 2 introduces the institutional background, and Section 3 discusses the methodology. Section 4 describes the data and sample selection. The results are presented in Sections 5 and 6. Section 7 explores potential mechanisms, and Section 8 concludes.

## 2 Institutional Background

Vocational education refers to courses that provide students with skills intended to prepare them for specific occupations or fields of work. Based on course content, vocational education is commonly categorized into several areas, including agriculture; business and office education; marketing and distribution; health occupations; occupational home economics; trade and industry; and technical and communications fields.

Vocational education are offered in three types of secondary schools in the United States: comprehensive public high schools, regional vocational schools, and full-time vocational high schools. Full-time vocational high schools emphasize vocational coursework while also providing academic instruction. Regional or area vocational schools offer vocational training, while students receive their academic instruction at their home high schools. Over 90 percent of the students attend comprehensive high schools and receive vocational education there. Most students do not complete a coherent vocational sequence; instead, vocational education exposure typically consists of a small number of courses taken intermittently.

Participation in vocational education is widespread. In 1992, 97 percent of U.S. high school graduates completed at least one vocational education course (NCES, 1997), and the average graduate earned approximately 3.8 vocational course credits (NCES, 1997). Over time, however, the number of vocational credits earned declined. By 2013, the average high school graduate completed roughly 2.6 vocational credits (NCES, 2013). In more recent years, vocational coursework participation has partially recovered; by 2024, average vocational credits increased to approximately 2.83 (NCES, 2024).

Following the expansion of federal vocational education policy under the Perkins Act, high school graduation requirements increasingly emphasized academic achievement. As a result, students allocated more coursework toward academic subjects.

Vocational education has long been supported by the federal government. In 2006, the Carl D. Perkins Career and Technical Education Improvement Act (Perkins IV) formally replaced the term “vocational education” with “career and technical education” (CTE). Under this framework, the aim of vocational education expanded beyond job preparation to include developing students’ academic and career-related skills, preparing them for both the labor market and further postsecondary education (Rooney et al., 2006).

### 3 Methodology

To understand the impact of high school vocational courses, I start with the simple OLS regression without covariates controlling for the individual background characteristics. Let us denote the outcome variable as “y”, and the variable “Creditvoc” representing the number of vocational class credits. The model describing the outcome for individual  $i$  is as follows:

$$y_i = \beta_0 + \beta_{voc}CreditVoc_i + \mu_i, \tag{1}$$

In this simplified model, I only include vocational credits. It’s worth noting that the opportunity cost of an additional vocational class could encompass other types of classes or leisure time, although this remains unspecified. Consequently, the effect denoted by  $\beta_{voc}$  not only captures the impact of acquiring skills and knowledge through vocational classes but

also the effect of extending the duration of high school by one more year. To more accurately isolate the impact of vocational classes, I introduce the following model.:

$$y_i = \beta_0 + \beta_{voc}CreditVoc_i + \beta_{all}CreditAll_i + \mu_i, \quad (2)$$

I have included the variable  $CreditAll_i$  into the model, representing the total credits completed during high school. The interpretation for  $\beta_{voc}$  now considers the following: while keeping the total credits constant,  $\beta_{voc}$  represents the incremental effect of one additional vocational class credit. It is assumed that students would not sacrifice their leisure time to enroll in additional classes; therefore, enrolling in more vocational classes comes at the expense of other classes. With the total credits held constant, when a student chooses to take an additional school year of vocational class, she is essentially trading off the skills and knowledge she could have acquired by taking other classes. For instance, if a student chooses to take one credit in a vocational class, forgoing one credit in an English class, and we assume a negative effect from the loss of skills and knowledge that could have been gained in the English class, and a positive effect from taking one credit in the vocational class, then  $\beta_{voc}$  represents the net effects of these two combined influences. In summary,  $\beta_{voc}$  captures this net effect of vocational class relative to the other classes.

The dependent variables encompass both educational and employment outcomes. The examination explores how vocational credits affect high school graduation, college attendance, and degree attainment for both 2-year and 4-year colleges. Employment outcomes are assessed across different ages, investigating variations in yearly earnings, weekly working

hours, weeks worked per year, and employment status.

Specification (2) does not fully address the non-random selection of students into different coursework. Students' decisions to enroll in specific types of classes are not arbitrary; rather, they are influenced by various factors that can also affect their outcomes. Students who opt for a higher number of vocational classes may systematically differ from their peers who choose fewer. These distinctions may include characteristics on both the individual and family levels. For instance, individuals from disadvantaged backgrounds are more inclined to enter the labor market immediately after graduation, and they are also more likely to pursue vocational classes. Consequently, this can introduce a bias in the estimation of college attendance and completion rates, as those taking more vocational classes are less likely to pursue higher education. To address such disparities, I incorporate a vector of controls denoted as  $X_i$  into the previous model:

$$y_i = \beta_0 + \beta_{voc}CreditVoc_i + \beta_{all}CreditAll_i + \beta_x X_i + \epsilon_i \quad (3)$$

The vector  $X_i$  includes observable individual characteristics and indicators of the family's socio-economic background. This includes the average household poverty ratio during the age range of 16-18, which corresponds to the period when most individuals are enrolled in high school. Additionally, it takes into account whether the respondent resided in a two-parent household and includes a binary variable indicating whether the mother has attained some college education. Furthermore, students' choices regarding the type of classes they take depend on their inherent abilities and personal preferences. In addition to the previously

mentioned controls, I introduce two variables that serve as proxies for ability and vocational class preference. Following the specification outlined in (Cellini, 2006), I utilize the test score in a sub-test from the ASVAB <sup>1</sup> (Armed Services Vocational Aptitude Battery) known as mechanical comprehension to proxy the respondent’s preference for vocational classes. The ASVAB test is employed as a proxy for their overall ability.

Equation (3), which incorporates controls for observable characteristics, can aid in mitigating some of the selection issues. However, there may exist additional unobservable characteristics that might influence students’ class choices and subsequent outcomes. For example, genetic traits, the community atmosphere in which they reside, and the influence of friends with whom they grow up can play significant roles. In such instances, the utilization of family fixed effects would serve as an effective method to help mitigate the impact of these unobserved characteristics:

$$y_i = \beta_0 + \beta_{voc}CreditVoc_i + \beta_{all}CreditAll_i + \beta_x X_i + Z_f + u_i \quad (4)$$

I augment the previous specification by incorporating  $Z_f$ , representing family fixed effects, to capture unobservable characteristics shared within families. This allows for a comparison among siblings who differ in the number of vocational class credits they have taken. Siblings share common genetic traits, are raised within the same family, and are exposed to the influences of the same neighborhood, culture, and even friends. The inclusion of family

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<sup>1</sup>The ASVAB is a test that measures several different cognitive and technical skills across ten areas. The subtests include general science, arithmetic reasoning, word knowledge, paragraph comprehension, mathematics knowledge, electronics information, auto and shop information, mechanical comprehension, and assembling objects.

fixed effects serves to further eliminate the effects of these unobservable characteristics, rendering siblings a more suitable comparison group than randomly selected individuals. For instance, if a family resides in a neighborhood where the majority of children enter the workforce immediately after high school and, consequently, they opt for more vocational classes, children within the same family are likely to follow this pattern. This local influence remains unobserved, and in an OLS model, the impact of vocational classes on college attendance may be biased downward. By introducing family fixed effects, we also account for such local characteristics, given that siblings typically attend the same school and are exposed to the same local economic conditions.

In addition to the above regression, I also use the following specification when estimating the effect of vocational credits on labor market outcomes:

$$y_{ia} = \beta_0 + \beta_{voc}CreditVoc_i + \beta_{all}CreditAll_i + \beta_x X_i + Z_{fa} + u_i \quad (5)$$

In this specification, I allow the fixed effects to vary with age, accommodating the changing impact of family and siblings on the individual across different life stages.  $y_{ia}$  indicates the corresponding labor market outcomes at a given age, and  $Z_{fa}$  indicates the fixed effect that changes with age. It is to be expected that the influence from the family during one's twenties differs from that in one's thirties, making it reasonable to let these fixed effects evolve with age.

## 4 Data and Sample of Analysis

I use the National Longitudinal Survey of Youth 1997 (NLSY97) to explore the effect of vocational class on various outcomes. The NLSY97 is a nationally representative dataset that includes 8,984 teenagers who were born between 1980 and 1984. Around the year of the first survey, 1997, they were aged between 13-16. The survey is taken annually till 2013 and every other year afterward. By the year of the latest survey, 2019, the respondents are aged between 35-39. The dataset provides detailed transcript data which I utilize for the analysis of credits taken through high school. The dataset also has rich information on different measurements for labor market outcomes.

Panel (a) for Table 1 provides a description of the data sample. To analyze high school transcript information, I restrict the sample to individuals with available transcript data and further exclude those with fewer than 3 total credits (indicating less than three school years of coursework). Additionally, individuals who exclusively pursued vocational classes during high school have also been excluded. The "Siblings" column displays the number of observations that are not singletons under each specified condition. This particular subset of the sample, comprised of individuals with siblings, is utilized for estimation purposes, specifically in the context of family fixed effects analysis.

Table 1 provides summary statistics for the background characteristics of both the full sample and the sibling sample. It is crucial to ensure that the sibling sample closely aligns with the characteristics of the full sample, as estimates from the sibling sample will be extrapolated to the broader population. The statistics in the table indicate that the mean values for each characteristic are comparable across the two samples, affirming the suitability

of using estimates from the sibling sample for broader inferences.

I begin with analyzing the full sample, and Table 2 presents key statistics, including high school credits and various outcomes. The sample is divided into "High-takers" (above-average vocational credits) and "Low-takers" (below-average vocational credits). Substantial differences in educational outcomes are observed across groups, impacting almost all measures except the likelihood of obtaining an associate degree. Employment outcomes also exhibit variations, with differences in employment duration at age 30 and employment status at ages 25 and 35.

The disparities in these outcomes can be attributed to two potential sources. Firstly, they may reflect the influence of vocational classes. Secondly, they could arise from systematic differences between individuals who opt for more vocational classes during high school and those who choose fewer. Table 3, which provides summary statistics on individual and family backgrounds for the full sample, sheds light on this matter. These two groups exhibit substantial disparities in various background characteristics. Notably, individuals classified as high takers are more likely to come from disadvantaged family backgrounds. They tend to be males with lower ASVAB scores and lower 8th-grade scores, originating from households with less wealth, residing in suburban areas, and having mothers with lower chances of attaining a college education. It's worth acknowledging the fact that high-takers often come from disadvantaged families, which could potentially introduce a downward bias into the estimates.

In an effort to alleviate some of the systematic bias, I compare siblings. Table 4 shows the family background characteristics among siblings who took different credits in vocational

classes. In the summary table, I exclude siblings who have the same number of credits in vocational classes. The high-taker group is the siblings in the family taking the highest credits in vocational classes, and the rest of the siblings are in the low-taker group. As expected, there are no significant differences in family backgrounds except for the fact that the high-taker siblings are more likely to be males. The only significant difference between the two groups lies in their ability. Siblings with higher vocational credits tend to have lower ASVAB and 8th-grade GPAs. But the differences between these two measures, compared to that in the full sample, are of a much smaller magnitude. (Among the two groups in the main sample, the difference in ASVAB and 8th grade GPA are respectively 7.565 and 0.341; for the sibling sample, the differences are 4.224 and 0.244.) In the comparison of the outcome variables, as shown in table 5, there are again fewer differences compared to the full sample. Comparison between the high- and low-takers in the full sample and sibling sample show that siblings have much more in common. They are similar in many observed characteristics and are likely to share unobserved family-level attributes. This makes siblings a more comparable group.

