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THE GENDER GAP IN UNDERGRADUATE BUSINESS PROGRAMS

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In the last several years there has been much scholarship in the area of the “reverse gender gap” in colleges and universities, as there have been more women than men attending and graduating from colleges and universities since the early 1980s. Little if any scholarship exists about students and recent graduates from business programs specifically, so in this paper I explore the gender gap trend there. Included are patterns among the majors and emphases in business programs (accounting, economics, finance, etc.), and a logit model with choice of business major as the dependent variable. Preliminary findings include the following: the odds a woman will choose business as a major are smaller than those of a man, the odds a student will choose business as a major is inversely related to the level of the education of the student’s parents, and the odds a student with advanced placement (AP) credit in high school will choose business as a major are smaller than those of students without AP credit. The finding regarding parents’ education is driven by the behavior of female students.

Introduction

Goldin, Katz, and Kuziemko point out the increase in women’s postsecondary degree attainment relative to men’s is actually a “homecoming” for women. That is, from 1900 to 1930 men and women attended postsecondary institutions at about the same rate, such that the ratio of men to women enrolled was around one during this time. The increase in relative male enrollments began in the 1930s and continued until after WWII. At its height in 1947, the male to female enrollment ratio was 2.3. After that year, women started to catch up with men, reaching parity again in the early 1980s (Goldin, et al. 2006). Now, according to the Bureau of Labor Statistics (2009), of the high school graduates in 2008 who went to postsecondary schools, 56% were women and 44% were men. (The percentage of female high school graduates enrolling was 46% compared to male high school graduates’ 36%.) Degree attainment (for all degrees and for bachelor’s degrees) was at the same proportions as enrollments for 2006, according to the Department of Education (2007).

It is important to note the percentage of both the male and female population partaking of postsecondary education has increased tremendously since 1940. According to the Digest of Education Statistics (2009), the percentage of 18 and 19 year olds enrolled in school was 28.9% in 1940, compared to 66.8% in 2007. This indicates women are not increasing their enrollment in postsecondary institutions at the expense of men, but the growth of female enrollment is faster



than that of males. This growth has not occurred primarily due to changes in the mix of students' ethnicity, type of postsecondary institutions, or students' socioeconomic background, but across all races, socioeconomic backgrounds, and types of postsecondary institutions. In fact, the "reverse gender gap" as it has been referred to, is not only occurring in the United States, but in almost all OECD countries (Goldin, et al. 2006, Buchman and DiPrete 2006).

Since girls have always, since data have been available, done better than boys in high school by class rankings, the question becomes, what changed after WWII that made women more likely to pursue postsecondary education? Goldin et al. (2006) suggest three things: 1) an increase the percentage of girls 14-18 who expected to be working at age 35, 2) an increase in the age of first marriage, and 3) the greater behavioral problems of boys. The first two reasons obviously increase young women's attachment to the labor force, providing incentive for them to pursue more education. The third reason is less clear. Has it ever been the case that boys and girls had similar rates of behavioral problems? Boys do have higher rates of ADHD and criminal activity, but the idea that this has changed substantially relative to girls in the last few decades is questionable. Buchmann and DiPrete (2006) suggest another reason for women's increased interest in higher education—faster growing returns to higher education for women than for men over the last several decades as women entered fields considered "non-traditional" for them until recently. These authors also point out that the reverse gender gap is largest among families with lower-educated or absent fathers, so the rise in the number of female-headed households is also a contributing factor.

Other scholarship on the topic of gender and higher education centers on major choice. While women have now "reversed" the gender gap in attainment of bachelor's degrees, they still are underrepresented in science, math, and engineering (SME) (Staniec 2006). Staniec (2006) finds that a significant reason for this underrepresentation is lower expected returns to these majors for women, and that once these lower returns are accounted for, the "female" dummy is no longer statistically significant in a model of college major choice. On the other hand, Morgan (2008) finds within-major pay penalties are virtually zero in SME for recent graduates (the sample is from 1990 and 1993 of 1988-89 college graduates). This author also finds most of the wage gap by gender in recent graduates is driven by two general studies fields: social science/humanities and business administration (other than accounting), and that most of the gap

in these fields can be explained by the different types of jobs women and men in these areas take after college (or job characteristics).

