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Persisting gaps: Labor Market outcomes and numeracy skill levels of first-generation and multi-generation College graduates in the United States



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ABSTRACT

While empirical research on American first-generation college students has tracked how students move into and through institutions, researchers rarely report on post-graduation outcomes of first-generation students. This project tests the assumption that first-generation and multi-generation college graduates are indistinguishable across numeracy skill and labor market outcomes. We analysed a nationally representative survey collected by the Organisation for Economic Co-operation and Development (OECD) which includes a measure of numeracy skill as well as labor market outcomes. We find that first-generation college graduates enjoy access to many of the same labor market outcomes of their multi-generation college graduate peers. However, first-generation college graduates lag behind in measures of numeracy.

1. Introduction

In the public psyche and in academic discourse, it is widely believed that a university degree is the great equalizer. In other words, social origins may determine educational attainment, but educational attainment (especially a college degree) determines labor market outcomes and membership to the American middle class. This notion is supported by the empirical work of scholars who have replicated this relationship in the US and abroad using nationally representative datasets (Blau & Duncan, 1967; Hout, 1984, 1988; Torche, 2011). This line of research, known in sociology as the “status attainment” tradition, has dominated public and academic understandings of the relationship between social origins, educational attainment (particularly attainment of a college degree), and occupational destinations for half a century. This is why much attention is paid to first-generation college students’ transitions into and through college (Spiegler & Bednarek, 2013). However, after college, first-generation college graduates become part of a larger group: college graduates.

In addition to asking if first-generation and multi-generation college graduates have similar labor market outcomes, this paper introduces a measure of cognitive skills to models that estimate how a college degree mediates the relationship between social origins¹ and occupational

destinations². A measure of cognitive skill (in the case of this project a measure of numeracy) allows for leverage on the human capital element of the relationship. What is the role of an individual’s ability/skills? Do first-generation and multi-generation college graduates have similar measured numeracy skills? Moreover, controlling for numeracy skill, do first-generation and multi-generation college graduates have similar labor market outcomes? Rather than treating college graduates as a monolithic whole, this paper seeks to understand whether there are latent differences in numeracy skills³ between first- and multi-generation college graduates and investigates whether there are differences in labor market outcomes between first- and multi-generation college graduates, while controlling for a measure of numeracy skill.

Understanding whether there are numeracy level and labor market differences between first- and multi-generation college graduates has important implications for theory and policy. College graduation is often understood to be a golden ticket to the American middle class. This notion does not question whether the rewards of higher education differ by social origins or even if higher education closes the class-based skills gaps that persist in primary and secondary schooling. From a policy perspective, this paper puts the outcomes of higher education into clearer context. Are colleges places that fill in the final skill gaps between first-generation and multi-generation students? If not, policy

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¹ Measures of parental education and occupation are traditionally used as proxies for social origins. For this study, highest level of parental education is used to determine if the college graduates in the sample are considered “first-generation” or “multi-generation” college goers.

² Educational attainment has been taken for granted as a proxy for skills, mainly because datasets that contain robust measures of adult skills are rare.

³ The dataset used for this paper includes measures of literacy, numeracy, and problem solving. We found literacy and numeracy to be most relevant to what we mean by cognitive skills. We ran our analyses for both literacy and numeracy and found that the results were quite similar. We decided that numeracy would provide a cleaner measure of skills, and our analyses proceed using only numeracy as a measure of skills.

makers may want to consider whether the equity agenda that shapes funding and assessment in the K-12 sector should to extend to higher education.

Our findings confirm some of the pillars of the status attainment paradigm, but also offer some complicating perspectives. First, we find that first-generation and multi-generation college graduates have similar labor market outcomes in terms of monthly earnings, employment, and occupational prestige. However, we find significant differences in numeracy scores of college graduates who are first-generation and those who have a college-educated parent. Multi-generation college graduates outperformed their first-generation college graduate peers by significant margins on assessments of numeracy.

We proceed by presenting a brief review of the literature on education and status attainment/social mobility research in the US. We then present our analytical strategy and describe the data. Our findings and discussion follow. Next, we discuss possible mechanisms for the gaps in numeracy scores among college graduates. We conclude by presenting some ways to interpret these seemingly incongruent findings: there are numeracy differences among first- and multi-generation college graduates; however, these differences do not seem to lead to real differences in labor market outcomes.

