

Gender Differences in Economics

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Abstract

Nationally, females account for less than one-third of the students in agricultural economics undergraduate programs. We identified a gender gap in test performance between genders with women in general economics and agricultural economics scoring nearly three percent lower than men. Compared to men, women also tended to be less interested in the subject. Contrary to expectations, interest in economics was not higher among women within business and economic majors when compared to women with other majors. Findings suggest the challenge of increasing women's interest in economics persists.

Keywords: agricultural economics, business, economics, gender gap, gender preferences

Introduction

Women play an important and growing role in U.S. agriculture. The percentage of farmers who are female nearly tripled, from 5% to 14%, between 1978 and 2007 (Hoppe and Korb, 2013). Women are also increasingly present in agribusiness, most recently comprising 44% of the workforce (Feedstuffs, 2013). However, the percentages of women receiving a degree in economics and agricultural economics differ considerably from general agriculture, other social science fields and certain business disciplines (Table 1). Women accounted for 28% of the bachelor's degrees in agricultural economics conferred in 2009-2010, while other social science fields saw a larger share comprised by women.

Although women's participation in economics has increased over the years, a gender gap continues. According to the National Center for Education Statistics (2012) among the almost half of the 12th graders in the U.S. completing a course in general economics, the average scale score was higher for male students than for female students. Additionally, 45% of males were at or above proficient level in economics, compared to 38%

for female students. Whether this persisting gender gap is worrisome has been a subject of interest for decades; the findings remain inconclusive.

At North Dakota State University, women accounted for 11% of economics majors and 17% of agricultural economics majors during spring semester, 2012. These percentages of women's participation are small compared to the national statistics on women's share of bachelor's degrees in economics (29%) and agricultural economics (28%) reported in Table 1. Our department's lower percentage of women motivated a more detailed look at gender differences.

We tested for gender differences among students in a principles of microeconomics course at North Dakota State University. Principles of microeconomics is a core subject in agricultural economics, general economics, business and other undergraduate curricula. Gender differences in test performance and in student views on economics coursework, economics proficiency and likelihood of enrolling in advanced economics courses were considered.

Table 1: Percentage of Females by Discipline and Degree Conferred in the U.S. in 2011-2012

	Bachelor's	Master's	Doctor's
Agriculture, general	42.48	57.91	47.62
Agricultural business and management	32.81	45.00	NA
Agricultural economics	27.75	41.67	35.37
Business administration and management	48.54	44.11	37.34
Accounting	51.97	53.02	56.41
Finance	31.10	36.30	21.57
Management information systems	24.56	32.00	32.81
Marketing/marketing management	53.58	60.34	40.00
Computer science	13.05	24.50	17.69
Mathematics	44.21	38.74	24.32
Statistics	41.55	48.14	36.53
Psychology	76.57	74.17	69.77
Anthropology	71.22	66.58	63.94
Economics	29.24	36.46	32.80
Geography	34.76	42.09	38.91
Political science and government	43.83	44.79	39.92
Sociology	69.15	66.16	63.10
History	40.17	46.53	45.15

Source: National Center For Education Statistics (2013)

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Gender Gap in Economics

Gender bias in economics curricula has been noted in previous studies (Barlett and Feiner, 1992; Ferber, 1984; Ginther and Kahn, 2006). Barlett and Feiner argued that abstract reasoning and extensive reliance on mathematical formalism have displaced other methodological approaches to studying economics. Indeed, mathematics preparation is highly essential for students in economics (Ballard and Johnson, 2004; Schuhmann et al., 2005). Some programs require students to have a mathematics level above intermediate algebra to enroll in principles of microeconomics, while others have no prerequisite for the course. Dynan and Rouse (1997) observed that females were less likely to major in economics because they had relative advantage in other subjects; females also had weaker mathematics skills, but mathematics background was not a factor in first-year student's decisions on whether to major in economics.

