

**“Recycling:” The Economic Implications of Obtaining Additional  
Postsecondary Credentials at Lower or Equivalent Levels**

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**Abstract**

This paper explores the earnings of graduates of community college and university undergraduate programs of different fields of study. There are two goals of this study. The first goal is to determine whether technical and applied community college programs provide their graduates with higher earnings opportunities than do the so-called “softer” liberal arts programs. The second goal is to examine the economic implications of obtaining an additional postsecondary credential that is not designed to be a continuation of the first credential, a practice known as “recycling.” Comparisons by field of study are investigated.

## Introduction

It is well understood in the research literature that university graduates of technical and applied programs have better labour market outcomes than their counterparts from liberal arts fields (Axelrod, Anisef, and Lin, 2001; Davies and Guppy, 1997; Guppy and Davies, 1998; Finnie, 2001). Graduates of applied and professional programs are thought to obtain jobs with higher wages because they later utilize the skills they learned in school. On the other hand, liberal arts graduates of the fine arts, humanities, and social sciences are believed to work for relatively lower wages, often in jobs that do not require university training, because their skills are not formally recognized by employers as being directly related to job requirements (Redpath, 1994).

However, less is understood about comparisons between community college and university undergraduates of different fields of study, as few assessments of this sort have been made in the research literature. More specifically, it is unclear whether technical and applied community college programs provide their graduates with higher earnings than do the so-called “softer” liberal arts programs. This is a particularly important issue, since university fees are usually substantially higher than college tuition costs and the average duration of university programs is much longer than the average duration of college programs. Unfortunately, the available research on this issue is restricted largely to profile reports that do not allow for statistical inferences, and do not control for the effects of possible spurious factors (Allen, 1996).

The viability of a liberal arts university education has become a key policy issue; however, perceptions of this issue are highly polarized. On the one hand, continued public funding of a liberal arts education may be in jeopardy, as policy makers and

government officials generally do not recognize the economic value of this form of education. On the other hand, recent research on the returns on postsecondary schooling suggests that liberal arts graduates do acquire employable skills that translate into favourable labour market outcomes, particularly over their career trajectories (Allen, 1996; Giles and Drewes, 2001). At the same time, others have emphasized the non-economic value of a liberal arts education (see Axelrod et al., 2001).

Nevertheless, most people now believe that programs providing technical skills represent the best form of job preparation in the new “knowledge-based” economy. This perception has been exploited by a number of technical and applied institutions (e.g. DeVry) through television commercials and radio advertisements. These factors likely explain the large numbers of university undergraduates, particularly those from liberal arts programs, who are attending community college programs to acquire technical skill after university graduation.

The term “recycling” refers to the practice of obtaining an additional postsecondary credential that is not designed to be a continuation of the first credential (Allen, 1996: 17). Thus, graduates who obtain a college diploma after earning a university degree are recyclers. Likewise, a university graduate who pursues an additional university undergraduate degree is also a recycler. Recycling, particularly among university undergraduates, has become a very common phenomenon. A recent report by Statistics Canada, drawing on data from the 1990 National Graduates Survey, shows that 59% of university undergraduates pursue further education. Of these graduates, 39% continued to a higher level; approximately 24% entered another

Bachelor's program;<sup>1 2</sup> and the remaining 38% entered into college or technical diploma/certificate programs (Statistics Canada, Applied Research Bulletin, 2001: 26). However, it is not clearly known whether those who chose to recycle also achieved higher earnings as a result. This provides an opportunity for this paper to make a unique contribution to the literature.

Drawing on a large Canadian dataset, the present study compares the labour market outcomes of college and university graduates of different fields of study. There are two key objectives of this paper. The first is to compare the earnings of college and university undergraduates of different fields of study, with the explicit purpose of determining whether community college graduates of applied and technical programs earn more than liberal arts university undergraduates, after controlling for other possible factors. The second objective of this study is to identify the extent to which recycling may affect the earnings of postsecondary graduates. This will be done by comparing the earnings of graduates who have recycled through the postsecondary education system with those who have obtained only one college or university undergraduate credential. While comparisons are made among graduates of a variety of recycled categories, most of our attention will be directed to comparisons between university graduates and university-to-college recyclers.

