THE EFFECTS OF COOPERATIVE EDUCATION ON JOB SEARCH TIME, QUALITY OF JOB PLACEMENT AND ADVANCEMENT

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Introduction

This article presents an analysis of the impact of cooperative education on job placement and advancement. It examines the impact of co-op on job search time, quality of job placement, and job advancement. In some cases, a different impact for males and females was found. It used a large sample of North Carolina community college graduates.

Review of the Literature

By providing students opportunities to gain work experience, cooperative education may benefit students by reducing the time it takes them to find their first job after graduation. Rogers and Weston (1987) found some evidence that two cohorts of engineering graduates (1983 and 1984) from North Carolina State University experienced a shorter initial job search time than their non-co-op counterparts, but the difference was small and did not meet the parameters for statistical significance for the sample. Kysor (1995) found no difference in the number of months taken by co-op and non-co-op graduates of Mercyhurst College to find related employment. Letourneau (1995) in a large national study of Canadian postsecondary co-op graduates found no evidence that co-op decreased job search time.

Another potential benefit of the early exposure to the workplace though the co-op experience is that it leads students to make a better choice of employers and jobs. One measure of this type of career maturity is whether students select jobs that match the skills and expectations they learned in their educa-

tional programs. Gardner (1995) found a greater mismatch in expectations among the co-op engineering graduates he studied than he did among the non-co-ops. Somers and Harrington (1995) reported higher rates of positive responses concerning job-matches among co-op students in a national, multi-disciplinary study of college and university graduates. Rogers and Weston (1987) reported a slight increase in self-reported affirmations of job-matches among co-op engineering graduates, but the increase was not statistically significant. Richards (1984) found significantly higher levels of job-matches among graduates of a variety of structured work experience programs.

Increased rates of job advancement for co-op participants have been examined in several studies. Dube et al., (1974) identified increased promotability as an outcome important to employers. In a study of engineering graduates working at the Lockheed-Georgia Company, Phillips (1978) reported salary and promotion advantages for former co-op students. Kysor (1995) found no significant relationship between co-op participation and promotion, nor did Gardner (I995).

Data Set

The data set consisted of a random sample drawn from a statewide pool of 1986-87 Associate in Applied Science graduates of 22 community colleges in the North Carolina system. Eleven colleges offering cooperative education were included in the study as were eleven colleges that did not offer cooperative education. These eleven non-co-op colleges were selected to be comparable to the co-op colleges based on size, program offerings, urban/rural status, geographic location within the state, and similarity of employment rates and weekly wages in the counties served. The resulting sample consisted of 3041 student records. A telephone survey made in 1993 of this group by The Center for Urban Affairs and Community Services resulted in 1575 completed interviews (51.8% of the original sample). The most frequent reason for the inability to complete an interview was that 30% of the original sample did not have a current telephone number. The records from the completed interviews were merged with the students' transcript files. The data set was subsequently limited by removing those who normally work less than 30 hours a week. This reduced the data set by 10.6%. The purpose of excluding these part-time workers from the study was to avoid the confounding effects of students' choices of part-time employment on wages and the other variables in our study.

Methodology and Variables Considered

The impact of cooperative education was analyzed using ordinary least squares regression and probit analysis[1]. Because these procedures

hold constant the effects of other important and relevant variables, they better isolate co-op's separate impact on the dependent variables.

Some independent variables included in the regressions were chosen by using the maximum R^2 improvement procedure developed by James Goodnight. This procedure has advantages over other stepwise selection procedures and is almost as effective as examining all possible regressions (Hocking, 1976).

The range of variables considered included both economic and demographic variables, in addition to variables of theoretical interest from the human capital perspective. Race, age, and gender were included. County weekly per capital wage provided a measure of the relative economic conditions in the various local labor markets. Dummy variables were used to hold constant the effects of the program area the student majored in, and whether the student accepted a job with their co-op employer after graduation. To control for possible self-selection bias, variables relevant to the decision to enroll in co-op were included.

One of the hypotheses examined in this study is whether co-op programs have an "external effect" on students attending colleges offering co-op but who are not enrolled in it. The variable COOPSCH captures this effect, being a binary variable equal to one if the college has a co-op program, and zero otherwise. If the student was in the co-op program, then the binary value COOPGRAD has a value of one; it measures the added effect of being in a co-op program, above and in addition to its external effects on all students at the college. Note that when COOPGRAD equals one, COOPSCH also equals one. Thus, the full effect of being a co-op graduate, as compared with a graduate at a non-co-op college, is the combined sum of the two variables. To illustrate, suppose all students at a co-op college earn 2% more in hourly wages than those at non-co-op colleges. Suppose further that those in co-op programs earn 3% more than non-co-op students at their college. Then COOPSCH has a value of 2%, COOPGRAD has a value of 3%, and their combined value (COOPSCH + COOPGRAD) has a value of 5%. The combined value says that a co-op graduate earns 5% more than those at non-co-op colleges.

