Is there place for women? Gender bias at top economics schools

Galina Hale*

Federal Reserve Bank of San Francisco

Tali Regev†

Tel Aviv University

PRELIMINARY, DO NOT CITE

June 6, 2010

Abstract

Over the last twenty years women became much more prominent in the economics profession. Analyzing faculty and graduate students data for the top-10 economics departments between 1983 and 2007, we find persistent differences in gender composition across institutions. We test whether such differences are driven by female faculty influence or by departments' gender preferences. Using a matched sample of PhD students and faculty, we find positive correlation between the share of female faculty and the share of women in the entering PhD class. We show that this correlation is explained by departments' gender preferences that vary both across departments and over time, and not by influence of female faculty on the gender composition of the entering PhD class. We also find that these top-10 departments are targeting a certain trend in the number or share of women on their faculty, lowering on average the probability of hiring a woman by about 10 percentage points for each additional woman already on the faculty. This evidence suggests that gender differences across institutions are explained by gender preferences and policies rather than hysteresis related to women's influence.

JEL classification: J16, J23, J71, I23, M51

Key words: gender, segregation, economists, gender bias, affirmative action, minority

*Galina.b.hale@sf.frb.org.

†TaliR@post.tau.ac.il

This paper would have been impossible without instrumental help of Ishai Avraham and Emily Breza. Helpful comments were received from Òscar Jordà, Giovanni Peri, Yona Rubinstein, as well as participants at seminars in Tel Aviv UniversityȦll errors are ours. All views presented in this paper are those of the authors and do not represent the views of the Federal Reserve Bank of San Francisco or the Federal Reserve Board of Governors.

1 Introduction

The gender wage gap is traditionally decomposed into a part that is due to occupational segregation and a residual unexplained gender gap attributed to discrimination, attitudes or bias. But what causes the market to be segregated in the first place? Gender segregation and the associated wage gap occurs not only across occupations but also across firms, suggesting segregation itself may be the result of employer discrimination (Becker (1971)). In addition, dynamic forces may perpetuate segregation, whereby institutions with a high share of women attract or seek more women. Disentangling employer gender bias from the causal effects of gender composition has important implication for the debate on affirmative action, and is the object of this investigation.

To focus our attention on the market we are most familiar with, the market for PhD economists, we analyze trends in the gender composition of faculty and PhD students in the top economics departments. Our goal is to understand whether differences in gender composition across top economics departments are due to women's influence or to gender policies. We test whether gender composition of faculty determines, causally, the share of female PhD students in the entering class and the hiring of new female faculty, or rather, whether it is driven by gender bias that also affects gender composition of entering PhD class and new faculty hires.

The gender composition of faculty may affect the gender composition of admissions and hiring because of demand or supply considerations. On the demand side, the political power of women faculty may be important if women advocate for women, leading to positive causal relationship between the gender composition of the faculty and the share of women admitted to PhD program or hired as new faculty. Alternatively, this positive causal relationship could arise if a larger share of women in the department reduces the the gender bias towards women.[1] On the supply side, assuming they can choose, entering women may be attracted to institutions where other women

[1]Goldin (1990) argues that a highly segregated workforce where men earn more than women will lead men to increase their prejudice against women, reinforcing the status quo. Indeed, Beaman et al. (2008) show that exposure to a female leader weakens stereotypes about gender roles in the public and domestic spheres.

have been successful, either because they expect better mentoring, or less discrimination.[2] The alternative non-exclusive hypothesis is that the observed correlation between the gender composition of faculty and that of students and new hires is not causal, but rather generated by an omitted variable, which is the gender norm at the department (which we interchangeably refer to as gender attitudes, gender bias, or unobserved gender policies).

Using matched data on students and faculty of ten of the top economics departments during 25 years, we look for causal and gender norms effects. Using the panel nature of our data, we can control both for institution and time fixed effects. We use a proxy for departmental minority bias, as well as a proxy for the university's gender bias to identify time-varying institution-specific tendency to accept women into the department. Finally we employ instrumental variables to account for the endogenous gender composition of the existing faculty.

Indeed we find that the positive correlation between gender composition of the faculty and of the PhD students is due to differences in gender policies that vary both across departments and over time. We find no evidence of the causal relationship between the faculty gender composition and the share of women in the entering PhD class, indicating that women on the faculty do not influence the gender composition of admissions and that women entering PhD programs do not self-select to schools with more female faculty. Moreover, we find that while a department's minority attitudes have strong effect on the gender composition of the entering class, university-wide gender attitudes do not.

