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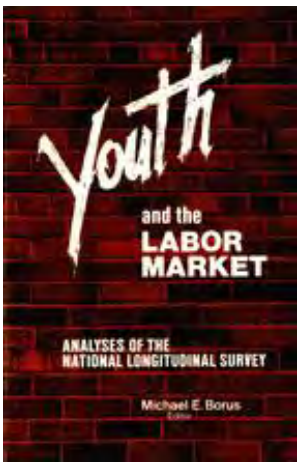

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Chapter 6 (pp. 157-192) in:
Youth and the Labor Market: Analyses of the National Longitudinal Survey
Michael E. Borus, ed.
Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 1984
DOI: 10.17848/9780880996273.ch6

Chapter 6
The Economic Value of Academic and Vocational Training Acquired in High School*

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I. Introduction

The recent report of the President's Commission on Excellence in Education, *A Nation at Risk,* has generated renewed interest in the quality of secondary schooling in the United States. There is particular concern that today's students are not preparing adequately for their future educational and economic lives by taking enough academic courses in such areas as mathematics and science. But what constitutes the best preparation for future work and education? And do curriculum differences in high school lead to differences in the outcomes of schooling?

These two questions have formed the basis for a substantial body of research on the outcomes of schooling. This

*Quoted with permission from *Job Training for Youth* (1982), edited by R. Taylor, H. Rosen and F. Pratzner, The National Center for Research in Vocational Education, The Ohio State University.

research confirms that educational outcomes—the likelihood of attending college, the type of college attended, and even the choice of college major—appear to be influenced by the curriculum followed in high school (Alexander, Cook, and McDill 1978; Polachek 1978; Kolstad 1979). But for those students who do not attend college, differences in high school curriculum appear to have little effect on labor market opportunities (Griffin and Alexander 1978). In particular, students who follow a vocational curriculum in high school enjoy no advantage in labor market opportunities over other students.[1] Recent empirical studies have failed to find systematic advantages to high school vocational training.[2]

The failure to find differences in labor market opportunities from high school curriculum is perhaps most disturbing to promoters of vocational education. They have long held that vocational education provides better preparation than other curricula for direct entry into the labor market immediately after high school. Their faith has spurred increased support for vocational education at both the state and federal levels.

Other observers question whether differences in high school curricula should, in fact, lead to differences in labor market opportunities. On the one hand, if vocational training in high school simply develops specific job skills useful in only a limited number of occupations, then graduates may not receive any relative advantage in earnings or other labor market opportunities, either because the benefits accrue to employers or because initial earnings advantages decline as the number of vocational graduates increase in response to initial advantages (Grubb 1979; Gustman and Steinmeier 1982). On the other hand, if vocational training merely develops more basic skills comparable to skills learned in other curricula, then vocational graduates again may fail to

enjoy an economic advantage over other high school graduates (Grubb 1979; Thurow 1979).

Thus, at least in theory it remains unclear whether differences in high school curriculum *should* lead to differences in labor market opportunities. Yet attempts to discern any differences in effect of curriculum remain.

Many past empirical studies of this problem suffer from several shortcomings. First, information on high school curriculum usually comes from students who are asked to identify their program as either college preparatory, vocational, or general. Curriculum differences may be understated because students misperceive their high school program (Rosenbaum 1980; Meyer 1981). More important, using a single measure of curriculum difference may obscure large variations in actual course work. For example, vocational students who follow and complete a full program may be quite different from those who simply take a few unrelated vocational courses (Brown and Gilmartin 1980; Campbell, Orth, and Seitz 1981). Students who identify their program as academic (or college preparatory), vocational, or general frequently take courses in all three program areas (Rumberger 1981; Meyer 1981). Identifying the various curricula with any accuracy thus requires information on specific courses taken by students.

Second, curriculum differences may make little difference in earnings and employment opportunities because high school graduates are frequently employed in low-skilled and low-level occupations (Reubens 1974). Students who prepare for a specific job following high school by completing a legitimate vocational program may, in fact, enjoy an advantage over other graduates if they find a job related to their training. Although several studies have examined the relationship between area of training and the type of job found after high school (Campbell, et al. 1981; Woods and Haney

1981), few have examined the economic advantage of holding a training-related job.

This study addresses both of these limitations, first by looking at differences in high school curricula in greater detail, and second by relating high school training to labor market outcomes more specifically, including an assessment of whether a student's vocational training was used on the job.[3]

We also examine race and sex differences in both high school vocational training and labor market opportunities. If vocational training shows little effect on labor market outcomes, then race and sex differences in curriculum may explain little of the observed differences in labor market opportunities among these groups. Yet, if certain areas of vocational training do provide access to better paying jobs, then differences in high school curricula may be telling. Vocational training opportunities in high school are clearly divided along sexual lines, with women more likely to enroll in office occupations training and young men more likely to pursue training in technical and industrial areas (Rumberger 1981). To a lesser degree there are also racial differences in vocational training opportunities. Thus, in some instances, race and sex differences in high school curricula may explain some of the differences in post-school labor market opportunities.

