Gender Differences in Predispositions towards Economics

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Abstract

Previous studies find that, upon entering the college class, women are less likely than men to be interested in economics and more likely to expect it to be difficult, which contributes to their under-representation in the field. This paper investigates causes of gender differences in predispositions towards economics, using survey data from a large state university. A key finding is that students widely view economics as a business-oriented field that prioritizes math skills and emphasizes making money –- a combination that is a turn-off for women, but not so much for men. Our results suggest that playing up the value of economics for social-welfare analysis, while playing down its business applications, may be important for re-balancing predispositions at the outset of the principles class.

[word count: 124]

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1. Introduction

Women are underrepresented in economics, as in certain other scientific and technical fields. As shown in Figure 1, 34% of all bachelor's degrees in economics were awarded to women in 2002/2003. Architecture and finance have shares in the same range as economics; only engineering, computer science and physics have lower shares. In contrast, many other fields that were previously predominately male -- including math, biology, chemistry, and business -- now award half or more of their degrees to women.[1]

A number of studies have investigated reasons for women's under-representation in economics programs. Factors that may exert an influence include: pedagogical methods that favor male students, such as lectures and multiple choice tests (Jensen and Owen 2001); a paucity of female role models (Robb and Robb 1999); differences in math aptitudes (Ballard and Johnson 2004); and presentation of subject matter in a way that over-represents men and male concerns (Ferber 1995). While studies indicate that indeed such factors help to account for women's lower propensity to study economics, they do not explain it away: even when women are well-prepared mathematically and confident academically, they are still less interested in exploring economics as a possible field of study (Jensen and Owen 2000, Dynan and Rouse 1997).[2]

An important issue identified in previous research concerns gender differences in pre-dispositions towards economics: upon entering the college class, women are less likely to be interested in economics, less likely to be considering it as a major, and more likely to expect it to be difficult (Dynan and Rouse 1997, Jensen and Owen 2001). This paper investigates the factors that underlie gender differences in pre-dispositions towards studying economics and presents empirical evidence from a survey of students at the outset of their first college economics class. The next section of the paper outlines conceptually the factors that may contribute to male/female differences in attitudes towards economics. We draw on the theoretical model of Breen and García-Peñalosa (2002), which identifies a number of reasons why women may not enter a traditionally male-dominated field, even after men's and women's preferences towards work/family balance have become similar; these include lower intrinsic

[1] See Jacobs (1995) on the slowdown in gender integration after 1985.
[2] For example, Turner and Bowen (1999) find that, among students with very high math SAT scores (above 750), the share of women majoring in economics is significantly lower than men.

interest in studying the subject, lower intrinsic interest in the careers to which it would lead, concerns about being poorly rewarded in those careers due to productivity or discrimination, continued preference for jobs that permit relatively good work/family balance, and/or pay differentials that are not large enough to offset the expected 'cons' associated with the field. Their work also highlights how learning problems may contribute to slow changes in gender balance in fields that have been gender-differentiated in the past.

The paper then goes on to present findings from a survey conducted in 2005/06 at San Diego State University (SDSU). The questionnaire was administered to 762 students in the first introductory economics course and asks questions about their interests, abilities and job plans; their reasons for taking economics; their expectations of the class; the types of jobs to which they expect an economics degree to lead; and what they expect economics jobs to be like along a number of dimensions. Our sample is of particular interest because, in the state of California, which is where most SDSU students are from, students must take a one-semester class in economics to graduate from public high school; this enables us to examine how prior performance and interest in the subject influences predispositions towards the subject upon entering the college class. Our findings suggest that women expect studying economics to be difficult, partly because they expect the class to prioritize math skills, but also because they expect it to be uninteresting based on their experiences with the subject in high school. An important finding of our work is that, despite the fact that academic economists generally think of the discipline as being centrally concerned with social welfare, both male and female students tend to see it as a financially-oriented business field –- which is not out of line with employment patterns of people with bachelors degrees in the subject. Women's more negative predispositions towards economics have much to do with this view of the discipline, especially widespread expectations that jobs in economics prioritize math skills and are primarily oriented to making money –- a combination that seems to be a turn-off for fields like finance and engineering as well.

2. Conceptual background: Beliefs and learning in the choice of college major

In thinking about predispositions towards studying economics and why those of women are more negative than those of men, it is valuable to first outline conceptual issues in students' decisions about what course of study to pursue. A model developed by Breen and García-Peñalosa (2002) is especially useful for our purposes, because it lays out the set of factors that may lead students to gravitate to one course of study and away from another, and highlights the role of uncertainties that students face about returns they will realize in different fields associated with different courses of study.

In their model, students choose a course of study that would prepare them to work in one of two sectors: (a) a high-pay sector in which one's probability of success depends on ability and effort during studies, and it is hard to combine work and family life; and (b) a low-pay sector in which pay does not depend on ability or effort, and it is easy to combine work and family life. Underlying returns to ability and effort in the high-pay sector may vary across genders, reflecting discrimination and/or 'real' differences in returns; however, effort is not publicly observed, so that the underlying structure of returns cannot be inferred from aggregate outcomes. Instead, people acquire beliefs about returns from their parents; themselves decide what to study, acquire experience and update their own beliefs; and in turn pass these beliefs to their children.

Breen and García-Peñalosa consider the case in which, initially, women had a stronger 'preference' for family life, and so chose education for low-pay jobs -– but then a change occurs such that women's preferences shift towards those of men.[3] Under perfect information about returns to ability and effort, if men and women were identical in underlying ability and effort and had their ability and effort rewarded identically as well, then differences in their labor-market outcomes would also disappear. However, the need to acquire information about returns through personal channels imparts hysteresis to the evolution of the distribution of beliefs, which may not even converge to true values over time. Rather, if it is relatively hard to study for work in the high-paying sector and being 'unsuccessful' in the high-paying sector is worse than working in the sector with low pay, then women may continue to pursue education for low-pay jobs. Here, too little is learned about what returns really are, and priors remain influenced by what the past was like.[4]

Breen and García-Peñalosa's model points to five hypotheses, not mutually exclusive, for why women might remain underrepresented in economics programs despite the considerable integration that has taken place in other fields of study:

- the expected disutility of studying economics may be greater for women than it is for men (and more so than for most other previously male-dominated fields)
- expected performance in economics classes may be lower for women than for men

[3] Here 'preferences' should be understood in the general sense of 'reasons for behaving' (Bowles 1998), not as hard-coded orientations.

[4] That people rely primarily on first-hand information about what different careers are like receives some empirical support from our survey: two-thirds of students said their own jobs and internships were of primary importance in influencing their ideas, and two-thirds again pointed to discussion with family, friends and acquaintances. In contrast, a quarter or less said internet/library research and reading job postings were important in their job search.

- the types of careers expected to be related to the study of economics may be intrinsically less satisfying to women than they are to men (and again, more so than for other traditionally male-dominated fields)
- if women expect to retain a differential responsibility for family life, they may be less inclined towards economics-related careers if they expect them to be relatively hard to combine with family life
- the expected pay differential between economics and other types of work may not be sufficiently high to offset these other reasons why women might steer away from economics
- women may not expect their returns to ability in economics-related jobs to be as high as those of men, either because of discrimination or productivity

Previous research examines the disutility of studying economics and/or expectations of academic performance as sources of women's under-representation in economics programs (Dynan and Rouse 1997; Jensen and Owen 2000, 2001; Ballard and Johnson 2004). But as the model makes clear, women's disinterest in economics may also reflect expectations of what working in economics-related jobs is like, along any of these dimensions. Thus, our survey is intended to examine the extent to which these other factors may also be involved in women's predispositions against studying economics. However, it is important to note here that women's expectations of their returns economics-related work may be out of line with reality: as in Breen and García-Peñalosa's model, if the rate of learning about returns to effort and ability for women in economics is slow, present-day expectations may still appreciably reflect beliefs that prevailed in the past. Thus, it is also important to bear in mind that students' expectations of economics-related work may be driven by old-fashioned views.

3. Survey methodology and descriptive statistics

To gain insight into students' expectations of studying economics and economics careers before they have university-level experience with it, we surveyed students in first-semester principles classes at San Diego State University (SDSU) in the first few weeks of the fall and spring semesters of the 2005/06 academic year. The survey was run in six different sections of macroeconomics (the usual first semester principles class at SDSU) taught by five different instructors, with a total of 762 students completing the questionnaire. While there are reasons to be concerned that a survey conducted on one campus is not representative of the undergraduate population (Siegfried and Fels 1997), there are also reasons why a study based on data from SDSU is of broad interest. First, SDSU is in important ways typical of institutions responsible for a large share of economics instruction at the college level. It is a large public

institution (20,000+ undergraduates) with students whose standardized test scores are squarely in the middle of the national distribution. In 2004, of the 9.2 million students enrolled at 4-year colleges and universities, 68% percent attended public institutions, and of those enrolled at public institutions, three-quarters attended institutions with 10,000 students or more. In 2005, SDSU's incoming students had verbal SATs of 480-580 and math SATs of 490-600, compared to national averages for college-bound students of 510 and 520 respectively (College Board 2005). As such, SDSU can be seen as representative of an instructional environment that is notably widespread.