Analyzing the gender composition of rookie hires we find that it is not affected by the gender bias, unlike the gender composition of the entering PhD class. Instead we find evidence that top ten economics departments are targeting a certain trend of female faculty and when the number of women falls below, they are more likely to hire a female faculty. On average, for each additional woman already on the faculty, the probability of hiring a woman falls by about 10 percent.

[2]Some recent effort has been devoted to finding mentoring effects of women faculty on students choices and success, see Hoffmann and Oreopoulos (2009), Bettinger and Long (2004), Neumark and Gardecki (2003), Hilmer and Hilmer (2007) and Blau et al. (2010).

There has been a large body of research looking into gender segregation across institutions in sociology, psychology and, because of title VII and its legal implications, even law.[3] Economic research has acknowledged the role of gender in shaping identity and hence segregation and group formation (Akerlof and Kranton (2005) and Boschini and Sjgren (2007)). Bayard et al. (2003) use matched employer-employee data to estimate the contributions of sex segregation and wage differences by sex within occupation, industry, establishment, and occupation-establishment. More work focused on describing gender differences in academic career paths of economists (Kahn (1993), Kahn (1995), McDowell et al. (1999), Ginther and Kahn (2004), and Lynch (2008)).

Empirical research, however, has not yet investigated the mechanism shaping this segregation and has yet to study the determinants of the allocation of women across institutions. We fill this gap by providing direct evidence on institution specific, time-varying gender bias in hiring and admissions. Our final contribution is in providing market-based evidence on employer discriminatory tastes, evidence which was most convincingly provided through audit studies and sex-blind hiring (Neumark (1996), Goldin and Rouse (2000)) which are, however, subject to the Heckman (1998) critique.[4]

In section 2 we describe our data sources and the trends, in section 3 we present our results, and in section 4 we offer some concluding thoughts.

2 Data

Our data set contains information on all ladder faculty and graduating students from ten of the top economics departments over the years 1983 to 2007. We know the gender composition of both faculty and students, as well as full academic history of all faculty, including employment, tenure

[3] In one of the first studies to find direct evidence of employer discrimination Carrington and Troske (1995) use a sample of small business owners find that small firms are highly segregated by sex and that the owner's sex strongly affects the gender composition of a firm's workforce. See also Petersen and Morgan (1995) for a decomposition of gender wage gaps due to occupation and firm segregation and Barbara F. Reskin and Kmec (1999) for the determinants and consequences of race and sex composition of organizations. Kathi Miner-Rubino and Stewart (2009) describes how gender diversity affects women's well being.

[4] See Altonji and Blank (1999) for a review on the direct evidence on labor market discrimination.

and publications throughout their careers.

2.1 Data Sources

Our faculty data was collected based on faculty lists from 1983 to 2007 of 10 top economics departments.[5] For each faculty member that appears in the data set, gender, rank and tenure status were recorded. Tracking curriculum vitaes for each individual that was newly hired during these 25 years we obtained further information regarding his or her PhD institution and year of graduation, together with yearly data regarding his/her career path: rank and tenure status at each institution since graduation.

We further augmented this data set with publication history. To do this, we obtained the number of publications up to a given year for each faculty member in our data set using Harzing's Publish or Perish engine, which itself is based on Google Scholar search.[6]

The source of the graduating students data is the National Science Foundation Survey of Earned Doctorates, which is conducted annually by the University of Chicago National Opinion Research Center. The survey contains data on all earned doctorates granted by regionally accredited United States Universities, in all fields, and contains information on race and gender of graduates.

For each university in our sample we took the gender composition of the graduating PhD class in economics. We used this data source further to construct measures of minority attitudes at the institution and department levels. We computed the share of non-whites in the economics graduating class to proxy for minority bias at the department level, and the share graduating women in all the departments except economics to stand for institutional gender bias. We will refer to these variables as Minority-Economics and Gender-University, respectively.