During the 1979 NLS interview, respondents were asked to identify the high school they were currently attending, or last attended. For those respondents who were 17 to 21 years old in 1979 and who had last attended an American high school (8,420 out of 11,406 respondents), efforts were made to collect high school transcripts and school information. Complete transcript data were collected for 6,591 respondents (78 percent of those eligible). We further restricted the sample to those respondents who were not enrolled full-time during the

second interview, who had completed 9 to 12 years of schooling, and for whom complete transcript data were available for all years of school completed.[4] These further restrictions resulted in a sample of 1,857 respondents. Throughout the analysis, observations were weighted by their sample weights to adjust for the oversampling of blacks, Hispanics, and disadvantaged whites.

II. Academic and Vocational Training in High School

We grouped courses into three areas: academic, vocational, and other. Academic courses include language arts, foreign languages, mathematics, natural sciences, and social sciences; vocational courses include agriculture, distributive education, health occupations, home economics, office occupations, and technical, trades and industry.[5] All remaining courses, including business, industrial arts, art, music, and physical education, fall into the "other" category.[6] These major divisions differentiate between the general skills acquired from academic courses and the specific skills acquired from vocational training.

Graduates completed a total of 15.4 credits during their last three years of high school, whereas dropouts completed an average of only 5.4 credits (table 6.1). Graduates completed an average of eight credits in academic subjects (52 percent of their total credits), 3.5 credits in vocational subjects (23 percent), and 3.9 credits in other subject areas (25 percent). As we might expect, students in college preparatory programs took more academic subjects than other students, while vocational students took more of their course work in vocational areas. College preparatory students had the most credits in language arts and social sciences; vocational students had the majority of their credits in home economics, office occupations, and trades and industry.

Table 6.1
Mean Number of High School Credits by Graduation Status, Self-Reported Program, and Curriculum Area[a]

Curriculum area	Graduates				Dropouts	Total
	College prep	Vocational	General	Total		
Academic	9.87	7.01	7.75	7.95	2.59	7.06
Language arts (05)	3.13	2.70	2.84	2.86	.99	2.54
Foreign languages (06)	.77	.24	.29	.37	.05	.32
Mathematics (11)	1.67	.96	1.09	1.16	.43	1.04
Natural sciences (11)	1.81	.94	1.10	1.19	.44	1.07
Social sciences (15)	2.49	2.16	2.43	2.37	.67	2.09
Vocational	2.16	5.08	3.14	3.49	.98	3.05
Agriculture (01)	.06	.16	.25	.19	.14	.18
Distributive ed. (04)	.11	.24	.16	.17	.06	.16
Health occupations (07)	.05	.08	.05	.06	.02	.05
Home economics (09)	.63	.80	.80	.77	.24	.65
Office occupations (14)	1.01	2.11	1.17	1.40	.20	1.20
Tech., trades & industry (16, 17)	.30	1.70	.70	.90	.32	.80

Other	3.56	3.51	4.29	3.93	1.86	3.61
Business (03)	.18	.23	.22	.22	.06	.19
Industrial arts (10)	.46	.78	.89	.78	.40	.71
Art, music (02, 12)	.90	.66	1.02	.90	.34	.81
Miscellaneous (08, 18-22)	2.03	1.82	2.16	2.05	1.06	1.91
Total	15.60	15.59	15.18	15.38	5.42	13.72

a. Tabulations based on a weighted sample of 17 to 21 year olds who were not enrolled in school full-time in the winter of 1980, who had completed 9 to 12 years of school, and for whom complete transcript data were available (N = 1857). One credit corresponds to a standard, full-year course. Only credits for courses taken in grades 10-12 are included. Numbers in parentheses refer to major curriculum areas designated by the Office of Education (Putnam and Chismore 1970).

Students also took a number of courses in miscellaneous areas such as health, driver education, and physical education.

Because students in all three program areas often take both academic and vocational courses, program designation may reveal little about the actual academic and vocational preparation a student receives in high school. This causes a problem for research, one which may be especially acute when we are looking at vocational areas that involve specific training. In order to assess the effectiveness of vocational training accurately, we must identify vocational students: one way to do this is to find what proportion of those who identify themselves as vocational students actually complete a given number of credits in the vocational area in which they are training.[7]

Such an examination reveals that a significant proportion of vocational students have taken less than three credits in the specific area in which they were training (table 6.2). In fact, the transcripts of some students show that they have not received credit for a single course in their specific area. The proportions of students receiving given numbers of credits also vary widely by area—three-quarters of vocational students in office occupations had completed three or more credits in that area, whereas about one-third of vocational students in distributive education and health occupations had done so. Some students in other vocational areas and in college preparatory and general programs have also completed three or more credits in more specific vocational areas.

