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The Influence of Debt on Choice of Major

By Edward P. St. John

There has been speculation that high debt burden influences students to choose majors with high expected earnings. This article develops and tests a model for examining the factors that influence college students to choose majors with higher expected earnings.

Final major choices made in 1985 by college students in the high school class of 1980 were examined. The findings include: 1) major choice is influenced by social background, high school achievement, high school major choice, and college experiences; and 2) debt burden was not significantly associated with major choice.

Student major choice is a topic of increasing interest in higher education (Afrin, 1986; Braxton, Brier, Herzog, and Pascarella, 1990; Kramer and Van Dusen, 1986; Whiteley and Fenske, 1990). However, questions about why students select majors with high expected returns have received little attention. Given the increasing tendency for students to select majors with high expected earnings in the 1980s, coupled with the growing levels of student debt burden during this period, there was speculation that high debt burden influenced student major choice (e.g. Kramer and Van Dusen, 1986). This issue merits systematic consideration.

This article examines the factors that influenced college students in the high school class of 1980 to choose majors with high expected earnings. After a brief background on the issue of debt burden and major choice, the research approach, findings and conclusions are presented.

Background

During the early 1980s, the federal government increased its emphasis on loans and deemphasized grants (College Board, 1992; St. John and Elliott, in press). As part of a restructuring of federal Title IV programs that was aimed at reducing costs: Pell Grants were retargeted toward low-income students, campus-based programs were substantially reduced, and need analysis was reinstated in the GSL program (Hearn, 1993; St. John and Elliott, in press). The specially directed programs were also substantially reduced: the Social Security education benefits were eliminated, while veterans benefits and other nonmilitary grants were cut in half (College Board, 1992). Between fiscal years 1980, when the high school class of 1980 entered college, and 1985, when the data for this study were collected, total federal grants declined by over one-third in constant dollars, while loans increased by more than one-tenth in constant dollars (St. John and Elliott, in press).

With this restructuring of the federal aid programs, the percentage of loans in the financial aid packages for most students with financial need increased substantially and rapidly. Indeed, the 10% increase in annual total federal loans between 1980 and 1985 does not indicate the extent of change in financial aid packages for needy students. With

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the reinstatement of the needs test for guaranteed loans,¹ the percentage of loans going to low-income students dropped substantially, while loans for middle- and low-income students climbed.

The increased use of loans in financial aid packages for students with financial need led some to speculate that the financial aid restructuring would be detrimental to enrollment by low-income students (Newman, 1985), a claim that has been reinforced by recent studies (St. John, 1991; St. John, 1993). At the same time, some critics of the Reagan administration speculated that the increased emphasis on loans in financial aid packages could have an influence on academic choices, including the choice of academic major (Kramer and Van Dusen, 1986), a claim that has not been fully examined. This analysis focuses on this issue by addressing two research questions. First, what factors influence students to choose majors with high expected returns?² Second, does debt burden influence major choice when other factors are controlled for?

Research Approach

The Model

To address these questions, it was necessary to develop a new model, since there was limited prior research on the topic. This study views major choice as an attainment process. The basic attainment model views educational attainment and career choice as a function of social background, prior educational experience, and aspirations (Blau and Duncan, 1967; Alexander and Eckland, 1975). Recent research has used the basic attainment approach as a basis for developing models to examine the factors that influence college-attendance decisions (St. John, 1991) and persistence (St. John, Kirshstein, and Noell, 1991). Based on this prior research, this article views the decision to select a major with high expected returns as a function of social background, high school experience, and college experience.

The development of the model required a two-step process: first it was necessary to develop an appropriate ranking of majors based on their expected returns; then, to use this ranking as an outcome measure in an analysis of student major choice. To accomplish these tasks, two national data bases were used.

Data Bases

Two longitudinal studies developed by the National Center for Education Statistics were analyzed. The 1980 follow-up for the National Longitudinal Study of 1972 (NLS-72) was used to develop a ranking of majors (Tourangeau, et al., 1987) by 1979 earnings for college graduates in the high school class of 1972, which was used to examine final major choice by college persisters in the high school class of 1972. The 1980 follow-up of NLS-72 sampled 18,630 students (Tourangeau, et al, 1987). Of this group, 10,628 were currently employed, reported attending at least some college, and reported their earnings in 1980. The ranking used the portion of this population that reported receiving their four-year college degree as their highest level of educational attainment.

The 1985 follow-up survey of the high school class of 1980, the High School and Beyond Senior Cohort (HSB-80), was used to examine

the factors that influenced student major choice. HSB-80 sampled 28,000 seniors in high school during the 1979-80 academic year. In the 1985 follow-up, there were 3,893 respondents who reported having attended college and had sufficient information on other variables in the model to be included in this study. These students had at least four semesters of college and, therefore, not all of them held bachelors degrees.