Zafar (2009) found that much of the gender gap in academic major preferences was due to differences in preferences and beliefs about enjoying coursework. He found individuals' beliefs about their own abilities and future earnings to be insignificant in explaining the choice of academic major. On the contrary, Jensen and Owen (2000) found that students who are confident in their ability in economics are more likely to continue to study economics. Confidence in turn was found to be dependent upon student's math ability, teacher's experience, whether students freeze up during examinations, GPA and other factors. They also found that, in general, females are less likely to take an introductory economics class or to continue in economics after taking the first introductory course in economics – a finding generally consistent with the conclusion reached by Horvath et al. (1992).

Besides concerns about math skills, general perceptions about economics as a business-oriented field also contribute to the negative predispositions women have towards studying economics (Bansak and Starr, 2010). The course content in introductory economics courses may instigate a more negative attitude and disinclination towards the subject, even in the absence of a performance gap (Bollinger et al., 2006). But undergraduate business majors are broadly composed by a number of sub-disciplines. While females have low participation and less interest in finance (Ford and Kent, 2010), some business majors are dominated by women (Ball, 2012). Women accounted for most of the accounting and marketing degrees at the bachelor's and master's levels in 2009-2010 and they also accounted for nearly half of the bachelor's degrees in business administration conferred during the same period (National Center for Education Statistics, 2012).

In the U.K., Ashworth and Evans (1999) observed no gender differences in opinions on economics among those who studied A-level [General Certificate of Education Advanced Level.] economics. However, 63% of the women who opted not to enroll in A-level economics felt that the subject was uninteresting (32%) or

that they knew nothing about it (31%). Do students' past experience and knowledge in economics have influence over their current performance in and perception about economics? If so, how?

Based on a sample of college students in California and Washington, Gill and Gratton-Lavoie (2011) observed that college students who had taken economics in high school performed slightly but significantly better than students who had not. These results, however, contradict earlier findings by Reid (1983), Becker et al. (1990) and Ballard and Johnson (2005) who found a negative correlation between high school economics experience and performance in college-level introductory economics. Ballard and Johnson (2005) noted that this lapse is more pronounced among women and women tend to have a lower expectation on the grades they will receive in economics. These lower expectations, they noted, are self-fulfilling.

Methods

This research is part of a project entitled "Assessing Student Learning in Economics," approved by the Institutional Review Board at North Dakota State University on January 10, 2011. All participants provided written informed consent prior to participation in the study. We developed a set of survey questions regarding student's personal background and academic preparation for Principles of Microeconomics. Personal information collected in the survey included student's age and personal background. Academic information included student's high school graduation year, year in college, ACT score, cumulative college GPA, academic major, economics course experience and math background. The survey was administered online via Blackboard. Students in the course during years 2011 and 2012 were invited to participate in the survey during the last three weeks of class. Students' answers to 44 core questions were used to measure their learning and cumulative knowledge in principles of microeconomics.

Principles of Microeconomics is required of all agricultural economics, business, economics and pharmacy majors at the university and is also is a course listed under a list of general education courses for all undergraduate students. In this paper, business majors include all accounting, business administration, finance, marketing, management information systems majors. Economics majors include both economics and agricultural economics. A total of 921 students participated in the survey, but due to missing values and incomplete or ambiguous responses, the resulting sample size is 771. Due to a relatively small number of economics students (7 students), students in both economics and agricultural economics are combined as one group, abbreviated as AGECE.