### **Data and Methods**

The source of data for this study is Statistics Canada's 1995 National Graduates Survey (NGS). The NGS is sponsored by Human Resources Development Canada and has been conducted by Statistics Canada since 1984. The NGS provides information on

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<sup>1</sup> As a result of rounding, the percentages do not sum to 100.

postsecondary graduates surveyed two years following graduation. The survey is conducted by telephone, and respondents are asked a variety of questions relating to their educational histories and employment situations. The survey provides information about the labour market experiences of recent graduates of post-secondary institutions. The main goals of the NGS are to provide information about the link between educational experiences and employment outcomes, and to gain a better understanding of school-to-work transitions and the returns to human capital.

The 1995 NGS has a sample of 43,040 respondents. It is representative of all provinces and territories in Canada, and is the largest and most comprehensive survey available in Canada to analyze the relationship between education and work.

#### *Selection Criteria For This Analysis*

The present analysis includes only graduates of community college and university undergraduate programs who have not obtained an additional degree, diploma, or certificate subsequent to the credentials they originally received in 1995. Those graduates who had obtained additional qualifications were excluded because they no longer belong to the original educational group. The analysis also excludes those who are working part-time in order to pursue their education. It is important to exclude these respondents in order to prevent mixing school and work in such a way that would affect labour market outcomes (Finnie, 2000b: 200).<sup>3</sup>

The method of analysis in this paper is ordinary least squares regression, treating the log of earnings two years post-graduation (1997 dollars) as the dependent variable.

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<sup>2</sup> One might expect that a large proportion of these students enter into teaching and education undergraduate programs.

<sup>3</sup> The selection criteria used in this study are similar to the criteria used by other researchers employing NGS data (Finnie, 2000a; 2000b; Krahn and Bowlby, 1999).

The sociodemographic independent variables include sex, marital status, age, region, parental socioeconomic status, language of interview, Indian status, and number of children. Three education variables are employed in this analysis. The first is a recycling measure, derived specifically for this study, which has six categories: 1) graduates with only a university degree (reference category), 2) graduates with only a college diploma, 3) graduates with a college diploma who had previously obtained a different college diploma, 4) graduates with a university undergraduate degree who had previously obtained a college diploma, 5) graduates with two different undergraduate degrees, and 6) graduates with a college diploma who had previously obtained a university degree.

The field of study variable in the 1995 NGS converted the survey responses into a five-digit field-of-study code. Field-of-study codes are part of the University Student Information System (USIS) and Community College Student Information System (CCSIS), developed by the Centre for Education Statistics at Statistics Canada. These codes are hierarchically constructed such that the first digit indicates a major group, the second and third digits indicate a broad field of study within the major group, and the fourth and fifth digits indicate a more specific field of study within the broad field. The field-of-study codes were aggregated by Statistics Canada into a smaller subset of ten categories, using a harmonization code that matches the university student field of study codes (USIS) and the community college field-of-study codes (CCSIS) to Census field-of-study codes.

The census field-of-study codes are applicable for all graduates, and are designed to compare the NGS findings with other Statistics Canada surveys and the Census of

Population (see Appendix B of the 1995 NGS). The harmonized categories are grouped according to the following fields of study:

- 1) Education, recreational and counseling services;
- 2) Fine and applied arts;
- 3) Humanities and related fields;
- 4) Social sciences and related fields;
- 5) Commerce, management and business administration;
- 6) Agricultural and biological sciences;
- 7) Engineering and applied sciences, technologies and trades;
- 8) Health professions, sciences and technologies;
- 9) Mathematics and physical sciences; and
- 10) Interdisciplinary studies, unknown, or other.

The last education variable used in this analysis indicates whether the respondent graduated from a co-operative (co-op) program. This is an important control variable, because graduates of coop programs generally receive hands-on work experience as part of their educational training, and presumably this experience leads to stronger linkages between school and work.

Lastly, two variables are used to distinguish among different types of occupations: The first distinguishes between full-time and part-time workers, the second between different types of occupations, using the Standard Occupational Classification (SOC) codes. The occupational categories are as follows:

- 1) Managerial administrative and related;
- 2) Natural sciences, engineering and math;
- 3) Social sciences and related fields (reference category);
- 4) Religion;
- 5) Teaching and related;
- 6) Medicine and Health;
- 7) Art, literary, recreational and related;
- 8) Clerical and related;
- 9) Sales;
- 10) Service; and
- 11) Manual blue-collar occupations.