Model Specifications

The final choice of college major by college students in the high school class of 1980, ranked by expected earnings, was used as the outcome measure for the study. The rankings are discussed under study findings below. Given prior research on educational attainment (e.g. Alexander and Eckland, 1975), independent variables were selected that were thought to have an influence on choosing majors with high expected returns.

Five *social background* variables were examined. Students who were *African-American* and *Hispanic* were separately identified using dichotomous variables to compare them to other students. *Males* were also separately identified using a dichotomous variable. *Family income*, a seven-category measure, and mother's educational level, a five-category measure, were also used.

Four *high school experience* variables were examined. Students who were in *vocational* and *academic* programs in high school were separately identified with dichotomous variables and compared to students who were in general high school programs. *High school grades*, an eight-point scale, was used as an indicator of achievement. *High school major choice* (response to a major preference question asked in high school), ranked using the same scale as final major choice, was used to control for the influence of early aspirations on subsequent academic choices made in college.

Four *college experience* variables were examined. *College grades*, an eight-point scale, was used to control for the influence of college achievement. *Debt burden*, the cumulative amount of loans students took out while in college, was used because of concern that growing levels of debt could be influencing student academic choice (e.g. Newman, 1985; Kramer and Van Dusen, 1986). *Semesters in college* was used to control for the influence of length of time attended on major choice. Whether students initially enrolled in a *private* college were coded as dichotomous variables.

Statistical Methods

Descriptive statistics were used to analyze certain aspects of student major choice. The rankings of majors using NLS-72 were developed by comparing means for 1979 earnings by college major. Major changes by the high school class of 1980 were also examined using descriptive statistics.

Ordinary least squares (OLS) regression was used to examine the factors that influence major choice. OLS regression analysis was considered appropriate since the outcome measure was a simple ranking. Additionally, standardized regression coefficients are presented, which

“With this restructuring of the federal aid programs, the percentage of loans for most students with financial need increased substantially and rapidly.”

permits comparison of the relative effects of different variables in each analysis.

Limitations

The study has at least four limitations. First, NLS-72 and HSB-80 have missing data. It was assumed that missing data were randomly distributed and therefore no attempt was made to control for missing data.

Second, while it was assumed that the rankings of majors by 1979 earnings for recent graduates approximates the type of information on earnings that would have been available to college students in the 1980s, it is not necessarily a ranking that would be appropriate for other periods. Therefore, to the extent that this research is used as a model for future studies, researchers might want to develop other, more current, major rankings.

Third, the influence of debt on major choice merits periodic study, since more recent and future changes in federal loan policies could influence student major choice. Indeed, this may be an unintended outcome of shifts in aid policy that merits routine examination, as is the case with intended outcomes (i.e. access and persistence).

Fourth, the model for predicting major choice used in this paper does not control for the full range of factors that could influence students to choose or change their academic majors (Pascarella and Terenzini, 1991). Instead, it controls for variables that seem appropriate, if we make commonly held economic and sociological assumptions about educational attainment processes.

Findings

Regression analysis was conducted on final major choice by college persisters. In this analysis students were counted as persisters if they enrolled initially in a four-year college and persisted for at least four semesters. Four semesters was considered an appropriate minimum, since students who had persisted at least four semesters would have had opportunities to change their majors.

The major ranking was developed for the analysis of working college completers in the high school class of 1972 (Table 1). NLS-72 was reexamined to develop a ranking of majors for college graduates. This ranking was used because students who persist for at least four semesters are more likely to aspire to complete their four-year degrees. It was assumed that major ranking represented the type of information students in the early 1980s would have had about earnings by field³. Engineering, business, computer science, and health services had the highest expected earnings. Education, agriculture/home economics, public service, social sciences, and physical sciences/math were in the middle range. Biological sciences, Humanities, office/clerical and professional programs⁴ had the lowest expected earnings.

Social background has a strong influence on the final major choice by college persisters (Table 2). First, background continues to have a strong influence. Being Hispanic, male, and having a high family income had significant and positive associations with choosing majors with high expected earnings. Mother's education had a negative influence on choosing majors with high expected earnings⁵. Only one background variable, being African-American, was not significant. These

TABLE 1
Major Rank by Students in the High School Class of 1972
With Bachelor's Degrees

| Rank | Major | 1979 Earnings |
|------|---------------------------------------|---------------|
| 1 | Engineering | \$23,431 |
| 2 | Mechanical and Engineering Technology | 19,450 |
| 3 | Business | 19,288 |
| 4 | Computer Technology | 19,147 |
| 5 | Health Services | 18,583 |
| 6 | Agriculture/Home Economics | 17,028 |
| 7 | Education | 16,129 |
| 8 | Public Service | 15,610 |
| 9 | Social Sciences | 15,338 |
| 10 | Physical Sciences/Math | 15,054 |
| 11 | Biological Sciences | 14,766 |
| 12 | Humanities | 14,201 |
| 13 | Office/Clerical | 13,728 |
| 14 | Professional Programs | 11,775 |

Source: National Longitudinal Study of the High School Class of 1972 Base Survey and Follow-Ups.