In presenting the findings, results are presented separately by gender only when these are significantly different (see Tables 1 and 3). Significance levels reported in the tables are for the standard statistical test of the null hypothesis that the coefficient is equal to zero (i.e., the "two-tail" test).

[1] Probit analysis is a measure of likelihood of occurrence based on deviation from the mean of a normal frequency distribution.

Impact on Time to Find First Job

One of the principal economic outcomes investigated was the effect of cooperative education on how quickly students secured their first job after graduation. Like the past studies discussed above, our study found that co-op had little effect on job search time. On the other hand, it found that being placed with one's co-op employer significantly reduced search time as did being at a college offering co-op (this being an "external effect" of co-op).

A regression was run on the number of months it took students to find their first job after graduation. For this regression, the sample was limited to those looking for a new job after graduation. The mean search time was 6.47 months for all graduates in this sample. The average was 5.57 months for males and 7.37 months for females.

Table 1 presents the results from the regression on the time to find the first job. For females, the effect of being a co-op graduate, as reflected in the combined effect, was to lower job search time, but at a significance level of only 9%. This is for the two-tail test. However, when tested against the null hypothesis that the coefficient is positive, its significance level was 4.5% (half the two-tail level shown in the table). This is "significantly negative" at the conventionally accepted 5% level. For males, being at a co-op school appears to have a significantly negative effect on search time, while the combined effect is insignificant.

The data suggest that graduating from a college that offers co-op (which we call the "external effect") is more of a factor in decreasing job search time than participating in co-op itself.

While co-op itself had little effect, some of its impact can be seen in the results for the variable JOB1COOP ("First Job With Co-op Employer"), a binary variable equal to one if the co-op student was employed in their first job after graduating by their co-op employer. This variable is important as approximately 40% of co-op graduates in this sample were placed with their co-op employer. In the combined regression on males and females, having the first job with the co-op employer reduced search time by 5.1 months, which was significantly negative at the 2.5% level. That this variable was not significant in the separate regressions on males and females is due to their smaller sample size.

One issue is how much the small effect of being in a co-op program is due to the presence of the JOB1COOP variable in the regression. To find out, this variable was dropped from the above regressions. In the combined regression, dropping the variable had little effect: COOPSCH results were similar (-2.75 at 1.85% significance level) while COOPGRAD had a smaller effect (0. 0098 at a 99.43% significance level). The presence of JOB1COOP in the regression reduces, but not significantly, COOPSCH's coefficient.

Table 1
Regression Results for Time to Find First Job

	Female Results		Male Results	
Variable	**Coefficient**	**Significance Level**	**Coefficient**	**Significance Level**
COOPSCH	-1.2607	0.3780	-4.218	0.0378
COOPGRAD	-1.636	0.3468	3.8891	0.1580
First Job with Co-op Employer	-4.1928	0.1513	-7.3817	0.1303
Combined Effects of COOPSCH and COOPGRAD	-2.8967	0.0907	-0.3291	0.9077
Results Over Males And Females Combined				
COOPSCH	-2.7706		0.0172	
COOPGRAD	1.2475		0.3992	
First Job with Co-op Employer	-5.4588		0.0319	
COOPSCH + COOPGRAD (Co-op graduates compared with graduates at non-co-op colleges)	-1.5231		0.3075	

Other variables: program area, race, age, marital status when entering major, worked when entering major, set of dummy variables for city size, self-employment status.

Impact on Job Turnover

While the speed of placement is important and has immediate financial impact, the quality of placement is also of interest. A major difference between U.S. workers and workers in other industrial countries is the higher turnover rate among U.S. workers. To the degree that a higher turnover rate is the result of poor job placement, it represents a serious cost to the economy in underutilized worker skills and needless search time. If cooperative education results in better job placement, then lower job turnover and longer job tenure should result. However, one must be cautious in interpreting job turnover. Higher turnover may be the result of greater opportunities for the worker elsewhere, opportunities that would not have been available without cooperative education opening new channels of employment.