## Results

Three regression models were estimated, with the independent variables entered into models in stages. The first model includes the sociodemographic variables sex, marital status, age, region, parental socioeconomic status, language of interview, Indian status, and number of children, along with the education variables recycling, field of study and co-op. Model 2 includes an additional term for the interaction between the recycling and field of study variables, and Model 3 adds the occupation variables. The parameter estimates and model statistics for the following analysis are provided in Table 1.<sup>4</sup>

The  $R^2$  for Model 1 is .216, and the F-tests reveal that the coefficients of each of the three education variables are statistically significant ( $p < .001$ ).<sup>5</sup> Not surprisingly, graduates of co-op programs earn more than graduates of non-co-op programs, when controlling for the other variables in the model.<sup>6</sup> The most interesting results from Model 1 are the parameter estimates for the recycling variable. Graduates who went from one university undergraduate program to another university undergraduate program are at the top of the earnings distribution. They earn more than the reference category, graduates with only one postsecondary undergraduate degree ( $p < .001$ ). Graduates who obtained a college diploma, and then achieved a university undergraduate degree are next, ahead of graduates with only an undergraduate degree ( $p < .001$ ). Perhaps the most noteworthy

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<sup>4</sup> Due to space considerations, the coefficients for the sociodemographic variables are not presented in Table 1. The full tables are available upon request from the author.

<sup>5</sup> Caution should be made when interpreting these results, since other theoretically important variables (i.e. ability) could not be included as control variables in the analysis. Thus, these OLS results are subject to the omitted variable (or selection) bias.

<sup>6</sup> When not otherwise stated, the relationships between the dependent variable and each independent variable are to be interpreted as controlling for all of the other variables included in the respective models.

finding is that graduates who obtain a college diploma after a university degree earn less than graduates with only a university degree ( $p < .001$ ). Graduates with two college diplomas earn less than university undergraduates ( $p < .001$ ), and less than graduates who went to university and then to college, but only slightly more than graduates with only one college certificate. Graduates who only completed one college program earn the least.<sup>7</sup>

The interaction between the recycling variable and the field of study variable is included in Model 2 to determine whether recycling has differential advantages or disadvantages for graduates of various fields of study. As expected, the interaction between the two variables is statistically significant ( $p < .001$ ), suggesting that the extent to which recycling improves earnings depends on the field of study that is chosen. After including the interaction term between field of study and the recycling variable, the  $R^2$  increases to .232. The parameter estimates for the variables included in the interaction term are plotted in Figure 1, to provide a visual representation of the relationship between education and earnings for college and university graduates who have and have not recycled their education.

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<sup>7</sup> The parameter estimates for the recycling and field of study variables are discussed in further detail after the interaction term between the two variables is included in Model 2.