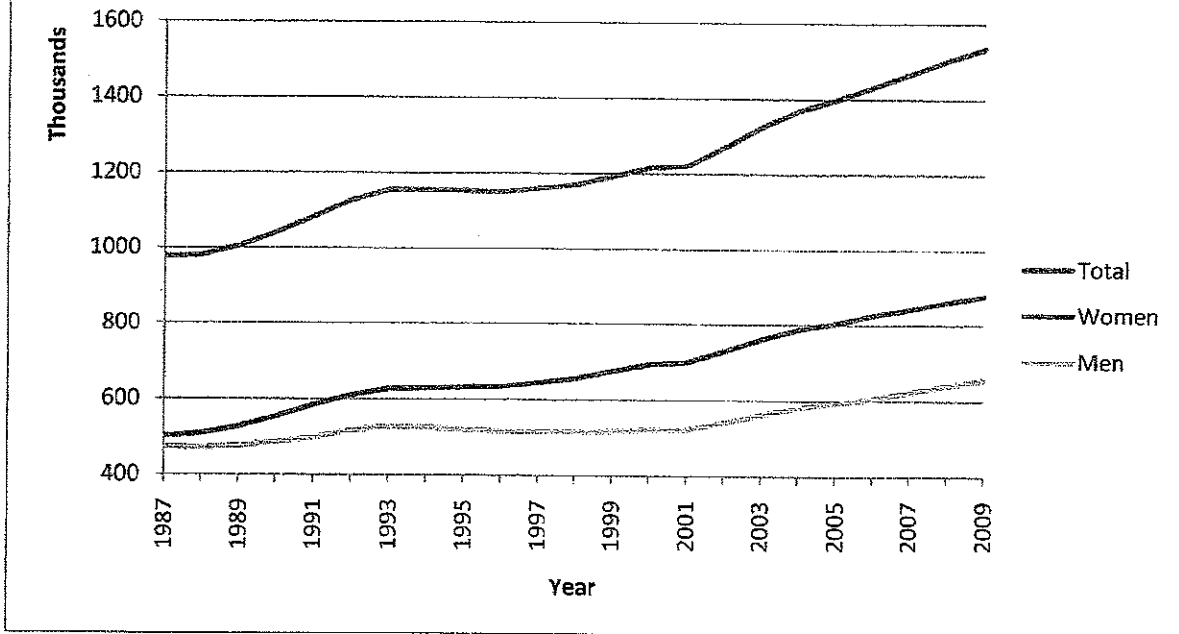
I am interested in exploring the trends in the gender mix of students in business programs over the last two decades to see if they reflect the overall changes in college enrollments, or if they are significantly different. I would also like to see to what extent these trends may be driven by changes in the gender mix of particular emphases in business, such as accounting or finance, and in turn, to what extent those changes are driven by different returns to particular emphases. I will begin with descriptions of enrollments in undergraduate business programs in 4,543 bachelor-degree granting institutions in the U.S. from 1987 to 2009 and changes in the distribution of business majors across sub-disciplines.

I use data retrieved from the Integrated Postsecondary Education Data System (IPEDS) at the U.S. Department of Education's Institute of Education Sciences National Center for Education Statistics (U.S. Department of Education 2010a). I gathered data on bachelor degree completions (total, business programs, and business sub-disciplines) from 4,543 colleges and universities that were in the data base for the entire time period. Of these colleges and universities, 1,602 offered bachelor's degrees and 1,244 offered at least one business degree in 1987 while 2,009 offered bachelor's degrees and 1,598 offered at least one business degree in 2009.