In the sample used for this study, 46% of those in the labor force had not changed employers in six years since graduating from community col-

lege. This figure allows for a convenient split in the sample between those who have changed jobs since graduation and those who did not. A binary outcome variable (JOB CHANGE) was created that equals one if the worker changed employers once or more and equal to zero if they have remained with the same employer. A probit model was fitted to the data to determine the effects of cooperative education upon turnover. All graduates in the labor force at the time of the survey were included. Since no significant difference in effects for males and females was found, Table 2 presents the combined results.

Table 2 shows the results from the probit model run on JOB CHANGE. Each coefficient shows the corresponding variable's impact on the probit index variable (the normal "Z" variable). Two results are significant at the 5% level. Students with higher GPA's and students in licensed professions had lower turnover. Although having one's first job with the co-op employer (JOB1COOP) did not quite meet the 5% test of statistical significance, it was significantly negative in impact. Evaluated for the mean graduate[2], being placed with one's co-op employer reduced the probability of changing jobs from 53.1%to 42.7%. Cooperative education itself had little impact on turnover.

Impact on Expected Turnover in the Future

Current full-time workers were asked if they "plan to remain" with their current employer for two more years. A "yes" answer reflects the combined satisfaction of the worker with their employer along with their expectations of their employer continuing to employ them. Except in those cases where the person expects their employer to lay them off, this reflects their satisfaction with the quality of their job placement.

A probit model was fitted over the data with the dependent binary variable REMAIN, which is equal to one if the worker expects to remain and zero if they do not. Table 3 presents the main results.

For males, cooperative education appears to have no significant relationship with expected future job turnover. On the other hand, having worked in an area related to the major while attending community college was strongly associated with the expectation of remaining with their current employer.

For females, there is evidence of an "external effect" reflected in a lower expectation of remaining with the current employer by all students, co-op and non-co-op, enrolled at a college offering a co-op program. There is no support for the combined effect of co-op for either gender.

[2] This comparison treats all graduates as if they are co-op students and averages the results to determine what the added effect of being placed with one's co-op employer is.

Table 2
Probit Results for Job Change

Variable	Coefficient	Standard Error	Significance Level
COOPGRAD	-0.0419	0.1090	0.7007
COOPSCH	-0.0035	0.0844	0.9669
First Job With Co-op Employer	-0.2577	0.1485	0.8250
GPA	-0.1474	0.0666	0.0269
Licensed Profession	-0.2164	0.0007	0.0107

Other variables: program area, county per capita weekly income, single digit industry dummy variables, educational level, parents' educational level, race, age, gender, marital status, worked at community college dummy variable, self-employment status, percent county worked in that is urban.

Effects of Combined Variables		
Variables	**Coefficient**	**Significance Level**
COOPSCH + COOPGRAD (Co-op graduates compared with graduates at non-co-op colleges)	-0.0454	0.9669

Impact on Use of Skills Learned in Community College

One contribution a co-op program may make is to help students assess employment prospects for their likelihood of matching the skills they learned in their educational program. To analyze this effect, respondents were asked to rate their employer's use of the skills and training they gained from their community college education. A binary variable was created which equaled one if the employer made "excellent" use of their skills and zero if not. Table 4 presents the results obtained by fitting this variable to the data using a probit model.

Being a co-op graduate significantly increased the likelihood that the respondent felt the employer was making excellent use of the skills they learned at community college. Being a graduate of a college offering co-op decreased this probability. The joint effect of the two variables was insignificant, so that the responses of co-op graduates to this question were not significantly different from those of graduates from colleges not offering co-op. A positive response to this question was associated with those who were working in an area related to their major while at community college.

Table 3
Probit Results for Worker Expecting to Remain Two More Years with Their Current Employer

	Female Results		Male Results	
Variable	**Coefficient**	**Significance Level**	**Coefficient**	**Significance Level**
COOPSCH	-0.3181	0.0163	-0.1645	0.2444
COOPGRAD	0.4406	0.1740	0.0011	0.9950
First Job with Co-op Employer	0.2002	0.3897	0.1822	0.4694
Worked in Area at Community College	0.1491	0.2358	0.3774	0.0031
Years in Labor Force	0.0162	0.0874	0.0032	0.7769
Years with Current Employer	0.0225	0.1091	0.0068	0.6036
Combined Effect COOPSCH + COOPGRAD (Co-op graduates compared with those at non-co-op colleges)	0.1225	0.4760	-0.1634	0.3788

Other variables: program areas, single-digit industry dummy variables, percentage workers' county is urban, educational level of workers, age, gender, marital status.