Instead of the program designation offered by students themselves, the benchmark of three credits will be used in the next part of this study to identify vocational students.[8] Of course not everyone who has completed three credits of vocational courses in a specific area has completed a pro-

Table 6.2
High School Vocational Credits by Graduation Status, Program, and Curriculum Area

Vocational curriculum area	Graduates				Dropouts	Total
	Academic	Vocational		General		
		Specific[a]	Total			
Percent with some credits						
Agriculture	4	75	9	13	11	10
Distributive education	7	71	11	11	7	10
Health occupations	3	43	3	2	1	2
Home economics	44	81	50	60	19	46
Office occupations	56	96	59	61	21	53
Tech., trades & indus.	11	67	38	24	14	24
Percent with 3 or more credits						
Agriculture	1	56	2	4	1	3
Distributive education	1	40	4	2	1	2
Health occupations	1	32	1	1	1	1
Home economics	5	56	8	8	0	6
Office occupations	13	78	4	15	0	17
Tech., trades & indus.	5	54	7	12	6	13
Percent with 6 or more credits						
Agriculture	0	10	0	0	0	1
Distributive education	0	8	1	0	0	0
Health occupations	0	20	1	0	0	0
Home economics	1	27	12	1	0	3
Office occupations	1	31	14	2	0	4
Tech., trades & indus.	1	32	15	4	1	6

a. Students whose specific vocational program corresponded to the vocational curriculum areas that are listed.

gram in that area. Each vocational program consists of a particular sequence and number of courses. Although the benchmark of three credits only provides an approximate indication of students who have completed a vocational program, it offers a marked improvement over the program identification used in most previous studies.

The mean numbers of credits in various curriculum areas for specific race-sex groups of high school graduates are shown in table 6.3. Other than the observation that white young women seem to be more likely than minorities to take vocational training in office occupations, little systematic racial difference appears among high school curricula. Not surprisingly, we find large sex differences in types of vocational courses taken: young women tend to concentrate in office occupations and home economics and young men in trades and industries.

III. Effects on Labor Market Outcomes

The effects of high school curriculum were estimated through a series of equations that expressed several measures of labor market success as a linear function of high school course work and an array of control variables. Estimates were derived using ordinary least squares regression. Course work represents the number of credits completed in various subject areas and was expressed in varying degrees of detail. Unlike previous studies that use dummy variables to distinguish between vocational, academic, and general curriculum areas, we were able to measure the actual *amount* of course work taken by each person in specific subject areas. Because our sample consists of persons who have completed from 9 to 12 years of schooling, the number of credits completed in grades 10-12 varies from zero to over 20. Thus we can estimate the incremental effects of taking additional course work in various curricula as well as the relative effects

Table 6.3
Mean Number of High School Credits by Sex, Race, and Curriculum Area[a]

	Females			Males			Total
	Black	Hispanic	White	Black	Hispanic	White	
Academic	8.25	8.27	7.89	7.93	8.07	7.97	7.95
Language arts	2.94	2.81	2.89	2.98	2.80	2.81	2.86
Foreign languages	.43	.96	.45	.20	.58	.27	.37
Mathematics	1.31	1.10	1.04	1.30	1.25	1.26	1.16
Natural sciences	1.23	1.07	1.17	1.06	1.09	1.24	1.19
Social sciences	2.33	2.32	2.35	2.39	2.35	2.40	2.37
Vocational	3.58	3.38	4.23	2.88	2.48	2.84	3.49
Agriculture	.03	.05	.11	.21	.34	.29	.19
Distributive education	.28	.17	.13	.24	.05	.22	.17
Health occupations	.11	.03	.11	.01	.00	.00	.06
Home economics	1.39	1.13	1.14	.57	.36	.39	.77
Office occupations	1.46	1.83	2.45	.41	.34	.44	1.40
Tech., trades & indus.	.31	.17	.29	1.45	1.39	1.51	.90
Other	3.27	4.02	3.51	4.36	5.22	4.32	3.93
Business	.16	.17	.25	.14	.09	.20	.22
Industrial arts	.08	.11	.12	.85	1.39	1.52	.78
Art, music	.73	.94	1.17	.85	.81	.71	.90
Miscellaneous	2.30	2.80	1.97	2.53	2.93	1.90	2.05
Total	15.10	15.67	15.64	15.18	15.78	15.13	15.38

a. High school graduates only (N = 1429).

of taking more courses in one or another area (e.g., vocational versus academic).

In each equation the same set of control variables were included to minimize any bias due to students of different backgrounds and abilities selecting different high school subjects.[9] Background variables included a measure of parental education and a cultural index indicating the presence of newspapers, magazines, and a library card in the respondent's original home. The respondent's grade point average in the ninth grade was used as a measure of early ability.[10] Additional control variables included race, marital status, presence of children, sex-children interaction, and post-school experience.[11]

In order to examine different dimensions of labor market behavior and success, we analyzed three labor market outcome variables: hourly earnings in the 1980 survey week, the number of weeks unemployed in the previous year, and the number of hours worked in the previous year.[12]

Estimates were derived for respondents in our basic sample (1,857 cases) who had complete information on the dependent variables and information on most of the independent variables.[13] Males and females were analyzed separately, since they tend to have different labor market experiences and generally acquire different vocational training in high school. Estimates for each of the three dependent variables are shown in separate panels in table 6.4 for males and in table 6.5 for females.