For the analysis of the gender composition of the entering PhD class, we matched the faculty

[5]Choice of universities was dictated by data availability. The following institutions provided faculty lists for all years: Berkeley, Chicago, Harvard, MIT, NYU, Northwestern, Penn, Princeton, UCLA and Yale

[6]We are limited to publication data, and not quality-adjusted measure such as citations, since the date of citation is generally unknown.

and student data by institution and year of admission decision. We assumed decisions were made six years prior to graduation.[7] As student data is available through 2006, this left us with 190 institution-year observations for the analysis of admissions.

For the hiring decision analysis, we use the faculty data for the full range of years (1983-2007). Our initial data set contains 12,202 person-year observations of which 1,236 are females. These represent 741 economists, (98 female). Of these, 340 total and 64 females have taken their first job since 1983. Aggregating individual data to the institution level, we have 181 cases in which an institution hired newly minted PhDs.

2.2 Sample Characteristics

Table 1 presents general trends in our data. The first three columns report the total number of women, men, and the share of women who received PhD degrees from our ten economics departments in each of the years in our sample. We can see that while the share of women fluctuated quite a bit, there is clearly an upward trend. This trend, however, is much less pronounced than the trend in the share of women on the faculty of our top departments. The share of female faculty tripled during our sample period, increasing rather monotonically from less than 4 percent in 1983 to about 12 percent in recent years. The last two columns report the total number of women and men hired by our top ten departments in each year of our sample. Here too, we see an increase in the number and share of women hired, especially in recent years.

To see whether these trends are uniform across the institutions, Tables 2 and 3 report the shares of female faculty and the share of women in graduating PhD class by institution and year, respectively. These are our explanatory and dependent variables. In Table 2 we see that the share of female faculty increased steadily in all institutions with the exception of the University of Pennsylvania, where it actually went down from 9 percent in 1983 to about 4 percent in recent years. We also note considerable variation in the share of women on the faculty across institutions

[7]Since we do not have attrition data by institution-year, our data is more accurately described as the ex-post successful PhD entering class.

and in trends in that share across institutions. For instance, the share of women in UC Berkeley was already high in 1983, compared to the rest of the sample, and only increased slightly over our sample period, while the share of women on the economics faculty at MIT and UCLA increased steadily. Importantly, the share of female faculty remains rather low across all department, only reaching over 20 percent in two observations — UCLA in 2004 and 2005.

Table 3 presents the shares of women in graduating PhD class for each institution and each year in our sample. While these shares are much more volatile than faculty shares, we can still detect positive trends in most departments.

3 Results

We now try to disentangle two possibilities — that differences across departments are due to differences in their gender preferences or that they are due to the influence women already on the faculty may exude on PhD admission and hiring decisions. The latter possibility is also observationally equivalent to women choosing to enter, as graduate students or faculty, the departments that have more women. In both cases, whether demand or supply driven, this could be viewed as causal relationship between the share of women already on the faculty and the share of women entering economics departments as either graduate students or new ladder faculty.

We begin our analysis with PhD admissions and then turn to the analysis of fresh PhD hires. We focus on fresh PhD hires in order to avoid difficulties due to lateral moves of the faculty from one of our institutions to another. More importantly, the group of freshly minted PhDs is roughly uniform in terms of the information available to hiring institutions and their access to the job market.

3.1 Gender Composition of Entering PhD class

As mentioned above, we can think of three mechanisms that could generate positive correlation between the share of women in the entering PhD class and the share of female faculty. Two of these mechanisms are causal: first, female faculty may advocate for the admission of the larger share of women into the PhD program; second, women, who are likely to be admitted to more than one PhD program from the top ten list, may choose to go to the department with a larger share of women on the faculty. These two causal mechanisms are observationally equivalent because we do not observe all the admission offers, but only admission outcomes. Thus, we will not try to disentangle them, but will merely look for evidence of the causal relationship between the female faculty share and share of women in the entering PhD class. The third mechanism is the gender composition preference of the department, gender bias for short, that would create positive correlation between the share of female faculty and the share of women in the entering PhD class, without any causal relationship.

The results of our analysis of the gender composition of the entering PhD class are reported in Tables 4 and 5, using OLS and instrumental variables approaches, respectively.

The first column of Table 4 shows that the share of women in the entering PhD class is positively associated with the share of women in the ladder faculty. We have seen in the previous section that both of these shares are trending over time and therefore we control for a linear trend,[8] coefficient on which is indeed positive, although not statistically significant. Despite controlling for a common trend, we find positive correlation between the share of women on the faculty and the share of women in the entering PhD class.