Second, because students increasingly have studied some amount of economics in high school, it is useful to be able to examine whether high-school experiences with economics may contribute to gender differences in predispositions towards studying it in college. Walstad and Rebeck (2000: 96) report that 44% of high school graduates in 1994 had a taken an economics class for credit, up from 24.3% in 1982. Effects of high-school experience with economics on attitudes towards economics in college are not well understood: for example, the fact that women receive lower average grades in math and science in high school is thought to affect their propensity to study these areas in college, so that a similar difference in grades in high-school economics, if there is one, may contribute to under-representation in college-level study.[5] In this regard, a sample from a California State University is especially useful because, to graduate from public high school in California, students must take a one-semester class in economics, based on standards established by the National Council on Economic Education (NCEE).[6] Because over 90% of SDSU students are from in-state, an unusually large share of students in our sample have taken some economics already: whereas the College Board (2005: 4) estimates that 45% of college-bound students from the class of 2005 took an economics class of some kind in high school, 86% of students in our sample had taken economics.

Sample Composition

Table 1 shows basic descriptive statistics on the sample composition. 59% of the students in the sample were women, a percentage that matches women's share of the university's undergraduate student body. The vast majority of students were taking introductory economics "involuntarily": about 80% were taking it to satisfy a general-education requirement, and 77% because it was required for their intended major; overall, 95% had one, or the other, or both of

[5] Walstad (2001) provides an overview of economics education in high school. Lopus (1997) discusses effects of high-school economics experience on performance in the college principles class.

[6] The class is part of California's "Economics Mandate", which was adopted in 1985 and specifies economic ideas to be learned at each grade level. See Benjamin (2003) for discussion. The standards can be found at http://www.ccee.org/TeacherTools/CaliforniaStandards1.pdf

these reasons for being in the class. A majority of students in the sample, as in SDSU's principles classes generally, plan to major in a business-oriented field, although with a notable gender difference in specialization: the share of men planning to concentrate in general business management or international business was significantly higher than that of women, while the share of women was significantly higher in non-financial fields like communications (public relations, advertising, and journalism), marketing, and hospitality/tourism management.[7] Only 8 students in the sample (6 men and 2 women) identified themselves as economics majors, although more may become economics majors after failing to meet the more selective admissions requirements of the business program.[8]

Variables measuring predispositions

To gain insights into the hypotheses laid out above, we collected information on four sets of factors related to predispositions towards studying economics; detailed descriptions of these variables are given below, but it is useful to provide an overview here. The first set of factors concerns expected aptitude for and disutility of studying economics. Students were asked how they expected introductory economics to compare to their other classes in terms of difficulty, interest, skills it would prioritize, relevance to their career, and emphasis. Second, students were asked about their general interest in studying various topics with important economic dimensions, such as trade and poverty. Third, students were asked to indicate the types of jobs to which they expected an economics major to lead. The final set inquires about students' impressions of how economists' jobs compare to six other professions with respect to work characteristics, necessary skills, pay levels, and work/family balance; students were also asked to indicate in which of these professions they could imagine themselves working. Not unexpectedly, our results show important gender differences along many of these dimensions, as will be discussed below.

Independent variables

To understand factors that may underlie gender-related differences in predispositions, the questionnaire also asked students a number of questions about their abilities, skills, and

[7] Note that not all of the majors referred to here as 'non-financial business fields' are offered through the Business School: notably, majors in public relations, advertising, and journalism are offered through the School of Communication, while the recreation major is offered through the College of Professional Studies and Fine Arts. Nonetheless, we consider these majors (along with marketing, hospitality/tourism, and sports management) to be 'non-financial business fields' because they share an applied business orientation, in contrast to the study of arts and sciences or engineering. On gender differences in business concentrations, see Bauer and Dahlquist (1999).

[8] Salemi and Eubanks (1996) discuss the flow of "discouraged business majors" into economics. At SDSU, the GPA required to declare a business major is 2.9, while it is 2.4 for economics.

interests; what goals are important to them in their work and private lives; and what prior experience they may have had with studying economics. Table 2 shows the information collected, along with basic descriptive statistics. Much previous research suggests that differences in math abilities contribute to differential performance in economics classes, especially aptitude for spatial tasks which on average is stronger in men (Ballard and Johnson 2004); thus, if women know going into the principles class that it will prioritize skills at which they are relatively weak, they may expect to find economics to be relatively difficult. The survey contained three measures of math ability: (a) scores on the math portion of the SAT, (b) a question on math ability in which people were asked to rate themselves as being in the top 10%, above average, average, below average, or in lowest 10% of people their age, and (c) a question asking people whether math was among the high-school subjects in which they got their best grades. While the math SAT might be expected to provide the most objective measure,[9] in our sample math SAT information was not available for 30% of students, either because they took the ACT or because they left the item blank, with the extent of non-response being significantly greater for women than it was for men (see Appendix Table A). Because this would lead to a substantial reduction in sample size and because the non-response is not random, our regressions instead use item (b) or (c). These are highly correlated with each other (tetrachoric *p* of .78) and have no problems of non-response.[10]

The survey also asked students' to rate their strengths along a number of dimensions, relative to other people their age. Again, there were significant differences between genders in self-reported strengths. Men were significantly more likely to rate themselves as above average with respect to overall intelligence, computer skills, and competitiveness; the 'competitiveness' variable is of interest given evidence that men tend to enjoy opportunities to compete while women tend to shy away from them (see Niederle and Vesterlund 2005), which may contribute to women's disinterest in fields they may expect to be heavy on interpersonal competition. In contrast, women were more likely to rate themselves as high in motivation for school work, communications skills, and organizational skills. To capture desired attributes of work and lifestyle, students were asked to identify goals that were "personally important to you". Women were more likely than men to say it was very important to them to contribute to the betterment of society, help the disadvantaged, work extensively with people, and have intellectually stimulating work; they were also more likely to say it was important to them to have a job with good work/family balance, although the difference here was fairly small (90%

[9] Note, however, that checks of self-reported SAT scores against administrative records show upward bias in self-reported data (Maxwell and Lopus 1994).

[10] Moreover, these items often have expected effects in the regression analysis whereas analyses using SAT math scores showed no significant effects of variation in math ability.

of women versus 86% of men) and significant at a 10% level only. In contrast, there was no significant difference between male and female students in the importance to them personally of becoming financially well-off.

The questionnaire also asked students to indicate which high-school subjects they liked the most or least, and which were among those in which they got their best or worst grades (in both cases multiple subjects could be checked); they also indicated which subject(s), if any, they had not taken. Responses showed important differences between men and women in their experiences with economics in high school. Some 11% of men and 16% of women had not taken economics in high school. Among both male and female students, about 14% took economics in high school but said their grades in the subject were among their worst. 20% of men and 28% of women said economics was among their best grades in high school, but also among the subjects they liked the least. Finally, 55% of men and 42% of women reported economics to have been both among their best grades and also among the subjects they most liked.

To put these numbers in perspective, it is useful to compare them to figures for other disciplines that have been traditionally male dominated (see Table 3). Among students who took economics in high school, 17% reported their grade in the subject to have been among their worst; comparable shares for math, biology, and physics were 38%, 31%, and 42%. The relatively low incidence in economics of relatively low grades no doubt reflects the nature of high-school economics in California: although the required class is based on standards established by the National Council on Economic Education, its short duration and intention of being accessible to students of all abilities mean it is more of a narrative overview of key economic ideas than a simplified version of the principles class. Still, the fact that high-school economics was not among the relatively hard classes is potentially important, given evidence that women seem to be more likely than men to attribute low grades to ability rather than inadequate effort (Kramer and Lehman 1990).

However, economics does stand out as a subject with a large gender difference in interest: of students who studied economics in high school, 62% of men considered it to be one of the subjects they most liked, versus 50% of women. This 12 percentage point difference is second only to that of physics (25 percentage points); it is notably larger than that for math (6 percentage points) and contrasts with that of biology, for which the difference is not statistically significant.[11] Still, 50% of women who had taken economics in high school both liked it and did well in it, compared to 44% for math, 40% for biology, and 22% for physics. Thus, women's background in economics would not seem to give them any reason to feel less

[11] Note that virtually all students who did poorly in economics disliked it.

competent in the subject than men, and although they are significantly less interested in it, their interest is not anywhere near as low as in physics, the other subject that remains strongly male dominated.

4. Expectations of studying economics

The questionnaire asked "Before taking this class, how did you expect a class in economics to compare to classes in other subjects?" and provided a list of answers that respondents could check: "more difficult", "more interesting", "more relevant to my career", "more about today's world", "more about helping people", "more about business and making money", and "more demanding in math skills." Table 4 shows probit analyses of students' answers to these questions. All regressions include dummy variables for the five teachers; even though the questionnaire was administered as early as possible in the semester to capture students' predispositions towards economics, variations across teachers in style, reputation, the textbook used, course workload, etc., may have influenced students' impressions of what introductory economics would be like. In most regressions, the teacher dummies were not jointly significant (as can be seen from the p-values at the bottom of the table), although they were significant in the regressions explaining whether students expected introductory economics to be more difficult or more interesting than their classes in other subjects. This underlines the ability of the instructor to influence attitudes at the outset of the class.

In a first set of regressions that control only for gender and teacher effects, women are significantly more likely to say they expected introductory economics to be difficult, and significantly less likely to say they expected the class to be more interesting than their other classes. This confirms the expectation based on previous work that *ex ante* women have more concerns than men about economics being a relatively difficult and uninteresting subject to study (Dynan and Rouse 1997; Jensen and Owen 2000, 2001). The question is whether we can identify what factors account for these more negative predispositions. Thus, a second set of regressions adds controls for students' perceived strengths, abilities, and goals and backgrounds in economics, as well as teacher-specific effects. Adding these controls affects the estimated effects of gender, reducing its magnitude in the regression for difficulty and making it become insignificant in the regression for interest, suggesting that the included explanatory variables capture important dimensions of gender-related variations. Technical aptitude is certainly an influence here: ceteris paribus, students with higher self-reported math ability and computer skills were less likely to expect economics to be difficult and more likely to expect it to be interesting compared to their other classes (although the effect of math ability in the regression for interest is significant at a 10% level only). Furthermore, having

strong communications skills is associated with expecting the class to be more difficult and less interesting, presumably because these skills are not expected to be used intensively in an economics class. Thus, women's lower perceptions of their math abilities and higher perceptions of their communications skills compared to men contribute to their higher likelihoods of expecting the subject to be difficult and uninteresting.