## **5 Main Findings**

### **5.1 Educational Outcomes**

I begin by examining educational outcomes, as shown in Table 6. Columns 1 through 3 correspond to the pooled OLS model, while the last three columns pertain to the family fixed effects model. For model set, I gradually introduce variables. I begin with the unconditional

estimation regression depicted by equation (1) that includes only  $CreditVoc_i$  (the number of vocational class credits). Next, I move on to estimates from equation (2), where holding total high school credits constant by including  $CreditAll_i$ . Finally, I include variables that control for all observed background characteristics. Each estimate in the table represents the coefficient for the marginal effect of vocational class under different specifications.

In the pooled OLS model, an additional school year of vocational classes during high school, on average, does not show a correlation with the likelihood of obtaining a high school diploma. However, it is associated with a decrease in overall college attendance and college degree attainment. This negative association with college attendance stems from varying effects between 2-year and 4-year colleges. Column (3) suggests Vocational education is positively associated with attendance at 2-year colleges, which suggests a 1.2 percentage points increase in the probability of attending 2-year college. But it is negatively associated with 4-year college attendance, roughly 2.7 percentage points less likely to attend 4-year college. The OLS estimates also suggest a significant decrease in the likelihood of attaining a 4-year degree, for about 2.2 percentage points. These OLS model effects remain consistent across different control variables. Although the estimates in column (2) that only control for vocational and total credits have a larger magnitude, the conditional estimates in column (3), which account for individual and family background characteristics, only attenuate the impact. This suggests that these observable characteristics do explain some of the effects on various educational outcome variables.

The results for educational outcomes differ once within-sibling comparisons are used to hold constant shared family characteristics. Column (5) of 6 reports estimates from the

family fixed-effects model that controls only for vocational and total class credits, showing negative associations between vocational coursework and both four-year college attendance and four-year degree attainment. When we further eliminate unobservable characteristics by including the full set of control variables, the FE model yields distinct outcomes. Comparing columns (3) and (6), the family fixed-effects model with full controls shows a significant 2.6 percentage point reduction in four-year college attendance, with no significant associations with degree attainment or other educational outcomes. This contrasts with the pooled OLS results, which indicate significant positive associations with two-year college attendance and completion but significant negative associations with four-year college attendance and completion. In magnitude, the family fixed-effects estimate implies that taking one extra school year of vocational credit reduces four-year college attendance by 2.6 percentage points, corresponding to a 4.3 percent decline relative to the baseline mean of 60.9 percent, lowering the attendance rate for the average student to about 58 percent. These varying results on degree attainment suggest that the negative correlation found in the pooled OLS model may be attributed to unobservable characteristics not accounted for in that specification.

The results of the FE model imply that vocational curricula in high school may function as a sorting system, guiding students based on their comparative advantages. The negative association with 4-year college attendance, coupled with no correlation with graduation, suggests that students less inclined toward academic curricula might opt against pursuing higher education. However, for those who do attend college, taking additional vocational classes does not appear to hinder their ability to graduate.

## 5.2 Labor Market Outcomes

To understand the impact of vocational classes on labor market outcomes, I look into the effects on several measurements: hours worked per week, weeks worked within a year, annual earnings, and employment status. Firstly, I examined the average effect of vocational classes. Using employment data pooled across ages, I calculate the average effect of vocational coursework over the age range of 19–36. Notably, I allowed family fixed effects to vary with age, acknowledging that the influence of family or siblings for an individual would vary at different ages. The findings are presented in Table 8, which is structured similarly to the educational outcomes table, with the gradual inclusion of control variables. Overall, additional vocational classes were found to have a statistically significant impact on nearly every labor market outcome. A comparison between column 3 and column 6 reveals that the family FE model produces estimates of larger magnitude than the pooled OLS model. This implies that an individual who takes one more credit in vocational classes is expected to experience a substantial average increase of \$671.866 in annual earnings (in 2010 dollars) across the age range of 19-36.

The impact of vocational classes on labor market outcomes is expected to vary over time. To reveal how the effects evolve, I conduct a detailed examination of the marginal effects of vocational classes at each age. The estimates for various outcome variables are presented in Figure 1. The dot on each figure represents the results of a distinct regression at a particular age, depicting the trends in the changes of effects for vocational classes from age 19 to 36.

The family FE model demonstrates a positive association between vocational courses and labor market outcomes. Panel (a) and (b) illustrates how the effects of vocational

classes on annual earnings change over ages. The average impact of vocational coursework on annual earnings is smaller in the early twenties, then approaches zero between ages 24-26, and becomes significantly positive in the thirties. The FE model reveals that additional vocational classes during high school are associated with an increase of about \$500 in the early twenties and approximately \$2,000 in the early thirties. Conversely, the OLS model suggests positive effects only exist in the early twenties and diminish with age, even turning negative in the thirties. The OLS model results may be confounded by unobserved factors not captured by individual and social background controls, such as local labor market conditions, which could influence both vocational class choices and earnings. The family FE model helps account for such differences, as siblings living in the same household are exposed to similar local conditions. The family FE model addresses these variations, capturing the impact of shared local conditions on siblings residing in the same household

Panels (c) through (h) present age-specific estimates regarding the impact of vocational coursework on various labor market outcomes. In line with earlier findings on annual earnings, the FE model consistently reveals a positive correlation between high school vocational coursework and these outcome variables. In contrast, the Pooled OLS model does not lend support to this conclusion. Within the FE model, each additional year of vocational coursework is associated with a roughly one-hour increase in weekly working hours, spanning from the early twenties to the early thirties. Conversely, the OLS model indicates positive effects predominantly confined to the early twenties, with no significant influence in one's thirties. Likewise, the FE model indicates a positive association with the number of weeks worked per year, particularly for individuals aged 29 and above, showing an additional week of em-

ployment. Prior to age 29, the estimates remain positive but lack statistical significance. In contrast, the OLS model reveals an opposing pattern, with noteworthy positive effects between ages 19 and 22. Regarding employment status, neither model demonstrates significant variations across age groups, except for individuals aged 34 and older in the FE model. In this case, individuals with more vocational classes are more likely to be employed.

The family FE model indicates a consistent positive association between vocational classes and various labor market outcomes, extending across ages until the mid-thirties. In contrast, the OLS model suggests that this association is limited only to the early twenties. Vocational classes are primarily attended by individuals from socially disadvantaged backgrounds, who are also less likely to attend and complete college. This negative selection provides a lower bound for the effect of vocational classes, as seen in the results from the OLS model. The positive association with labor market outcomes in the early twenties can be attributed to the 'lock-in' effects, such as unemployment, that individuals from more-advantaged socioeconomic backgrounds experience when pursuing further education. Consequently, these effects tend to diminish with age as these individuals graduate from college and enter the workforce. However, the family FE model presents a different pattern. Over time, the positive association becomes even more pronounced in one's thirties compared to their twenties. This suggests that when controlling for selection bias, the impact of vocational classes persists with age, and the positive effects endure at least until the mid-thirties.

## 6 Heterogeneity Analysis and Robustness Checks

To have a better understanding of who would benefit most from vocational classes, I look further into the effects of vocational classes into the effects across various individual and family characteristics. I assess the impact of vocational classes on key outcome variables across distinct observations, considering factors such as gender, race, ability level (measured by ASVAB score), and mother's educational level.

### 6.1 Educational Outcomes

In Table 9, I assess the effects of additional vocational classes on educational outcomes across various sub-groups. Broadly, the impact is mainly associated with college attendance. Within the high ASVAB group, vocational classes show a positive association with attending 2-year college while exhibiting no significant impact on 4-year college attendance. Conversely, for the low ASVAB individuals, it is significantly negatively associated with attending 4-year college, with no discernible effect on 2-year college attendance. Examining the mother's educational level, vocational classes are negatively associated with 4-year college attendance in both groups. For whites, vocational classes negatively impact 4-year college attendance and graduation. In contrast, for non-whites, additional vocational classes do not affect college attendance but are negatively associated with obtaining a 2-year college degree. Males show a negative association with 4-year college attendance, while females exhibit a positive association with 4-year college graduation. Overall, the heterogeneity patterns suggest that vocational coursework mainly affects students with lower skill levels, who become less likely to pursue four-year college after exposure to vocational classes, while students with higher

skill levels appear largely unaffected. This pattern is consistent with vocational coursework helping students recognize alternative educational pathways rather than discouraging college attendance.

## 6.2 Labor Market Outcomes

Studies indicate that maternal education plays a major determinant in a child's development and can also serve as an indicator of the family's socioeconomic status. In the analysis following, I differentiate maternal education based on whether she has ever attended college, categorizing individuals accordingly. Figure 2 presents separate estimates for siblings from these two groups across four labor market outcomes. The estimates suggest that individuals whose mothers have not attended college experienced significantly more positive effects on their annual earnings in their thirties comparing to their peers whose mothers had attended college. Furthermore, they tend to work significantly more hours and weeks.

In addition to maternal educational level, an individual's own ability also plays a significant role in determining the benefits of taking more vocational classes. I divide the siblings into two distinct groups based on their ASVAB scores: the high-ASVAB group, composed of individuals with scores above the average, and the low-ASVAB group, which includes those with scores below the average. The results are showed in Figure 3. For individuals in the low ASVAB group, the positive effects of vocational classes are particularly evident. While the effect on earnings is mostly negligible, some small but statistically insignificant positive associations emerge at ages 27-29 and 33-34. However, there are consistent positive associations for working hours and weeks across different ages. Overall, individuals in

the low ASVAB group who take more vocational classes during high school tend to work approximately one hour more per week compared to their peers with similar ASVAB scores but fewer vocational credits. They also show a positive trend in the number of weeks worked per year, although these effects are not statistically significant for most ages. Additionally, the low ASVAB group exhibits a slightly higher likelihood of being employed in their early thirties. Conversely, the high ASVAB group experiences a positive insignificant association with vocational classes primarily in terms of earnings. There is no notable impact on working hours, weeks worked, or employment status for this group. As a result, high school vocational classes appear to exert a slightly more pronounced influence on individuals with lower ASVAB scores, while those with higher ASVAB scores do not seem to be significantly impacted.

Next, I explore variations in the impact of vocational classes based on race, as presented in Figure 4. For whites, the positive association between high school vocational classes and earnings is particularly pronounced, especially in their early thirties. Between the ages of 31 and 34, an additional year of vocational classes is associated with an approximately \$2,000 increase in annual earnings. On the other hand, non-whites experience a similar positive association, although it occurs at a later age and with a smaller overall magnitude. Notably, the positive association with working hours and weeks worked is more prominent for non-whites when compared to their white counterparts. For non-whites, each additional school year of vocational coursework is linked to an increase of approximately one additional working hour per week, peaking at about two hours in the age ranges of 28-30 and 33-34. In contrast, white individuals experience less than a one-hour increase. Similarly, non-whites

show a substantial increase in annual working weeks, particularly between the ages of 22-27, with an approximate half-week gain, which further increases to a full extra week around the ages of 28-30, and more than a week for individuals over 30. White individuals, on the other hand, experience an increase of less than one week. For non-whites, vocational coursework is also linked to a higher probability of being employed in their thirties, while this relationship remains statistically insignificant for their white counterparts. In summary, apart from the impact on earnings, it is evident that non-whites tend to benefit more from additional vocational classes, particularly in terms of working hours, annual working weeks, and employment prospects.