One possibility is that this positive correlation is driven by differences between the departments that do not change over time — either due to initial conditions that play a permanent role or due to permanent differences in gender policies across the departments. To test this, we include in the

[8] Including quadratic trend instead does not change any of the results and coefficients on both linear and quadratic components are not statistically significant.

second column of Table 4 institution fixed effects, with UC Berkeley being a benchmark. We find that only one of these fixed effects (for NYU) is statistically significant and that the correlation between the share of women entering the PhD program and the share of female faculty is, if anything, higher than when we did not include institution fixed effects. We continue to control for the common trend, which remains positive but not statistically significant.

Institution fixed effects, however, are only able to capture time-invariant gender bias. It is very likely that gender policies changed over the 18 years in our sample and that these changes were uneven across the departments. In fact, we have seen in the previous section that both the share of women on the faculty and the share of women in the PhD class had rather different dynamics in different departments. Thus, we attempt to estimate the effect of time-variant gender bias more directly.

While we do not have a direct measure of the gender bias, we proxy for it using a measure that we believe is a good indicator of a department's attitude towards minorities in general, namely the share of non-white students in the department's entering PhD class[9]. The results are reported in column (3). Indeed, a higher share of non-white students is positively correlated with the share of women in the entering PhD class. The coefficient on the share of female faculty, however, remains positive and statistically significant, and is only slightly lower than in the previous column where we did not control for our proxy of the minority bias. Institution fixed effects are now changed — negative coefficients for Chicago and UCLA become statistically significant, while positive coefficient for NYU loses significance.

Another possibility is that graduate admission policies are set at the university level, as opposed to the department. To control for this, in column (4) we add to the regression the share of female students admitted to the PhD program university-wide (excluding economics department). We find that this variable also enters positively, but is not statistically significant.[10] Moreover, including

[9] Alternatively, we use the share of non-white *male* students.

[10] Time to graduation varies across disciplines and over time, and hence lagging this variable by 6 years for the admission decision introduces noise which may be hindering us from finding significant results.

this additional control variable does not change our results.

From the above results we may want to conclude that we find evidence of both the gender bias at the department level (as measured by our proxy) and of a causal relationship between the share of women on the faculty and the gender composition of the entering PhD cohort, because the coefficient on the share of female faculty is still positive and significant even though we are controlling for the proxy of the gender bias and the institution fixed effects. One concern is, however, that our proxy does not fully capture the gender bias and the remaining correlation between the share of female faculty and the share of women in the entering PhD class is still due to the gender bias common factor rather than the causal relationship between the two variables.

Thus, we employ instrumental variables approach to test for causal relationship. The results of both first and second stage of the instrumental variables regressions are reported in Table 5, with first stage reported in the top panel and the second stage in the bottom panel of the table.

Our instrument for the share of women on the faculty is the average number of publications, up to a given year, by male faculty in the department. This variable is strongly negatively associated with the share of women in the department — the higher is the average publication score of the male faculty in the department, the smaller the share of women tends to be. There is also no reason to believe that the average number of publications by male faculty would in any way affect directly the share of women in the entering class.[11] One may want to be cautious in interpreting this relationship, because we are controlling for institution fixed effects, which are now strongly statistically significant.

This means that identification comes from over-time variation in publications by male faculty and in the share of women on the faculty. Thus, our first-stage results show that when the average number of publications by male faculty increases, the share of women on the faculty tends to decline, relative to trend, which is now strongly statistically significant. The average publications by male faculty captures the quality or status of the department. This negative correlation between

[11] As an informal test of the exclusion restriction, we included this variable in the regressions reported in Table 4. In none of the specifications it entered significantly.

status and the share of women is indicative of the role status plays in gender segregation across institutions. One explanation for this relationship could be that, on average, women do not stand up to the publication criteria of high status institutions.[12]

We continue to control for gender bias via our proxy of the minority attitude in the economics department and gender attitude university-wide, in columns (2) and (3), respectively. We find that neither of these variables is significant in the first stage or affects the coefficient on the instrumental variable. In the second stage, however, the effect of the minority bias at the department level remains statistically significant, while the university-wide gender bias does not have a significant effect.