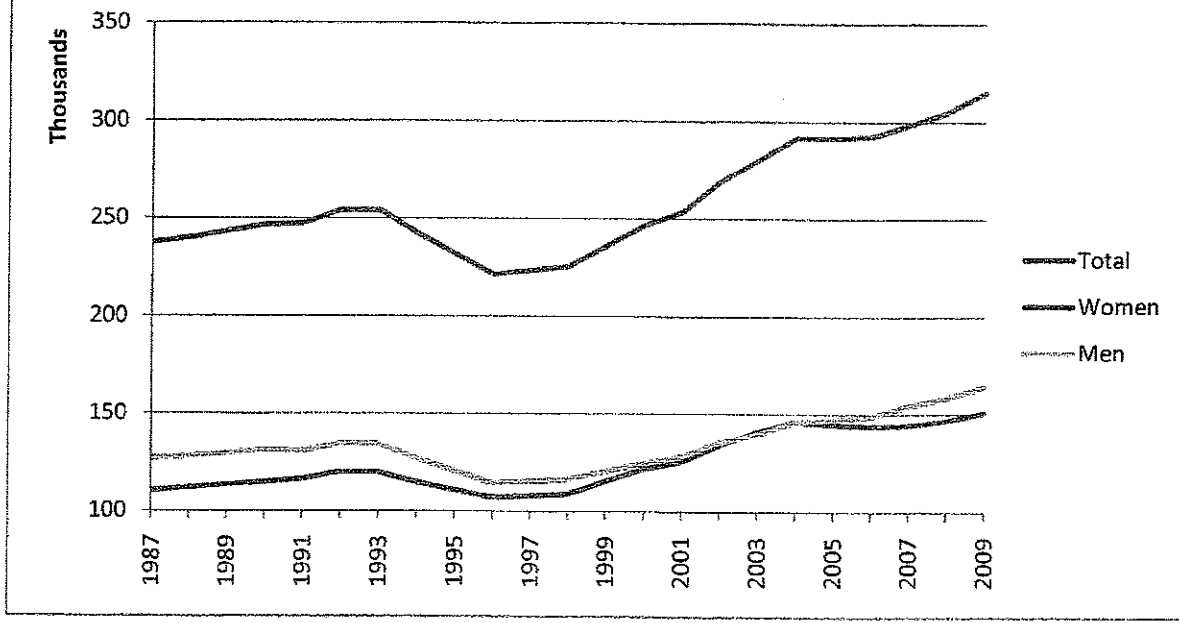
Trends

In 1987, there were about 973,000 bachelor's degrees awarded from these institutions, of which about 237,000 were business degrees. By 2009, this number had increased about 58% for all bachelor's degrees to around 1,534,500, of which about 315,000 were business degrees (an increase of 33%). The increase in the number of women completing a bachelor's degree was 75%, while the increase in the number of men was only 38% (figure 1). As for business degrees, there was a 37% increase in the number of women attaining a degree, and an increase of 29% for men (figure 2). So, while women outpaced men in attaining any bachelor's degree and in business degrees, the increase was smaller for business degrees (figure 3). From 1987 to 2009, the percentage of all bachelor's degrees being earned by women increased from 51% to 57%, while for business degrees, the increase was only two percentage points, from 46% to 48%. (All percentages are approximate.)

**Fig 1: Bachelor Degree Completions
1987-2009**

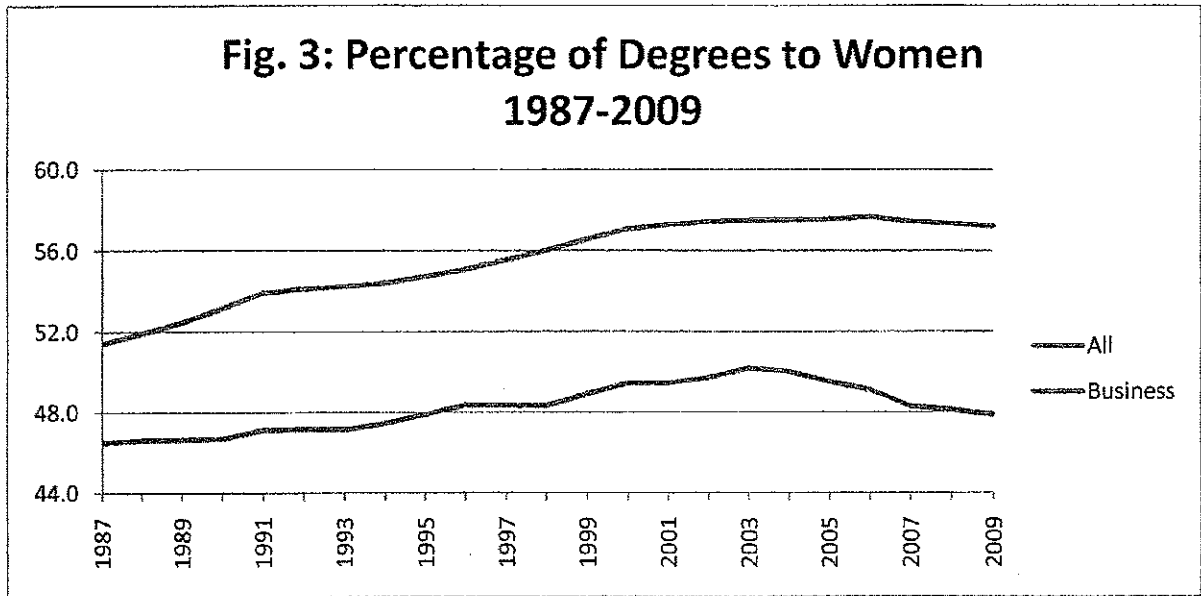


**Fig 2: Business Degree Completions
1987-2009**



Source (both charts): Calculated from IPEDS, U.S. Department of Education 2010a.