Finally, I examined the effects of gender differences and found that males tend to benefit more from vocational classes. As indicated in Figure 5, additional vocational classes have a positive association with earnings for males. Furthermore, they are associated with an increase of approximately 2 hours in weekly work hours after the age of 24. Additionally, males experience an increase of more than 1 week in annual work between the ages of 24 and 31. In contrast, the impact of vocational classes on females is notably different. It is only positively associated with higher earnings at the ages of 33 and 34, while showing no significant differences for other measurements.

### **6.3 Robustness**

One concern regarding the use of family fixed effects is driven by sample selection on the results. The balance test for background characteristics and outcome variables between the full sample and sibling samples has been conducted in the summary section, and the

results suggest that the two samples are similar in terms of observable characteristics. The robustness check involves comparing estimates across OLS from the full sample, OLS from the sibling sample, and FE from the sibling sample. Table 10 presents the robustness check for labor market outcomes. Column (2) indicates the OLS results from the sibling sample. Comparing results from columns (1) and (2), the estimates from the sibling sample closely resemble those from the full sample, while the magnitude of results is larger for the fixed effects results. Table 11 displays the results for educational outcomes. The patterns for effects across different educational outcomes are similar between the full sample and sibling sample, but they differ from the FE results with the sibling sample. This suggests that the effects observed in FE models are not solely driven by sample selection and, furthermore, indicates that the FE model to some extent accounts for the selection issue that the OLS model cannot address.

## 7 Potential Mechanisms

### 7.1 Investigating the Job Matching from Vocational Coursework

The main findings suggest positive effects on labor market outcomes, especially a sustained positive trend for annual earnings till the mid-thirties. One potential channel is that vocational classes contribute to improved job matching, resulting in fewer job changes and facilitating the accumulation of earnings.

Having acquired specific skills and knowledge through vocational training, individuals with more vocational class experience may find it easier to secure a stable job that aligns

with their abilities. On the other hand, individuals with a more general knowledge base, developed through academic classes, may have a wider array of opportunities but may also be more prone to job changes as they can fit into various occupations. However, it also makes them easier to be substituted, increasing the likelihood of transitioning from one occupation to another, which usually lead to a decrease in earnings (Böhm et al., 2024). To test this hypothesis, I explore the effects of vocational class credits on job match by looking into two indicators of job match — number of moves between occupations and the total number of unique jobs one has ever had. A job change is counted as long as the reported occupation code differs from the previous year, and the number of jobs counted does not include duplicate occupation codes. For example, from age 19 to 21, a person reported herself as a sales representative, cashier, and again as a sales representative, she had two job changes and two unique jobs.

I followed the occupation categories defined by Autor and Dorn (2013) to account for changes in occupation. Occupations are categorized into six groups based on the tasks underlying different jobs, indicating the intensity of manual/non-manual and routine/non-routine tasks for each job group. The six categories of occupations are as follows: Managers/professional/tech/finance/public safety, Production/craft, Transport/construct/mechanical/mining/farm, Machine operators/assemblers, Clerical/retail sales, and Service occupations.

Table 12 presents the results for the effects on Job Match. The OLS results suggest that vocational credits are negatively associated with the total number of jobs one has ever attempted and job changes, indicating that vocational classes taken during high school can contribute to a better job match later in the job market. However, results from the FE model

do not support this result. The FE results are not statistically different from zero. Thus, comparing siblings implies that individuals coming from similar backgrounds and differing only in the credits taken for vocational classes during high school do not predict a better job match. The previous hypothesis does not hold; this discrepancy in results suggests that job match may not be the channel for a positive effect on earnings.

## 7.2 Investigating the Role of the College Wage Premium

Another potential channel for the positive effects on annual earnings might be the college wage premium. Since the estimates reflect average returns across individuals with different educational attainment, including those who later attended or completed college, it is possible that the results capture the college wage premium rather than the effect of high school vocational education. There is extensive evidence that obtaining a college degree substantially raises earnings (Averett and Burton, 1996; Grogger and Eide, 1995). Given that my results show vocational coursework does not reduce the probability of college completion for those who enroll, it is reasonable to suspect that the observed returns to earnings may partly reflect the effect of attending or finishing college, rather than vocational coursework itself.

To test this hypothesis, I extended the basic specification from Equation (4) by adding controls separately for ever attending college and for earning a college degree. The new estimates are not significantly different from the baseline results. Figures 6 show that the trend of marginal effects of high school vocational credits on yearly earnings from the family FE model, after including the two college indicators, closely mirrors the general trend shown in Figure 1, Panel (a). This evidence suggests that the positive effect on annual earnings is

not driven by college attendance or completion, but instead reflects the effect of vocational coursework taken during high school.

### **7.3 Investigating the Role of Comparative Advantage**

The exercises above rule out two possible mechanisms. If the positive earnings effects do not arise from better job matches or a college wage premium, they may instead reflect comparative advantage. This line of reasoning is also consistent with the mechanism suggested by the education results. This interpretation aligns with the findings of Meer (2007), who shows that students do not earn more when switching to an alternative track, as well as Silliman and Virtanen (2022), who find that individuals who express a preference for the vocational track benefit more from vocational education.

Students who are exposed to a variety of courses, rather than being constrained by track choices, may have more opportunities to discover their comparative advantage. Recognizing their comparative advantage and preferences at an earlier stage may divert them away from more academically oriented pathways, which is also reflected in the decline in four-year college attendance. Entering the labor market earlier allows these students to accumulate work experience, tenure, and occupation-specific human capital, which may be reflected in higher annual earnings.

## **8 Conclusion**

This paper investigates the impact of high school vocational classes on individuals' educational and labor market outcomes. I analyze within-family differences in outcomes by

comparing siblings who accumulated different amounts of vocational coursework during high school. The results show that vocational coursework is associated with sustained labor-market benefits, particularly for students from less advantaged backgrounds, while not affecting the college success of those who pursue higher education.

These findings speak to how vocational coursework fits within the broader high school curriculum and for whom it may be more relevant. They are broadly consistent with the College and Career Readiness (CCR) framework, which emphasizes that “not every student requires the same proficiency in all areas” (Conley, 2012). From this perspective, it may be important to for vocational coursework to remain accessible to high school students. Exposure to a wider range of courses beyond the general curriculum may help students identify their comparative advantage and make more informed educational decisions. Given that vocational coursework is associated with positive and sustained mid-term earnings outcomes for the average student, maintaining access to such courses may be beneficial. The heterogeneity results further suggest that the earnings effects are stronger for students from more disadvantaged backgrounds, which may be relevant for discussions of educational equity.

# Figures and Tables

Table 1: Comparison - Full and Sibling Samples

	(1) Full	(2) Siblings
<b><i>A. Sample Selection</i></b>		
Whole Sample	8,984	4,035
Transcript Available	6,232	2,271
Total Credit $\geq 3$	5,874	2,124
<b><i>B. Summary Statistics</i></b>		
<b><i>Credits</i></b>		
Vocational class credits	3.574 (2.860)	3.770 (2.890)
Core class credits	13.674 (4.119)	13.658 (4.088)
Elective class credits	3.688 (2.637)	3.646 (2.588)
Other class credits	3.232 (2.013)	3.170 (1.899)
Total class credits	24.132 (6.653)	24.212 (6.525)
<b><i>Background Characteristics</i></b>		
Male	0.497 (0.500)	0.504 (0.500)
Black	0.132 (0.339)	0.123 (0.328)
Hispanic	0.106 (0.308)	0.109 (0.312)
Other race	0.011 (0.106)	0.010 (0.101)
Birth Year	1981.896 (1.412)	1981.916 (1.432)
Poverty Ratio	3.785 (3.576)	3.528 (3.471)
Urban	0.698 (0.459)	0.677 (0.468)
Mother w/ some college	0.482 (0.500)	0.457 (0.498)
Single-Parent Family	0.286 (0.452)	0.268 (0.443)
ASVAB	54.622 (28.01)	53.390 (28.19)
Mechanical Comprehension	-0.406 (0.763)	-0.442 (0.791)
8th Grade GPA	6.019 (1.590)	5.955 (1.637)
Observations	4303	1570

Notes: Mean coefficients; sd in parentheses. Data source: NLSY97.  
Number of Observations in panel B excludes missing values.

Table 2: Full sample - Credits and Outcome Variables

	(1)	(2)	(3)
	High-Taker	Low-Taker	Diff
<i>Credits</i>			
Vocational class credits	5.531 (2.882)	1.681 (0.876)	3.850*** (0.0711)
Core class credits	13.818 (3.290)	13.535 (4.782)	0.283* (0.132)
Elective class credits	3.129 (2.340)	4.228 (2.791)	-1.099*** (0.0848)
Other class credits	3.272 (1.951)	3.193 (2.071)	0.0789 (0.0659)
Total class credits	25.681 (5.125)	22.634 (7.558)	3.048*** (0.207)
<i>Educational Outcomes</i>			
High School Diploma	0.936 (0.245)	0.840 (0.366)	0.0958*** (0.00997)
Ever attended college	0.747 (0.435)	0.796 (0.403)	-0.0490*** (0.0135)
Attended 2-year	0.467 (0.499)	0.383 (0.486)	0.0838*** (0.0162)
Attended 4-year	0.547 (0.498)	0.659 (0.474)	-0.112*** (0.0158)
Obtained any college degree	0.428 (0.495)	0.552 (0.497)	-0.124*** (0.0163)
Associate Degree	0.110 (0.313)	0.094 (0.292)	0.0160 (0.0103)
Bachelor Degree	0.318 (0.466)	0.458 (0.498)	-0.140*** (0.0159)
<i>Employment Outcomes</i>			
Emp. Status 25	0.872 (0.334)	0.849 (0.358)	0.0228* (0.0116)
Emp. Status 30	0.805 (0.396)	0.782 (0.413)	0.0232 (0.0134)
Emp. Status 35	0.758 (0.428)	0.728 (0.445)	0.0301* (0.0143)
Weeks Employed 25	45.804 (11.81)	45.227 (12.31)	0.577 (0.417)
Weeks Employed 30	47.881 (10.20)	46.623 (11.80)	1.259** (0.403)
Weeks Employed 35	47.499 (9.841)	46.964 (10.63)	0.535 (0.390)
Earnings 25	30,334.089 (21374.5)	29,169.301 (20437.2)	1164.8 (757.1)
Earnings 30	39,683.684 (30779.5)	39,094.742 (29020.0)	588.9 (1120.6)
Earnings 35	49,570.964 (40316.5)	52,032.545 (41875.9)	-2,461.6 (1782.5)
Observations	2120	2183	4303

Notes: Mean coefficients; sd in parentheses

High taker and Low taker refers to individuals with higher or lower than average credits in vocational classes

