Abstract

Grade Point Average (GPA) is one of only a few costly signals that a university graduate can send to employers to distinguish themselves from other graduates. This study examined the extent to which the association between academic achievement and early-career incomes are different for male and female undergraduate degree recipients.

Undergraduate alumni records for a large state university system were matched to the state’s unemployment insurance database from 2004-2014 to determine wage data and industry of employment. Records were also matched to National Student Clearinghouse data that indicate alumni enrollment in a graduate program. I examine several specifications of income for graduates 7-12 months after graduation, when degree attainment and academic achievement is most likely to be a primary signal to employers, and estimate the returns to academic achievement in several industries.

Findings indicate that, on average, GPA is a meaningful signal to employers and graduates with a higher GPA earn an premium income, though there is significant heterogeneity across industries. Industries with higher average incomes also tend to have higher returns to GPA. I do not find evidence that men and women see differential returns to academic achievement within industries.

Keywords: labor market signaling, returns to higher education, gender discrimination

JEL codes: I24, I26, J24, J70

Summary main results

• Undergraduate academic achievement is a relevant signal to employers, but the importance of that signal is heterogeneous across industries.
• Higher income industries (e.g. finance and insurance, internet and computer systems, manufacturing) have higher rates of return to GPAs.
• I did not find statistically significant differences in returns to educational achievement across men and women in any single industry or across industries.

Data sources

Construct of interest: Annual salary of first full-time employment after entering the labor market with an undergraduate degree.

Administrative Academic Records: undergraduate degrees awarded by a US public university system from academic years 2004-2014, GPA, sex, field of study, and demographic data.

Quarterly Income: Quarterly earnings for income subject to unemployment insurance taxes and industry of employment earned in the calendar year past annualization. Analyzed using best-quarter annualization.

National Student Clearinghouse: Enrollment records for graduates that are enrolled at a US college or university in the calendar year after graduation.

Excluded Graduates:
• Students without administrative data on sex (2% of graduates)
• Income from outside the state
• Income from federal or military employment
• Income from self-employment, informal sector employment, or otherwise not subject to unemployment tax
• Graduates enrolled at a college or university
• Graduates in the labor force part-time (as measured by state minimum wage)

Methods

OLS model with log-linear outcome, clustered on campus of degree:

\[ \ln(\text{income}) = \beta_0 + \beta_1 \cdot \text{GPA} + \beta_2 \cdot \text{Sex} + \beta_3 \cdot \text{Discipline} + \beta_4 \cdot \text{GPA} \cdot \text{Sex} + \beta_5 \cdot \text{GPA} \cdot \text{Discipline} + \epsilon \]

• GPA: Vector of indicator variables for GPA levels. C/C+ is the reference group.
• C/C+ \leq 2.5; B- \leq 2.8; B \leq 3.2; B+ \leq 3.5; A- \leq 3.7; A/\text{A+}\leq 3.7
• Sex: Binary indicator for sex as indicated on undergraduate admissions file
• Discipline: Primary field of undergraduate study (e.g. life sciences, humanities)
• Industry: Industry of employment (e.g. internet and computer systems, business services)
• \(X_i^1\): Individual covariates: Race/ethnicity, administrative low-income indicator, campus primary industry of work, academic year of graduation.

Quadlin (2018) indicated that the observed returns to academic achievement are likely non-linear and potentially non-monotonic. Using discrete categories obviates the assumption of (log)linearity and monotonicity.

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References