Controlling for experiences with economics in high school is also important in reducing the estimated effects of gender per se on predispositions towards economics. Not surprisingly, students who took economics in high school and got relatively low grades in it were more likely to expect college-level economics to be difficult and less likely to expect it to be interesting, compared to students who had not taken economics in high school (the omitted group); conversely, students who did well in high-school economics and also liked it were less likely to expect the class to be difficult and more likely to expect it to be interesting. Less expected is that students who got good grades in high-school economics but did not place it among the subjects they most liked –- a group in which women are overrepresented -- were no more or less likely than students who had not taken economics to expect the class to be difficult; they were also significantly more likely to expect the class to be difficult than those who did well at high-school economics and liked it.[12] This difference cannot be traced to math ability, general intelligence, or motivation for schoolwork, for which the regressions control. Rather, it suggests that these students may not let their prior success in the subject lower their expectations of 'difficulty' because they anticipate that it will be a challenge to apply themselves consistently in a subject in which they have low interest.

Along the other dimensions of expectations about which the questionnaire asked, there was only one other significant gender effect: men were much more likely than women to expect the class to be relevant to their career, whether or not students' abilities, interests, and background were included in the regression. This effect disappears if a set of variables for intended major is included in the regression (results not shown): in this case, compared to general-business majors, students oriented towards financial business fields are 13.3 percentage points more likely to expect economics to be relevant to their careers (p-val=.07), while those oriented to non-financial business fields are 30 percentage points less likely (p-val=.00).[13] This suggests that the instrumental value of studying economics is most apparent to students oriented to generic business careers, a group in which women are underrepresented.

[12] The latter difference is large (15 percentage points=2.5-(-12.5)), with a p-value of .00.
[13] The probability of expecting the class to be relevant to their careers is also 34.8 percentage points lower for students intending to major in arts and sciences (p-val=.00).

While results from the other regressions are not informative, some of the mean responses to the expectations questions are of nonetheless of interest. That students view economics as primarily oriented to business and finance is indicated by the fact that 85% expected introductory economics to be "more about business and making money" than their other classes. In contrast, although academic economists view economics as having a notable concern with social welfare, the expectation of incoming economics students does not feature this idea: less than 30% expected introductory economics to be more oriented than their other classes to ideas about improving people's lives. Finally, although the abstraction of economic models is sometimes put forth as a reason why women would disfavor the subject, going into the college class at SDSU there does not seem to be much concern that economics will not address 'real world' problems: on the contrary, about 2/3 of students expected economics to be more about "issues of today's world" than their other classes.

5. General interest in economics topics

Conceivably, some part of women's lower interest in studying economics may reflect an inherently lower interest in the subject matter of economics, instead of or in addition to issues of *how* economic problems are approached. To examine this aspect of disinterest, the questionnaire listed 10 topics that have important economic dimensions and asked students which (if any) they would be interested in learning about during their undergraduate studies. Asking about the topics, without referring to economics or any other discipline specifically, is expected to provide insight into students' interest in the '*what'* of economics, independent from what they think about the *how*.

Students expressed a fair amount of interest in these issues, picking an average of 4.4. While there was no gender difference in the number of topics chosen, there were important differences in the topics in which they expressed interest. As shown in Table 5, controlling for students' skills, interests, goals, etc., men were significantly more likely to be interested in learning about macro/financial dimensions of economics. The gender difference in interest in learning about 'what drives the stock market' is particularly large: ceteris paribus, men were 27 percentage points more likely to be interested in learning about the stock market than women. Men were also significantly more interested in learning about problems of global capital markets, globalization and trade, and social security reform. In contrast, women expressed significantly more interest in economic topics with socio-distributional dimensions, including global poverty and inequality; discrimination in wages and employment; race/ethnicity and access to economic opportunity; and women in the work world. These results suggest that female students are not inherently disinterested in issues and problems

that academic economists would consider to be 'economic'. Rather, it would seem that either they do not expect economics-related topics that interest them to be covered in introductory economics, and/or do not expect them to be covered in a way that they would find interesting.

6. Types of jobs to which an economics major is expected to lead

As the model of Breen and García-Peñalosa indicates, a student's orientation to a given field of study will reflect his/her expectations not only of the difficulty and interest of college-level studies in the field, but also of what it would be like to work in the kinds of jobs to which studies in that field would lead. The survey data confirm the importance of practicalities in the selection of a course of study for SDSU students.[14] In choosing a major, 84% of students rated as "very important" the extent to which studying the subject improves their job prospects in their field of interest; additionally, 73% rated as "very important" the extent to which the subject lines them up for a well-paying job. Thus, students may be drawn to economics in part because of the doors they expect it to open, just as they may be disinterested in it due to disinterest in the types of careers to which they expect it to lead.

Especially in early years of college, students may have fairly vague ideas about job prospects associated with different majors, although they often have general impressions of the kinds of career paths to which given majors would lead. To get at what students think of economics in this regard, the questionnaire asked, "What comes to mind when you think of the typical job that someone majoring in economics would get after college?" This was asked as an open-ended question, for which the answers were coded into seven categories. Figure 2(a) shows the distribution of responses. Some 29% of students said "stock broker" or some other financial-sector occupation such as banker, accountant, real estate, insurance, financial advisor, and tax advisor. Another 15% mentioned jobs elsewhere in private business, including CEO, entrepreneur, office worker, market research, and "high salary white-collar professional". The idea of analyzing data clearly came to mind, as reflected in such answers as "number crunching", "making graphs for corporations", and "cubical office with charts." About 6% of students cited positions in government, politics or media, including "head of the [F]ed", "dealing with the unemployment rate (trying to fix it)", Census worker, bureaucrat, and politician. Some mentioned writing for the *Wall Street Journal* or becoming a commentator on a business-news program, " … like Neal Cavuto with 'Your World'." Some 15% pointed to teachers or professors of economics, probably because educators are the only people they know with economics credentials. For 31% of students, nothing came to mind: they either said

[14] See also Jensen and Owen (2001) on the importance of career interests in students' decisions.

so, gave an uninformative answer like "economist?", or left the item blank. A small group of students conveyed specifically negative views, including several replies along the lines of "something boring with too much math."[15] Only 1% wrote broadly positive comments like "there are many jobs, this major isn't limiting".

For comparison, Figure 2(b) shows the actual distribution of employment among people having only a bachelor's degree in economics, based on data from the National Science Foundation. Students are clearly right to emphasize private business employment: 75% of people with bachelor's degrees in economics are employed in private, for-profit businesses, and another 9% own businesses or are self-employed. To gauge whether high-school experience with economics influenced people's ideas about the job prospects of economics majors, we estimated a multinomial logit model in which the dependent variable was the categories of jobs shown in Figure 2(a) and the explanatory variables were as above (results are not shown, but are available from the authors upon request). Hardly any of the explanatory variables had statistically significant effects, but the variables indicating high-school experience with economics produced one notable result: All students who had taken economics in high school, regardless of how they fared in the class, were significantly more likely to have mentioned a financial-sector job than those who had not taken economics, *ceteris paribus*. Thus, prior study of economics seems to give students a clearer mental image of the job prospects to which an economics degree would lead, where they understand its value to lie especially in financial/business options.

7. Impressions of economists compared to other professions

The model of Breen and García-Peñalosa also points to specific aspects of jobs in different fields that would be expected to influence whether women would opt into a field of study that was traditionally male-dominated: the extent to which they expect the work to interest them, the extent to which they expect their abilities to be valued in the field, their preferences for work/family balance, their impressions of how easy or difficult it would be to combine family life with working in the field, and their expectations of whether compensation levels in the field are sufficiently high to offset other negative aspects of working in it. In attempting to gauge how these factors may affect women's predispositions towards economics, we again face the problem that students admittedly do not know much about economists' jobs. However, we expected them to have sufficiently clear impressions of the work of various kinds of

[15] Notable also were the sprinkling of answers like "Ferris Bueler's Day Off" (the film in which Ben Stein played an insufferably boring economics teacher) and "Alex P. Keaton" (Michael J. Fox's character in the 1980s sit-com "Family Ties", in which he played a *Wall Street Journal*-carrying, Louis-Rukeyser-watching proponent of supply-side economics).

professionals, including economists, that they could identify in broad terms those professions which they associated with prioritizing certain types of skills, being favorable or unfavorable for work/family balance, etc.

Thus, we asked students to indicate how they thought of seven different professions, including that of economist, along a number of different dimensions. Besides "economist", the other jobs were selected to represent a broad range of careers. Two were high-income high-prestige professions, one more quantitative (stock broker) and the other less so (corporate lawyer); one was a technically-oriented profession (engineer); one was a profession that would make intensive use of communications skills (journalist); one was a job specifically associated with good work/family balance (high-school teacher); and the last was a profession associated with a traditionally female-dominated major (psychologist). Students were asked to indicate which of these jobs they thought of as having specified qualities, such as being primarily concerned with making money, being primarily oriented to helping people, putting a priority on math skills, etc. For each item, students could check as many occupations as they saw fit.