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

data source: NLSY97

Table 3: Full sample - Background Characteristics

	(1) High-Taker	(2) Low-Taker	(3) Diff
Male	0.540 (0.499)	0.455 (0.498)	0.0849*** (0.0164)
Black	0.142 (0.349)	0.123 (0.329)	0.0188* (0.00899)
Hispanic	0.100 (0.300)	0.112 (0.316)	-0.0126 (0.00821)
Other race	0.012 (0.107)	0.011 (0.105)	0.000491 (0.00367)
Birth Year	1981.89 (1.409)	1981.902 (1.415)	-0.0120 (0.0475)
Poverty Ratio	3.572 (3.257)	3.991 (3.849)	-0.419*** (0.121)
Urban	0.652 (0.476)	0.743 (0.437)	-0.0905*** (0.0152)
Mother w/ some college	0.436 (0.496)	0.527 (0.499)	-0.0904*** (0.0164)
Single-parent Family	0.292 (0.455)	0.281 (0.449)	0.0115 (0.0145)
ASVAB	50.778 (27.11)	58.343 (28.37)	-7.565*** (0.889)
Mechanical Comprehension	-0.428 (0.761)	-0.386 (0.764)	-0.0418 (0.0244)
8th Grade GPA	5.845 (1.547)	6.186 (1.612)	-0.341*** (0.0517)
Observations	2120	2183	4303

Notes: Mean coefficients; sd in parentheses

High taker and Low taker refers to individuals with higher or lower than average credits in vocational classes

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

data source: NLSY97

Table 4: Sibling Sample - Background Characteristics

	(1) High-Taker	(2) Low-Taker	(3) Diff
Male	0.559 (0.497)	0.460 (0.499)	0.0981*** (0.0287)
Black	0.115 (0.320)	0.117 (0.322)	-0.00189 (0.0148)
Hispanic	0.101 (0.302)	0.111 (0.314)	-0.00962 (0.0144)
Other race	0.011 (0.103)	0.009 (0.0951)	0.00168 (0.00599)
Birth Year	1981.861 (1.431)	1981.965 (1.439)	-0.103 (0.0845)
Poverty Ratio	3.539 (3.275)	3.726 (3.821)	-0.187 (0.214)
Urban	0.672 (0.470)	0.675 (0.469)	-0.00231 (0.0274)
Mother w/ some college	0.469 (0.499)	0.463 (0.499)	0.00534 (0.0289)
Single-parent Family	0.273 (0.446)	0.266 (0.442)	0.00665 (0.0252)
ASVAB	51.827 (27.69)	56.051 (28.09)	-4.224** (1.575)
Mechanical Comprehension	-0.404 (0.762)	-0.424 (0.806)	0.0206 (0.0445)
8th Grade GPA	5.857 (1.595)	6.101 (1.668)	-0.244** (0.0938)
Observations	674	699	1373

Notes: Mean coefficients; sd in parentheses.

High taker and Low taker refers to individuals with higher or lower than average credits in vocational classes. Excluding siblings with the same number of credits in vocational classes.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

data source: NLSY97

Table 5: Sibling Sample -Credit and Outcome Variables

	(1)	(2)	(3)
	High-Taker	Low-Taker	Diff
<i>Credits</i>			
Vocational Class credits	5.247 (3.034)	2.631 (2.155)	2.615*** (0.155)
Core class credits	13.888 (3.457)	13.645 (4.445)	0.244 (0.224)
Elective class credits	3.274 (2.243)	4.028 (2.845)	-0.753*** (0.148)
Other class credits	3.249 (1.865)	3.071 (1.897)	0.178 (0.109)
Total class credits	25.607 (5.213)	23.361 (7.082)	2.247*** (0.347)
<i>Educational Outcomes</i>			
High School Diploma	0.942 (0.234)	0.857 (0.351)	0.0854*** (0.0166)
Ever attended college	0.760 (0.427)	0.770 (0.421)	-0.0102 (0.0242)
Attended 2-year	0.433 (0.496)	0.412 (0.493)	0.0216 (0.0285)
Attended 4-year	0.570 (0.495)	0.616 (0.487)	-0.0458 (0.0282)
Obtained any college degree	0.469 (0.499)	0.507 (0.500)	-0.0377 (0.0289)
Associate Degree	0.106 (0.308)	0.106 (0.309)	-0.000583 (0.0177)
Bachelor Degree	0.363 (0.481)	0.400 (0.490)	-0.0371 (0.0283)
<i>Employment Outcomes</i>			
Emp. Status 25	0.870 (0.336)	0.855 (0.353)	0.0154 (0.0197)
Emp. Status 25	0.806 (0.396)	0.785 (0.411)	0.0212 (0.0232)
Emp. Status 30	0.750 (0.433)	0.748 (0.435)	0.00200 (0.0251)
Weeks Employed 25	45.754 (11.75)	45.210 (12.66)	0.545 (0.735)
Weeks Employed 25	48.011 (10.16)	46.383 (11.89)	1.627* (0.705)
Weeks Employed 35	48.276 (8.798)	47.290 (9.889)	0.986 (0.621)
Earnings 25	31,278.835 (21201.6)	31,371.502 (21568.8)	-92.67 (1353.2)
Earnings 30	44,978.133 (34570.8)	38,746.177 (29457.6)	6,232.0** (2097.1)
Earnings 35	54,414.542 (45508.9)	48,424.936 (36107.1)	5,989.6 (3148.0)
Observations	674	699	1373

Notes: Mean coefficients; sd in parentheses.

High taker and Low taker refers to individuals with higher or lower than average credits in vocational classes. Excluding siblings with the same number of credits in vocational classes.

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

data source: NLSY97

Table 6: Effects of Vocational Classes on Educational Outcome

	Pooled-OLS - Full Sample		Family Fixed Effects - Sibling Sample			
	(1) Voc Only	(2) Voc and Total Credits	(3) All control	(4) Voc Only	(5) Voc and Total Credits	(6) All control
High School Diploma	0.026** (0.002)	-0.002 (0.001)	0.001 (0.002)	0.037** (0.005)	-0.000 (0.004)	-0.001 (0.004)
Attend Any college	-0.011** (0.002)	-0.036** (0.002)	-0.015** (0.002)	0.003 (0.006)	-0.023** (0.006)	-0.012* (0.006)
Attend 2-year	0.015** (0.003)	0.014** (0.003)	0.012** (0.003)	0.009 (0.007)	0.003 (0.008)	0.007 (0.008)
Attend 4-year	-0.023** (0.003)	-0.054** (0.002)	-0.027** (0.003)	-0.010 (0.007)	-0.039** (0.007)	-0.026** (0.007)
Any college degree	-0.018** (0.003)	-0.044** (0.003)	-0.019** (0.003)	-0.005 (0.006)	-0.021** (0.007)	-0.008 (0.007)
2-year degree	0.004** (0.002)	0.004* (0.002)	0.003+ (0.002)	0.000 (0.005)	-0.001 (0.005)	-0.001 (0.006)
4-year degree	-0.023** (0.003)	-0.048** (0.002)	-0.022** (0.003)	-0.006 (0.006)	-0.020** (0.007)	-0.007 (0.007)
N	4438	4438	4438	1621	1621	1621

Notes: Each coefficient represents estimate for vocational classes from a separate regression. Specifications (1)-(3) are OLS models, (4)-(6) are family FE models. (1) includes only vocational credits; (2) includes both vocational and total credits; (3) includes vocational, total credits and individual and family background characteristics, which contain the following variables: male, black, hispanic, other race, poverty-ratio, urban area, mother with some college education, ASVAB score, 8th grade GPA, and ASVAB-Mechanical comprehension score. Dummy variables for birth year, whether individual come from two-parent family, and a constant term. (4) is family FE model with only vocational credits; (5) is FE model includes both vocational and total credits; (6) is the full FE model with controls for individual characteristics: male, black, hispanic, other race, ASVAB, 8th-grade GPA, ASVAB-Mechanical comprehension score, dummy variable for birth year and a constant term. Standard Errors are clustered at family level.

Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: National Longitudinal Survey of Youth 1997 (unweighted)

Table 7: Effects of Vocational Classes on Labor Market Outcomes

	Pooled OLS - Full Sample			Family Fixed Effects - Sibling Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
	Only Voc	Voc and Total Credit	All Controls	Only Voc	Voc and Total Credit	All Controls
Annual Earnings	-24.373 (38.079) [64050]	-488.203*** (39.956) [64050]	103.660** (46.533) [64050]	1063.497*** (280.198) [23449]	872.547*** (312.875) [23449]	671.866** (304.215) [23449]
Weekly working hours	0.478*** (0.027) [80677]	0.287*** (0.029) [80677]	0.269*** (0.032) [80677]	0.991*** (0.236) [29474]	0.953*** (0.273) [29474]	0.753*** (0.278) [29474]
Annual Weeks	0.323*** (0.025) [73498]	-0.013 (0.027) [73498]	0.171*** (0.029) [73498]	0.922*** (0.218) [27044]	0.760*** (0.228) [27044]	0.676*** (0.239) [27044]
Employment Status	0.005*** (0.001) [55504]	-0.001** (0.001) [55504]	0.002*** (0.001) [55504]	0.008** (0.004) [20542]	0.004 (0.004) [20542]	0.003 (0.004) [20542]

*Notes:* Each coefficient is estimated from separate regression. specifications in column (1)-(3) are OLS models, column (4)-(6) are FE models. (1) includes only vocational credits; (2) includes both vocational and total credits; (3) includes vocational, total credits and individual and family background characteristics, which contain the following variables: male, black, hispanic, other race, poverty-ratio, urban area, mother with some college education, ASVAB score, 8th grade GPA, and ASVAB-Mechanical comprehension score. Dummy variables for birth year, whether individual come from two-parent family, and a constant term. (4) is FE model with only vocational credits; (5) is FE model includes both vocational and total credits; (6) is the full FE model with controls for individual characteristics: male, black, hispanic, other race, ASVAB, 8th-grade GPA, ASVAB-Mechanical comprehension score, dummy variable for birth year and a constant term.

Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: National Longitudinal Survey of Youth 1997 (unweighted)

Table 8: Effects of Vocational Classes on Labor Market Outcomes

	Pooled OLS - Full Sample			Family Fixed Effects - Sibling Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Annual Earnings	Only Voc -24.373 (38.079) [64050]	Voc and All Credit -488.203*** (39.956) [64050]	All Controls 103.660** (46.533) [64050]	Only Voc 1063.497*** (280.198) [23449]	Voc and All Credit 872.547*** (312.875) [23449]	All Controls 671.866** (304.215) [23449]
Weekly working hours	0.478*** (0.027) [80677]	0.287*** (0.029) [80677]	0.269*** (0.032) [80677]	0.991*** (0.236) [29474]	0.953*** (0.273) [29474]	0.753*** (0.278) [29474]
Annual Weeks	0.323*** (0.025) [73498]	-0.013 (0.027) [73498]	0.171*** (0.029) [73498]	0.922*** (0.218) [27044]	0.760*** (0.228) [27044]	0.676*** (0.239) [27044]
Employment Status	0.005*** (0.001) [55504]	-0.001** (0.001) [55504]	0.002*** (0.001) [55504]	0.008** (0.004) [20542]	0.004 (0.004) [20542]	0.003 (0.004) [20542]

*Notes:* Each coefficient is estimated from separate regression. specifications in column (1)-(3) are OLS models, column (4)-(6) are FE models. (1) includes only vocational credits; (2) includes both vocational and total credits; (3) includes vocational, total credits and individual and family background characteristics, which contain the following variables: male, black, hispanic, other race, poverty-ratio, urban area, mother with some college education, ASVAB score, 8th grade GPA, and ASVAB-Mechanical comprehension score. Dummy variables for birth year, whether individual come from two-parent family, and a constant term. (4) is FE model with only vocational credits; (5) is FE model includes both vocational and total credits; (6) is the full FE model with controls for individual characteristics: male, black, hispanic, other race, ASVAB, 8th-grade GPA, ASVAB-Mechanical comprehension score, dummy variable for birth year and a constant term. Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis. \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: National Longitudinal Survey of Youth 1997 ( unweighted)

Table 9: Heterogeneity in Effects of vocational Classes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ASVAB High	ASVAB Low	Mom with college	Mom with no college	White	Non-white	Male	Female	Full Sibling Sample
High School Diploma	0.006 (0.006)	-0.006 (0.009)	0.001 (0.005)	-0.004 (0.006)	0.003 (0.005)	-0.013 (0.008)	0.002 (0.008)	0.012 (0.009)	-0.001 (0.004)
Attend Any college	-0.012 (0.008)	-0.005 (0.012)	-0.019* (0.009)	-0.011 (0.009)	-0.016* (0.007)	-0.008 (0.012)	-0.023+ (0.012)	0.001 (0.013)	-0.012* (0.006)
Attend 2-year	0.034* (0.016)	0.004 (0.013)	0.010 (0.014)	0.004 (0.010)	0.010 (0.010)	-0.002 (0.014)	0.006 (0.017)	-0.002 (0.018)	0.007 (0.008)
Attend 4-year	-0.015 (0.012)	-0.033** (0.012)	-0.025* (0.011)	-0.025** (0.009)	-0.031** (0.009)	-0.010 (0.012)	-0.057** (0.014)	-0.004 (0.017)	-0.026** (0.007)
Any College Degree	0.005 (0.015)	-0.009 (0.011)	-0.021+ (0.012)	-0.002 (0.009)	-0.008 (0.010)	-0.002 (0.011)	-0.022 (0.015)	0.020 (0.017)	-0.008 (0.007)
2-year Degree	0.020+ (0.011)	-0.010 (0.009)	0.003 (0.009)	-0.005 (0.007)	0.012+ (0.007)	-0.021* (0.009)	-0.000 (0.012)	-0.013 (0.013)	-0.001 (0.006)
4-year Degree	-0.016 (0.015)	0.001 (0.010)	-0.024+ (0.012)	0.003 (0.008)	-0.020* (0.009)	0.019+ (0.011)	-0.022 (0.014)	0.033* (0.016)	-0.007 (0.007)
N	2270	2168	1961	2477	2582	1856	2184	2254	4438

*Notes:* All the coefficients in this table are Fixed effects results, and each is estimated from a separate regression. Each regression includes vocational and total credits with controls for individual characteristics: male, black, hispanic, other race, ASVAB, 8th-grade GPA, ASVAB-Mechanical comprehension score, dummy variable for birth year and a constant term. Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: National Longitudinal Survey of Youth 1997 ( unweighted)

Table 10: Robustness - Labor Market Outcomes

	Pooled OLS - Full Sample	OLS - Sibling Sample	Family FE - Sibling Sample
	(1)	(2)	(3)
Annual Earnings	167.462***	272.575***	684.086**
	(40.532)	(67.614)	(302.515)
	[60183]	[22026]	[22026]
Weekly working hours	0.287***	0.324***	0.729***
	(0.033)	(0.055)	(0.280)
	[69758]	[25527]	[25527]
Annual Weeks	0.180***	0.284***	0.655***
	(0.030)	(0.049)	(0.237)
	[68893]	[25361]	[25361]
Employment Status	0.002***	0.003***	0.003
	(0.001)	(0.001)	(0.004)
	[52547]	[19458]	[19458]

*Notes:* All the coefficients in this table from a separate regression with full control variables, like the previous table. Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

Source: National Longitudinal Survey of Youth 1997 ( unweighted)

Table 11: Robustness - Educational Outcomes

	Pooled OLS - Full Sample	OLS - Sibling Sample	Family FE - Sibling Sample
	(1)	(2)	(3)
High School	0.001 (0.002)	0.002 (0.003)	-0.001 (0.004)
Attend Any college	-0.015*** (0.002)	-0.017*** (0.004)	-0.012* (0.007)
Attend 2-year	0.012*** (0.003)	0.009* (0.005)	0.007 (0.009)
Attend 4-year	-0.027*** (0.003)	-0.030*** (0.004)	-0.026*** (0.007)
Obtained Any college	-0.019*** (0.003)	-0.015*** (0.004)	-0.008 (0.007)
Obtained 2-year	0.003* (0.002)	0.010*** (0.003)	-0.001 (0.006)
Obtained 4-year	-0.022*** (0.003)	-0.024*** (0.004)	-0.007 (0.007)
N	4438	1621	4438

*Notes:* All the coefficients in this table are estimated from separate regressions with full control variables. Standard Errors are in parenthesis, number of observations for each specification is in square parenthesis.

\*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$

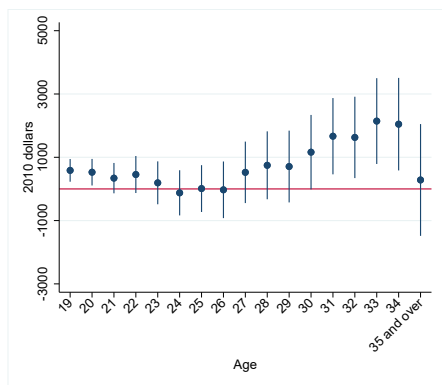
Source: National Longitudinal Survey of Youth 1997 (unweighted)

Table 12: Effects on Job Match

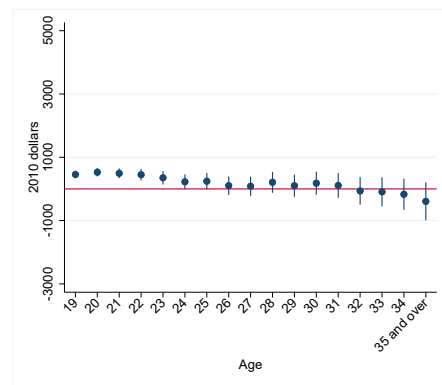
	Pooled OLS			Fixed Effects		
	no control	basic control	All control	no control	basic control	all controls
Total jobs	-0.053** (0.012)	-0.058** (0.013)	-0.044** (0.014)	-0.021 (0.036)	-0.008 (0.039)	0.001 (0.041)
Moves	-0.055** (0.014)	-0.051** (0.015)	-0.036* (0.016)	-0.013 (0.044)	0.005 (0.048)	0.015 (0.049)
N	3961	3961	3961	1453	1453	1453

*Notes:* No control includes only vocational credits; basic control includes vocational credits and all credits; full control includes all other demographic characteristics. \*\*\*  $p < 0.01$ ; \*\*  $p < 0.05$ ; \*  $p < 0.1$ ; Source: National Longitudinal Survey of Youth 1997 ( unweighted)

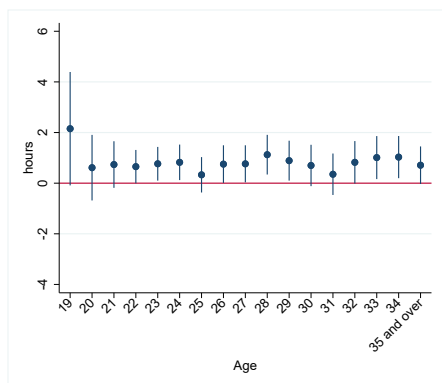
Figure 1: Effects of High School Vocational Classes on Labor Market Outcomes



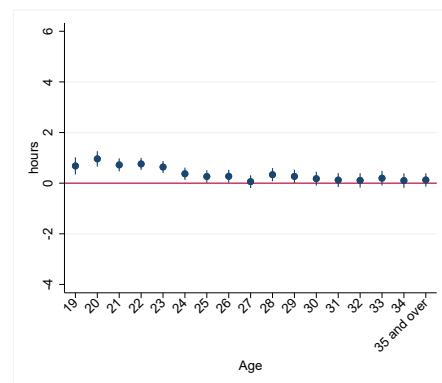
(a) Earnings - Fixed Effects



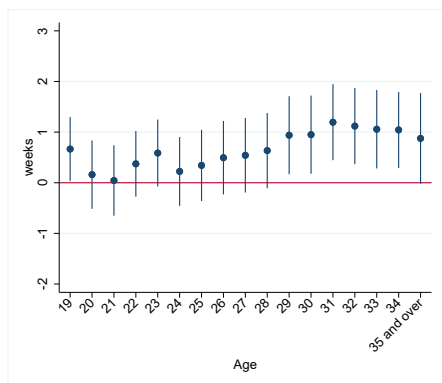
(b) Earnings - OLS



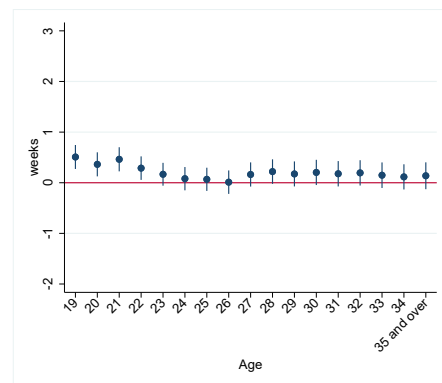
(c) Hours - Fixed Effects



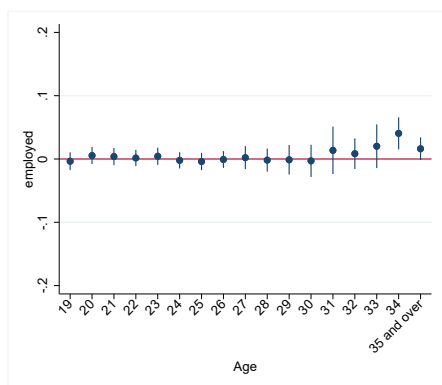
(d) Hours - OLS



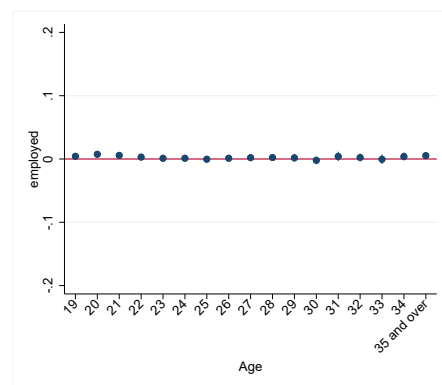
(e) Weeks - Fixed Effects



(f) Weeks - OLS



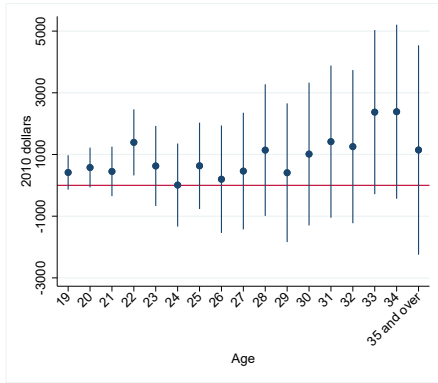
(g) Employment Status - Fixed Effects



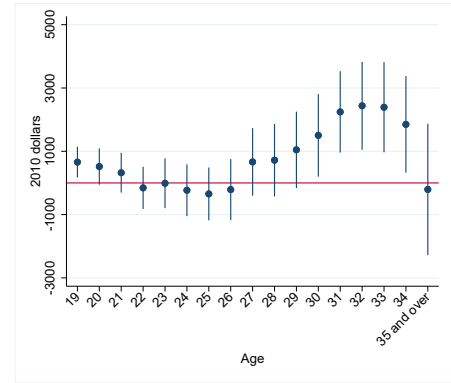
(h) Employment Status - OLS

Note: Figures compare trend of marginal effect of vocational class on various outcomes across age between family FE model and OLS model.

