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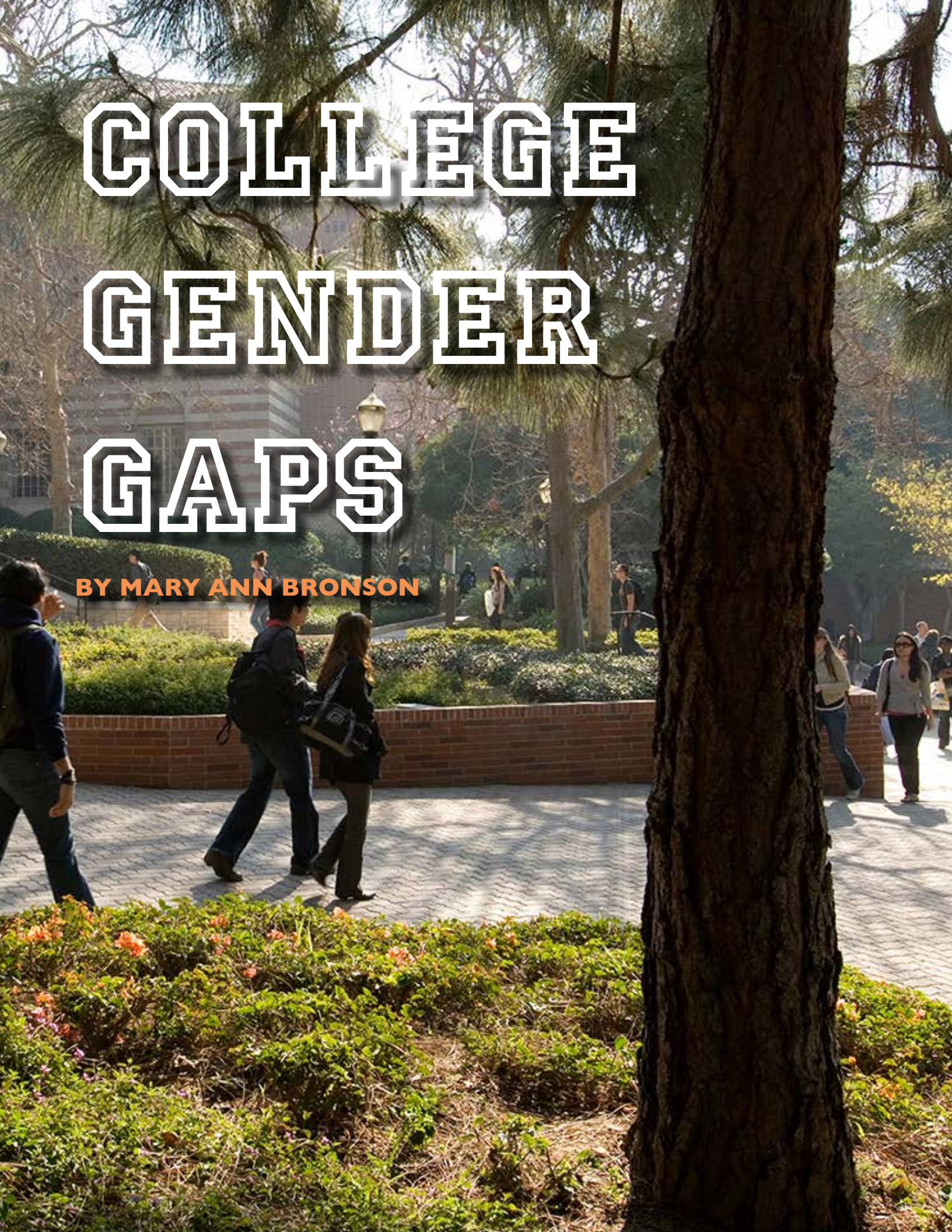
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A photograph of a college campus scene. In the foreground, there are green bushes with small orange flowers. A paved path leads through the middle ground where several students are walking. Some are carrying backpacks. In the background, there are tall trees, a brick wall, and a building. The lighting suggests a sunny day with shadows cast on the path.

COLLEGE GENDER GAPS

BY MARY ANN BRONSON

WHY DO WOMEN ATTEND college at much higher rates than men?

And given women's high college attendance rates, why do they select disproportionately into low-paying majors? Since the mid-1980s, women have made up the majority of college students in the U.S. even as their lifetime labor force participation rates remain well below men's. Between 1960 and 2012 women's four-year college graduation rates more than tripled, from 10% to more than 35%. Men's rates also increased, more slowly, from around 17% to nearly 30% (Figure 1). While women reversed the historical "college gender gap" in the mid-1980s, Figure 1 shows that the convergence in college graduation rates began around 1970. At this time, men's college attainment began to stall and even fall, while women continued to increase their investments in a college education. This general pattern is not just a U.S. phenomenon. Over the 1980s and 1990s, women similarly outpaced men in college graduation rates in Canada, Australia, New Zealand, and almost all of Europe, with the exception of Switzerland (Goldin, Katz, and Kuziemko (2006); OECD STATS (2012)).