Responses to these questions are shown in Figure 3. Broadly, students seem to see economists' jobs as sharing the technical orientation and competitive work environment of stockbrokers and engineers, but rather than having the high-income, high-stress lifestyles of stockbrokers, economists' jobs seem to share the moderate-income lifestyles and conventional business workday of engineers. More specifically:

- Economists' jobs are definitely thought of as putting a priority on math-related skills (panel (a)). Stockbrokers' and engineers' jobs are also widely viewed as needing strong math skills, while those of corporate lawyers, journalists and psychologists are not. Some students also pointed to jobs of high-school teachers here, noting that they would need strong math skills if they taught math.
- Economists' jobs are not thought to be "primarily oriented to helping people" (panel (b)). Here students rate high-school teachers and psychologists quite highly and stockbrokers quite low; economists' jobs also rate on the lower side, but in the same range as engineers, lawyers and journalists. Instead, economists' jobs, like those of stockbrokers and corporate lawyers, are thought of as being "primarily concerned with business and making money" (panel (c)).
- Students do not see the workplace of economists as having much potential for "fostering friendly, sociable relationships with co-workers" (panel (d)). Workplaces of stockbrokers, lawyers and engineers do not look particularly friendly either, while those of high-school teachers look quite friendly; those of journalists and psychologists are rated in the middle.

- In terms of "offering flexibility to balance work and family", students rate economists' jobs on the lower end of the spectrum, although no where near as low as those of stockbrokers and corporate lawyers, which seem to offer no flexibility at all (panel (e)). Jobs of high-school teachers are perceived as offering quite a lot of flexibility, while those of journalists, psychologists and engineers are rated in the middle.
- Unlike stockbrokers and corporate lawyers, the jobs of economists are not widely seen as "attracting people who put work first in their lives"; rather, economists' jobs are seen as having a moderate work orientation, similar to that of journalists, engineers and psychologists (panel (f)). Only high-school teachers stand out as low in this respect.
- Finally, in terms of compensation, the jobs of economists are not widely seen as likely to lead to a high-income lifestyle (panel (g)). Not surprisingly, students see the jobs of stockbrokers and corporate lawyers as having strong potential in this respect, while those of high-school teachers and journalists are seen as having virtually none. The earnings prospects of economists are rated in the middle, although a notch below those of engineers and psychologists.

While men and women have very similar impressions of the various jobs,[16] they have very different views on the fields in which they could imagine themselves working. The questionnaire asked students whether they thought of people in the various fields as being "the kinds of people I could imagine myself working with", where they could choose as few or as many jobs as they saw fit. As shown in panel (h) of Figure 3, there are large differences between men and women, going largely along traditional lines: men are much more likely than women to be able to imagine themselves among economists, stockbrokers, and engineers, while women are more likely to be able to imagine themselves among journalists, teachers, and psychologists. Interestingly, women are no less likely than men to imagine themselves as corporate lawyers. Potentially the lack of gender effect for corporate lawyer reflects impressions from media representations that the legal profession is gender-balanced and hospitable for competent women; it also suggests that that women are not put off by hard-driven-professional jobs *per se*, but rather such jobs in combination with work that is expected to be intensive in math skills.

[16] As can be seen from Figure 3, there were modest yet significant gender differences in expectations, with women tending to rate jobs of economists, stockbrokers, lawyers, and engineers as even more about money, hard work and high incomes than men –- while rating the other jobs as somewhat more about helping people, friendly workplaces, interesting lives outside of work, and work/family balance than men. This may reflect some bias among women (relative to men) against fields that are predominantly male and bias in favor of others –- but it also may just be that women use a broader frame of reference when thinking about jobs than men do.

Again, to examine the extent to which self-rated abilities and goals contribute to these gender effects, Table 6 presents results of the probit analyses; explanatory variables are largely as before, although with a few additional variables relevant to career and lifestyle aspirations included. Broadly, the results suggest that students use their impressions of what jobs in different fields are like, in combination with their perceived self-knowledge, as indicators of their potential fit in one field or another. Thus, people rating themselves high on competitiveness and wanting to be well-off financially are more likely to be able to imagine themselves as stock brokers or lawyers; people who really liked English in high school or rate themselves high in communications skills are more likely to be able to imagine themselves as journalists; and people rating work/family balance as very important to them are less likely to see themselves as stock brokers or corporate lawyers, and more likely as high-school teachers. Still, there are important effects of gender after controlling for other determinants of predispositions towards the different professions: ceteris paribus, women remain significantly less likely to be able to imagine themselves as economists, stock brokers or engineers –- and significantly more likely to be able to see themselves as journalists or psychologists. Considering the range of controls for individual characteristics included in the regressions, the fact that gender remains significant suggests that women use it as an indicator of their probable 'fit' in such professions –- that given their gender, there is reason to suspect that the nature of the work or the work environment will not match their skills, interests, objectives, and/or aspirations.

The analysis above indicates what it is that the professions disfavored by women have in common: they look to students like quantitatively-oriented, traditional business jobs, high in money orientation and low in friendliness and flexibility. Greater disinterest among women in working in such fields may reflect some distaste for such work, and/or concerns about not having relevant skills -- but these would have to be above and beyond the obvious possibilities (perceived math ability, interest in working with people, competitiveness, desire for work/family balance, etc), for which the model controls. Instead or in addition, use of gender as an indicator of fit may reflect persistence of old-fashioned beliefs: because there has been low entry of women into these fields, women's knowledge of their prospects for success and job satisfaction may remain affected by old views of gender and work, wherein quantitatively-oriented business jobs do not look like "women's work". The survey data alone cannot establish whether learning problems in part lead women to be more negative than they 'ought' to be about their prospects for success in quantitatively-oriented business fields. Still, the data suggest that low interest in such fields is at least as much of an issue as biased expectations in explaining why women tend not to see themselves working in these kinds of professions.

8. Discussion and implications

Returning to the hypotheses laid out in section 2, our findings can be summarized in five main points. First, women's more negative predispositions towards studying economics indeed reflect concerns about math, but also a broader problem of disinterest in the subject, acquired by some through uninteresting experiences studying it in high school. Second, it is a mistake to think of women in principles classes as inherently disinterested in studying economics; while they may be less interested than men in macro/financial topics, they express more interest than men in economic topics with social-welfare angles, like unemployment and global poverty. Third, women do tend to be less interested in the kinds of jobs to which an economics degree is expected to lead, given expectations that these jobs will prioritize math skills, emphasize making money, and have unfriendly workplaces. Fourth, concerns about work/family balance do not appear to be important in tilting female undergraduates away from economics-related careers. Finally, while expected returns to ability no doubt contribute to women's disinclination to train for economics careers, this disinclination seems to result at least as much, if not perhaps more, from a lower inherent interest in quantitatively-oriented business work.

It is important to recognize, however, that these findings concern beliefs and impressions that students have at the *outset* of the economics class. Some beliefs, like those related to socio-cultural norms or self-perceived abilities, may be fairly deep-rooted. But impressions of economics are quite likely open to modification, as suggested by our findings that (a) many students admittedly do not have very clear ideas about the field, and (b) instructors do have some significant effects on students' expectations of what studying economics will be like. Our findings suggest three recommendations for dispelling impressions of economics that contribute to women's predispositions against the subject at the outset of the class. First, while the relevance of studying economics is apparent for students oriented to finance or general-business careers, its relevance to the careers of other students can be fruitfully clarified. Of particular importance is drawing connections between economics and fields that tend to be of greater interest to women. At SDSU, for example, this could be done by using examples relevant to the non-financial business fields in which women tend to specialize; e.g. examining changes in supply and demand in the airline industry would highlight the value of economic analysis for tourism/hospitality studies. Second, syllabi can be constructed to make sure that early sections of the class do not reinforce women's predispositions towards disinterest in economics. Thus, for example, a macro-principles class that begins by covering trade, capital markets, and fiscal policy runs risks of being off-putting, whereas one that features discussion

of global poverty or unemployment early on may be more effective for challenging the pre-conception that economics is all about making money. Finally, while economics majors do flow overwhelmingly into general, entry-level jobs in private business, it is nonetheless valuable to clarify to students that many different kinds of career options are associated with studying economics, including policy-oriented jobs that tackle problems of social welfare and even some jobs that make intensive use of communications skills (like that of financial correspondent Maria Bartiromo, who majored in journalism and minored in economics at New York University). Altogether, then, what seems most important for re-balancing predispositions towards economics at the outset of the class is to broaden students' understanding of what economics *is*, replacing the image of economics as a financially-oriented business field with one in which its broad range of applications is more readily apparent.

Table 1. Basic descriptive statistics					
	Share of group			Male - female difference	
	All	Men	Women	Diff.	p-val.
Number of students	762	314	448	--	--
% freshman	60.6	62.7	60.6	3.6	.18
% taking economics to satisfy gen-ed Requirements	79.9	79.9	79.9	0	.53
% taking economics because it is required for their major	77.4	75.5	78.8	-3.3	.16
% intending to major in:					
Business: general (management, administration, pre-business, international)	32.0	39.2	27.0	12.2*	.00
Business: financial (finance, accounting, real estate)	9.8	10.5	9.4	1.1	.35
Business: non-financial (communications, public relations, advertising, journalism, marketing, hospitality/tourism/recreation, sports management)	33.9	20.4	43.3	-22.9*	.00
Arts & sciences (humanities, fine arts, social sciences, sciences)	12.7	15.0	11.2	3.8+	.08
Engineering & computer science	3.0	6.0	0.9	5.1*	.00
Other and undeclared	8.5	8.9	8.3	0.7	.42

* Significant at 5% level or better.