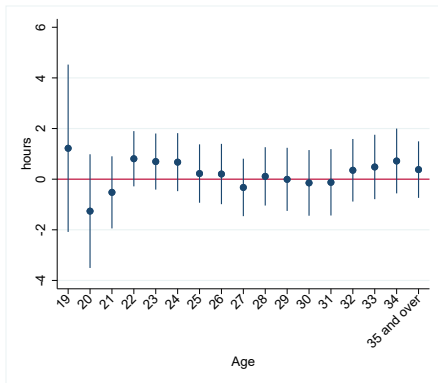
Figure 2: Heterogeneity by mother's educational level



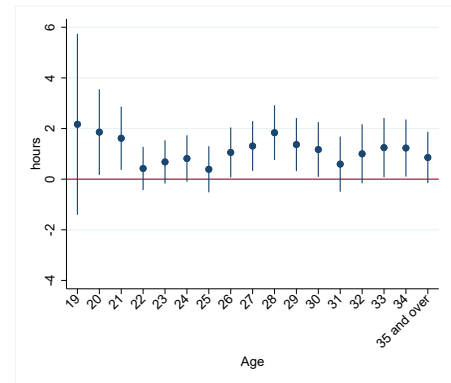
(a) Earnings - mother with some college



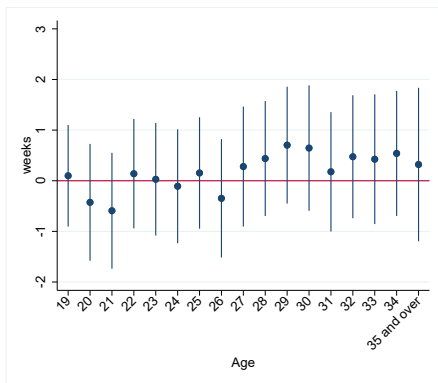
(b) Earnings - mother without college



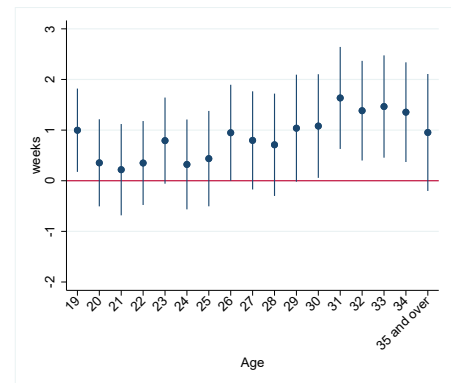
(c) Hours - mother with some college



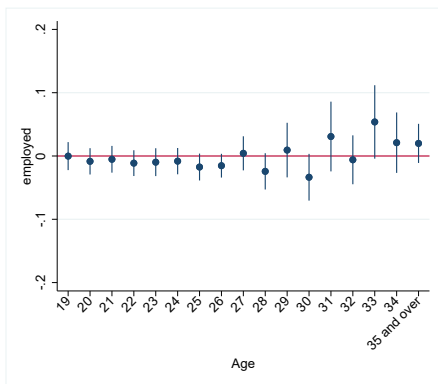
(d) Hours - mother without college



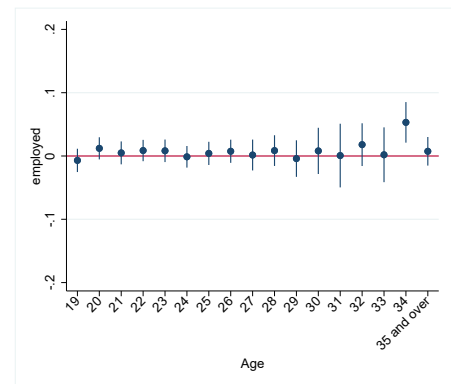
(e) Weeks - mother with some college



(f) Weeks - mother without college



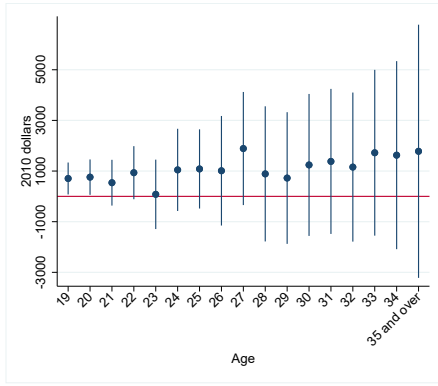
(g) Employment Status - mother with some college



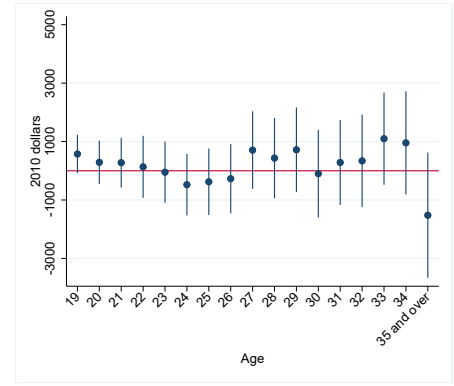
(h) Employment Status - mother without college

Note: Figures compare trend of marginal effect of vocational class on various outcomes across age from family FE model by mother's educational level.

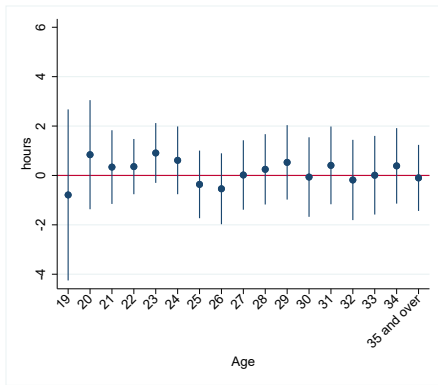
Figure 3: Heterogeneity by Ability



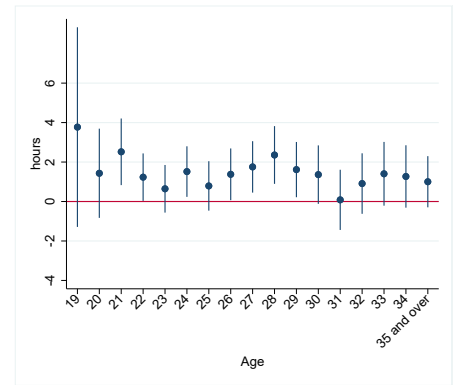
(a) Earnings - High ASVAB



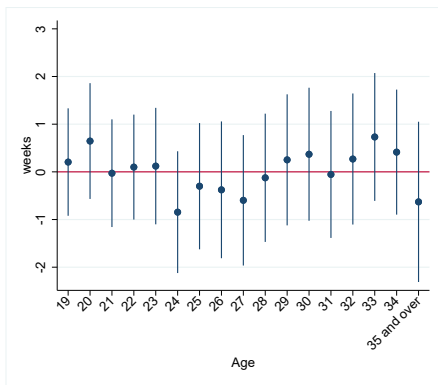
(b) Earnings - Low ASVAB



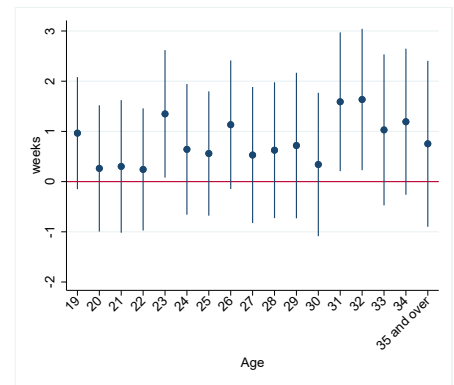
(c) Hours - High ASVAB



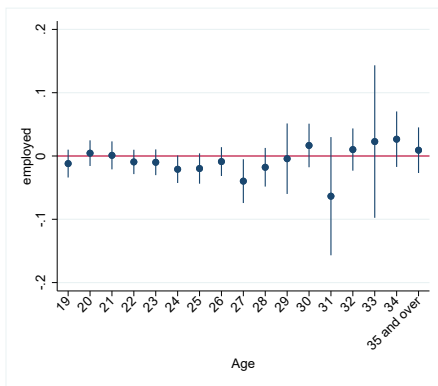
(d) Hours - Low ASVAB



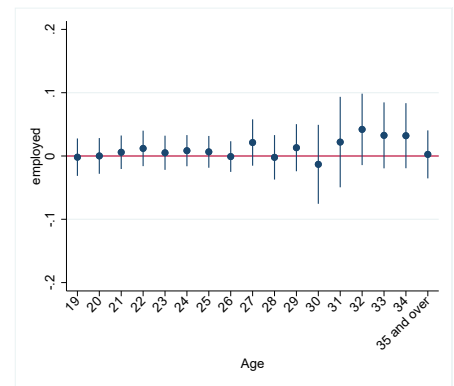
(e) Weeks - High ASVAB



(f) Weeks - Low ASVAB



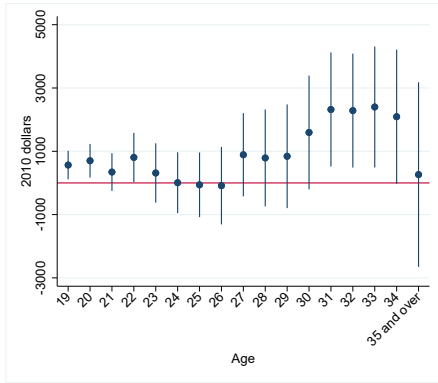
(g) Employment Status - High Asvab



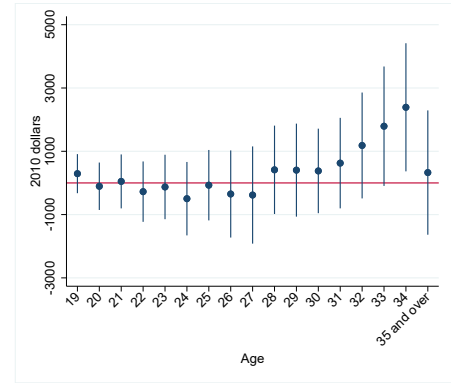
(h) Employment Status - Low ASVAB

Note: Figures compare trend of marginal effect of vocational class on various outcomes across age from family FE model by High and Low ability level (ASVAB score).