In contrast to the dramatic convergence in men's and women's college attendance rates in the 1970s and early 1980s, men and women never fully converged in their choice of college major. In Figure 2, I graph the share of undergraduate degrees in each major awarded to women starting in 1970, the earliest year that such data is available. Figure 2 shows that partial but significant

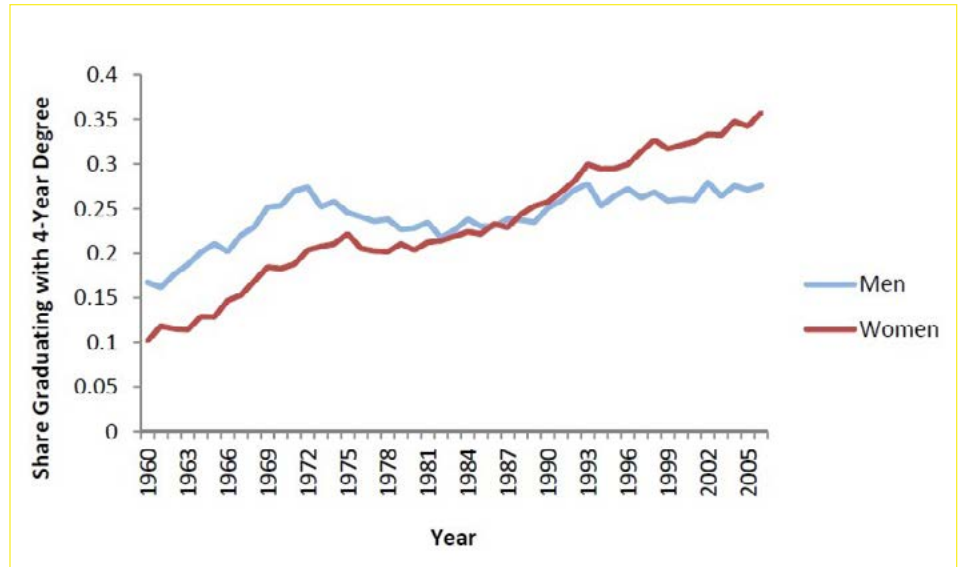


Figure 1: Share of Men and Women Graduating with a 4-Year Degree, 1960-2010. Source: Current Population Survey (1962-2012)

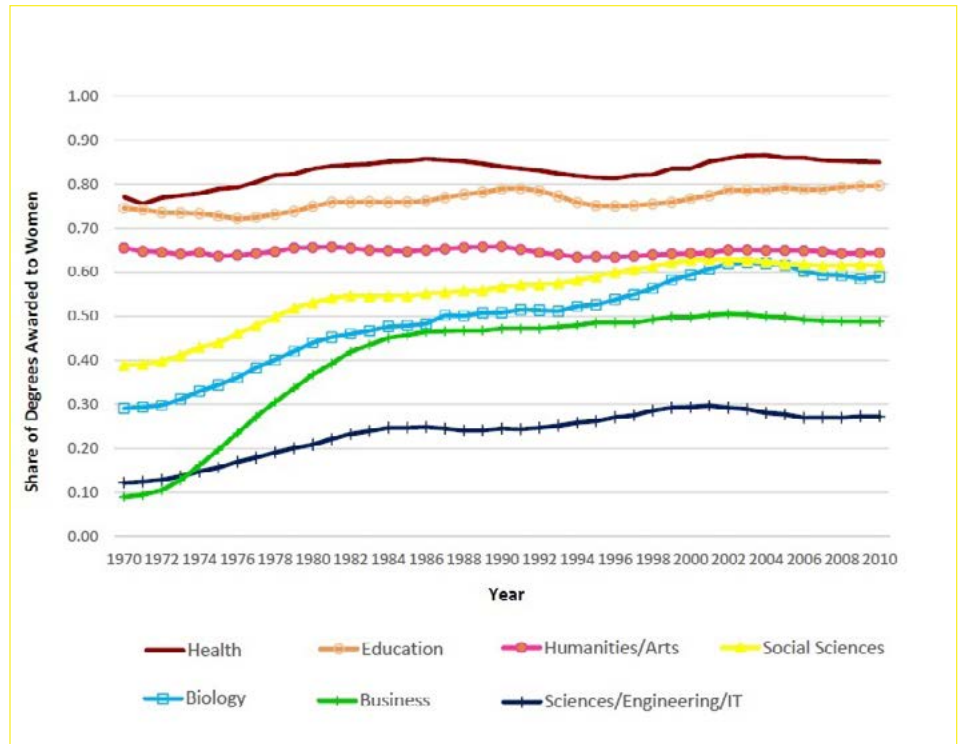


Figure 2: Share of Bachelor's Degrees Awarded to Women By Major, 1970-2010. Source: National Center for Education Statistics, Digest of Education Statistics (2012)