\+ Significant at 10% level or better.

Table 2. Definitions and descriptive statistics: Independent variables (all are 0/1 and are shown here as shares of the relevant group)

		Men	Women	Male – female diff.	p-val.
Female	Student is female	0	100	-100	--
Math among best HS grades	Student identifies math as one of the HS subjects in which she got her best grades	61.8	55.6	6.2*	.05
Math ability	Student self-rates as above average w/respect to this trait	55.1	38.5	17.7*	.00
Overall intelligence		77.1	65.0	12.1*	.00
Motivation for schoolwork	"	34.1	52.2	-18.2*	.00
Computer skills	"	50.3	33.7	16.6*	.00
Communications skills	"	60.2	65.0	-4.8+	.10
Competitiveness	"	67.8	46.0	21.9*	.00
Organizational skills	"	39.8	63.0	-23.1*	.00
Contribute to a better society	Student indicates that this goal is "very important" to her personally	39.2	45.3	-6.1*	.05
Be financially well-off	"	80.3	76.3	3.9	.12
Help the disadvantaged	"	38.9	51.1	-12.1*	.00
Work extensively w/people	"	84.4	93.1	-8.7*	.00
Intellectually stimulating work	"	29.6	36.8	-7.2*	.02
Becoming a respected professional	"	74.5	79.9	-5.4*	.05
Job that permits good work/family balance	"	86.0	90.0	-4.0+	.06
HS: Didn't take	Student did not take economics as a subject in HS	11.2	15.9	-4.7*	.04
HS: Took econ/didn't do well	Student took economics in HS, but it was among the subjects in which he got his worst grades	14.3	14.5	-0.2	.52
HS: Did well/didn't like	Student took economics in HS and it was not among the subjects in which she got her worst grades; but it was not among the subjects she liked the most	19.8	27.7	-7.9*	.01
HS: Did well & liked	Student took economics in HS, and it was not among the HS subjects in which he got his worst grades; and it was among the subjects he liked the most	54.8	42.0	12.8*	.00
Some AP work	Student took at least one AP class or exam in high school	69.8	75.2	-5.5+	.06
English among best-liked subjects	Student identifies English as one of the HS subjects he liked the most	52.2	65.0	-12.7*	.00

* Significant at 5% level or better.

\+ Significant at 10% level or better.

Table 3. Experiences in various subjects in high school, among students who took the subject

	Share of group			Male - female difference	
	All	Male	Female	Diff.	p-val.
Economics					
Took + did poorly	16.8	16.1	17.2	-1.1	.39
Did well but didn't like	28.4	22.2	32.9	-10.7*	.00
Did well + liked	54.9	61.7	49.9	11.8*	.00
Total	100	100	100	--	--
Math					
Took + did poorly	38.0	35.0	40.1	-5.1+	.09
Did well but didn't like	15.5	15.2	15.6	-0.4	.48
Did well + liked	46.6	49.8	44.3	5.5+	.08
Total	100	100	100	--	--
Biology					
Took + did poorly	31.4	28.6	33.3	-4.7	.11
Did well but didn't like	27.6	28.6	27.0	1.6	.35
Did well + liked	41.0	42.9	39.8	3.1	.22
Total	100	100	100	--	--
Physics					
Took + did poorly	41.9	33.3	48.7	-15.4*	.00
Did well but didn't like	24.8	19.3	29.2	-10.0*	.01
Did well + liked	33.3	47.4	22.1	25.3*	.00
Total	100	100	100	--	--
Memo items:					
Took economics	86.1	88.9	84.2	4.7*	.04
Took physics	63.0	67.8	59.6	8.2*	.01

* Significant at 5% level or better.

+ Significant at 10% level or better.

Table 4. Expectations of introductory economics, compared to your other classes: Probit analysis, marginal effects														
	More difficult		More interesting		More relevant to my career		More about today's world		More about business & making money		More about improving people's lives		More demanding in math skills	
Female	.15* (.04)	.09* (.04)	-.14* (.03)	-.04 (.03)	-.11* (.04)	-.08* (.04)	-.01 (.03)	-.03 (.04)	.00 (.03)	.02 (.03)	-.03 (.03)	-.01 (.04)	.05 (.04)	.01 (.04)
Math ability		-.10* (.04)		.05+ (.03)		.06 (.04)		-.03 (.04)		.02 (.03)		.00 (.04)		-.04 (.04)
Overall intelligence		-.03 (.05)		-.02 (.04)		-.04 (.04)		-.03 (.04)		-.00 (.03)		-.01 (.04)		.04 (.04)
Motivation for schoolwork		.00 (.04)		.01 (.03)		-.01 (.04)		.07+ (.04)		-.02 (.03)		.01 (.04)		-.03 (.04)
Computer skills		-.13* (.04)		.13* (.03)		-.07+ (.04)		.02 (.04)		-.01 (.03)		.01 (.03)		-.06 (.04)
Communications skills		.07+ (.04)		-.11* (.03)		-.07+ (.04)		.00 (.04)		-.03 (.03)		-.04 (.04)		.01 (.04)
Competitiveness		.05 (.04)		.14* (.03)		.06 (.04)		.02 (.04)		.02 (.03)		.09* (.04)		-.02 (.04)
Help make society better		.02 (.04)		.03 (.03)		-.07 (.04)		.07* (.04)		.02 (.03)		.10* (.04)		.05 (.04)
Be financially well-off		.02 (.05)		.04 (.04)		.15* (.05)		.10* (.04)		.02 (.03)		.08+ (.04)		.00 (.05)
Help the disadvantaged		.05 (.04)		.02 (.03)		.10* (.04)		.03 (.04)		.03 (.03)		.08* (.04)		-.01 (.04)
Work extensively w/people		.05 (.06		-.09+ (.06)		-.07 (.06)		.05 (.06)		.04 (.05)		-.02 (.06)		.09 (.06)
HS: Took econ/didn't do well		.21* (.07)		-.13* (.04)		-.11 (.07)		-.08 (.07)		.02 (.04)		.00 (.06)		.03 (.07)
HS: Did well/didn't like		.03 (.06)		-.11* (.04)		-.02 (.06)		-.05 (.06)		.03 (.04)		-.01 (.06)		-.00 (.06)
HS: Did well & liked		-.13* (.06)		.13* (.05)		.12* (.06)		.02 (.05)		.09* (.04)		.03 (.05)		-.09 (.06)
Pseudo-R2	.03	.10	.04	.19	.01	.07	.00	.03	.01	.03	.00	.04	.01	.02
p-val. of teacher dummies	.00	.00	.00	.00	.19	.22	.63	.45	.55	.57	.64	.61	.25	.19

Notes: + = significant at 10% level. * = significant at 5% level. All specifications include teacher dummies

Table 5. Interest in studying various topics during undergraduate studies: Probit analyses, marginal effects

	Stock market	Global capital mkts	Trade, globali-zation	Soc. sec. reform	Consum-ers & media	Poverty in US	Global poverty	Discrim-ination	Race/ ethn.	Women & work
Female	-.27* (.04)	-.20* (.04)	-.14* (0.04)	-.11* (.04)	.06 (.04)	.04 (.04)	.07+ (.04)	.13* (.04)	.09* (.04)	.39* (.04)
Math ability	.07+ (.04)	-.04 (.04)	-.06 (.04)	-.01 (.04)	-.13* (.04)	-.03 (.04)	-.01 (.04)	.02 (.04)	-.04 (.04)	.02 (.04)
Intelligence	-.01 (.04)	.00 (.04)	-.01 (.04)	-.03 (.04)	.02 (.04)	-.07+ (.04)	-.05 (.04)	-.10* (.04)	-.03 (.04)	-.06 (.05)
Motivation	.06 (.04)	.02 (.04)	.02 (.04)	.07* (.04)	.05 (.04)	.07+ (.04)	.03 (.04)	.05 (.04)	.05 (.04)	.10* (.04)
Computer skills	.05 (.04)	.03 (.04)	.00 (.04)	.04 (.04)	.04 (.04)	-.04 (.04)	-.01 (.04)	-.01 (.04)	-.02 (.04)	.02 (.04)
Commun. Skills	.07+ (.04)	-.01 (.04)	-.01 (.04)	-.05 (.04)	.09+ (.04)	-.00 (.04)	-.02 (.04)	-.02 (.04)	-.05 (.04)	.02 (.04)
Competitiveness	.09 (.04)	.06 (.04)	.09* (.04)	-.05 (.04)	.02 (.04)	-.01 (.04)	.00 (.04)	-.01 (.04)	-.01 (.04)	.04 (.04)
Contribute to better society	.02 (.04)	.04 (.04)	.08+ (.04)	.08* (.04)	.05 (.04)	.20* (.04)	.18* (.04)	.09* (.04)	.14* (.04)	.13* (.04)
Be financially well-off	.12* (.05)	-.01 (.05)	-.03 (.05)	.01 (.04)	.02 (.04)	-.07 (.05)	-.07 (.05)	.01 (.05)	.05 (.05)	.03 (.05)
Help disadvantaged	-.06 (.04)	.00 (0.04)	-.03 (.04)	.04 (.04)	-.11* (.04)	.11* (.04)	.09* (.04)	.06+ (.04)	.09* (.04)	.01 (.04)
Work w/people	-.01 (.07)	.08 (.06)	-.01 (.06)	.02 (.06)	.01 (.06)	.08 (.06)	.08 (.06)	.04 (.06)	.03 (.06)	.04 (.07)
HS: Took/didn't do well	-.13+ (.07)	-.14* (.06)	-.04 (.07)	-.07 (.06)	-.07 (.07)	-.10 (.07)	-.04 (.07)	.03 (.07)	.01 (.07)	-.12+ (.07)
HS: Did well/didn't like	-.11+ (.06)	-0.17* (.05)	-.06 (.06)	-.03 (.06)	-.02 (.06)	.03 (.06)	-.02 (.06)	.04 (.06)	.03 (.06)	.04 (.06)
HS: Did well & liked	.04 (.06)	-.02 (.05)	-.03 (.04)	.01 (.05)	.01 (.05)	.00 (.06)	-.04 (.06)	.10+ (.06)	.06 (.06)	-.05 (.06)
Pseudo-R2	.11	.06	.03	.03	.04	.07	.06	.04	.04	.16
p-val. teacher vars.	.59	.42	.28	.67	.07	.82	.94	.98	1.00	.90
p-val. HS econ experience	.00	.00	.25	.32	.52	.19	.84	.19	.69	.37