**Fig. 3: Percentage of Degrees to Women
1987-2009**

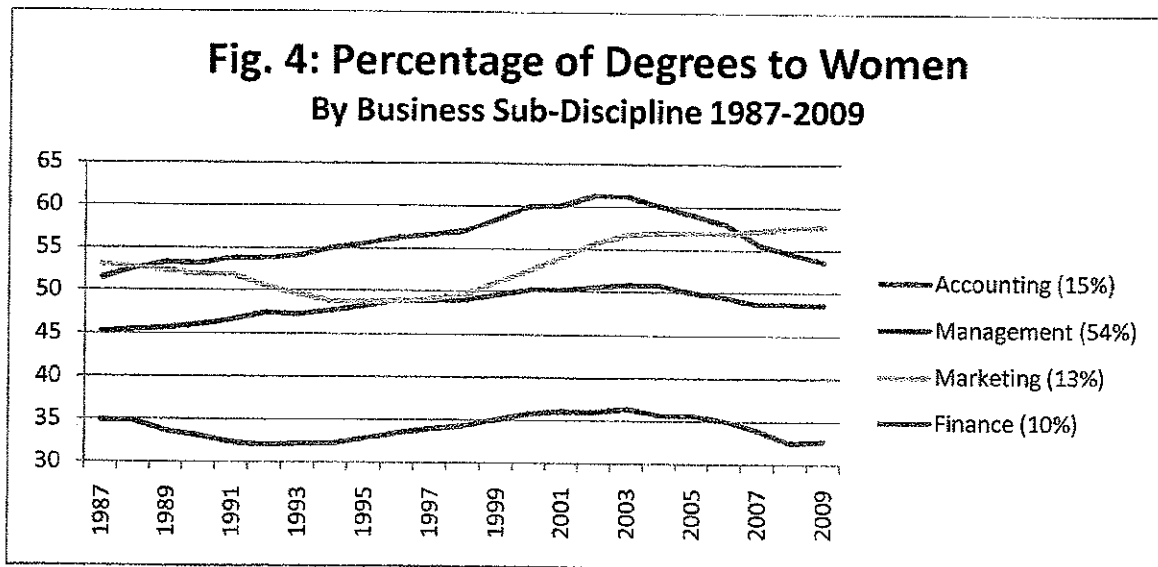


Source: Calculated from IPEDS, U.S. Department of Education 2010a.

This may be surprising since some important sub-disciplines in business have become more female dominated in the last couple of decades. However, as a percentage of all business degrees, the more heavily female sub-disciplines have actually become smaller over the past 20 years. Regarding the percentage of degrees earned by females, the sub-disciplines that most closely mirror the changes in all degrees are accounting and marketing (figure 4). In 1987, both of these sub-disciplines were majority female, 51% and 53% respectively, and these majorities increased over the twenty years, to 56% and 58%. However, both of these sub-disciplines became smaller percentages of all business degrees, dropping from 18% to 14% in the case of accounting, and from 14% to 12% in the case of marketing. Therefore, although the female percentage of these areas increased, the decrease in these sub-disciplines as a percentage of all business degrees actually represents a net loss to the percentage of all business degrees going to women.

Management, on the other hand, increased both its share of all business degrees, and became more heavily female. In 1987, the management degrees were 51% of all business degrees; by 2009 this percentage had increased to 58%. In the same time period, the percentage of management degrees completed by women increased from 45% to 49%. Looking more deeply into the areas of management, the biggest gains for women came in international business,

human resources, and hospitality. All of these areas are majority female, and international business and human resources also became a larger share of all business degrees. Hospitality stayed about constant as a percentage of business degrees, but became much more female dominated (from 54% to 60% female). Putting all of this together, we can see that the increase in the percentage of women earning business degrees has been almost entirely driven by changes in the management category of business degrees.