**Table 1**  
**Ordinary Least Squares Regression: Recycling**

	Model 1			Model 2			Model 3		
	b	SE (b)	p	b	SE (b)	p	b	SE (b)	p
<b>Coop Program</b>			< .001			< .001			< .001
Coop	0.05	0.006		0.05	0.006		0.03	0.006	
No coop	---	---		---	---		---	---	
<b>Field of Study</b>			< .001			< .001			< .001
Fine Arts	-0.02	0.012		-0.14	0.022		-0.11	0.019	
Humanities	-0.04	0.009		-0.06	0.014		-0.07	0.012	
Social Sciences	0.00	0.007		-0.03	0.012		-0.03	0.011	
Commerce	0.08	0.007		0.10	0.013		0.04	0.012	
Agricultural/Bio Sci	0.00	0.011		-0.03	0.015		-0.07	0.014	
Engineering/Ap Science	0.15	0.008		0.15	0.015		0.07	0.014	
Health Professions	0.11	0.009		0.14	0.020		0.06	0.019	
Math	0.10	0.011		0.08	0.016		0.02	0.015	
Other	-0.02	0.016		-0.04	0.025		-0.05	0.022	
Education	---	---		---	---		---	---	
<b>Recycle</b>			< .001			< .001			< .001
College only	-0.11	0.006		-0.12	0.015		-0.11	0.014	
College to college	-0.11	0.010		-0.18	0.034		-0.11	0.029	
Univ after college	0.00	0.008		-0.04	0.015		-0.02	0.013	
Univ to univ	0.06	0.009		0.05	0.015		0.08	0.013	
College after Univ	-0.05	0.013		-0.03	0.038		-0.04	0.034	
University only	---	---		---	---		---	---	
<b>Field of Study*Recycle</b>						< .001			< .001
Arts*College				0.15	0.028		0.12	0.025	
Arts*College to college				0.23	0.058		0.13	0.049	
Arts*Univ after college				0.08	0.046		0.07	0.039	
Arts*Univ to univ				0.15	0.089		0.01	0.078	
Arts*College after univ				0.10	0.066		0.08	0.061	
Humanities*College				0.07	0.030		0.07	0.026	
Humanities*Col to col				0.10	0.075		0.08	0.064	
Humanities*Univ aft c				0.03	0.027		-0.02	0.024	
Humanities*Univ to u				0.06	0.032		0.05	0.028	
Humanities*Col aft u				-0.05	0.059		-0.04	0.052	
Soc Sci*College				0.08	0.019		0.08	0.017	
Soc Sci*Col to col				0.19	0.044		0.10	0.038	
Soc Sci*Univ aft c				0.03	0.020		0.00	0.017	
Soc Sci*Univ to u				0.04	0.023		0.00	0.021	
Soc Sci*Col aft u				-0.06	0.052		-0.02	0.046	
Commerce*College				-0.06	0.018		-0.02	0.016	
Commerce*Col to col				0.03	0.041		-0.01	0.035	
Commerce*Univ aft c				0.01	0.019		0.01	0.017	
Commerce*Univ to u				-0.03	0.027		-0.07	0.024	
Commerce*Col aft u				-0.03	0.045		-0.03	0.040	
Agricultural*College				0.05	0.026		0.08	0.022	
Agricultural*Col to col				0.13	0.054		0.10	0.048	
Agricultural*Univ aft c				0.09	0.039		0.03	0.035	
Agricultural*Univ to u				-0.03	0.047		-0.06	0.040	
Agricultural*Col aft u				-0.03	0.073		-0.01	0.065	
Engineering*College				0.00	0.020		0.02	0.018	
Engineering*Col to col				0.05	0.040		0.00	0.034	
Engineering*Univ aft c				0.03	0.023		-0.02	0.020	
Engineering*Univ to u				-0.03	0.036		-0.04	0.031	

R-square = 2157  
Adj R-square= .2107  
n= 11028



Of the three liberal arts groups, social science graduates have the highest earnings, and only college graduates of mathematics and engineering earn more, when controlling for the other variables in the model. In fact, college graduates of engineering and mathematics also earn more than university graduates of education, as well as those classified in the “other” category.<sup>8</sup> The earnings of social science university graduates are roughly in the middle of all university graduates, while the earnings of humanities, and particularly fine arts graduates, are the lowest of all university fields of study. The earnings of humanities graduates are also surpassed by community college graduates in the health related fields, while university graduates in the fine arts earn less than college graduates of every field, except those classified in the “other” category.

Figure 1 also provides information about the earnings differences associated with recycling. The graph shows that college graduates and graduates with two college diplomas are either at or near the bottom of the earnings distribution for every field of study. Conversely, university graduates who previously had obtained another undergraduate degree are at the top of the earnings distribution for nearly every field of study. One notable exception is for graduates with a postsecondary credential in mathematics. Graduates who have a college diploma in mathematics, but who had previously obtained a university degree, earn more than their counterparts in any of the other categories.

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<sup>8</sup> F-tests reveal that all of these differences are statistically significant ( $p < .001$ ).