Differences in Preferences

Females accounted for 42% of the students in our sample. Table 2 displays the levels of enjoyment with coursework by gender. The Fisher's exact tests in Table

Table 2: Contingency Table by Major

A. All Students			
	Do Not Enjoy	Enjoy	N
Male	32.8%	67.2%	445
Female	50.3%	49.7%	326
Total	40.2%	59.8%	771
Fisher's exact test = 0.000			
B. Non-Business and Non-AGEC Majors			
	Do Not Enjoy	Enjoy	N
Male	37.9%	62.1%	256
Female	50.7%	49.3%	213
Total	43.7%	56.3%	469
Fisher's exact test = 0.002			
C. Business and AGECE Majors			
	Do Not Enjoy	Enjoy	N
Male	25.9%	74.1%	189
Female	49.6%	50.4%	113
Total	34.8%	65.2%	302
Fisher's exact test = 0.000			

2 suggest dependence between gender and preference. Panel A shows that 67% of all males enjoyed the coursework. Although considerably less than the proportion of males who viewed the course favorably, females' preferences split almost evenly on how much they enjoyed the course. Women's split opinion persists even among the AGECE and business majors; about 50% of female AGECE and business majors enjoyed the course, compared to 74% of males (Panel C).

For comparison purposes, we broke down business and AGECE majors into different sub-disciplines and report their preferences in Table 3. The table shows that males overwhelmingly had a favorable view on economics, especially among finance and accounting majors. Among the economics majors (Panel A), 95% of male students viewed the coursework positively, compared to just 50% of female students. Only 7 of 28 (or 25%) of finance majors were females. Fifty-three percent of female accounting majors and 71% of female marketing majors did not enjoy the course in microeconomics. We observed only 18% of business administration and management majors in our sample were female – a proportion substantially less than the share of women receiving a bachelor's degree in this field nationally and the percentage of female business administration and management majors at our institution. In Spring 2012, 24% of finance majors, 43% of marketing majors, 40% of management majors and 34% of business administration students at our institution were women.

Differences in Academic Performance

The average test score for non-economics and non-business majors in our sample (both

Table 3: Business and AGECE Majors

A. AGECE Majors			
	Do Not Enjoy	Enjoy	N
Male	5.3%	94.7%	19
Female	50.0%	50.0%	8
Total	18.5%	81.5%	27
Fisher's exact test = 0.017			
B. Finance Majors			
	Do Not Enjoy	Enjoy	N
Male	14.3%	85.7%	21
Female	42.9%	57.1%	7
Total	21.4%	78.6%	28
Fisher's exact test = 0.144			
C. Accounting Majors			
	Do Not Enjoy	Enjoy	N
Male	25.6%	74.4%	43
Female	53.3%	46.7%	30
Total	37.0%	63.0%	73
Fisher's exact test = 0.026			
D. Marketing Majors			
	Do Not Enjoy	Enjoy	N
Male	37.5%	62.5%	16
Female	71.4%	28.6%	14
Total	53.3%	46.7%	30
Fisher's exact test = 0.081			
E. Business Admin/Management Majors			
	Do Not Enjoy	Enjoy	N
Male	28.0%	72.0%	75
Female	43.4%	56.6%	23
Total	34.4%	65.6%	128
Fisher's exact test = 0.081			

male and female) (60.5%) was 2.6 percentage points higher than for economics and business majors (57.9%). The difference is statistically significant (t statistic = 2.238) at the 5% level. The same group of students also had a higher average GPA (3.2 out of 4.0) than economics and business majors (3.0). The difference was significant at the 1% level (t statistic = 4.071). A sizable portion (30%) of the non-AGECE and non-business majors in our sample are pre-pharmacy students. Among the pre-pharmacy students in our sample, 60% are women. The admission criteria for the pharmacy program at our university are fairly stringent. Hence, the average GPA and test score for pre-pharmacy students are higher than for others. Table 4 presents the average economics test scores and GPAs by gender and major. The last column of Table 4 reports the t statistics for the two-sided t tests on the difference in average test scores and on the difference in average GPAs.