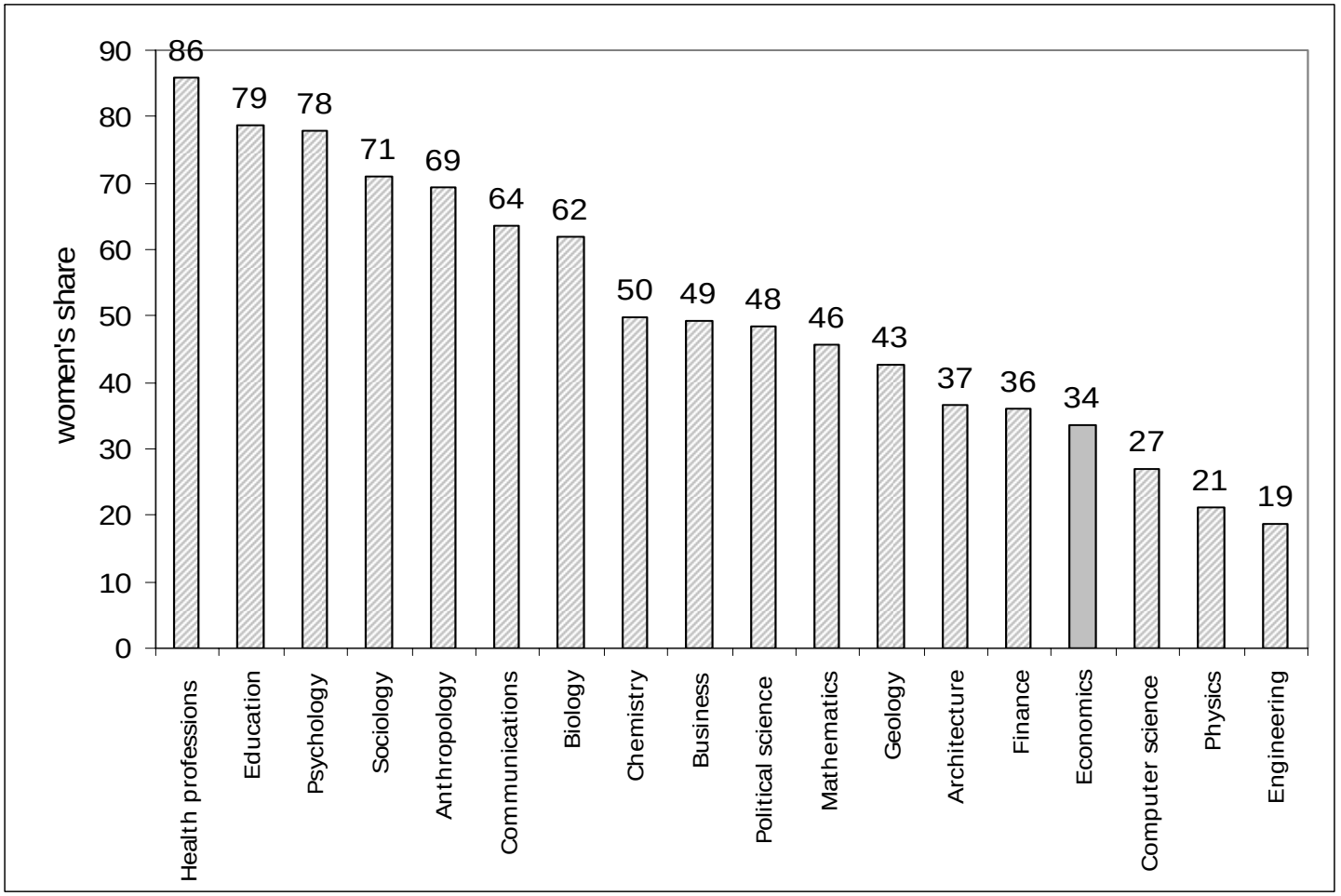
Notes: * = significant at 5% level; + = significant at 10% level. All specifications include teacher dummies.

Table 6. Probability of saying that people in the specified jobs are "the kinds of people I could imagine myself working with": Probit analysis, marginal effects

	Economist	Stock broker	Lawyer	Engineer	Journalist	HS teacher	Psycho-logist
Female	-.11* (.04)	-.13* (.04)	.04 (.04)	-.09* (.03)	.10* (.04)	.05 (.04)	.13* (.04)
Math among best HS grades	.07+ (.04)	.03 (.04)	-.06 (.04)	.03 (.02)	-.16* (.04)	.01 (.04)	-.10* (.04)
Some AP work	.12* (.03)	.06 (.04)	.09* (.04)	.04+ (.02)	.02 (.04)	-.07 (.04)	.01 (.04)
Overall intelligence	-.03 (.04)	-.02 (.04)	-.02 (.04)	.01 (.03)	.00 (.04)	-.01 (.04)	-.02 (.04)
Motivation for schoolwork	.01 (.04)	-.00 (.04)	-.06+ (.04)	.02 (.02)	-.03 (.04)	.02 (.04)	.04 (.04)
Computer skills	.04 (.04)	-.05 (.03)	.00 (.04)	.04 (.02)	.03 (.04)	.02 (.04)	.01 (.04)
Communications skills	-.02 (.04)	.01 (0.04)	.03 (.04)	.02 (.02)	.10* (.04)	.00 (.04)	.03 (.04)
English among best liked subjects	-.03 (.04)	-.04 (.04)	-.05 (.04)	-.09* (.03)	.16* (.04)	-.00 (.04)	-.01 (.04)
Competitiveness	.01 (.04)	.09* (.04)	.08* (.04)	-.01 (.02)	-.03 (.04)	-.14* (.04)	-.08* (.04)
Contribute to betterment of Society	-.01 (.04)	-.08* (.04)	.02 (.04)	.03 (.03)	.04 (.04)	.06 (.04)	-.02 (.04)
To be a respected professional	.05 (.04)	.09* (.04)	.08* (.04)	-.04 (.03)	-.04 (.05)	-.07 (.05)	.04 (.05)
To be well-off financially	.02 (.04)	.14* (.04)	.18* (.04)	.03 (.03)	-.08 (.05)	-.06 (.05)	-.01 (.05)
To help disadvantaged	.04 (.04)	.03 (.04)	-.04 (.04)	.00 (.02)	-.01 (.04)	.11* (.04)	.04 (.04)
Work extensively w/people	-.04 (.04)	.00 (.04)	.03 (.04)	-.02 (.02)	.04 (.04)	.02 (.04)	.04 (.04)
Intellectually stimulating work	.10* (.04)	.11* (.04)	.08* (.04)	.02 (.03)	.06 (.04)	-.00 (.04)	.04 (.04)
Job that permits work/family balance	-.03 (.06)	-.17* (.06)	-.11+ (.06)	-.01 (.04)	-.06 (.06)	.12* (.06)	.02 (.06)
HS: Took econ/didn't do well	-.13* (.06)	-.10 (.06)	-.02 (.07)	-.02 (.04)	-.01 (.07)	-.03 (.07)	-.03 (.07)
HS: Did well/didn't like	-.03 (.06)	.04 (.06)	.05 (.06)	-.00 (.04)	.07 (.06)	-.00 (.06)	-.01 (.06)
HS: Did well & liked	.14* (.05)	.09+ (.05)	.10+ (.05)	.04 (.04)	-.01 (.06)	.02 (.06)	-.02 (.06)
pseudo R2	.10	.11	.08	.13	.10	.05	.05
p-val. teacher dummies	.74	.31	.20	.08	.26	.15	.51
p-val. HS econ experience	.00	.00	.09	.28	.35	.86	.96

Notes: * = significant at 5% level; + = significant at 10% level. All specifications include teacher dummies.

