



Career Outcomes of STEM and Non-STEM College Graduates: Persistence in Majored-Field and Influential Factors in Career Choices

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Background of the Study

- College students' career outcomes:
- What we know:
 - There are educational, sociological, and economic studies to understand the occupational choices and career outcomes of college graduates.
- What remains largely unattended:
 - The consistency between the academic training and occupational choice of college graduates

Research Objectives

- The objectives are to identify factors that underline the career choices of college students, and to improve their persistence and career outcome during their post-college years
- Research questions:
 - What factors influence the career choices and progress of college graduates? And
 - How do their influences differ for individuals in STEM and non-STEM fields?

Review of Literature

- Career-related inquiries branch out into three directions (Goyette & Mullne, 2006):
 - Gender and race imbalance in the selection of fields of study in college and graduate school;
 - Factors influencing entry into STEM fields; and
 - Occupational outcomes for college students.
- Important factors identified:
 - Include, but not limited to, gender, race/ethnicity, family background, academic ability/performance, socio-psychological variables, financial resources, institutional characteristics, and labor market returns

Review of Literature (cont.)

- Not only is there a wide spectrum of variables to be considered for inquires into the career choices of college graduates, but also several competing theoretical views are available, including, but not limited to
 - Meritocratic theory
 - Social reproduction
 - Human capital theory

Theoretical Framework

- This study adopts an expanded econometric theoretical framework that
- “assumes that individuals make decisions by weighing the monetary and nonmonetary costs against the monetary and nonmonetary benefits for all possible alternatives and then selecting the alternative that maximizes utility with respect to individual preferences, tastes, and expectations” (Perna, 2004, p.489).
- Why?
 - It allows simultaneous manifestation of meritocratic theory and social reproduction theory; and
 - It adds an economic view to the sociological variables.

Data Source

- The restricted-use data of Baccalaureate and Beyond Longitudinal Study (B&B: 93/97/03)
 - A survey sponsored by the National Center for Education Statistics (NCES)
 - It tracks students' education and work experiences after they received a bachelor's degree during the 1992-93 academic year.
 - The 1993 B&B cohorts consisted of 11,192 students from the National Postsecondary Student Aid Survey (NPSAS:93), are a representative sample of graduating seniors in all majors.
 - Follow-up surveys were completed in 1994, 1997, and 2003.

Variables

- Dependent variable: how closely related an individual's current job is with her/his undergraduate major
 - job closely related to college major;
 - job somewhat related to college major;
 - job not related to college major; and
 - Unemployed (excluded due to extreme small sample).
- Independent variables:
 - *Monetary and nonmonetary costs and benefits*
 - *Cultural and social capitals*
 - Graduates' demographics and academic performance

Statistical Analysis

- Descriptive analysis of the data is used to
 - show the distribution of bachelor degree recipients in jobs closely related, somewhat related, and not related to their college major with respect to demographic factors and the major independent variables.
- Multinomial logit regression analysis is conducted separately for STEM and non-STEM graduates.
 - Identical model structure is used for the 1994, 1997, and 2003 data times since career-related variables were measured repeatedly in those years.
 - The models of identical structure over time permit a longitudinal view of career progress, and separate models for STEM and non-STEM graduates help to reveal differences in career choices across major fields and the sources of the differences.

Separation of STEM and Non-STEM Students

- Self-selection bias – individuals are prone to major in fields that lead to occupations of greater earnings
- There are earning advantages for majors that are scientifically and quantitatively oriented
- The expanded econometric theoretical framework suggests:
 - Education decisions based on the expectation of earnings are likely to be influenced by imperfect and incomplete information, and
 - Expected earning is only one of many factors reflecting individual preferences and expectations.

Results

- Output tables
- All multinomial logit models have good fit indices.
 - With the model χ^2 being significant at $p < .001$ level, each model explains the data significantly better than its corresponding baseline model.
 - The overall classification rates are above 60% for the three models of STEM graduates and are slightly lower for the non-STEM models.
 - The fit indices suggest that all models fit the data well, with somewhat better fit for STEM students than for their non-STEM counterparts.

Major Findings

- The monetary and nonmonetary benefits, as measured by individuals' pay rate, job status, and satisfactions with job challenge and promotion, dominate the career choices of college graduates
- The only prominent monetary factor is the pay rate; monetary costs of undergraduate education, as well as parents' financial support, have little connection with choosing a job related to major.
- The association between high pay rate and increased likelihood of having a job closely related to major is much more visible for STEM than it appears for non-STEM graduates.

Major Findings (cont.)

- Social capital has strong influence on the likelihood of non-STEM graduates choosing a job closely related to one's undergraduate major.
 - The cohort graduation rate reduces the likelihood of a non-STEM graduate choosing a major-related job holding other variables constant;
 - Carnegie classification: the 1997 and 2003 models show that for non-STEM graduates from baccalaureate, master's and doctoral institutions, the likelihood to choose a job that is closely related to degree major reduces by at least 55% relative to those from Associates and other institutions;
- In general, cultural capital measures, including parents' highest education attainment, family income and career aspiration, do not show noticeable relationship with the job preference of non-STEM college graduates.

Major Findings (cont. 2)

- A consistent gender difference is only observed for non-STEM graduates. Male students are significantly lower in their likelihood of holding a job closely related to college major.
- The only gender-based difference in STEM graduates takes place in 2003, ten years after graduation, with males having significantly higher likelihood of having a job that is somewhat related to college major than not related at all.
- In terms of academic performance measures, the general pattern appears to be that lower academic performance, especially the undergraduate GPA, reduces the likelihood of an individual holding a job closely related to undergraduate major.

Major Findings (cont. 3)

- Overall, younger groups, in comparison to those who received their bachelor degree at 30 years or older age, have a decreased likelihood to have a major-related job
- Those with part-time jobs are more likely than their counterparts holding fulltime positions to have a non-major-related job in both 1994 and 1997, but this pattern disappears in 2003. Graduates having a job closely related to major are much more likely to have high satisfaction with job challenge throughout their career.

Theoretical Implications

- Social capital may play a more important role than cultural capital in preparing college students for future careers.
- Both econometric and sociological factors are required in order to better understand the dynamics of college students' career choices.
- Longitudinal effects of variables on career outcomes need to be examined.

Policy Implications

- The foremost question is whether it is sufficient to focus on graduation rates as the traditional measure of institutional effectiveness and student success.
- What administrators and practitioners can do in the higher education system to contribute to improved career outcomes of college graduates.
- What we can learn from Associate and other 2-yr institutions

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Questions & Comments?