convergence in choices of major by men and women occurred over the 1970s. Most dramatically, the share of business degrees earned by women increased from less than 10% in 1970 to more than 40% by

1985. After the early 1980s, however, gender convergence was at best limited. Strikingly, women earned about a fifth of hard sciences and engineering degrees in 1985 and still earn roughly the same share of these



Returning to the original question—how do we connect the two “college gender gaps?” In both cases, factors related to marriage appear to play an important role. Given the gender wage gap, and in particular the low wages and poor labor market opportunities for low-skilled women relative to men, a college degree may provide important “insurance” value for women as they expect to spend more of their lifetime in a single-earner household.

degrees today. Around three quarters of education degrees and more than 85% of health and social services degrees were awarded to women in 1985 and 2012 alike.

Are these patterns related? If so, is it possible to provide a unified explanation for the evolution of both college “gender gaps”—in college attendance and in choice of major—over time? In my study, “Degrees Are Forever: Marriage, Educational Investment, and Lifecycle Labor Decisions of Men and Women,” I try to provide such an explanation for these patterns. Let’s look at these two college gender gaps one by one.

For economists, a natural starting point in analyzing decisions behind costly educational investments is to look at the educational returns. It is possible that returns to a college degree evolved differently for men and women over time, thus explaining their different college attendance rates over time. One standard way to measure the return to getting a college degree is to look at the “college wage premium,” or the

additional wages an individual with a college degree earns relative to an individual with only a high school degree, controlling for various individual characteristics. In my study, I find that this wage premium evolved very similarly between 1960 and 2010 for both sexes, so that different growth in wage premiums for men vs. women over time cannot account for the strong gender differences in educational choices over time. For both men and women, the college wage premium rose rapidly in the 1960s, fell in the 1970s, and then rose again starting in the 1980s. Today, wages of men and women with a college degree are about 48% higher than those of their counterparts with only a high school degree. Interestingly, Figure 1 suggests that from the standard economic point of view, men roughly made the “right” decisions about college attendance over time. As premiums increased in the 1960s, young men increased their college attendance rates. As premiums stalled or fell in the 1970s, more men decided to forego college. By contrast, women continued to increase their attendance rates as their anticipated college wage premium began to fall in the early 1970s. From the point of view of a standard human capital investment model, a particularly interesting question is why exactly women continued to increase their attendance rates as their anticipated college wage premium began to fall in the early 1970s. What else changed in women’s economic environments?

Many changes during this period likely contributed to women’s increased college attendance, including the women’s movement,

anti-discrimination laws in the 1960s, and the introduction of oral contraceptives that gave women greater control over their fertility and potentially increased their return to college (Goldin and Katz (2002)). But the specific timing of this gender convergence in college attendance rates suggests one important explanation: changes in marriage patterns. In 1970, California enacted one of the first divorce law reforms allowing couples to secure divorce without having to prove “fault,” i.e. without having to testify in court that one of the spouses was guilty of neglect, adultery, or abuse in the marriage. Over the next 10 years, the vast majority of states enacted similar reforms, in what some call the “no-fault” divorce revolution that dramatically reduced barriers to divorce for couples and initiated a period of dramatic increases in divorce rates (Friedman, 1998).

As young women anticipated spending more of their lives relying on their own wages, it is possible that their expected returns to a college education increased substantially more rapidly than men’s expected returns—in a way that is not readily captured by the college wage premium. Given the existence of the gender wage gap and the very low earnings of women with only a high school education (\$27,700 for those employed full-time in 2000, compared with \$36,300 for men), securing the college wage premium may be substantially more important for women than for men, especially as women spend more of their lifetimes in single-earner households. Secondly, women’s income often has to stretch

farther than men’s, given that they are more likely to have custody of children, and given poor enforcement of child support payments. In other words, for many women the college degree can offer a type of “insurance” against very low income, especially in the case separating from their partner.

