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Are college costs worth it? How ability, major, and debt affect the returns to schooling

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ABSTRACT

This paper examines the financial value over the course of a lifetime of pursuing a college degree under a variety of different settings (e.g. major, student loan debt, individual ability). I account for ability/selection bias and the probability that entering freshmen will not eventually graduate.

I find the financial proposition of attending college is a sound investment for most individuals and cost scenarios, although some scenarios do not pay off until late in life, or ever. I estimate the present discounted value of attending college for the median student to vary between $85,000 and $300,000 depending on the student's major. Most importantly, the results of this paper emphasize the role that risk (e.g. the nontrivial chance that a student will not eventually graduate) plays in the cost-benefit analysis of obtaining a college degree.

1. Introduction

Personal debt arising from student loans has steadily risen in recent years. The most recent graduating college cohort is burdened by an average of roughly $30,000 in student loan debt, while the national total has surpassed $1.2 trillion, a figure that some claim represents an economic bubble which could have substantial negative effects for future generations.

These numbers beg the question: Is taking on substantial student loan debt to (possibly) obtain a college degree a sound financial proposition? Unsurprisingly, this simple question has a complicated answer which depends on a variety of factors, such as the student's major, ability level, and probability of completing a degree, among many others. This paper seeks to provide the most comprehensive statistics to date on the lifecycle returns to various majors, and the implications these returns have for paying off costs associated with attending college.

In order to do this, I extend the lifecycle earnings simulation model developed by Webber (2014a) to examine the expected returns to attending college to a hypothetical high school senior. This approach allows me to estimate the length of time it takes for a college degree to become a positive financial proposition (taking into account the explicit costs associated with attending college as well as the implicit opportunity cost and uncertainty associated with completing the degree) under a wide variety of scenarios including different majors, student loan amounts, and ability levels. This approach allows me to correct for various types of selection/ability bias, as well as the fact that approximately 40% of students will not graduate within 6 years of beginning college (a critical, but often overlooked factor when evaluating the financial value of attending college).

From the perspective of a high school senior deciding whether to attend college, what to major in, and how much to pay for such an education, I find that college is

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almost always the right financial decision in terms of the expected value of lifetime earnings. For students with average levels of debt, the anticipated returns will, in expectation, outpace any costs by middle age or considerably earlier. The decision becomes much less clear, however, when college costs and subsequent debt are high, and in particular when examining students at the lower end of the ability distribution. For this group of students, a college degree may not pay for itself until much later in life, and depending on the major, it may never be a good financial proposition. I estimate that the net present discounted value for the median student ranges from $85,000 to $300,000 across the various major categories, exceeding the costs of attending the typical public institution, but potentially falling short of the more expensive private institutions.

These findings translate to a number of policy implications. Most important among them is transparency and dissemination of the expected financial returns to recent high school graduates who are making decisions about their educational future. The ethos surrounding postsecondary education has increasingly become akin to "A college degree is the best outcome for everyone regardless of cost". While true for most students, the results of this paper show that this does not apply to everyone, especially when it concerns degrees with low financial returns and/or high levels of debt. Furthermore, the results presented below make clear that importance of policies aimed at reducing or eliminating the risk of financing higher education (for example via an expansion of income-based repayment policies or income share agreements) and programs which improve the completion rates of students.

The paper is constructed as follows: Section 2 discusses the previous literature. Section 3 describes the data used to construct the lifetime earnings trajectories. Section 4 details the empirical methodology used in the simulations. Section 5 provides a discussion of the findings and their implications, and Section 6 concludes.

2. Previous literature

This paper contributes to three related literatures: the returns to education, major choice, and student loans. This section focuses mainly on the major choice and student loan literatures due to the large scope and scale of the work focusing on the returns to education. For an overview of the general returns to education, see Card (1999) or Heckman, Lochner, Todd, (2006a). For work specifically dealing with the returns to a college degree, see Averett and Burton (1996), Brewer, Eide, and Ehrenberg (1999), Dillon (2012), Goldin and Katz (2008), Grogger and Eide (1995) to name just a few. For recent reviews of heterogeneous returns to human capital, see Altonji., Blom, and Meghir (2012) or Webber (2014b).

Much of the literature on college major choice focuses on the role of expected earnings in students' decisions. Berger (1988) uses a Heckman selection framework, using family background characteristics as exclusion restrictions from the earnings equation to control for self-selection into majors and produces an estimate of the short-term expected future earnings from each degree. The predicted future earnings for each major are subsequently included in a conditional logit model of college choice, and are found to be a significant factor in students' decisions. For an excellent review of the recent work on college major choice, see Altonji. et al. (2012).

Arcidiacono (2004) uses a dynamic discrete-choice framework to estimate the impact of expected earnings on major choice. While Arcidiacono (2004) concludes that expected earnings do play a role in major choice, the estimates are smaller in magnitude than the results of Berger (1988), a finding attributed to invalid exclusion restrictions in the Berger (1988) Heckman model. In a more recent study of Duke University undergraduates, Arcidiacono, Hotz, and Kang (2012) conclude that much of the selection into majors is due to comparative advantage. Additionally, Montmarquette, Cannings, and Mahseredjian (2002) find a strong impact of expected earnings upon graduation from college in their model of major choice, which also accounts for relative major premiums and the likelihood of completing a given major. Wiswall and Zafar (2015) conclude, via experimental evidence, that both expected earnings and subjective tastes play a large role in major choice, but failing to account for subjective tastes may upwardly bias the importance of expected earnings.

Another branch of the college premium literature focuses on the differential returns to specific skills learned in college rather than majors. For example, Grogger and Eide (1995) document the importance of math ability in explaining earnings differences, decomposing this effect into both the return to math ability and the change in the composition of college graduates' field of degree. Hamermesh and Donald (2008) demonstrate that holding college major constant, there are substantial returns to taking upper-division science and math courses.

Robst (2007) provides evidence that there can be significant wage penalties for workers employed in fields different from their college major. This could lead to differences in the returns to college majors if there are differential shifts in the supply/demand for each major, thus forcing some majors to work in outside fields more than others.

Many studies which examine the returns to specific majors have focused on the returns at a specific point in time rather than across the lifecycle - typically early career earnings. A notable exception is Walker and Zhu (2011), who decompose lifetime earnings by major, but due to data constraints, they are unable to account for endogenous major choice. The empirical model in the current paper extends the work of Webber (2014a), which documented stark differences in lifetime earnings premia across majors after accounting for selection based on both cognitive and noncognitive factors. A more detailed description of the model is given in Section 4.

With regard to the literature on student loans, much of the work in this field – on loans and the relative value of obtaining a college degree – is summarized in the excellent *Journal of Economic Perspectives* article by Avery and Turner (2012). They provide a detailed history of student loan programs in the U.S., and a wealth of statistics on student debt. The chief aim of this manuscript is to provide a more formal and in depth treatment of the helpful back-of-the-envelope calculations on the made in Avery and Turner (2012).