In general, the average test scores are not different for males and females (59.7 vs. 59.3). We broke down our sample by student's major. While the average test scores for male economics and agricultural economics majors are higher than those of women by nearly 6 percentage points, the difference is not statistically significant. The gender difference in economic test performance is only significant for finance majors – the average test score for men was about 13 percentage points higher than that for women in finance. While more females in accounting and most females in

Table 4: Average Test Score and GPA by Gender and Major

	Mean		H ₀ : Difference = 0
	Male	Female	t-stat
Economic Test Scores			
All Students (N = 771)	59.7	59.3	0.318
Non-Business & Non-AGECE Majors (N = 469)	60.8	60.3	0.299
Pre-Pharmacy (N = 145)	68.4	64.8	1.273
Business & AGECE Majors (N = 302)[#]	58.2	57.5	0.345
AGECE (N = 27)	61.0	55.1	1.024
Finance/Pre-Finance (N = 28)	62.8	50.0	2.190**
Accounting/Pre-Accounting (N = 73)	58.8	59.5	-0.185
Marketing/Pre-Marketing (N = 30)	58.8	59.3	-0.075
Pre-Business Admin/Pre-Management (N = 128)	54.8	57.5	-0.999
GPA			
All Students (N = 771)	3.041	3.282	-5.725***
Non-Business & Non-AGECE Majors (N = 469)	3.114	3.328	-4.062***
Pre-Pharmacy (N = 145)	3.489	3.490	-0.016
Business & AGECE Majors (N = 302) [‡]	2.941	3.195	-3.602***
Econ & Ag Econ (N = 27)	3.018	2.974	0.158
Finance/Pre-Finance (N = 28)	3.014	3.339	-1.855 [†]
Accounting/Pre-Accounting (N = 73)	3.050	3.278	-1.831 [†]
Marketing/Pre-Marketing (N = 30)	2.858	3.248	-1.276
Pre-Business Admin/Pre-Management (N = 128)	2.841	3.144	-3.091***

[#]We found only 1 female student among 16 MIS majors in our sample. Hence, MIS majors' mean test scores and GPAs are not reported in this table.

*** significance at the 1% level for a 2-sided t test

** significance at the 5% level for a 2-sided t test

[†] significance at the 10% level for a 2-sided t test

[‡]significance at the 5% level for a 1-sided t test

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marketing said that they did not enjoy the coursework (see Table 3), they fared no worse than male students in the same programs (Table 4). Additionally, with the exceptions of economics and marketing majors in the sample, on average, female students have higher GPA than male students.

Regression Analysis

We modelled the percentage of student's correct answers on the set of core questions (student's test score) as a function of the student's characteristics, academic background and course features. The binary variable Calculus = 1 for students who had had or were concurrently taking applied calculus or higher level calculus, otherwise Calculus = 0. Work is also a binary variable and Work = 1 for students who reportedly had a job and zero otherwise. We also controlled for student's gender (1 for female student, 0 otherwise), instructor's gender (1 for female instructor, 0 otherwise) and teacher's experience. The final ordinary least squares regression results are presented in Table 5. We also controlled for student's algebra preparation, status of financial aid, family background, parents' education, marital status, participation in intra/extramural activities, course load, previous experience with economics (prior high school and college economics), transfer status and other class characteristics. None of these factors were significant. Further, we broke down students by major, but only pre-pharmacy major consistently remained significant in the model. Hence, only the final results are presented here.

In Model 1, GPA and calculus had a positive effect on student's test score. A one point higher GPA is estimated to raise student's test score by 8.3%, almost a full letter

grade. Students with some calculus background were estimated to have an approximately 5% higher score (or half a letter grade) than those who did not have calculus. Although some colleges require students to have taken intermediate algebra or college algebra before taking principles of microeconomics, to the authors' knowledge, calculus is not a prerequisite for principles of microeconomics. Calculus concepts, however, are very much useful and applicable in economics and they are routinely applied in higher level economics at the intermediate and advanced levels. Having some calculus preparation may give students an edge over their peers even in introductory economics.

While we saw in Table 4 that generally, without controlling for student's characteristics, average student test scores were not significantly different for the two genders, Table 5 shows that female students are estimated to score about 2.8% lower on the economic test than their male counterparts, after controlling for student's GPA and other factors. This means that, even though women tend to have a higher GPA in the class, given the same GPA and holding all other factors constant, a male student would score 2.8% higher than a female student on the test.