Most importantly, we can see from the second stage that not only the coefficient on the instrumented share of female faculty is substantially lower than it was in the OLS specification reported in Table 4, but it is no longer statistically significant, indicating that there is in fact no significant causal relationship between the share of female faculty and the gender composition of entering PhD class. This result does not change in columns (2) and (3) where we control for our minority policies proxy: in fact, the coefficient on the female faculty share becomes even smaller.

Our results are robust to a number of alterations, some of which we will mention here. First, we allowed for discontinuity of the effect of the share of female faculty when the share is zero. Our results indicate that there is no significant discontinuity in the effect. Next, we used an alternative instrumental variable, either by itself or in combination with the average number of publications by male faculty — the average number of tenured exits from the department up to the year in question. We find that in the first stage this variable has a negative and significant effect on the share of female faculty. One possible interpretation of this results is that departments with more "friendly" atmosphere both discourage exits and attracts women faculty. This variable also does not have a statistically significant effect on the share of women in the entering PhD class. We find

[12] In our sample, there is a gender publication gap, half of which is explained by women being younger on average. Still, women begin with a level difference of 15 less publications, and every year publish 3.25 papers compared to 4 papers men publish. To be fair, one should further inquire why women publish less than men.

that our second stage results are the same whether we use this alternative instrument either by itself or along with our main one.[13] Finally, including time fixed effects instead of trend does not change the results of either OLS or IV regressions.

We therefore conclude from this section's analysis that the positive correlation that we observe between gender composition of the faculty and of the PhD students is due to differences in gender attitudes that vary both across departments and over time. We find no evidence of the causal relationship between the faculty gender composition and the share of women in the entering PhD class, indicating that women on the faculty do not influence the gender composition of admissions and that women entering PhD programs do not self-select to schools with more female faculty. Moreover, we find that a department's minority attitude has a strong effect on the gender composition of the entering class, but we do not find a similar effect of university-wide gender attitudes.

3.2 Gender Composition of Rookie Hires

Since the share of women on the faculty is positively associated with the gender composition of the incoming PhD class, we may expect that it will also be associated with the gender composition of rookie hires. The same three mechanisms that we discussed above could be at play: advocacy by existing faculty for more new women, choice by job candidates with multiple offers of the department with higher share of women on the faculty, and the gender bias. In addition, however, there may be a mechanism that would work in the opposite direction — departments with low or declining share or number of women on the faculty may be more likely to hire a woman to improve the gender balance.

Because most schools hire only one or two people in any given year, we cannot use the share of women hired as a dependent variable. Instead, conditioning on whether a given institution hired a rookie in a given year, we test whether the probability that this rookie was female is affected

[13] We tried to instrument for the share of female faculty with a few different variables, such as the number of tenured male exits, or the the accumulated supply of female PhD's from the other top-9 institutions divided by the size of the department. Again, the second stage did not produce significant estimates of the share of female faculty.

by the share of women on the faculty in the year the offer was made. The results of the Logit regressions are reported in Table 6. We repeated the analysis with linear probability and Probit model specifications, and found that the results are the same.

The first three columns of Table 6 report the results of the regression of the indicator that the new hire is female on the share of women on the faculty in the year the offer is made and a set of control variables. The next three columns disentangle the share of women on the faculty into the number of women and the number of men on the faculty — we want to see if it is the share or the number of women that matters. We limit the sample to institutions and years in which new hires took place, so that our results report the effects of our control variables on the probability of hiring a woman conditional on hiring.

We are controlling in all regressions for a common trend, which is positive and statistically significant, institution fixed effects, which show that, compared to UC Berkeley, for a given share of female faculty and holding other controls constant, Chicago, NYU, Northwestern, University of Pennsylvania, and Yale economics departments were less likely to hire a women throughout our sample, while Harvard economics department was more likely to hire women. The latter effect is explained by the minority-bias — even though the coefficient on minority bias proxy does not enter significantly in our regressions, Harvard fixed effect is no longer significant once we control for it, and in fact becomes basically zero once we also control for university-wide gender bias (which also does not enter significantly).

In addition, we control for the average share of women in the set of new hires in the given year and the number of new hires in each institution at a given year. Both of these controls come in positive and statistically significant. The first of these measures captures fluctuations in the job market that are common to all departments and are not captured by the linear trend. It proxies for the supply of women relative to men among graduates eligible for the job in the top ten departments. The second one is indicative of the number of jobs available at the institutions, and proxies for the demand of new rookie hires at the institution.