To test the hypothesis that changes in the marriage market following divorce law reforms increased women’s returns to college relative to men’s, I use variation in the exact timing of divorce law reforms across states as a sort of “natural experiment.” In particular, I test whether it is true that young, college-aged women increased their graduation rates relative to men more rapidly in states just after they passed a divorce law, as compared to young women in the same years in states that did not just pass reforms. I find that this is indeed the case—the college gender gap decreased significantly more in states shortly after a divorce law reform. I conduct a similar analysis to test whether women were more likely select a higher-paying traditionally “male” major in business or the sciences after such reforms, as a way to “insure” even further. I find that young women in states that just passed a divorce law reform bridged the gap in choice of majors more rapidly, again a statistically significant effect.

If securing a higher wage becomes particularly important for women as their share of lifetime spent in marriage decreases, why don’t even more women select high-paying majors, like engineering? Again, a natural starting point for analyzing the gender differences in choices of

major is to ask whether the wage premium specific to each major differs significantly for men and women. In my study I find that, again, the answer to this question is no. I document that the relative financial returns to different majors for men and women working full-time are very similar. For example, the lowest paying major for both men and women is an education major, followed by arts/humanities and social science majors. Nursing degrees are the highest-paying degrees among non-science, non-business majors. For both men and women, engineering and IT degrees provide by far the highest wage premium, about 35% more than the premium associated with a humanities or social-science major. To provide a reference point for this number, the average relative earnings difference between an individual with a humanities major vs. an engineering major is nearly as large as the earnings difference between an individual who only completed high school and one with a college degree.

If women systematically choose lower-paying majors, something else must be compensating them for this choice. One possibility is gender differences in tastes. Another possibility is that women and men value differently other characteristics of majors and the occupations associated with them, such as flexibility in allocating time to work and family. Indeed, data on hours worked shows that despite their high perceived labor force participation rates, college-educated women today still take substantial time off during their childbearing years, and may find such flexibility important.

At age 35, less than 60% of college-educated women today work full-time, compared to more than 90% of college-educated men.

Do different majors offer different levels of work-family flexibility, such as availability of part-time work, and low wage penalties for time taken out of the labor force? My findings suggest that they do. Using data that follows women in different majors over thirty years after their college graduation, I find that women in business and the sciences suffer a significantly larger wage penalty for either taking time out of the work force or choosing part-time work, relative to other college-educated women. Women who do not work in business or the sciences incur around a 6% wage penalty for these choices, compared to a 20% penalty for women with a science or business major who work in their field. Not surprisingly, this is also reflected in women's labor supply choices. I find that among college-educated women with young children, those in the sciences or business work 12 to 16 hours more per week compared to all other college-educated mothers, even while spending almost the same amount of time weekly on household work and child care.

Returning to the original question—how do we connect the two “college gender gaps?” In both cases, factors related to marriage appear to play an important role. Given the gender wage gap, and in particular the low wages and poor labor market opportunities for low-

skilled women relative to men, a college degree may provide important “insurance” value for women as they expect to spend more of their lifetime in a single-earner household. On the one hand, a higher-paying major provides even more insurance, helping to account for the partial gender convergence in choice of college major in the 1970s. On the other hand, the vast majority of college-educated women today marry and choose to have children over the course of their life. Conditional on being in a married household, many families choose to have one of the spouses, at least temporarily, spend more time out of the labor market. Setting aside biology or norms, the existence of a gender wage gap implies that from the perspective of a married household, it is typically optimal for the woman to do this. As such, having a degree associated with high-paying but non-flexible occupations will not always be preferable for many women.

What can we learn from this? Firstly, expected returns to college and to a choice of major are not just about the wage premium, but also about anticipated decisions about marriage, family, and divorce. To understand gender differences in educational choices, one has to understand what is optimal both from an individual's and a household's perspective over the lifecycle. If we want to encourage more women to apply their talents in science and business, understanding this relationship is crucial.

Mary Ann Bronson, a Ph.D. candidate in the Department of Economics, received a CSW Irving and Jean Stone Dissertation Year Fellowship in 2013. Made possible by the generosity of Mrs. Jean Stone, this fellowship supports an exceptionally promising doctoral student whose dissertation topic pertains to gender, sexuality, and/or women's issues and who is at the dissertation-writing stage of their academic career. Bronson's dissertation, currently titled “Degrees are Forever: Marriage, Educational Investment, and Lifecycle Labor Decisions of Men and Women” examines why women have made up the majority of college students, despite lower college wage premiums and labor force participation rates than men. It asks why, while outpacing men in college attendance, women have consistently continued to select systematically lower-return majors since 1980. Her study is one of the first in the economics literature to provide a unified explanation for these two sets of patterns of educational investment choices by gender over time, and to tie them to marriage market changes, particularly falling marriage and rising divorce rates.

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