When making comparisons by field of study, with the exception of fine arts graduates, graduates with only a university undergraduate degree earn more than their college field-of-study counterparts, whether the latter have earned one or two college diplomas. Graduates who went to college after receiving a university degree earn more than their counterparts with the equivalent university credential in only two instances: if they have obtained a fine arts diploma or a mathematics diploma. In fact, graduates who first obtained a university undergraduate degree and then went on to obtain a college diploma only earn more than social science undergraduates if their college diploma is in commerce, engineering, health, or mathematics. Recycling of this kind might be more advantageous for the other liberal arts university graduates, because recycled graduates in the majority of fields of study earn more than humanities graduates, and in particular, than those in fine arts.

When the occupation variables are added in Model 3, the  $R^2$  increases to .454, suggesting that occupation has a substantial impact on earnings, over and above the effects of education and the various background characteristics. The only parameter estimates for the education variables that change markedly when the occupation variables are added to the model are those for graduates of mathematics and the health professions. Their respective coefficients are reduced once the occupation variables are included, suggesting that the labour market outcomes of these graduates may be largely attributable to the close ties between their educational programs and various occupational sectors.

## Discussion

This study has addressed two social and policy concerns regarding the labour market outcomes of postsecondary graduates of various educational programs. The first is related to earnings comparisons of college and university undergraduates of different fields of study. The second involves the potential impact of recycling on earnings. The results of this study have a number of implications that are addressed below. Some limitations of the analysis are also discussed.

The first objective of this study involved comparing the earnings of college and university undergraduates of different fields of study, while controlling for possible background factors. Particular emphasis was placed on comparing community college graduates of technical and applied programs with graduates of liberal arts undergraduate programs. The regression results showed that graduates of college programs in two different fields, engineering and mathematics, earn more, on average, than do university undergraduates of the liberal arts programs. The results also show that it is important to distinguish among liberal arts fields, because social sciences graduates earn significantly more than graduates of most community college programs, whereas the earnings of fine arts and, to a lesser extent, humanities undergraduates, are eclipsed by college graduates with diplomas in a number of different fields.

If we consider the higher costs of a university undergraduate education, not to mention the lengthier program requirements relative to community college programs, the results of this study may challenge future postsecondary students and their parents to question the financial advantages of a liberal arts degree. At the same time, however, it is important to point out that the true potential of a liberal arts university education is

underemphasized when comparing labour market outcomes of liberal arts undergraduates with those of community college graduates. This is because an undergraduate education provides additional opportunities to pursue further studies in graduate and professional programs, where the labour market outcomes are generally better. In fact, graduates of liberal arts programs are more likely to stay in school and pursue further education than are most other graduates (Statistics Canada, 2001: 27).<sup>9</sup> Community college graduates, in contrast, do not have the opportunity to continue on to professional programs such as medical school, business school, or law school.

Another point to consider is that while the knowledge and skills obtained in liberal arts programs might not be directly rewarded in the labour market, they can be very useful and helpful for gaining access to jobs where written, oral, and critical thinking skills are essential. Thus, the modest labour market outcomes of liberal arts graduates, while a matter for concern, should be considered with these other factors as far as social policy is concerned, especially since the benefits of these programs are not as obvious or observable (see, e.g., Axelrod et al., 2001).

The results reported here should also be interpreted with some caution, because the findings are subject to a number of qualifications. For example, the analysis is restricted to graduates surveyed only two years after graduation; this is a limited amount of time for graduates to achieve their real earnings potential. The findings, however, do provide a basis on which to build future research. In particular, a longitudinal study of the earnings trajectories of college and university graduates of different fields of study would be a valuable complement to the research in this area. While some researchers

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<sup>9</sup> The only exception is for biological and agricultural science graduates, who have slightly higher rate of continuing their education (Statistics Canada, Applied Research Bulletin, 2001: 27).

have examined the longitudinal files for earlier versions of the National Graduates Surveys (Finnie and Frenette, 2000; Finnie, 2001), little is known as yet about the earnings trajectories of postsecondary graduates, particularly from recent cohorts. When the five-year follow-up for the 1995 NGS becomes publicly available, it will be possible to determine if the earnings trajectories of graduates of different fields of study from college and university programs have changed for the 1995 cohort. This is an important issue because past research, using longitudinal data on university graduates of the early 1990's, suggests that it takes some time before the more transferable skills obtained by graduates of liberal arts programs translate into labour market advantages (Giles and Drewes, 2002; Finnie and Frenette, 2000: 15).