Finally, we control for the average number of publications by male faculty, which we find to enter with a negative and significant sign. This finding corroborates our story in the previous section that when average quality of publications improves, departments are likely to hire fewer women. It also indicates that we cannot use this variable as an instrument if we wanted to use the same methodology here as we did in the previous section, because it has a direct effect on the outcome of the second stage. In fact, we believe that any variable that affects the gender composition of the existing faculty will also affect the probability of a new hire, thus we will not be using the instrumental variables approach here.

Turning to the coefficients of interest, we find that both the share and the number of female faculty have a negative effect on the probability of a new hire. We have to be careful interpreting this effect because it is conditional both on common positive trend and on institution fixed effects. A negative coefficient means that when the share or the number of female faculty is below the trend, departments are more likely to hire women than if the share is higher. We think of this result as indicating that the departments are attempting to keep up with the trend in the share of women in top schools. Computing marginal effects for column (4), we can see that the probability of hiring a woman falls by 9.7 percentage points for each additional woman already on the faculty. The number of men on the faculty, not surprisingly, does not affect the probability of hiring a woman.

Even though we find a negative relationship between the share or the number of women already on the faculty, indicating some target trend of the number of women on the faculty that the departments have in mind, we want to see if this effect is mitigated by potential gender bias that would work in the opposite direction. Thus, in columns (2) and (5) of Table 6 we include our proxy for the minority policies of the department.[14] We can see that the magnitude of the negative coefficient on the share and the number of women already on the faculty increases, even though the proxy does not enter significantly. The marginal effect of having an additional woman on the

[14]We continue using the same proxies as we used in previous section, both for the department minority attitudes and for university gender bias.

faculty would now lower the probability of a new hire being female by 13.3 percent. This change, however, is due to the change in sample that shrinks because of the shorter sample period for our proxy — when we restrict the regression reported in column (4) to the same 133 observations that we have in column (5) regression, we find that the magnitude of the effect is the same as in column (5). We therefore conclude that a minority bias is not pushing departments with more female faculty to hire more women, and our "targeting" results are not mitigated by this force.

To see whether university-level gender bias has an effect, we include the Gender-University proxy on the right-hand side in the regressions reported in columns (3) and (6). As before, this proxy does not have a significant effect and only marginally affects the magnitude of estimated coefficients on the share and the number of women already on the faculty.

These results are robust to including additional control variables such as the number of male and female exits in the year before the offer was made, the size of the department, and the average age of the department (years since graduation from the PhD program). These variables do not enter significantly and do not affect our results. We also estimated the specification for the full sample, including institution-years in which there were no hires and an indicator of whether it was the case. Not surprisingly, since these observations do not participate in the identification of the coefficients, our results are unchanged.

As mentioned before, estimating probit or linear probability models do not change much— with Probit, the marginal effect of the regression in column (4) is 9.9 rather than 9.7 percentage points, while with linear probability model it is slightly lower, 6.8 percentage points.

Thus, in this section we find that the gender composition of new hires into top ten economics departments is not affected by the gender bias, unlike the gender composition of the entering PhD cohort. Instead we find evidence that top ten economics departments are targeting a certain trend of the share or number of women on their faculty and when the number of women falls below, they are more likely to hire a female. On average, for each additional woman already on the faculty, the probability of hiring a woman falls by about 10 percent.

4 Conclusion

From our analysis of the effects of gender composition of the faculty in top ten economics departments on the gender composition of their admissions and new hires over the last 25 years, the following pattern emerges. First, we find that gender preferences or policies, which we refer to as gender bias, matter and that department-specific minority bias more than university-wide gender bias is important. Moreover, we find no evidence of female faculty affecting gender composition of the entering PhD class or new hires in a causal way. Rather, we find that top ten economics departments tend to target certain number of women on their faculty, increasing the probability of hiring a woman when the the number of women is below desired target or trend.

Overall, our results provide market based evidence that the allocation of women across economics departments is determined by employers' gender norms and gender targets.

References

Akerlof, George A. and Rachel E. Kranton, "Identity and the Economics of Organizations," *Journal of Economic Perspectives*, Winter 2005, *19* (1), 9–32.