Note: Following the sub-discipline's label is its average percentage of all business degrees in 2007-2009.
Source: Calculated from IPEDS, U.S. Department of Education 2010a.

So business programs have drawn women at a slower rate than the average for all bachelor's degrees, and most of the women they have drawn have pursued a field with one of the largest gender wage gaps in the early 1990s (Morgan 2008). This begs the question of whether and how this gender wage gap is changing, which will be addressed in the next section. However, business programs have also drawn *men* at a lower rate than for all bachelor's degrees. Which disciplines *are* drawing students? Looking at the same sample of colleges and universities for all degrees from 1987 to 2009, the disciplines which grew more than one percentage point of all bachelor's degrees (45 categories) for both sexes were parks and recreation, security and protective services, social sciences and history, and visual and performing arts. For women, biological/medical sciences and psychology also grew more than one percentage point (psychology was the big winner here at 2.4 percentage points). The only discipline that fell more

than a percentage point of all bachelor's degrees for both sexes was business, and it fell by almost 5 percentage points for women and by more than 2 percentage points for men. This was the largest decrease of all disciplines for both sexes. Other losers for women included computer science/technology and education; for men, physical sciences and engineering were big losers. From a utility maximization or revealed preferences perspective, this is not a problem. Young people make their choices based on their family backgrounds, their academic strengths, their expected returns, and how important money is to them (Joy 2006?). However, from the perspective of business educators, we may be missing the boat. How can we serve the new mix of potential business students? Can we assure our female students that the returns to their business degrees will be comparable to the returns of their male colleagues' degrees?

The Wage Gap

It is possible one reason business programs have not drawn women as fast as other disciplines is due to its relatively large gender wage gap. As stated above, Morgan (2008) found that for 1989 graduates, the wage gap by gender within majors was particular high for business degrees. The good news here is, according to the Baccalaureate and Beyond survey (a longitudinal study of about 11,000 graduating seniors from 1993 interviewed in 1994, 2007, and 2003, and a new batch of graduating seniors from 2000 interviewed in 2001), the gender wage gap in business was smaller for the class of 2000 than for the class of 1993. The female-to-male ratio of first job salaries of business graduates was .85 in 1994, and that rose to .92 in for the class of 2001 (U.S. Department of Education, 2010b and 2010c). Furthermore, if the graduate's job was closely related to his/her major, the gap disappeared by 2001. The female-to-male salary ratio was .90 in 1994 and 1.00 in 2001 for these jobs, and more women reported their jobs were closely related to their majors than did men (59% versus 51%). Unfortunately, some of the detailed data are unavailable through the Department of Education's data analysis system, so it impossible to estimate how much of the decrease in the wage gap came from movements into low wage-gap sub-disciplines from higher wage-gap sub-disciplines and how much came from lower wage gaps in all business areas. In the data that are available, however, we can see the wage gap decreased in some sub-disciplines, and in at least one case "reversed," from 1994 to 2001 (table 1). In the sub-discipline of management, which is becoming a larger proportion of business degrees and more heavily female, this was the case. It is important to remember that

gender wage gaps tend to increase over time for a given cohort. Because women often take time out of the workforce or take “smaller jobs” as they start families, a starting wage gap is just the tip of the iceberg. The fact that the gender wage gap in first jobs is decreasing is good news, but it does not necessarily mean that gender wage gaps throughout career lives are disappearing.

Table 1: First Job Female/Male Salary Ratio for Jobs Closely Related to Major

Business Discipline	1994	2001
Accounting	0.91	0.99
Finance	NA	1.14
Management	0.80	1.05
Systems Management	NA	0.97

Note: Missing for both years are Marketing, Business Support, and Secretarial—data not available by gender.
 Source: Data Analysis System of U.S. Department of Education, National Center for Education Statistics, 2001 Baccalaureate and Beyond Longitudinal Study (B&B:2000/01), 9/13/2010.