TABLE 2
Analysis of Final Choice of Major for Four-Year College
Persisters Using Mother's Education and Family Income¹

| Variable | Standardized Estimate |
|-------------------------------|-----------------------|
| Background | |
| Black | .027 |
| Hispanic | .040* |
| Male | .127** |
| Family Income | .057** |
| Mother's Education | -.075** |
| High School Experience | |
| Academic Program | -.039 |
| Vocational Program | -.028 |
| High School Grades | .068** |
| High School Major Choice | .381** |
| College Experience | |
| College Grades | -.038 |
| Semesters in College | .079** |
| Debt Burden | -.009 |
| Private College | -.075** |
| N | 2155 |
| R^{2***} | .206 |

Source: High School and Beyond Base Survey, Follow-Ups, and Student Aid Supplement

¹Only students with at least four semesters of college attendance were included in this analysis.

*P < .05

**P < .01

***R² is the ordinary least squares regression measure of proportional reduction in error. Thus, .206 means the model explains 20% of the variation in change of major.

findings suggest that major choice can be viewed as an attainment process.

High school experience also had a strong influence on final choice of major. Both high school grades and high school choice of college major had significant associations.

Third, college experiences also had an influence on major choice. First, attending a private college had a negative influence on choosing majors with high expected returns,⁶ and the size of the standardized estimate increases when compared to the prior analysis. Second, semesters attended had a strong positive influence on choosing majors with high expected earnings. The longer students persist, the more likely they are to choose a major with high expected returns.⁷

Finally, debt burden did not have a significant relationship with final choice of major. When other factors that could influence students to choose majors with high expected earnings are controlled for, debt does not appear to be significant.

Conclusions and Implications

What influences students to choose majors with high expected earnings?
Decisions to select majors with high expected earnings are appropriately viewed as an integral part of the attainment process. Students who come from families with high incomes, achieve well in high school, and persist and achieve well in college are more likely to choose majors with high expected earnings. The high school choice of college major has an influence, as does college experience.

Does Debt Burden Influence Major Choice?

In the middle 1980s at least, debt burden did not have a measurable influence on major choice. Nevertheless, the influence of debt burden on major choice certainly merits scrutiny and should be routinely monitored, especially if debt levels continue to rise.

Implications

The fact that students select majors with high expected returns is often viewed as a problem for higher education because there is an apparent association between the choice of these majors and debt burden (Newman, 1985; Kramer and Van Dusen, 1986). Viewed from this perspective, the fact that college experiences, including grades and persistence, influence students to choose majors with high expected earnings may be discouraging to some who believe that economic considerations should not influence academic choices. However, the association between educational attainment and earnings has long been made in both sociology (Blau and Duncan, 1967) and economics (Becker, 1964). Therefore, perhaps we should not view this tendency of students to select majors with high expected earnings as a problem.

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Endnotes

¹In the *Middle Income Student Assistance Act of 1978*, the income cap for GSLs was removed. The number of loans to upper-income students increased as a result (St. John and Byce, 1982) and the Reagan administration reinstated an income cap, then eventually implemented need analysis.

²Specifically, this paper attempts to develop a model that controls for the background variables that should, logically, be controlled for in order to assess the effects of debt on major choice.

³This assumption was based on the fact that there is usually a time lag between the collection and dissemination of information on earnings.

⁴Professional programs included four-year programs like "para legal" that give students a professional qualification.

⁵It is interesting to note that income and mother's education have the opposite effect on major choice. These variables are usually combined in a more general socio-economic-status (SES) variable. This analysis illustrates why such a grouping is not always appropriate. I suspect that this finding on mother's education is attributable to the fact that mothers who have college educations encourage their children to choose majors because of their interests, rather than because of expected earnings.

⁶This finding is probably an artifact of the types of major offerings available in many liberal arts colleges. Traditional liberal arts majors have lower expected earnings than engineering, computer science, and other majors more frequently found in more comprehensive institutions.

⁷And this analysis suggests that students in majors with high expected returns are more likely to persist, an issue that merits further examination.