Lumsden and Scott (1987) suggested the multiple-choice exam format may serve as a clear disadvantage to female students taking introductory economics. In our study, even for the female pre-pharmacy students who tended to have a higher GPA and a higher economics test score than other students, their average test score was no better than that of male pre-pharmacy students. Unfortunately, due to limited teaching resources, we were not able to assess student performance using

essay questions and to also address the problem of inconsistency in essay grading highlighted by Ferber et al. (1983). The coefficient on female instructor also suggests that having a female professor had no significant effect on student performance. A Wald test shows that the slope coefficients in Model 1 are the same for males and females. [Wald test for slope differences between males and females: $\chi^2 = 0.81$, $p\text{-value} = 0.606$.]

In Model 2, we broke down the Female Student dummy variable by students' majors in three undergraduate programs (pre-pharmacy, business and economics and others) and male students in the sample constitute the base group for comparison. Recall that women in the pre-pharmacy program have a higher average GPA than all other female students (see Table 4). To some extent, their GPA reflects their academic performance. Because the admission criteria into the pharmacy

Table 5: OLS Regression Analysis^{z,y}

Dependent Variable: Economic Test Score	Model 1		Model 2		Model 3	
	Coef.	t stat	Coef.	t stat	Coef.	t stat
GPA	8.353 (0.803)	10.40***	8.583 (0.785)	10.94***	8.349 (0.806)	10.36***
Calculus	4.759 (0.939)	5.07***	4.933 (0.920)	5.36***	4.764 (0.941)	5.06***
Work	-2.726 (0.867)	-3.14***	-2.745 (0.868)	-3.16***	-2.730 (0.867)	-3.15***
Female Student	-2.769 (0.852)	-3.25***				
Female Pre-Pharmacy Student			-0.730 (1.404)	-0.52 (1.565)	0.014 (1.565)	0.01
Female Business/AGEC Student			-2.896 (1.157)	-2.50** (1.317)	-2.336 (1.317)	-1.77*
Female Student in Other Programs			-3.347 (1.219)	-2.75*** (1.374)	-2.784 (1.374)	-2.03**
Male Pre-Pharmacy Student					2.695 (1.710)	1.58
Male Student in Other Programs					0.421 (1.214)	0.35
Female Instructor	1.612 (1.756)	0.359	1.590 (1.759)	0.90 (1.757)	1.647 (1.757)	0.94
Teacher's Experience	-3.375 (2.250)	-1.50	-3.230 (2.450)	-1.47 (2.246)	-3.329 (2.246)	-1.48
Constant	28.406 (3.266)	8.70***	27.96 (3.250)	8.60***	28.115 (3.319)	8.47***
N	771		771		771	
R ²	0.5065		0.5052		0.5066	

^z Robust standard errors reported in parentheses.

^y Semester control variables not reported in the table.

***, **, * denote significance at the 1%, 5% and 10% levels, respectively.

program at this university are stringent and the acceptance rate is low, students in the pre-pharmacy program are highly motivated in addition to having a strong academic record indicative of their high ability. Controlling for other factors, we observed a statistically insignificant and negligible (< 0.75 percent) gap between female pre-pharmacy students and male students. However, women in the business and economics programs and women in all other programs, respectively, are expected to score 2.9 and 3.3 percentage points lower compared to their male counterparts.

In Model 3, we partitioned male students in our sample into three sub-groups in accordance to their majors (pre-pharmacy, business and economics and others) and we held male students in the business and economics programs as the base group for comparison. Notice that in Table 5 (Model 3); the coefficient on Female Pre-Pharmacy Student is positive, relatively small in magnitude and insignificant. Controlling for all other factors, there is not a knowledge gap between women in this program and the base group (male business/economics students). But such gap persists for women in all other programs including those in the business and economics programs.