A Model of Major Choice

It may be informative to explore the characteristics of students who choose business as a major in college compared to other majors. To this end I estimate a logit model using the data analysis system of the Department of Education to access Baccalaureate and Beyond 2000/2001 data (U.S. Department of Education 2010c). All variables in the model are binaries. The dependent variable is the student’s college MAJOR, which is coded 1 if the student is a business major and 0 if another major. The independent variables are the following: GENDER, which is 1 if female, and 0 if male; RACE has coded categories of 1 for Black, Asian, Latino, and other non-white, with white as the omitted variable; PRIMARY LANGUAGE is coded 1 if a language other than English is the first language of the student, 0 if English is the first language; PARENTS’ HIGHEST EDUCATION LEVEL has coded categories of 1 for high school diploma, some college, bachelors, graduate/profession school, with no high school diploma as the omitted category; and HOUSEHOLD INCOME is the total income of the student’s household, whether or not s/he is a dependent, coded as 1 in categories of \$50,000-100,000, \$100,001-150,000, \$150,001 and above, where under \$50,000 is the omitted category, and AP CREDIT is coded 1 if the student had advanced placement credit in high school, and 0 if not. I

also estimated the model for female students only and male students only. The results are in table two below.

	Odds Ratio F&M	Wald	Odds Ratio Female	Wald	Odds Ratio Male	Wald
Intercept	0.434		0.321		0.342	
Gender 1999-2000		34.032**				
"Female" vs. "Male"	0.644					
Race-ethnicity		2.1353		0.928		0.923
"Black"	1.088		0.949		1.277	
"Latino"	0.731		0.714		0.737	
"Asian"	0.920		1.153		0.709	
"Other non-white" vs. "White non-Hispanic"	0.600		0.608		0.588	
Primary language		5.503*		7.009**		1.761
"Other first language" vs. "English"	1.589		1.760		1.457	
Parent's highest education level		5.228**		7.448**		2.142
"High school diploma"	0.859		0.831		0.965	
"Some college"	0.593		0.602		0.624	
"Bachelors"	0.681		0.560		0.908	
"Grad/prof school" vs. "Did not complete high school"	0.511		0.367		0.762	
Total income of in/dependent students		7.481**		3.197*		5.505**
"\$50,000 <= X <= 100,000"	1.567		1.426		1.705	
"\$100,001 <= X <= 150,000"	1.473		1.752		1.205	
"\$150,001 <= X <= 500,000" vs. "Under \$50,000"	1.709		1.255		2.137	
High school credit: advanced placement		10.851**		5.805*		3.836
"High school AP credit" vs. "No AP credit"	0.630		0.615		0.641	
Overall Fit of Model		7.306**		4.445**		4.377**

Note: **significant at 99% level of confidence, *significant at 95% level of confidence.

Source: Data Analysis System of U.S. Department of Education, National Center for Education Statistics, 2001
Baccalaureate and Beyond Longitudinal Study (B&B:2000/01), 9/13/2010.

As seen in the table, the odds that a female student will be a business major are about 35% lower than the odds that a male student will be a business major. The odds ratios regarding race are not statistically significant, although some of the differences in the male and female odds ratios are interesting (e.g., Black and Asian). The odds a student with a language other than English will choose business as a major are almost 60% higher than the odds that a native English speaker will be a business major, and this result seems to be driven largely by female students. Also driven by female students are the lower odds of being a business major when a student's parent or parents have higher levels of education. It can be seen that the higher a female student's parent's or parents' education level is, the lower the odds that student will be a business major, but this does not seem to hold true for male students. On the other hand, for both female and male students, it seems the odds a student will be a business major are increased if their family income is above average (average income in this sample was about \$55,000). Regarding advanced placement (AP) credit in high school, overall the odds are about 37% lower that a student with AP credit will be a business major versus the odds for a student without AP credit. (Although this is not statistically significant for male students, the coefficients of the male and female students are not very different, suggesting it is the larger number of observations in the female model that drives the statistical significance.)

A few implications stand out. If female students are less likely to choose business as a major when their parents have higher levels of education, the trend of a greater percentage of Americans attaining college degrees can help explain why fewer women are choosing business as a major. If this trend continues, and presumably we hope it will, this could mean even smaller percentages of women choosing business as a major in the future. Of course, this explanation is only a surface one. We would like to know *why* women are less likely to choose business as a major if their parents have more education. Likewise, using AP credit as a proxy for high school preparation and performance, since women as a whole tend to do better in high school than male students, this could also be part of the (surface) explanation.

The next iteration of this paper will include the average starting salary by major to proxy for expected returns to the major and/or the importance of expected salary in major choice, and a "Hot Major" binary to account for majors that appeared prominently in the media during the students' college careers. A multinomial logit model with other possibilities of major will also be explored.

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