Job Advancement

Respondents were also asked how many job advancements or job promotions they had received in the last five years. These advancements and promotions were divided into those resulting in an increase in pay, an increase in responsibility, or an increase in a better job match.[3] Table 5 shows the main results for all three types of advancements combined.

The combined effect of **COOPSCH** and **COOPGRAD** was significantly positive for the combined number of advancements and promotions. Co-op graduates received more advancements than did the non-co-op graduates at their colleges, a result that is significantly positive (using a one-tail test) at the 5% level.

The results for each category of advancements are not shown. The combined effect of **COOPSCH** and **COOPGRAD** were positive and sig-

[3] A similar set of questions was asked about employer changes in the last five years and if these changes had the above result. However, cooperative education had little impact on these, so we focused on job advancements only.

Table 4
Probit Results for Employer Making Excellent use of Skills Learned at Community College

Variable	Coefficient	Standard Error	Significance Level
COOPSCH	-0.1545	0.0877	0.0781
COOPGRAD	0.2317	0.1141	0.0423
First Job with Co-op Employer	0.0950	0.1486	0.5223
Worked in Related Area while at Community College	0.2704	0.0778	0.0005

Other Variables: program areas, weekly wages in county worker works in, percent urban of county, city size dummy variables, education level, age, gender, race, marital status.

Effects of Combined Variables

Variables	Coefficient	Significance Level
COOPSCH + COOPGRAD (Co-op graduates compared with graduates at non-co-op colleges)	0.0772	0.4987

Table 5
Regression Results for Advancements and Promotions

Variable	Coefficient	Standard Error	Significance Level
COOPSCH	0.2147	0.3349	0.5217
COOPGRAD	0.7492	0.4404	0.0892
First Job with Co-op Employer	-1.2247	0.5586	0.0377

Combined Effect of Variables

Variables	Coefficient	Significance Level
COOPSCH + COOPGRAD	0.9638	0.0313

Other Variables: Program areas, city size dummy variables, weekly wage in county worker works in, marital status at community college, current marital status, age and its squared value, worked when entering major, worked in related area when entering major, race, gender.

nificant for the number of job advancements resulting in better matches and was close to significant for advancements resulting in increased pay. The separate results for males and females were similar in sign but different in size and significance.

Having the first job with the co-op employer had a negative impact on all advancements for increased responsibility, better job match, and all

advancements combined. Recall that this variable was also very close to being significant as a factor reducing job turnover. These results seem contradictory as one would assume that those with fewer advancements would be more likely to quit their job. One explanation is that co-op students who are placed with their co-op employers following a graduation start at higher levels of pay and responsibility and in jobs better matching their skills. As a result, further advancements are fewer during their early years of employment. However, the wage data do not support this hypothesis as JOB1CO-OP employer did not increase wages. To analyze this issue better, a future survey will focus on the level of responsibility and job matches rather than on the number of advancements.

Conclusions

Students graduating from cooperative education programs who are placed with their co-op employers do appear to have reduced search times for finding their first job. In addition, being at a college offering co-op appears to reduce search time, whether one is a co-op student or not. The possibility that this results from left-out variables or from selectivity bias is reduced by the fact that the regressions held constant the factors leading persons to choose co-op programs and colleges offering co-op programs, as well as the main factors reflecting local economic conditions. For example, variables for city size did not approach significance in the regression and had little effect on the co-op variables. As this "external" effect was found for wages and other variables, the results do suggest that the presence of a co-op program does effect the whole college. Without more data, there can be no definitive explanation of this phenomenon. However, one may speculate that having a co-op program gives the faculty greater knowledge of the needs of employers which they pass on to students, that having a co-op program provides feedback to the faculty on the quality of what their students have learned and thus motivate them to better the programs, and that having a co-op program gives employers greater knowledge of the quality of the community college's graduates.

A relationship between participation in co-op and job turnover was not supported by the data. Females graduating from colleges offering cooperative education had lower expectations of continuing to work for their current employers for the next two years. Those whose first job was with their co-op employer had significantly lower turnover.

Cooperative education graduates reported significantly more job advancements of all types than graduates from colleges that did not offer co-op. They were much more likely to receive advancements resulting in their job better matching their skill. In addition, their employers were

more likely to make excellent use of the skills they learned in community colleges. Overall, this suggests a positive effect of co-op education on the quality of job-matches.

A future article will present findings from a second survey that extends longitudinal assessment of wage impacts and will examine the levels of job responsibility and match.

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