As a reference point, the first equation in each table shows the effects of the standard measure of educational attainment—years of school completed. The effect of years of school completed on hourly earnings (.047 for males and .055 for females) is slightly lower but fairly consistent with previous studies using a similar measure of educational attainment (e.g., Griliches 1976). However, precise com-

parisons with the results of previous studies are difficult because we observe earnings very early in the work career and restrict our analysis to those who do not go on to college. Although not shown in the tables, the years completed equation was also estimated with an additional "diploma" variable to test for a credentialism effect: surprisingly, there was no evidence of such an effect.[14] In the second equation in each panel, we substituted total credits for years completed and found fairly consistent results for both men and women. As expected, both variables have positive effects on hourly earnings and hours worked and negative effects on weeks unemployed. Given that a normal school year usually consists of five or six credits, the size of the coefficients for years completed and total credits correspond very closely for women and moderately well for men. The main exception is that the effect of total credits on hourly earnings is quite small for men.

In the third equation, we partition credits into our categories: academic, vocational, and other. In most cases, academic and vocational course work have similar effects. For hourly earnings, the effects of both types of course work are insignificant for men and significant for women. The coefficients for women imply that a half-day's course work for a school year (i.e., about three credit hours) of either academic or vocational courses would increase hourly earnings by about 3 percent. For weeks unemployed, the results imply that a half day's course work would reduce unemployment by about one to one and one-half weeks per year, with the effects of academic training being stronger for men and the effects of vocational training being slightly stronger for women. Both academic and vocational training have strong effects on annual hours worked for women: a half-day's course work of either is associated with working about 150 more hours per year, the equivalent of almost four weeks of full-time work. The biggest difference in effects is for hours

Table 6.4
The Effects of Curriculum on Labor Market Success for Young Men Who Do Not Go On to College[a]

	Equation (1)	(2)	(3)	(4)	(5)
	(Log) hourly earnings				
Years completed	.047*				
Total credits		.004			
Academic			.007	.008	.008
Vocational			.005		
Vocational (nonprogram)				-.009	-.010
Vocational (program)				.004	
Vocational (program, not used)					-.001
Vocational (program, used)					.007
Other			-.001	-.0005	-.0005
R^2 (adj.)	.12	.11	.11	.11	.11
N	713	713	713	713	713

	Weeks unemployed				
Years completed	-2.620**				
Total credits		-.404**			
Academic			-.575**	-.583**	-.584**
Vocational			-.305*		
Vocational (nonprogram)				.148	.151
Vocational (program)				-.304*	
Vocational (program, not used)					-.264
Vocational (program, used)					-.325*
Other			-.196	-.221	-.220
R^2 (adj.)	.08	.07	.08	.08	.08
N	515	515	515	515	515
	Hours worked				
Years completed	239.90**				
Total credits		32.797**			
Academic			14.149	13.940	14.222
Vocational			52.331**		
Vocational (nonprogram)				67.859*	66.554*
Vocational (program)				52.281**	
Vocational (program, not used)					35.263*
Vocational (program, used)					61.758**
Other			47.156**	45.238**	46.127**
R^2 (adj.)	.14	.12	.13	.13	.13
N	515	515	515	515	515

a. One asterisk indicates statistical significance at the .05 level, and two asterisks indicate significance at the .01 level.

Table 6.5
The Effects of Curriculum on Labor Market Success for Young Women Who Do Not Go On to College[a]

	Equation				
	(1)	(2)	(3)	(4)	(5)
	(Log) hourly earnings				
Years completed	.055*				
Total credits		.010*			
Academic			.011*	.011*	.012*
Vocational			.010*		
Vocational (nonprogram)				.003	.002
Vocational (program)				.009	
Vocational (program, not used)					-.002
Vocational (program, used)					.015**
Other			.008	.008	.009
R^2 (adj.)	.06	.06	.06	.05	.06
N	648	648	648	648	648

	Weeks unemployed				
Years completed	-2.190**				
Total credits		-.356**			
Academic			-.435**	-.433**	-.457**
Vocational			-.503**		
Vocational (nonprogram)				-.546*	-.523*
Vocational (program)				-.509**	
Vocational (program, not used)					-.362**
Vocational (program, used)					-.658**
Other			-.056	-.054	-.079
R^2 (adj.)	.05	.05	.06	.06	.06
N	565	565	565	565	565
	Hours worked				
Years completed	257.86**				
Total credits		38.710**			
Academic			47.321**	44.929**	51.138**
Vocational			55.942**		
Vocational (nonprogram)				95.967**	88.388**
Vocational (program)				60.519**	
Vocational (program, not used)					17.073
Vocational (program, used)					104.24**
Other			4.734	2.139	10.645
R^2 (adj.)	.35	.34	.35	.35	.39
N	576	576	576	576	576

a. One asterisk indicates statistical significance at the .05 level, and two asterisks indicate significance at the .01 level.

worked for men: while the effect of vocational training is as strong as it is for women, the effect of academic training is insignificant.