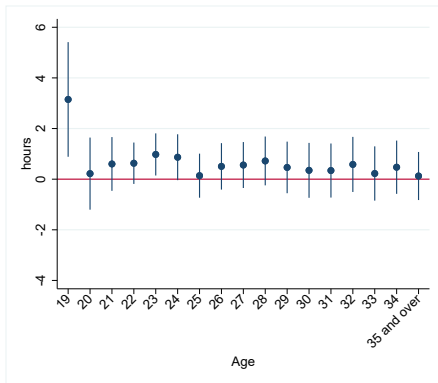
Figure 4: Heterogeneity by Race



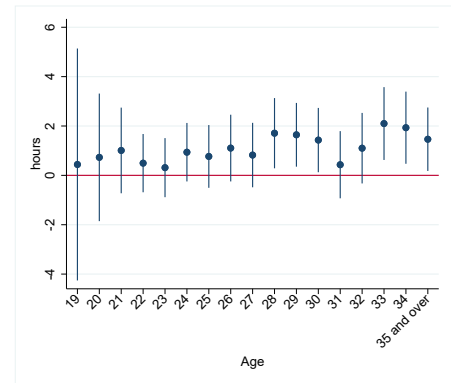
(a) Earnings - white



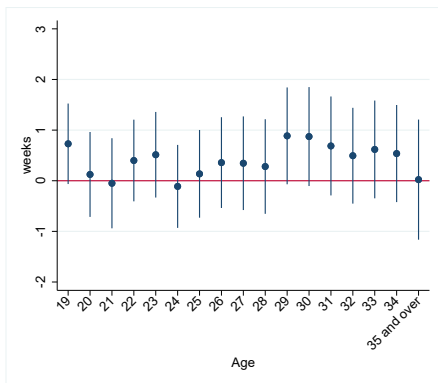
(b) Earnings - nonwhite



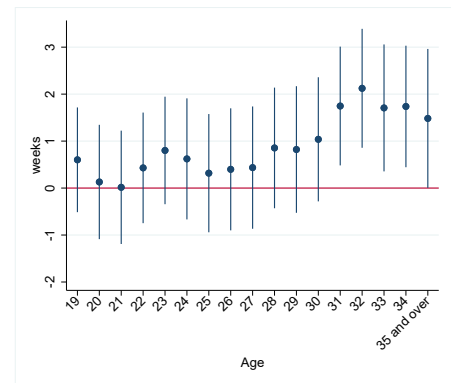
(c) Hours - white



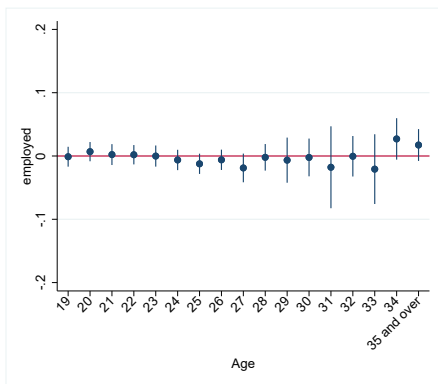
(d) Hours - nonwhite



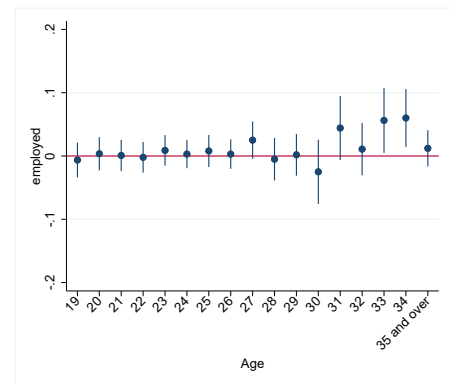
(e) Weeks - white



(f) Weeks - nonwhite



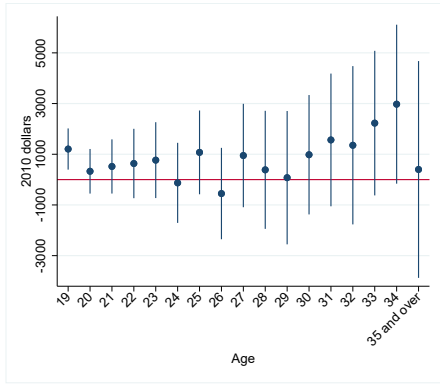
(g) Employment Status - white



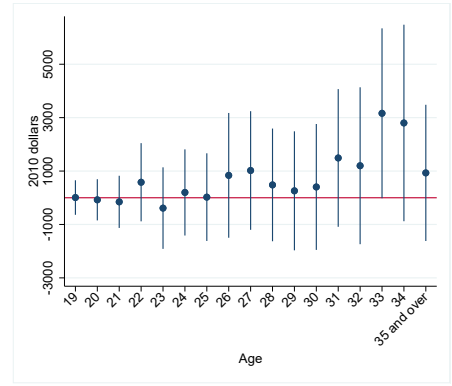
(h) Employment Status - nonwhite

Note: Figures compare trend of marginal effect of vocational class on various outcomes across age from family FE model by race.

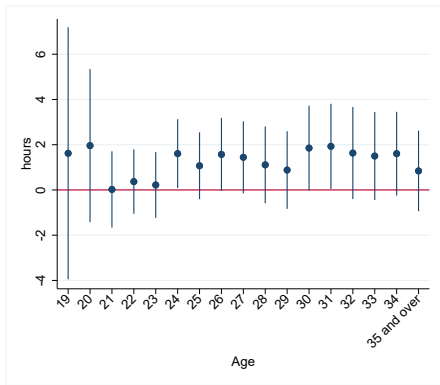
Figure 5: Heterogeneity by Gender



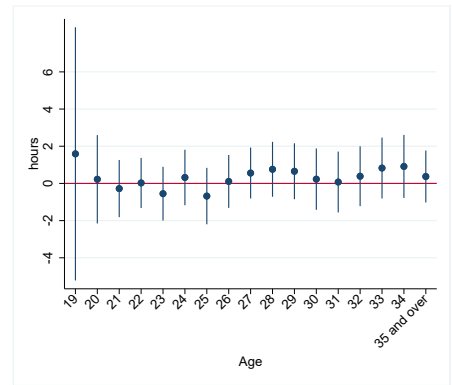
(a) Earnings - male



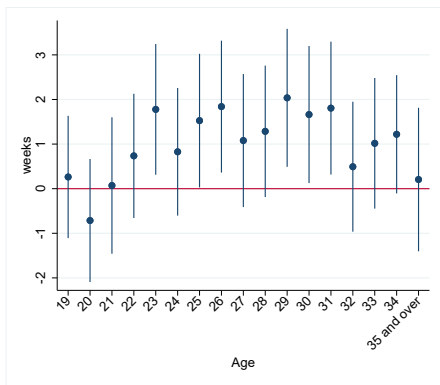
(b) Earnings - female



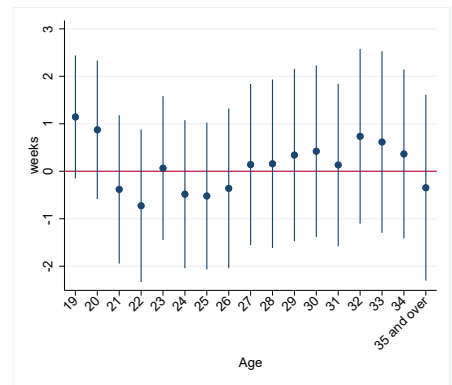
(c) Hours - male



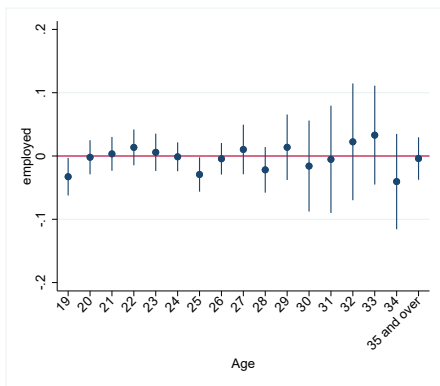
(d) Hours - female



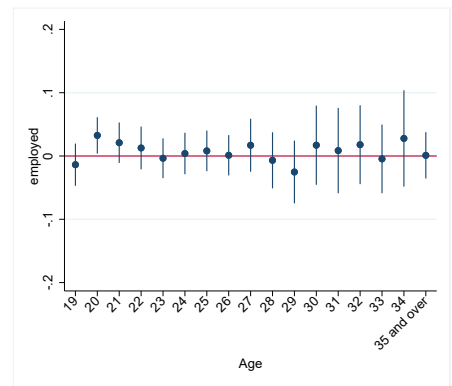
(e) Weeks - male



(f) Weeks - female



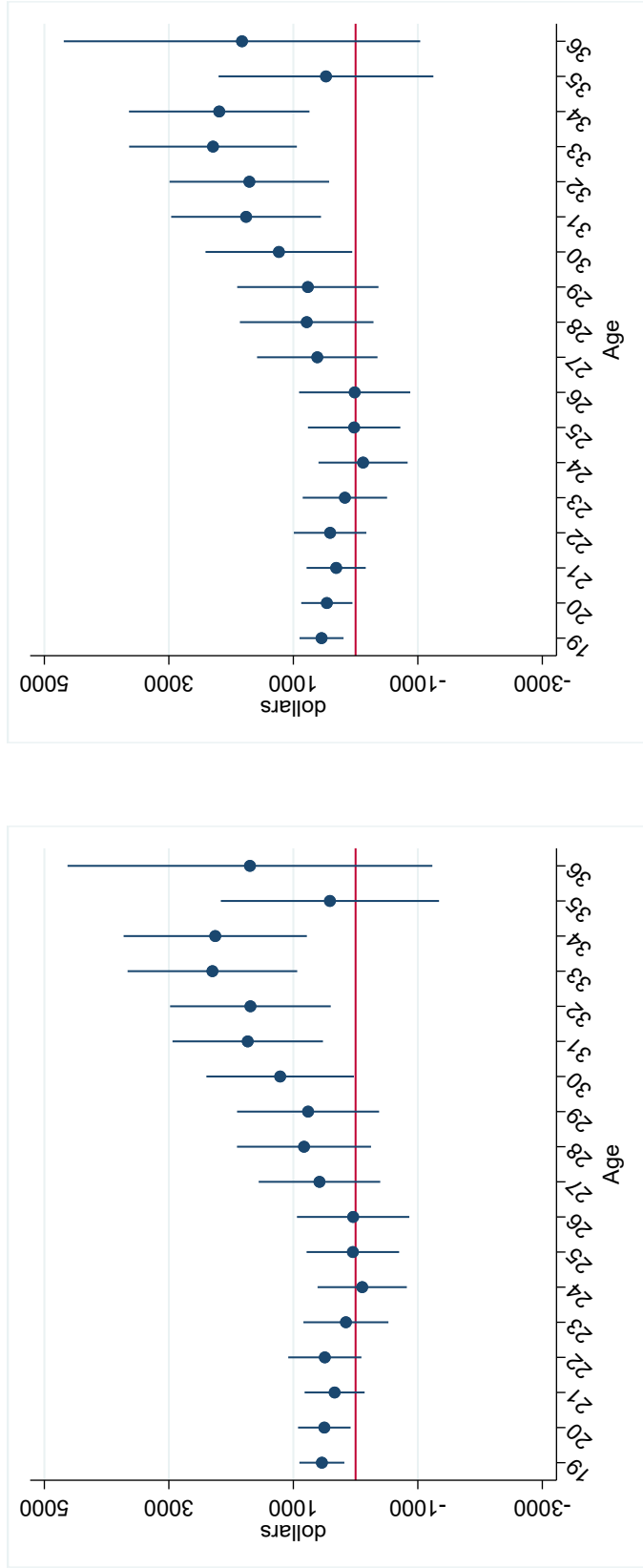
(g) Employment Status - male



(h) Employment Status - female

Note: Figures compares trend of marginal effect of vocational class on various outcomes across age from family FE model by gender.

