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ABSTRACT

Women are less likely than men to earn degrees from high quality post-baccalaureate programs, and this tendency has been growing over time. I show that, aside from the biomedical sciences, this cannot be explained by changes in the type of program where women tend to earn degrees. Instead, sorting by quality within degree program is the main contributor to the growing gap. Most of this sorting is due to the initial choice in which program type to apply to. No gender differences in selection with respect to ability or program quality arise as students progress through the admissions, enrollment or persistence choices.

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1. Introduction

The number of post-baccalaureate (PB) degrees granted in the U.S. has grown explosively in the last half-century, and a major driving force behind this expansion has been the rapid increase of women's representation in higher education. By 2006, women earned around 361,000 PB degrees, compared to the 236,000 earned by men. The number of master's degrees granted to women has grown over 16-fold in the last half-century (274,000 master's degrees to women in 2000, compared to only 17,000 in 1960), with even greater proportional increases at the

professional and doctoral levels (Snyder, Tan, & Hoffman, 2006).

This relative female success in PB education is a "homecoming" in the sense that Goldin, Katz, and Kuziemko (2006) use the term. Over the twentieth century, women's attainment of master's and doctoral degrees grew until 1930, fell through the Great Depression, and then began an unbroken increase in the 1970s.¹ Women's relative attainment rates reached an historic high among doctoral degrees by 1990, and approached the historic high among master's degrees in 2000 (Snyder et al., 2006).

While these gains have brought women's educational attainment to a historic peak, I show that once educational quality enters the analysis, we must conclude that women's relative gains in PB education are overstated. While women invest to a much greater degree than men in the quantity of education, their average investment in quality is substantially smaller. This disproportionate

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¹ Berelson (1960) presents a detailed history of the early days of formal graduate education.

concentration of women in low-quality programs is little known, it is an important component of U.S. postsecondary educational growth.

This gender-quality gap exists at every PB award level (master's, professional, or doctoral). Women are 40% less likely than men to earn a degree from a high-ranked doctoral program, but are equally likely to earn a degree from a low-ranked doctoral program. Women are 40% more likely than men to earn a degree from a low-ranked master's degree program. In addition, low-quality programs are the main driver of the increased share of degrees granted to women over the last 20 years, explaining 74% of the growth in the gender-quality gap. After I establish these facts, I begin to document the sources of the gender-quality gap and its growth. Two sets of results come out of this analysis.

The first set of results is negative. I show that the increasing over-representation of women in low-ranked programs can not be explained by changes in gendered patterns of sorting across fields of study. For example, master's programs in education are popular among women, they are growing rapidly, and there are hundreds of low-ranked education programs. But if anything, women are decreasing their representation in these programs relative to men. The same holds for other female-intensive programs like master's programs in nursing or the arts. I also show that there is very little evidence of gender differences in educational continuation choices across quality once students self-sort into applicant pools. Past studies of PB continuation (Millett, 2003; Montgomery, 2002; Mullen, Goyette, & Soares, 2003; Schapiro, O'Malley, & Litten, 1991) find, consistent with my own results, that women are less likely to continue into professional and doctoral studies. Most papers in this literature do not address PB educational quality. The few that do typically focus on narrow fields of study. Montgomery (2002) shows that women are less likely than men to apply to top-tier MBA programs, a result that this paper generalizes across fields and award levels.

The other set of results are constructive. I show that to the extent gender sorting across fields can explain the bottom-driven growth in women's PB attainment, the explanation lies almost entirely in the biomedical fields. MD and PhD bioscience programs are increasingly popular choices among women, they are growing quickly, and their growth is disproportionately in low-ranked programs. In the top 10% of MD programs, women's attainment rates caught up to men's at a rate of 2.9% per year, while in the bottom half of the rankings, they converged at a rate of 4.8% per year. To the extent that educational continuation choices create the gender quality gap, this effect comes entirely from women's tendency to select into the applicant pools of low-pay, low-selectivity programs. While men prefer to apply, controlling for other factors, to programs where expected income after graduation is higher, women exhibit no significant tendency to apply to higher-paying versus lower-paying PB programs.

I also provide preliminary but novel evidence that, holding ability constant, there are positive and large returns to PB quality (between a 1.1 and 1.3 percentage point increase in salary per one percentile increase in

the quality rankings) for women, but not men, in professional and doctoral degree programs. Song, Orazem, and Wohlgemuth (2008) investigate the returns to the three major PB award types (masters, professional, and doctoral), and demonstrate substantial the existence ability bias in the estimates, but I am aware of no other paper to estimate the mean value of quality in PB education.

The gender-quality gap is a puzzle. Women are over-represented in the top 10% of their high school classes (Goldin et al., 2006) and graduate from top undergraduate programs in numbers equal to men, with increasingly greater representation below. Choosing to attend a low-quality PB program can have a major impact on future earnings. Since the labor market returns to quality appear to be larger for women than for men, and women who are otherwise similar to men are being placed into lower-ranked programs, there may be substantial economic costs to the gender-quality gap.

This paper proceeds as follows. In Section 3, I establish the basic descriptive facts of the PB gender quality gap and how it has changed over time. I describe the changes in terms of completion rates and in terms of the share of degrees obtained by women. In Section 4, I model student progression towards a PB degree as a series of discrete choices. This allows me to study the relationship between gender, student ability, and program quality as students proceed through their formal schooling. I also present some estimates of how the monetary returns to quality differ by gender across award levels of PB schooling.

2. Data

I use three types of data in this paper: institutional-level data, program-level data, and individual-level data. I present a brief description of each data source here, and give a more detailed description of the data and its limitations in the online appendix. My source of institutional data is the Integrated Postsecondary Education Data System (IPEDS). I use completions data from 1985–2006, disaggregated by gender, award level and field of study.² I exclude all students of certification programs (such as the CPA), and I also exclude non-citizens under temporary permission to be in the country (typically an educational visa).³

The second type of data is program-level PB quality data. I use the 1994 Study of Research Doctorate Programs (SRDP) (Goldberger, Maher, & Ebert Flattau, 1995) to measure the quality of master's and doctoral programs in arts and sciences. For non-arts-and-sciences PB programs, I use a recent edition of the U.S. News and World Report's "America's Best Graduate Schools" survey (USNWR, 2005). The USNWR universe is almost entirely complementary to the SRDP, focusing on professional and service-based programs. All rankings are stated as centiles within the field and award level. In all cases, rankings are at the institution

² I also use IPEDS data on the 75th percentile of undergraduate SAT scores from 1993 as my measure of undergraduate educational quality.

³ I exclude these individuals primarily for expositional and analytical clarity, and because I can not observe students of this type in the individual-level data.

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