Although not directly comparable, our results are fairly consistent with several previous studies of the relative effects of vocational and academic courses. Using a set of dummy variables to measure curriculum, Grasso and Shea (1979) found that, net of the control variables, the labor market experiences of "the average male graduate of a vocational program who did not go on to college was not substantially different from that of the average general program graduate" (p. 156). Results such as these have often been interpreted as negative evidence of the effectiveness of vocational education. But this interpretation requires one also to conclude that a general curriculum is ineffective. Our specification and results suggest that a more appropriate interpretation is that, in general, *both* academic and vocational curriculum have a significant positive impact on labor market success.

Other course work appears to have relatively small effects on labor market success. The main exception is for hours worked where other course work had a substantial positive effect for men. In addition, the effect of other courses on hourly earnings is nontrivial for women, although it is not statistically significant at traditional levels.

We also performed parts of the analysis with the sample restricted to those who graduated from high school and in which academic, vocational, and other credits were coded as proportions of total credits. Since academic, vocational, other, and total credits are linearly dependent, the academic credits variable was omitted from the analysis and thus serves as a reference for evaluating the effects of vocational and other credits. This specification corresponds more closely to the traditional specification used by Grasso and Shea (1979) and others. The results from this alternative specifica-

tion are similar to those discussed above in that the only instance in which the effects of vocational training are significantly different from academic training is the stronger and more positive effects of vocational training on hours worked for men (table 6.6).

Because vocational training develops specific job skills, the labor market benefits of vocational courses that are part of a complete program may be higher than the benefits from unrelated courses. In order to examine this issue, we counted all of a student's vocational credits either in a program variable (if the student completed at least three credits in one specific vocational area), or in a nonprogram variable. The results for the equations in which these were substituted for the general vocational variable are shown as equation (4) in tables 6.4 and 6.5. The effects of the program variable for men were in the anticipated direction for all three labor market outcome variables, although its effect was not significant for hourly earnings. On the other hand, the nonprogram variable had a detrimental effect on hourly earnings and unemployment, although its effect on hours worked was positive and significant. These results generally support the hypothesis that participating in a specific vocational program does pay off in the labor market while an occasional vocational course does not. The evidence for women is less conclusive: the effects of nonprogram training on weeks unemployed and hours worked is as strong or stronger than that of training related to a specific vocational program. Only for unemployment is the effect of the vocational program variable somewhat stronger.

Again because vocational training develops specific job skills, its economic benefits may also depend on whether or not the individual is employed in an occupation where it can be used. To test this notion, program credits were further partitioned into two categories: one for program credits related to the respondent's occupation, the other for the re-

Table 6.6
Effects of High School Curriculum on Labor Market Success Among High School Graduates: Proportional Specification[a]

	Males			Females		
	(1)	(2)	(3)	(1)	(2)	(3)
	(Log) hourly earnings					
Vocational	-.081			-.009		
Vocational (nonprogram)		-.248	-.258		-.098	-.118
Vocational (program)		-.052			-.044	
Vocational (program, not used)			-.185			-.239*
Vocational (program, used)			.010			.066
Other	-.121	-.090	-.087	-.049	-.052	-.030
Total credits	-.006	-.008	-.008	.006	.006	.006
R^2 (adj.)	.12	.12	.12	.04	.04	.05
N	579	579	579	582	582	582

	Weeks unemployed					
Vocational	4.311			-2.571		
Vocational (nonprogram)		12.409**	12.681**		-1.538	-1.135
Vocational (program)		3.568			-1.265	
Vocational (program, not used)			5.990*			.487
Vocational (program, used)			2.356			-2.821
Other	4.418	3.200	3.291	7.177**	8.326**	7.996**
Total credits	-.086	-.036	-.029	-.288*	-.312*	-.308*
R^2 (adj.)	.06	.06	.06	.04	.04	.04
N	407	407	407	464	464	464
	Hours worked					
Vocational		603.78*			297.43	
Vocational (nonprogram)		435.74	397.33		516.20	352.31
Vocational (program)		597.00*			250.41	
Vocational (program, not used)			251.29			-411.25
Vocational (program, used)			774.93**			827.88**
Other	355.63	346.26	334.06	-648.00**	-779.90**	-635.62**
Total credits	-20.229	-21.259	-22.098	10.720	14.378	13.015
R^2 (adj.)	.12	.12	.12	.33	.33	.37
N	407	407	407	467	467	467

a. All curriculum area credits are the proportion of total credits in this area. One asterisk indicates statistical significance at the .05 level, and two asterisks indicate significance at the .01 level.

maining credits. The occupational and educational code crosswalk prepared by the National Occupational Information Coordinating Committee (1979) was used to partition program credits. For each specific vocational area, the crosswalk provides a list of occupations that were judged to use the skills taught in that area.[15] These two variables were substituted for the vocational program variable in equation (5) of tables 6.4 and 6.5. These results show that for both men and women and for each labor market outcome, the effect of vocational training used on the job is significant and substantially greater than the effect of vocational training not used on the job. Thus, vocational training seems to yield a higher payoff for those individuals who are employed in jobs where their training can be utilized.