Figure 6: Marginal Effects of High School Vocational Credits on Annual Earnings Across Age - Family Fixed Effects



(a) Controlling for Ever Attended College

(b) Controlling for College Degree

Note: Figures show the trend of the marginal effect of high school vocational class credits on annual earnings across age. Panel (a) controls for whether the individual ever attended college, and Panel (b) controls for whether the individual earned a college degree. data source: NLSY97

## References

- Altonji, J. (1992). The effects of high school curriculum on education and labor market outcomes.
- Altonji, J. G., E. Blom, and C. Meghir (2012). Heterogeneity in human capital investments: High school curriculum, college major, and careers. *Annu. Rev. Econ.* 4(1), 185–223.
- Anger, S. and D. D. Schnitzlein (2017). Cognitive skills, non-cognitive skills, and family background: evidence from sibling correlations. *Journal of Population Economics* 30(2), 591–620.
- Autor, D. and D. Dorn (2009). This job is "getting old": Measuring changes in job opportunities using occupational age structure. *American Economic Review* 99(2), 45–51.
- Autor, D. H. (2013). The "task approach" to labor markets: an overview. *Journal for Labour Market Research* 46(3), 185–199.
- Autor, D. H. (2019). Work of the past, work of the future. *AEA Papers and Proceedings* 109, 1–32.
- Autor, D. H. and D. Dorn (2013). The growth of low-skill service jobs and the polarization of the us labor market. *American Economic Review* 103(5), 1553–1597.
- Autor, D. H., F. Levy, and R. J. Murnane (2003a). The skill content of recent technological change: An empirical exploration. *The Quarterly journal of economics* 118(4), 1279–1333.
- Autor, D. H., F. Levy, and R. J. Murnane (2003b). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics* 118(4), 1279–1333.
- Averett, S. L. and M. L. Burton (1996). College attendance and the college wage premium: Differences by gender. *Economics of Education Review* 15(1), 37–49.
- Binder, A. J. and J. Bound (2019). The declining labor market prospects of less-educated men. *Journal of Economic Perspectives* 33(2), 163–190.
- Bishop, J. H. and F. Mane (2004). The impacts of career-technical education on high school labor market success. *Economics of Education Review* 23(4), 381–402.
- Bishop, J. H. and F. Mane (2005). Raising academic standards and vocational concentrators: Are they better off or worse off? *Education Economics* 13(2), 171–187.
- Böhm, M. J., H.-M. von Gaudecker, and F. Schran (2024). Occupation growth, skill prices, and wage inequality. *Journal of Labor Economics* 42(1), 201–243.
- Brunner, E. J., S. M. Dougherty, and S. L. Ross (2023). The effects of career and technical education: Evidence from the connecticut technical high school system. *Review of Economics and Statistics* 105(4), 867–882.
- Cellini, S. R. (2006). Smoothing the transition to college? the effect of tech-prep programs on educational attainment. *Economics of Education Review* 25(4), 394–411.
- Conley, D. T. (2012). A complete definition of college and career readiness. *Educational Policy Improvement Center (NJ1)*.
- Dahl, G. B., D.-O. Rooth, and A. Stenberg (2023). High school majors and future earnings. *American Economic Journal: Applied Economics* 15(1), 351–382.

- Dahl, G. B., D.-O. Rooth, and A. Stenberg (2024). Intergenerational and sibling spillovers in high school majors. *American Economic Journal: Economic Policy* 16(3), 133–173.
- David, A. and W. Melanie (2013). Wayward sons: The emerging gender gap in labor markets and education. *Third Way Report 20013*.
- Dey, M., M. A. Loewenstein, and H. Sun (2021). A look at the new job-task information in the national longitudinal surveys of youth. *Monthly Labor Review*, 1–28.
- Dontre, A. J. (2021). The influence of technology on academic distraction: A review. *Human Behavior and Emerging Technologies* 3(3), 379–390.
- Dougherty, S. M. (2018). The effect of career and technical education on human capital accumulation: Causal evidence from massachusetts. *Education Finance and Policy* 13(2), 119–148.
- Dougherty, S. M., M. A. Gottfried, and C. Sublett (2019). Does increasing career and technical education coursework in high school boost educational attainment and labor market outcomes? *Journal of Education Finance* 44(4), 423–447.
- Ecton, W. G. and S. M. Dougherty (2023). Heterogeneity in high school career and technical education outcomes. *Educational Evaluation and Policy Analysis* 45(1), 157–181.
- Eichhorst, W., N. Rodríguez-Planas, R. Schmidl, and K. F. Zimmermann (2015). A road map to vocational education and training in industrialized countries. *ILR Review* 68(2), 314–337.
- Gervais, M., N. Jaimovich, H. E. Siu, and Y. Yedid-Levi (2015). Technological learning and labor market dynamics. *International Economic Review* 56(1), 27–53.
- Glewwe, P. (1999). Why does mother’s schooling raise child health in developing countries? evidence from morocco. *Journal of human resources*, 124–159.
- Golsteyn, B. H. H. and A. Stenberg (2017). Earnings over the life course: General versus vocational education. *Journal of Human Capital* 11(2), 167–212.
- Goodman, J. (2012). The labor of division: Returns to compulsory math coursework.
- Grogger, J. and E. Eide (1995). Changes in college skills and the rise in the college wage premium. *Journal of Human Resources*, 280–310.
- Gustman, A. L. and T. L. Steinmeier (1982). The relation between vocational training in high school and economic outcomes. *ILR Review* 36(1), 73–87.
- Hall, C. (2016). Does more general education reduce the risk of future unemployment? evidence from an expansion of vocational upper secondary education. *Economics of Education Review* 52, 251–271.
- Hanushek, E. A., G. Schwerdt, L. Woessmann, and L. Zhang (2017). General education, vocational education, and labor-market outcomes over the lifecycle. *Journal of Human Resources* 52(1), 48–87.
- Hemelt, S. W., M. A. Lenard, and C. G. Paepflow (2019). Building bridges to life after high school: Contemporary career academies and student outcomes. *Economics of Education Review* 68, 161–178.
- Holzer, H. and R. Lerman (2023). America’s forgotten middle-skill jobs.
- Holzer, H. J. and R. I. Lerman (2009). *The future of middle-skill jobs*, Volume 41. Brookings, Center on Children and Families Washington, DC, USA.

- Jackson, M. I., K. Kiernan, and S. McLanahan (2017). Maternal education, changing family circumstances, and children’s skill development in the united states and uk. *The ANNALS of the American Academy of Political and Social Science* 674(1), 59–84.
- Joyce, M. and D. Neumark (2001). School-to-work programs: Information from two surveys youth employment. *Monthly Labor Review* 124(8), 38–50.
- Kang, S. and J. Bishop (1989). Vocational and academic education in high school: Complements or substitutes? *Economics of Education Review* 8(2), 133–148.
- Keane, M. P. and K. I. Wolpin (1997). The career decisions of young men. *Journal of Political Economy* 105(3), 473–522.
- Krafft, C. (2018). Is school the best route to skills? returns to vocational school and vocational skills in egypt. *The Journal of Development Studies* 54(7), 1100–1120.
- Kreisman, D. and K. Stange (2020). Vocational and career tech education in american high schools: The value of depth over breadth. *Education Finance and Policy* 15(1), 11–44.
- LaForest, M. (2023). The effects of high school career and technical education on employment, wages, and educational attainment. *Journal of Human Capital* 17(1), 39–71.
- Levesque, K. (1995). *Vocational education in the United States: The early 1990s*. US Department of Education, Office of Educational Research and Improvement.
- Levesque, K. and D. D. Nelson (2000). *Vocational education in the United States: Toward the year 2000*. US Department of Education, Office of Educational Research and Improvement.
- Mane, F. (1999). Trends in the payoff to academic and occupation-specific skills: the short and medium run returns to academic and vocational high school courses for non-college-bound students. *Economics of Education Review* 18(4), 417–437.
- Matthewes, S. H. and G. Ventura (2022). On track to success?: Returns to vocational education against different alternatives. *CEPA Discussion Papers*; 58.
- Meer, J. (2007). Evidence on the returns to secondary vocational education. *Economics of Education Review* 26(5), 559–573.
- NCES (1997). *Vocational Education in the United States: The Early 1990s*. NCES 97-391. U.S. Department of Education, Office of Educational Research and Improvement.
- NCES (2013). *Career and Technical Education (CTE) Statistics, Table H175*. U.S. Department of Education, Institute of Education Sciences.
- NCES (2024). *Report on the Condition of Education 2024*. NCES 2024-144. U.S. Department of Education, Institute of Education Sciences.
- Neumark, D. and D. Rothstein (2006). School-to-career programs and transitions to employment and higher education. *Economics of Education Review* 25(4), 374–393.
- Prada, M. F. and S. Urzúa (2017). One size does not fit all: Multiple dimensions of ability, college attendance, and earnings. *Journal of Labor Economics* 35(4), 953–991.
- Price, B. and B. Price (2013). The changing task composition of the us labor market: An update of autor, levy, and murnane (2003). *unpublished manuscript*.
- Rooney, P., W. Hussar, M. Planty, S. Choy, G. Hampden-Thompson, S. Provasnik, and M. A. Fox (2006). The condition of education, 2006. nces 2006-071. *National Center for Education Statistics*.

- Rose, H. and J. R. Betts (2004). The effect of high school courses on earnings. *Review of Economics and Statistics* 86(2), 497–513.
- Rosen, R., M. Visher, and K. Beal (2018). Career and technical education: Current policy, prominent programs, and evidence. *Mdrc*.
- Silliman, M. and H. Virtanen (2022). Labor market returns to vocational secondary education. *American Economic Journal: Applied Economics* 14(1), 197–224.
- Silverberg, M., E. Warner, M. Fong, and D. Goodwing. National assessment of vocational education: Final report to congress: Executive summary.
- Silverberg, M., E. Warner, D. Goodwin, and M. Fong. National assessment of vocational education: Interim report to congress.
- U.S. Census Bureau (2024). Table 3. detailed years of school completed by people 25 years and over by sex, age groups, race and hispanic origin: 2024. Current Population Survey, Educational Attainment Detailed Tables. Accessed: March 16, 2026.
- Zimmermann, K. F., C. Biavaschi, W. Eichhorst, C. Giuliatti, M. J. Kendzia, A. Muravyev, J. Pieters, N. Rodríguez-Planas, and R. Schmidl (2013). Youth unemployment and vocational training. *Foundations and Trends® in Microeconomics* 9(1–2), 1–157.

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