2. Literature review

The well documented empirical relationship between social origins, educational attainment, and social destinations is at the center of the status attainment paradigm. Status attainment sociologists have demonstrated the strong, positive relationship between social origins and educational attainment (Blau & Duncan, 1967; Hamilton, 2013; Hout, 1984, 1988; Torche, 2011). Father's occupation and educational attainment are associated with the occupational outcomes of the child *indirectly* through education (Blau & Duncan, 1967). Sewell, Haller, and Portes, (1969) built on Blau and Duncan's model by considering individual aspirations, peer group influences, and the effects of significant others when modeling the relationship between occupational attainment and social origins (Haller & Portes, 1973; Sewell et al., 1969). Both models hold that the association between social origins and social destinations is entirely mediated by the educational attainment of the individual. That is, social background has everything to do with how much education individuals attain, but, educational attainment, rather than family background, predicts labor market outcomes. Family advantages flow through educational attainment, but family advantages have no direct impact on occupational destinations. Hout succinctly writes:

Origin status affects destination status among workers who do not have bachelor's degrees, but college graduation *cancel*s the effect of background status. (Hout, 1988, p1358, emphasis added).

Thirty years later, Florencia Torche asked if the status attainment findings could be replicated using more recent data. In her piece, "Is a College Degree Still the Great Equalizer?" Torche (2011) finds that among college graduates, social background is not predictive of income or occupational prestige. Her findings have bolstered another generation of researchers to view a four-year college degree as "the great equalizer." The findings of Torche (2011) and other status attainment researchers have been influential in the way that sociologists and scholars of higher education have empirically treated college graduates. Taken at face value, these findings lead social scientists to assume that upon graduation all college graduates are virtually indistinguishable – that no matter their social origins, college graduates go on to inhabit the same levels of occupational prestige and labor market success.

2.1. The role of numeracy skill

Numeracy skill has proven to be a strong summary measure of ability in educational research because it is highly correlated with many

other measures of skill (Purpura, Hume, Sims, & Lonigan, 2011). In adults, numeracy skill is highly correlated with measures of literacy and problem solving (Goodman, Finnegan, Mohadjer, Krenzke, & Hogan, 2013). A measure of numeracy skill gives the researcher leverage on what the individual level skills, knowledge and competencies that underlie the credential. None of the studies reviewed in the preceding section consider the role of skill or ability in estimating the relationship between social origins, education attainment and occupational destinations. While most take education level as a proxy for skills, a growing literature suggests that in the US context, education level is, at best, a rough proxy and, at worst, highly correlated with race and class (Bonilla-Silva, 2017). Furthermore, there is no shortage of literature about the achievement differences by social class of students at every level of American education: students entering kindergarten through the end of high school have measurable, class-defined achievement differences (for a review see Reardon, 2011 and Reardon, 2013). Given that class-defined achievement differences exist in the elementary and secondary levels of schooling, it is not hard to imagine that these differences persist into and through higher education. However, most work that looks at the relationship between social origins, education and occupational destinations fails to incorporate a measure of skills. In other words, we may understand the credentialing function of education level on mediating social origins and economic outcomes, but we do not fully understand the role of human capital (i.e. knowledge, skills and competencies) in the mediating relationship. By introducing a measure of numeracy skills to status attainment models, we can better understand what has been measured by educational attainment in the past – merely the credentialing function of higher education or the acquisition of human capital.

Specifically, we will investigate the following research questions:

RQ1. On average, are there numeracy score differences between first-generation college graduates and multi-generation college graduates on numeracy measures?

RQ2. Is college graduate generational status related to employment outcomes after controlling for numeracy score?

We hypothesize that there are numeracy ability differences, measured by numeracy skill, between first- and multi-generation college graduates and that these numeracy differences have impacts on labor market outcomes. Prior literature suggests that there is horizontal stratification in the types of colleges that students attend by class: first generation students are more likely to attend community colleges or large regional campuses; multi-generation college students are more likely to attend selective universities and public, research-intensive flagship campuses (Carnevale, 2013; Mullen, 2010). When students from differing class backgrounds attend the same colleges, social class defines students' experiences and pathways through college (Hurst, 2010; Armstrong & Hamilton, 2013). This work suggests that achievement differences at the time of university admission are likely to persist through graduation.

This paper contributes to an emerging literature that explores differences among college graduates by social background⁴. Despite the paradigmatic role of status attainment theory, some emerging work has begun to examine types of differences that might exist among college graduates. Michael Gaddis' (2015) audit study using identical resumes demonstrates that black and white college graduates from selective and non-selective colleges have differing rates of calls about job interviews. Qualitative work by Armstrong and Hamilton (2013) chronicles how social background shapes college students' participation in majors, on-

⁴ There is a robust literature looking at first-generation college students as they apply and transition into college. Literature on the rates of first-generation college student persistence and engagement is rich and well documented. However, the literature on first-generation students' outcomes after graduation is much more sparse. Researchers tend to consider first-generation students post-college as members of a larger group: college graduates.

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