Altonji, Joseph G. and Rebecca M. Blank, "Chapter 48 Race and gender in the labor market," in Orley C. Ashenfelter and David Card, eds., , Vol. 3, Part 3 of *Handbook of Labor Economics*, Elsevier, 1999, pp. 3143 – 3259.

Bayard, Kimberly, Judith Hellerstein, David Neumark, and Kenneth Troske, "New Evidence on Sex Segregation and Sex Differences in Wages from Matched Employee-Employer Data," *Journal of Labor Economics*, October 2003, *21* (4), 887–922.

Beaman, Lori, Raghebendra Chattopadhyay, Esther Duflo, Rohini Pande, and Petia Topalova, "Powerful Women: Does Exposure Reduce Bias?," Working Paper Series rwp08-037, Harvard University, John F. Kennedy School of Government July 2008.

Becker, Gary S., *The economics of discrimination [by] Gary S. Becker*, 2d ed. ed., University of Chicago Press Chicago,, 1971.

Bettinger, Eric and Bridget Terry Long, "Do College Instructors Matter? The Effects of Adjuncts and Graduate Assistants on Students' Interests and Success," NBER Working Papers 10370, National Bureau of Economic Research, Inc March 2004.

Blau, Francine D., Janet M. Currie, Rachel T.A. Croson, and Donna K. Ginther, "Can Mentoring Help Female Assistant Professors? Interim Results from a Randomized Trial," NBER Working Papers 15707, National Bureau of Economic Research, Inc January 2010.

Boschini, Anne and Anna Sjgren, "Is Team Formation Gender Neutral? Evidence from Coauthorship Patterns," *Journal of Labor Economics*, 2007, *25*, 325–365.

Carrington, William J. and Kenneth R. Troske, "Gender Segregation in Small Firms," *The Journal of Human Resources*, 1995, *30* (3), 503–533.

Ginther, Donna K. and Shulamit Kahn, "Women in Economics: Moving Up or Falling Off the Academic Career Ladder?," *Journal of Economic Perspectives*, Summer 2004, *18* (3), 193–214.

Goldin, Claudia, *Understanding the Gender Gap: An Economic History of American Women* number gold90-1. In 'NBER Books.', National Bureau of Economic Research, Inc, 1990.

___ **and Cecilia Rouse**, "Orchestrating Impartiality: The Impact of "Blind" Auditions on Female Musicians," *American Economic Review*, September 2000, *90* (4), 715–741.

Heckman, James J, "Detecting Discrimination," *Journal of Economic Perspectives*, Spring 1998, *12* (2), 101–16.

Hilmer, Christiana E. and Michael J. Hilmer, "On the Relationship between the Student-Advisor Match and Early Career Research Productivity for Agricultural and Resource Economics Ph.D.s," *American Journal of Agricultural Economics*, 2007, *89* (1), 162–175.

Hoffmann, Florian and Philip Oreopoulos, "A Professor Like Me: The Influence of Instructor Gender on College Achievement," *Journal of Human Resources*, 2009, *44* (2).

Kahn, Shulamit, "Gender Differences in Academic Career Paths of Economists," *American Economic Review*, May 1993, *83* (2), 52–56.

Kahn, Shulamit B, "Women in the Economics Profession," *Journal of Economic Perspectives*, Fall 1995, *9* (4), 193–205.

Lynch, Lisa M., "Report of the Committee on the Status of Women in the Economics Profession 2007," *American Economic Review*, 2008, *98* (2), 611–18.

McDowell, John M., Larry D. Singell Jr., and James P. Ziliak, "Cracks in the Glass Ceiling: Gender and Promotion in the Economics Profession," *American Economic Review*, May 1999, *89* (2), 392–396.

Miner-Rubino, Isis H. Settles Kathi and Abigail J. Stewart, "More than numbers: Individual and contextual factors in how gender diversity affects women's well-being," *Psychology of Women Quarterly*, November 2009, *33* (4), 463–474.

Neumark, David, "Sex Discrimination in Restaurant Hiring: An Audit Study," *The Quarterly Journal of Economics*, August 1996, *111* (3), 915–41.

___ **and Rosella Gardecki**, "Women Helping Women? Role Model and Mentoring Effects on Female Ph.D. Students in Economics," *Journal of Human Resources*, Winter 2003, *33* (1), 220–246.