How many men and women hold jobs related to their area of high school vocational training? Table 6.7 shows the proportion of students taking (or not taking) vocational programs in specific areas whose occupation corresponded to that area. For example, the top row of the table indicates that among men who took a vocational program in agriculture, 42 percent held an occupation in 1980 that corresponded to that area, while only 17 percent of other men held that type of job. In most areas, vocational training substantially increases the likelihood of an individual's obtaining related employment. Apparently, either these programs are teaching important job-related skills or at least many employers think they do. Two exceptions to this general finding are trades and industry and home economics: for both men and women, the likelihood of students finding employment in these areas is about the same for students with and without vocational training.[16]

The variation across programs in the degree that training was used on the job raises the question of whether the labor market returns to vocational training varied by specific area of study. To examine this issue, we further partitioned our

vocational training variables into detailed areas while retaining the distinctions among program, nonprogram, and job-related training.

Table 6.7
Percentages of Students Taking (or Not Taking) Vocational Programs in Specific Areas Who Obtained a Job in an Occupation That Corresponded to That Area by Specific Area and Sex[a]

Vocational and occupational area (No. of students in program)[b]	Specific vocational program participation	
	Yes	No
	Males	
Agriculture (40)	42	17
Distributive education (16)	38	27
Health occupation (0)	-	5
Home economics (13)	4	6
Office occupation (16)	54	19
Trade and industry (191)	65	59
	Females	
Agriculture (9)	3	7
Distributive education (16)	66	28
Health occupation (16)	40	6
Home economics (97)	15	13
Office occupation (248)	60	35
Trade and industry (34)	26	32

a. For example, the entry in the top row in the left hand column indicates that 42 percent of students who participated in an agricultural vocational program obtained an occupation that utilizes skills developed in an agricultural vocational training program. The entry in the top row in the right hand column indicates that 17 percent of students who did not participate in an agricultural vocational program (i.e., either participated in another vocational program area or did not participate in any vocational program) obtained an occupation that utilizes skills developed in an agricultural vocational training program.

b. The entries for the number of students in a program are unweighted while the main entries are weighted percentages.

For men, it appears that the types of vocational training have no significant effect on hourly earnings or unemployment, but do have a substantial favorable impact on hours worked. For women, training in office occupations stands out as having the strongest favorable effect on each dimension of labor market success. Although training in home economics appears to increase hours worked and decrease unemployment for women, its effect on hourly earnings is not significant.

Another question we explored is whether different types of course work are more or less helpful to different types of students. For example, it is widely believed that the students who are at a disadvantage either because of race, ethnicity, social background, or cognitive abilities will be the primary beneficiaries of vocational training. Our sample is already restricted to those who do not go on to college and thus already contains an overrepresentation of disadvantaged students. However, to further explore this issue, we reestimated the effects of academic, vocational, and other credits (i.e., equation (3) in tables 6.4 and 6.5) on labor market outcomes for several subsamples which distinguish between individuals who might be considered to be either disadvantaged or not, based on their race, ethnicity, social background, or cognitive ability. This analysis was not disaggregated by sex because the size of some of these subsamples is already quite small and because the results presented so far have suggested only small sex differences in the relative effects of academic and vocational course work. In terms of race and ethnic differences, little systematic pattern appears. However, there is some evidence that the effects of both academic and vocational training on hourly earnings are lower for blacks than for whites and Hispanics. It also appears that the effects of both these types of course work are weaker for Hispanics on unemployment and stronger for hours worked than they are for other individuals (table 6.8). The bottom four rows of table 6.8 show the

Table 6.8
Effects of High School Curriculum on Labor Market Success for Different Samples Defined According to Race, Ethnicity, Socioeconomic Background, and Mental Ability[a]

Sample	Academic	Vocational	Other
	(Log) hourly earnings		
Total (1361)	.010**	.007*	.002
Whites (926)	.010*	.009*	.002
Blacks (242)	.006	-.007	.015
Hispanics (193)	.018*	.014	-.001
GPA ninth grade ≤ 2.2 (674)	.012*	.004	-.0004
Parents' education < 12 (455)	.018**	-.010	.008
GPA ninth grade > 2.2 (687)	.010*	.011*	.004
Parent's education ≥ 12 (906)	.008	.012*	-.0002
	Weeks unemployed		
Total (1080)	-5.14**	-.412**	-.133
Whites (727)	-.577**	-.446**	-.155
Blacks (207)	-.441	-.442	-.323
Hispanics (146)	-.031	-.337	-.461*
GPA ninth grade ≤ 2.2 (564)	-.511**	-.413**	-.314*
Parents' education < 12 (386)	-.450**	-.551**	.121
GPA ninth grade > 2.2 (516)	-.628**	-.520**	-.085
Parents' education ≥ 12 (694)	-.615**	-.420**	-.288**
	Hours worked		
Total (1091)	29.871**	55.997**	25.365**
Whites (725)	26.117**	57.510**	23.129*
Blacks (215)	38.544*	51.133*	46.736
Hispanics (151)	53.516*	75.538**	21.464
GPA ninth grade ≤ 2.2 (573)	34.036**	44.217**	53.322**
Parents' education < 12 (391)	38.616**	81.314**	31.947*
GPA ninth grade > 2.2 (518)	30.697**	71.685**	4.302
Parents' education ≥ 12 (700)	27.350**	47.244**	23.309*

a. One asterisk indicates statistical significance at the .05 level, and two asterisks indicate significance at the .01 level. The control variables included in the regressions are described in the text.