Research in this area would also be much more comprehensive if an assessment of the returns to postsecondary schooling could be made when accounting for the different costs of attending various postsecondary programs. Such a project would involve tracking individuals over long periods. Detailed information on the tuition costs of various programs would also be required. While this kind of longitudinal analysis might be costly and time consuming, it would also be invaluable to students, particularly because the cost of postsecondary schooling has increased dramatically over the last 40 years, not to mention that the costs of education have shifted increasingly from the public sector to the students themselves (Statistics Canada, Applied Research Bulletin, 2001: 28; see also Finnie and Gameau, 1996).

The second important finding of the present study concerns the relationship of recycling and earnings. As discussed earlier, the popular belief that a university degree provides knowledge, while a college diploma provides concrete skills that are more

valuable in the modern labour market, has led a number of university graduates to pursue shorter-term technical programs at community colleges after university graduation. However, the results from this study suggest that recycling may not always be as economically rewarding as some might expect. The most noteworthy finding from this analysis is that university undergraduates who later obtain a college diploma generally earn less than university undergraduates who have not recycled through the system.<sup>10</sup>

When these results are broken down according to field of study, we arrive at a clearer understanding of the possible financial implications of various types of recycling. In general, it may make less sense for graduates with an applied or technical university degree to recycle through the system, because their earnings are already high. However, obtaining a college diploma might have advantages for university undergraduates of certain fields. For example, university undergraduates who later obtain a college diploma in engineering, mathematics, health, and commerce earn more than those with only a university social science degree. The earnings of graduates with humanities undergraduate degrees are also surpassed by university graduates with a college diploma in education. Lastly, the earnings of graduates with fine arts degrees are surpassed by recycled graduates of nearly every program. The only exception is university graduates who later obtain a college diploma in the humanities. Their earnings are slightly lower than university graduates with a fine arts degree.

While the statistical analysis suggests some explanations for these results, an intuitive explanation can be offered regarding why university undergraduates who later obtain a technical college diploma generally have lower earnings than their counterparts

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<sup>10</sup> This, of course, is attributable to the high earnings of university undergraduates in health and engineering fields.

with only an applied university degree. For example, it might be that earnings are not completely related to technical skills, because these recycled students would have obtained these skills in college. Instead, it is possible that the premium associated with higher education may also have something to do with ability or motivation. Presumably, the most capable and motivated undergraduate students either continued on with their schooling to obtain higher-level postsecondary degrees, or they were able to find well-paying jobs. In contrast, those who recycled their postsecondary undergraduate education may be the ones who were less successful in their programs, and may have had limited job and education prospects after graduation. This implies that earnings may have something to do with motivation or ability, and not to having obtained a particular credential. Unfortunately, this assertion cannot be tested with the NGS data, as there are no variables available in the survey that tap into ability.

Lastly, more precise and complete information regarding the recycled graduates' programs, accompanied by more sophisticated and longitudinal statistical analyses, is required for a more comprehensive look into the financial implications of recycling. Additional program information, in particular, would help provide further explanation for these results. For example, there are some college programs where enrolment is nearly exclusive to students with an undergraduate degree, and so it is quite likely that these programs would have better labour market outcomes for their graduates than would college programs that do not request an undergraduate degree.<sup>11</sup> The inability to extract this information from the NGS data limits the generalizations that can be made from

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<sup>11</sup> Technically, however, these graduates would not qualify as recycled, as classified in this study.

these results.<sup>12</sup> Nonetheless, the results of this study provide an initial basis for future research and the development of policy initiatives.

The comparisons between college and university undergraduates may be particularly helpful for students, parents, and policy makers, since university programs usually have substantially higher tuition costs, as well as much more extensive program requirements. The implications of the recycling analysis may be important because the acquisition of additional education is costly, in terms of both time and money. Thus, this paper has the potential to influence educational policy decisions in Canada, particularly policy related to the funding of postsecondary schooling. At the very least, the results suggest that parents and students should investigate their postsecondary options carefully.

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<sup>12</sup> Furthermore, in light of the growing linkages between college and university undergraduate programs, it will be all the more important to account for the growing diversity of joint programs in future analyses.

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