Lastly, to probe students' persistence in economics, we use a 5-point Likert scale (0 for very unlikely, 1 for unlikely and 4 for very likely) to explore the likelihood of students taking another course in economics after the introductory course. The summary of their responses is reported in Table 6. The Fisher's exact statistics on Panel A of the table confirmed that the responses are not gender-independent. About 29% of men are unlikely or very unlikely to take another course in economics, compared to 47% of women. In Panel B, 43% of men and 66% of women in non-economics and non-business programs are unlikely or very unlikely to enroll in another course in economics. This is largely consistent with the composition of students in upper division economics classes and in undergraduate and graduate economics programs, in which women constitute a considerably smaller percentage of the student body.

Table 6: Likelihood of Taking Another Course in Economics				
Panel A. All Majors				
	All	Male	Female	N
Very Unlikely	15.5%	11.2%	21.5%	120
Unlikely	20.7%	17.5%	25.2%	160
Neutral	7.3%	9.9%	3.7%	56
Likely	23.9%	24.0%	23.6%	184
Very Likely	32.6%	37.3%	26.1%	251
	100%	445	326	771
Fisher's Exact = 0.000				
Panel B. Non-AGEC and Non-Business Majors				
	All	Male	Female	N
Very Unlikely	24.1%	17.2%	32.4%	113
Unlikely	29.9%	26.2%	34.3%	140
Neutral	9.0%	12.5%	4.7%	42
Likely	21.7%	24.6%	18.3%	102
Very Likely	15.4%	19.5%	10.3%	72
	100%	256	213	469
Fisher's Exact = 0.000				

Summary and Discussion

Economics offers an essential and practical means to tackle social, market and policy issues. Indeed, individual and policy decisions benefit from sound economic knowledge and understanding. Agricultural and general economics majors continue to be disproportionately male. In this study, we observed a gender gap in test performance in introductory microeconomics after controlling for student's GPA and academic major and in spite of the fact that women tend to have a higher GPA compared to their male counterparts. Women in business, economics and agricultural economics degree programs did slightly better than women in other programs, except pharmacy. However, they fared worse than men in all degree programs including those in their own programs.

However, test scores alone may not be the sole factor that deters women's participation in economics. Fifty percent of women in our study, compared to 33% of men, did not enjoy the course in microeconomics. The gender difference in interest was especially notable among agricultural and general economics students. To some extent, this result suggests a need to look at means to increase women's interest in agricultural economics. If the goal is to increase the share of women in the field, the literature and the current study suggest that potential venues include efforts to increase women's knowledge of the range of careers available to economics graduates and to help build their confidence in the field; We need to show women the careers they could have and build their confidence that they can succeed in the program and in these careers. Female role-models more publically now include Dr. Yellen, Chair of the Board of Governors of the Federal Reserve System, but there are many others that can serve, through example, to demonstrate economics is a viable option for women.

Limitations

One limitation of our study is the use of multiple-choice exam questions. Lumsden and Scott (1987) noted that male students performed better on multiple-choice questions, while female students performed better on essay questions because of their verbal skills. However, Ferber et al. (1983) argued that, even if the same key is used, the grading of essay questions is subjective, depending upon the grader. Additionally, the multiple-choice exam format itself may not be the driver of low economic test scores among women since multiple-choice exams are rather common in introductory courses in sociology, anthropology and psychology which historically have had a relatively larger share of women's participation.