results for those who are above and below average for our sample in terms of social background or cognitive ability.[17] On unemployment and hours worked, no systematic differences appear between the disadvantaged and the not-disadvantaged groups in the relative effects of academic and vocational training. On hourly earnings, vocational training has stronger effects than academic training in the not-disadvantaged groups relative to the disadvantaged groups, which if anything contradicts the hypothesis that the disadvantaged are the primary beneficiaries of vocational training and suggests that perhaps the most important need for disadvantaged students is training in basic skills.

IV. Conclusion

Our study of the economic value of academic and vocational education acquired in high school uses detailed information on course work available from high school transcripts. We attempted to discern whether differences in high school curricula lead to differences in labor market opportunities for persons who completed 10 to 12 years of schooling and acquired no post-secondary training. The economic variables were hourly wage rates, annual weeks unemployed, and annual hours worked. Consistent with other studies, the results varied between men and women.

For women, academic and vocational training showed equally strong effects on the different dimensions of labor market behavior that we examined. Although they should be interpreted with caution, our results suggest that an additional half-day's course work for a school year (i.e., about three credit hours) of either academic of vocational course work would lead to about 3 percent higher hourly earnings, one to one and one-half fewer weeks of unemployment per year, and 150 more hours worked per year.

For men, the results vary depending on which outcome variable is being examined. The effects of both types of training on unemployment are as strong for men as for women, but their effects on men's hourly earnings are smaller and statistically insignificant. Although the effect of vocational training on hours worked was as strong for men as it was for women, the effect of academic training on hours worked was insignificant.

The payoff to vocational training appears to vary in several other aspects. Vocational training that constitutes a specific program has a greater impact on labor market outcomes than vocational training in unrelated areas. In addition, the payoff to a program of vocational training is higher for persons employed in jobs where their training can be used. Moreover, vocational students were substantially more likely than other students to obtain employment in occupations that utilized their vocational skills except in the area of trades and industry, and home economics. These results suggest that in order to measure the payoff to vocational training, it is necessary to have more detailed information on the type of vocational training taken and the area of employment. Of course, very large sample sizes are needed to estimate the relative effects of curriculum on labor market success with any precision.

The strongest vocational training effects were associated with training in office occupations. We suspect that these high returns result from the recent growth in the service and clerical sectors of the economy where this type of training is particularly demanded. In any event, this finding suggests that the demand side of the youth labor market should be considered more carefully.

We observed substantial sex differences in the types of vocational training taken, with men concentrating in trades and industries and women concentrating in office occupations and home economics. This sex segregation in voca-

tional training surely contributes to sex segregation in occupations. Although the relative payoff to the types of training taken by women appears to be at least as high as the payoff to the types of training taken by men, this segregation may help perpetuate inequality indirectly by contributing to the idea that it is natural for men and women to do different work. Greater access to all program areas should be afforded both men and women. Important parts of this effort would be to better inform boys and girls of career opportunities in both traditional and nontraditional areas, and to provide additional support for students in nontraditional areas once they have entered them.

Racial differences in economic outcomes appear minimal. The effects of vocational training on hourly earnings were lower for blacks than for whites, but the effects of vocational training on unemployment and hours worked are similar for blacks, Hispanics, and whites. Since members of each of these groups take similar types of high school courses, vocational training appears to have little impact on racial and ethnic inequality.

Our results compare quite closely with those of other recent studies. Like these studies, ours did not find systematic advantages to any single type of high school curriculum, particularly vocational. This lack of evidence does not mean that vocational training has no economic value, only that it has no more than any other training acquired in high school. In other words, both vocational and academic curricula have positive results.

Of course the present analysis focused only on the immediate economic payoff to high school curricula for students who acquire no additional post-secondary training. A more complete assessment of the economic value of different high school curricula should include its long term benefits as well as its effects on subsequent training opportunities and the economic benefits that accrue from them

(Meyer 1981). Additional educational benefits may include the impact of various curricula on keeping students in school who otherwise might drop out (Reubens 1974). In all cases, the benefits should be assessed relative to their costs. Since vocational education is generally more costly than other forms of education (Hu and Stromsdorfer 1979), its benefits should exceed those from other types of secondary schooling. That did not prove to be the case in the present analysis.

The results of this research suggest that policies designed to improve the secondary school curriculum may improve the educational outcomes of high school, but do little to improve the economic outcomes. Only in some cases did we find that vocational training provides economic outcomes superior to other kinds of high school course work. In other cases vocational and academic course work may simply be substitutes for each other, with each developing general as opposed to specific skills (Grubb 1979; Thurow 1979).