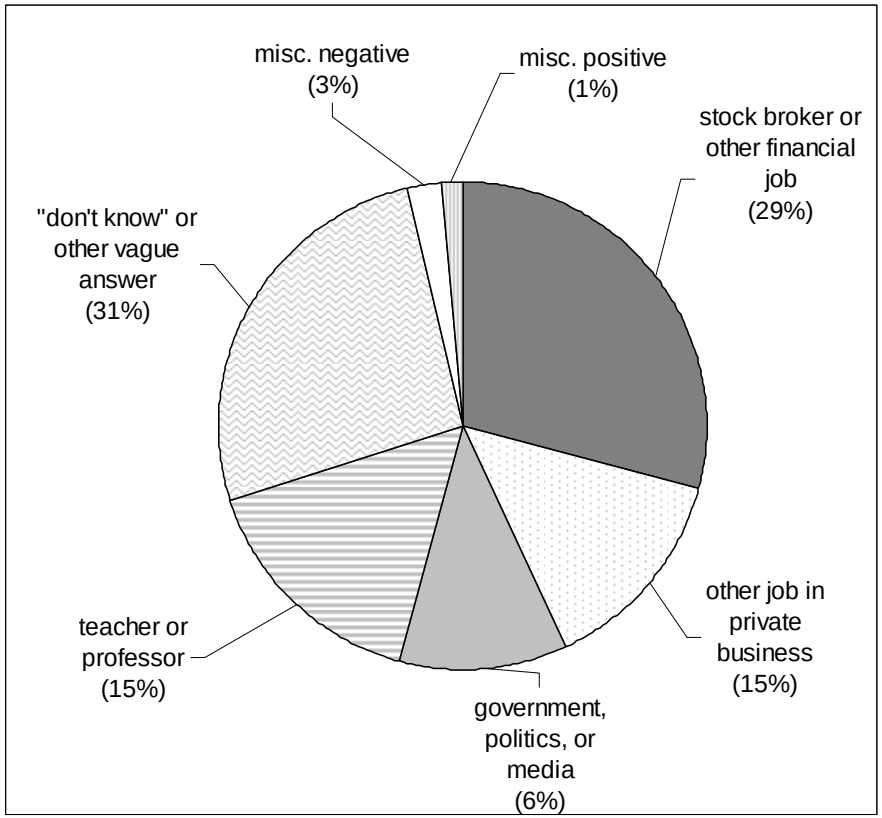
Figure 1. Women's share of total bachelors degrees awarded, by major field of study, 2002/03



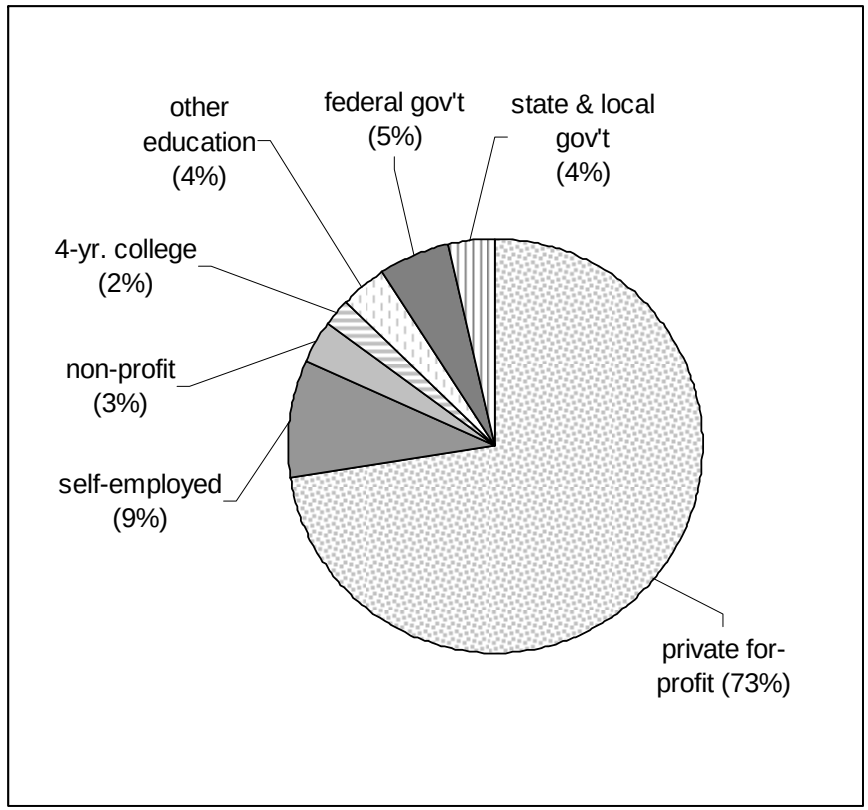
Source: National Center for Education Statistics, *2004 Digest of Education Statistics*, Table 253.

Figure 2. Students' impressions of where economics majors work after graduation – vs. actual distribution

(a) Survey results: What comes to mind when you think of the typical job someone majoring in economics would get after college?

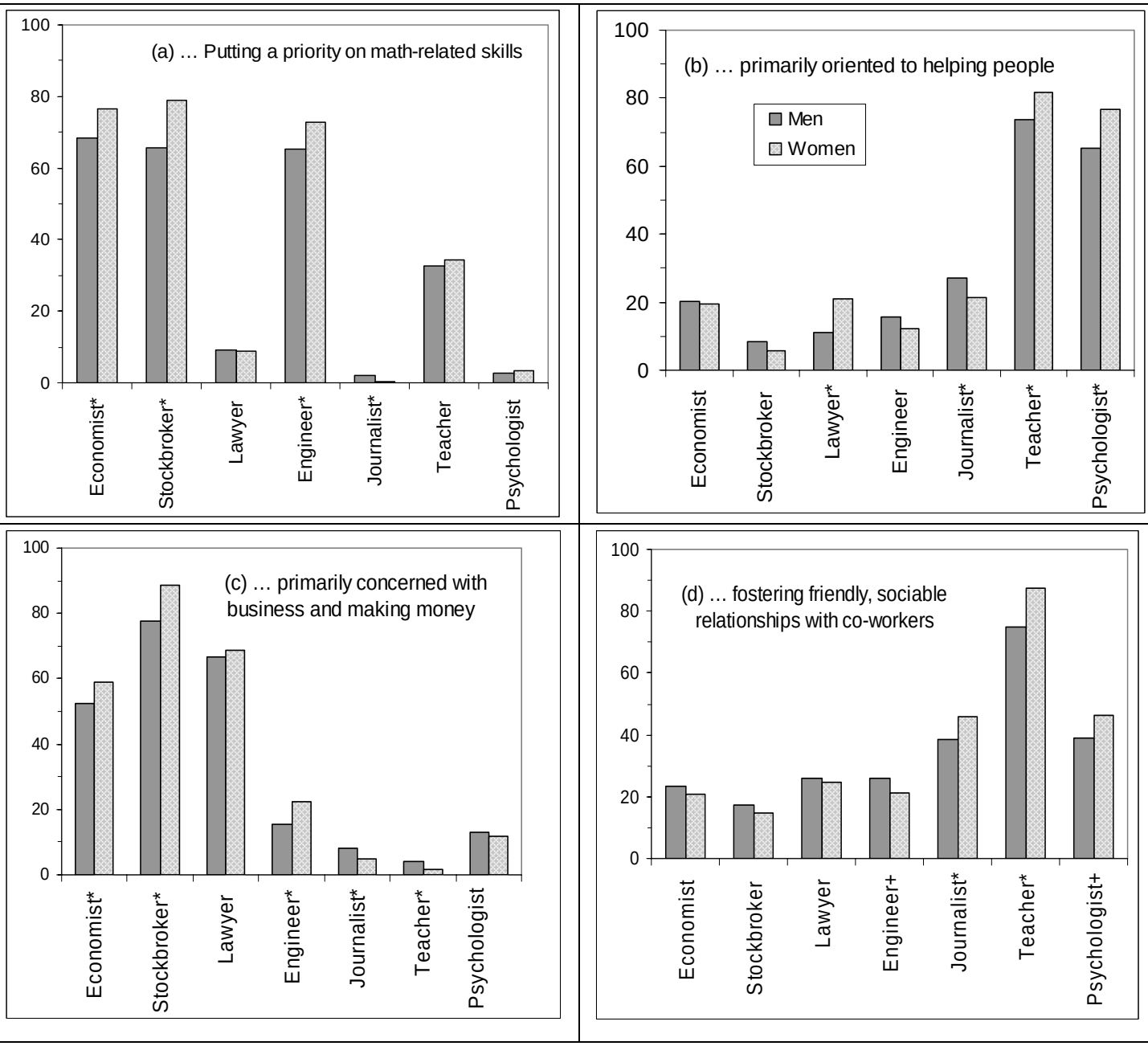


(b) Actual distribution of employment among people with a bachelors degree only in economics*



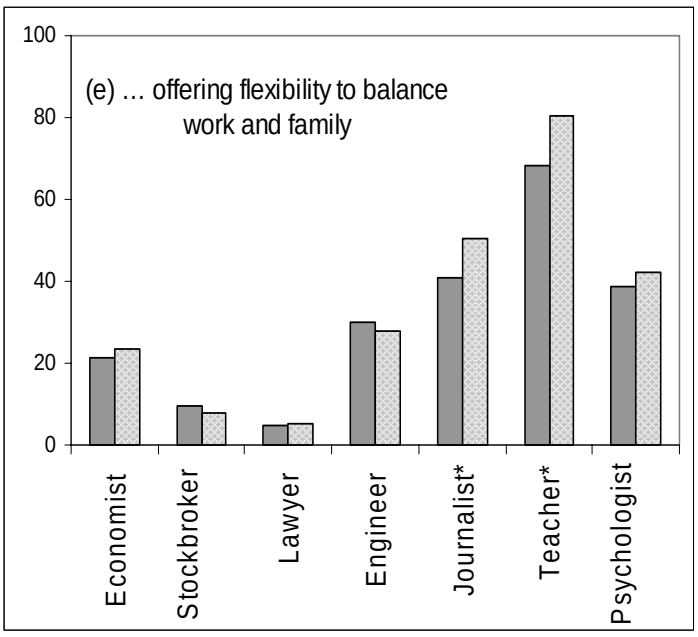
* Source: National Science Foundation, National Survey of College Graduates, 1993.