Literature Cited

- Ashworth, J. and L. Evans. 1999. Lack of knowledge deters women from studying economics. *Educational Research* 41(2): 209-227.
- Ball, J.A. 2012. The gender gap in undergraduate business programs in the United States. *Jour. of Education for Business* 87(5): 260-265.
- Ballard, C. and M. Johnson. 2004. Basic math skills and performance in an introductory economics class. *Jour. of Economic Education* 35(1): 3-23.
- Ballard, C. and M. Johnson. 2005. Gender, expectations and grades in introductory microeconomics at a U.S. university. *Feminist Economics* 11(1): 95-122.
- Bansak, G. and M. Starr. 2010. Gender differences in predispositions towards economics. *Eastern Economic Jour.* 36(1): 33-57.
- Barlett, R.L. and S.F. Feiner. 1992. Balancing the economics curriculum: Content, method and pedagogy. *American Economic Review Papers and Proceedings* 82(2): 559-564.
- Becker, W., W. Greene and S. Rosen. 1990. Research on high school economic education. *The Jour. of Economic Education* 21(3): 231-45.
- Bollinger, C.R., G.A. Hoyt and K. McGoldrick. 2006. Chicks don't dig it: Gender, attitude and performance in principles of economics classes. SSRN Working Paper. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=931670
- Dynan, K.E. and C.E. Rouse. 1997. The underrepresentation of women in economics: A study of undergraduate economics students. *Jour. of Economic Education* 28(4): 350-368.
- Feedstuffs, 2013, Women make up 44% of agribusiness workforce, September 19, <http://feedstuffs.com/story-women-make-44-agribusiness-workforce-45-102593-printversion>. January 14, 2014.
- Ferber, M.A., B.G. Birnbaum and C.A. Green. 1983. Gender differences in economic knowledge: A reevaluation of the evidence. *Jour. of Economic Education* 14(2): 24-37.
- Ferber, M.A. 1984. Suggestions for improving the classroom climate for women in the introductory economics course: a review article. *Jour. of Economic Education* 15(2): 160-168.
- Ford, M.W. and D. Kent. 2010. Gender differences in student financial market attitudes and awareness: An exploratory study. *Jour. of Education for Business* 85(1): 7-12.
- Gill, A.M. and C. Gratton-Lavoie. 2011. Retention of high school economics knowledge and the effect of the California state mandate. *Jour. of Economic Education* 42(4): 319-337.
- Ginther, D.K. and S. Kahn. 2006. Women's careers in academic social science: Progress, pitfalls and plateaus. Boston University. Working Paper. <http://people.bu.edu/skahn/GintherKahn%20SocSci%20chapter.pdf>. January 15, 2014.
- Goldin, C. 2013. Can 'Yellen Effect' attract young women to economics? Bloomberg Opinion, October 14. <http://www.bloomberg.com/news/2013-10-14/can-yellen-effect-attract-young-women-to-economics.html>. January 15, 2014.
- Hoppe, R.A. and P. Korb. 2013. Characteristics of women farm operators and their farms. EIB-111, U.S. Department of Agriculture, Economic Research Service, April.
- Horvath, J., B.Q. Beaudin and S.P. Wright. 1992. Persisting in the introductory economics course: An exploration of gender differences. *Jour. of Economic Education* 23(2): 101-108.
- Jensen, E.J. and A.L. Owen. 2000. Why are women such reluctant economists? Evidence from liberal arts colleges. *American Economic Review Papers and Proceedings* 90(2): 466-470.
- Lumsden, K.G. and A. Scott. 1987. The economics student reexamined: Male-female differences in comprehension. *Jour. of Economic Education* 18(4): 365-375.
- National Center for Education Statistics. 2012. Digest of education statistics 2011. U.S. Department of Education. NCES 2012-001. <http://nces.ed.gov/pubs2012/2012001.pdf>.
- National Center for Education Statistics. 2013. Digest of education statistics 2012. U.S. Department of Education. http://nces.ed.gov/programs/digest/2013menu_tables.asp.
- Reid, R. 1983. A note on the environment as a factor affecting student performance in principles of economics. *Jour. of Economic Education* 14(4): 18-22.
- Schuhmann, P.W., K. McGoldrick and R.T. Burrus. 2005. Student quantitative literacy: Importance, measurement and correlation with economic literacy. *The American Economist* 49(1): 49-65.
- Zafar, B. 2009. College major choice and the gender gap. Federal Reserve Bank of New York Staff Report No. 364. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1348219.