It appears that the specific courses taken in high school, whether academic or vocational, may be less important in determining success in the labor market than other types of learning, such as appropriate work habits and attitudes. Recent surveys of employers suggest such qualities are indeed more desirable than specific job skills (Maguire and Ashton 1981; Wilms 1983). In that case, schools should offer a variety of academic and vocational courses to meet the various interests of students in order to help them to complete school.

NOTES

1. Reviews of earlier empirical studies are found in Reubens (1974), Hu and Stromsdorfer (1979), and Mertens, et al. (1981).

2. There has been a rash of recent empirical studies, generated in part by the availability of more detailed data and by recent federal interest in reviewing the value of vocational education. Studies include Grasso and Shea (1979), Wiley and Harnischfeger (1980), Campbell, et al. (1981), Meyer (1981), Gustman and Steinmeier (1982), Woods and Haney (1981).

3. This study focuses on individual differences in high school experiences and their effects on opportunities after leaving school. Another body of literature examines the effects of school characteristics and resources on students' performance and outcomes (e.g., Spady 1976; Griffin and Alexander 1978).

4. The last requirement dictated that a student's transcript showed three or more credits of course work for each year of school completed. For example, high school graduates were required to have transcript information for grades 10-12 in order to be included in the sample.

5. Because so few students had completed credits in technical areas, this category was combined with trades and industry.

6. Course categories correspond to standard curriculum areas (Putnam and Chismore 1970).

7. Students who identified their program as vocational were also asked to identify the specific vocational area of their program: agricultural, business or office, distributive education, health, home economics, trade or industrial, or other.

8. Three credits represent a half day of vocational training taken for a full year. This is the minimum amount of vocational training required to complete a program in certain subject areas. Other areas require more preparation.

9. Of course this approach only controls for selection bias associated with measured control variables. Systematic selection on unmeasured variables such as motivation or parental encouragement that is independent of the measured controls may also produce bias in the effects of high school curriculum on labor market success.

10. Indicators of mental ability, primarily IQ test scores, were collected along with the transcripts. Although these test scores were preferred on a conceptual basis, we decided not to use them because of the low response rates (about 50 percent), differences in the kinds of tests taken, and the wide range in the age when the test was taken.

11. More specifically, the control variables were measured as follows: Parental education was the number of years of school completed by either the respondent's mother or father, whichever was greater. The cultural index was the sum of three dichotomous variables each indicating the presence (= 1) or absence (= 0) of newspapers, magazines, or a library card in the household when the respondent was 14 years old. Grade point average was computed from all courses taken in the ninth grade in which the student received a passing grade. Passing grades were converted to numerical equivalents, with A = 4, B = 3, C = 2, D = 1, and F = 0. The two race variables included an indicator for being black (= 1; 0, otherwise) and an indicator for being Hispanic (= 1; 0, otherwise). Marital status equals 1 if married, spouse present; 0, otherwise. Children is the number of children living with the respondent. The sex-children interaction is the product of sex and children. Post-school experience is the number of months between the date the respondent last left school and the date of interview.

12. Since our sample ranges in age from 18 to 22 years of age, these variables measure labor market standing in most cases from 1 to 7 years after leaving school. Our results may be influenced by differences in the number of years since leaving school (although we control for this) as well as the particular year in which we measure labor market outcomes (1980). See the discussion by Gustman and Steinmeier (1982).

13. Observations were excluded from an equation if they had missing data on any variable included in the equation except parental education, the cultural index, and grade point average for the ninth grade. Race-sex specific means were substituted for missing data on parental education and the cultural index. Values were imputed for missing data on grade point average for the ninth grade based on a regression equation including the following explanatory variables: black, Hispanic, sex, parental education, cultural index, knowledge of the world of work, age, early mental ability test score, and a dichotomous variable indicating missing data on any early ability test score. In addition, observations were eliminated from the weeks unemployed last year and hours worked last year regressions if they had not been out of school for at least 12 months as of the date of interview.

14. The coefficient for the diploma variable (equal to one if the respondent received a high school diploma and equal to zero if not) was insignificant in five of the six equations and had the unexpected sign in half of them. More specifically, for men, the coefficients (and t values) were -.053 (-.7), -.38 (-.2), and -317 (-1.9) for hourly earnings, weeks unemployed, and hours worked respectively. For women, they were .065 (.8), 2.72 (1.6), and -213 (-1.3).

15. Although the crosswalk matches occupations to detailed vocational course categories, we only attempted to match respondents' occupations (1970 Census codes) to broad vocational categories (e.g., agriculture). For some of the more heterogeneous occupational categories (i.e., managerial, not elsewhere classified), we also required a match between the industry listed in the crosswalk and the respondent's industry.

16. This may be partly due to the broad and heterogeneous nature of the trades and industry category of occupations. About 60 percent of all the occupations held by the men in our sample required skills related to trades and industry vocational training. Perhaps a matching of more detailed breakdown of these program areas and occupations would yield different results.

17. Social background is measured using parental education; cognitive ability is measured using ninth grade GPA. See footnote 11 for a description of these variables.

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