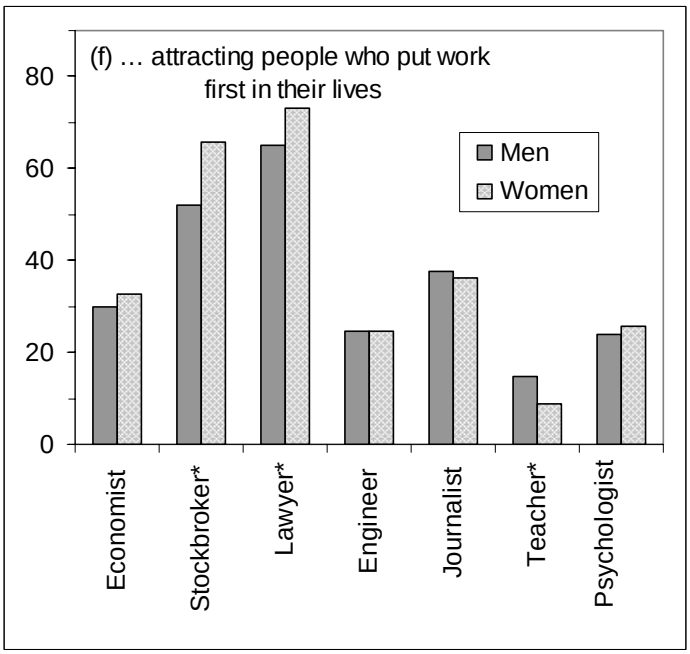
Figure 3.: Percent of students saying they think of the specified jobs as …

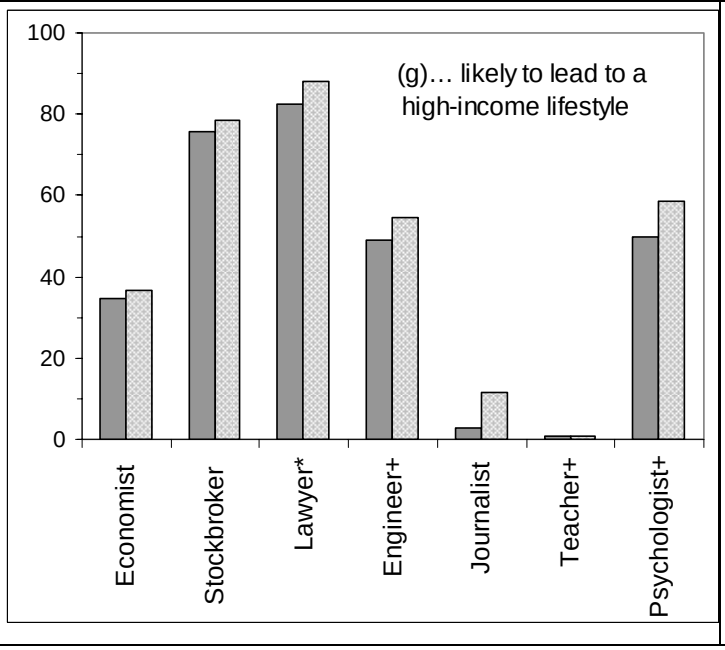


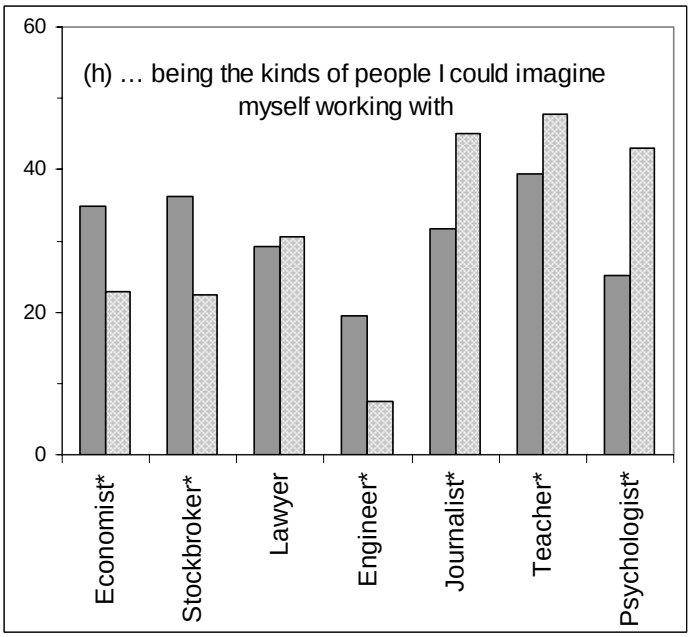
Difference between men and women significant at: * 5% level or better. + 10% or better

Figure 3. (con't.) Percent of students saying they think of the specified jobs as …









Difference between men and women significant at: * 5% level or better. + 10% or better

References:

Ballard, Charles and Marianne Johnson (2004). "Basic Math Skills and Performance in an Introductory Economics Class," *Journal of Economic Education*, Vol. 35, No. 1 (Winter), pp. 3-23).

Bauer, R.J. and J.R. Dahlquist (1999). "Recognizing and eliminating gender bias in finance education," *Finance Practice and Education*, Vol. 9, No. 1, pp. 83-91.

Benjamin, Joanne (2003). "California Association of School Economics Teachers (CASET)," *Social Studies Review*, Fall.

Bollinger, Christopher, Gail Mitchell Hoyt, and Kim Marie McGoldrick (2005). "Attitude, Performance and Gender in Economics Principles Classes", mimeo.

Bowles, Samuel (1998). "Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions," *Journal of Economic Literature*, Vol. 36, Iss. 1 (Mar.), pp. 75-111.

Breen, Richard and Cecilia García-Peñalosa (2002). "Bayesian Learning and Gender Segregation," *Journal of Labor Economics*, Vol. 20, No. 4 (Oct.), pp. 889-922.

College Board (2005). *2005 College Bound Seniors: Total Group Profile Report*. Accessed electronically at www.collegeboard.com, 11/14/2005.

Dynan, Karen E. and Rouse, Cecilia Elena (1997). "The Underrepresentation of Women in Economics: A Study of Undergraduate Economics Students," *Journal of Economic Education*, Vol. 28, No. 4 (Fall), pp. 350-368.

Ferber, Marianne (1995). "The Study of Economics: A Feminist Critique," *American Economic Review*, Vo. 85, No. 2 (May), pp. 357-61.

Jacobs, Jerry (1995). "Gender and academic specialties: Trends among recipients of college degrees in the 1980s," *Sociology of Education*, Vol. 68, No. 2 (April), pp. 81-98.

Jensen, Elizabeth and Ann Owen (2000). "Why are Women Such Reluctant Economists? Evidence from Liberal Arts Colleges," *American Economic Review,* Vol. 90, No. 2 (May), pp. 466-470.

_____ (2001). "Pedagogy, Gender, and Interest in Economics," *Journal of Economic Education*, Vol. 32, No. 4 (Fall), pp. 323-343.

Kramer, P.E., & Lehman, S. (1990). "Mismeasuring women: A critique of research on computer ability and avoidance," *Signs: Journal of Women in Culture and Society*, *16*(1), 158-72.

Lopus, Jane (1997). "Effects of the High School Economics Curriculum on Learning in the College Principles Class," *Journal of Economic Education*, Vol. 28, No. 2 (Spring), pp. 143-153.

Maxwell, Nan and Jane Lopus (1994). "The Lake Wobegon Effect in Student Self-Reported Data," *American Economic Review*, Vol. 84, No. 2 (May), pp. 201-205.

Niederle, Muriel, and Lise Vesterlund (2005). "Do Women Shy away from Competition? Do Men Compete Too Much?" NBER working paper No. 11474 (July).

Roberta Edgecombe Robb, and A. Leslie Robb (1999). "Gender and the study of economics: The role of gender of the instructor," *Journal of Economic Education*, Vol. 30, Iss. 1 (Winter), pp. 3-20.

Salemi, Michael and Carlie Eubanks (1996). "Accounting for the Rise and Fall in the Number of Economics Majors with the Discouraged-Business-Major Hypothesis," *Journal of Economic Education*, Vol. 27, No. 4 (Fall), pp. 350-61.

Siegfried, J.J. and R. Fels (1979). "Research on teaching college economics: A survey," *Journal of Economic Literature*," Vol. 17 (Sept.), pp. 923-69.

State of California, Board of Education (2006). "Grade Twelve History-Social Science Content Standards," dated March 8 [accessed electronically at http://www.cde.ca.gov/be/st/ss/hstgrade12.asp, on 5/8/2006].

Turner, Sarah and William Bowen (1999). "Choice of Major: The Changing (Unchanging) Gender Gap," *Industrial and Labor Relations Review*, Vol. 52, No. 2 (Jan.), pp. 289-313.

Walstad, William (2001). "Economics Education in U.S. High Schools," *Journal of Economic Perspectives*, Vol. 15, No. 3 (Summer), pp. 195-21.

Walstad, William and Ken Rebeck (2000). "The Status of Economics in the High School Curriculum," *Journal of Economic Education*, Vo. 31, No. 1 (Winter), pp. 95-101.

Appendix Table A. Measures of math ability			
	Male	Female	p-val. of difference
(a) Score on math SAT			
% of students providing an answer	74.2	63.0	.00
Mean among students who provided an answer	591	553	.00
(b) Self-reported math ability			
% of students providing an answer	99.0	99.3	.48
Distribution of responses among students who provided an answer (rating themselves compared to others their age):			
Top 10%	13.5	9.7	.00
Above average	42.1	28.1	
Average	32.2	39.6	
Below average	10.6	19.1	
Bottom 10%	1.6	3.6	
(c) Math performance in high school			
Distribution of responses:			
Among best grades	62.9	55.9	.10
Among worst grades	35.1	40.7	
Neither category checked	1.9	3.4	