Petersen, Trond and Laurie A. Morgan, "Separate and Unequal: Occupation-Establishment Sex Segregation and the Gender Wage Gap," *American Journal of Sociology*, 1995, *101* (2), 329.

Reskin, Debra B. McBrier Barbara F. and Julie A. Kmec, "The Determinants and Consequences of Workplace Sex and Race Composition," *Annual Review of Sociology*, 1999, *25*, 335–361.

Table 1: Gender composition of graduating PhD class, faculty, and new hires.

	PhD class			Faculty			New hires	
Year	Female	Male	Share F	Female	Male	Share F	Female	Male
1983				9	225	3.61	1	5
1984				12	231	4.27	2	5
1985				14	249	4.78	2	10
1986				16	268	5.06	0	8
1987				20	277	6.23	2	5
1988				22	289	6.56	2	8
1989	38	157	19.3	24	312	6.55	1	10
1990	29	166	15.6	27	340	7.02	0	4
1991	42	174	20.7	27	358	6.55	1	8
1992	34	195	13.3	27	354	6.86	2	8
1993	59	152	29.7	30	349	7.59	4	8
1994	58	172	28.2	34	342	8.79	3	6
1995	52	174	23.5	35	333	9.18	1	6
1996	54	192	21.4	38	329	9.93	2	9
1997	51	184	21.4	38	342	9.56	0	6
1998	68	175	27.4	39	343	9.84	1	8
1999	56	171	24.0	36	343	9.27	1	6
2000	51	191	21.4	37	353	9.29	2	11
2001	55	146	26.0	42	364	10.1	3	9
2002	66	171	27.9	45	366	10.6	1	4
2003	51	188	20.5	47	365	11.2	3	8
2004	56	157	27.2	50	365	11.6	3	8
2005	66	187	24.5	54	374	12.1	2	6
2006	72	166	30.3	53	373	11.9	4	2
2007				53	376	11.9	4	3

Table 2: Share of female faculty by institution and year

Year	Berkeley	Chicago	Harvard	MIT	NYU	N-western	Penn	Princeton	UCLA	Yale
1983	11.1	0.00	3.33	3.85	0.00	5.00	9.09	3.70	0.00	0.00
1984	10.7	0.00	11.1	3.85	0.00	4.76	8.70	3.57	0.00	0.00
1985	10.7	0.00	10.0	3.57	0.00	4.76	8.00	6.25	4.55	0.00
1986	12.5	0.00	8.11	3.45	0.00	4.17	6.45	5.71	4.55	5.71
1987	15.6	0.00	9.76	3.23	5.00	3.70	6.06	8.82	4.35	5.71
1988	17.1	0.00	11.4	3.13	4.76	3.23	6.06	6.06	8.00	5.88
1989	15.8	0.00	12.8	3.03	4.17	7.69	5.71	2.78	8.00	5.56
1990	17.1	4.00	14.3	5.88	6.67	5.13	2.86	2.27	7.41	4.65
1991	16.7	3.70	11.3	6.25	3.45	4.76	5.00	6.25	3.45	4.65
1992	19.0	4.00	5.77	5.88	3.13	5.41	2.56	8.16	9.68	5.00
1993	18.6	7.14	7.55	2.78	3.45	5.71	0.00	13.3	12.5	4.88
1994	18.6	7.41	5.88	5.71	3.33	8.57	5.26	14.0	13.9	5.26
1995	17.8	8.33	4.08	8.82	3.45	8.33	6.45	14.3	15.0	5.26
1996	18.6	6.90	6.52	11.1	3.33	6.06	9.68	14.6	17.1	5.41
1997	17.4	6.45	6.38	11.8	3.45	6.06	8.33	12.2	15.9	7.69
1998	17.8	10.0	6.98	11.4	3.13	6.06	5.56	13.0	17.1	7.32
1999	18.6	12.9	6.67	13.9	3.23	2.94	3.23	8.16	15.8	7.32
2000	17.8	13.8	6.12	11.4	3.45	5.71	2.94	8.16	14.0	9.52
2001	17.0	10.3	8.00	8.33	5.88	8.11	5.88	9.62	18.2	9.30
2002	17.6	6.90	8.33	8.33	7.69	12.8	5.88	9.80	19.0	9.52
2003	15.4	10.0	8.51	8.33	7.50	16.2	6.45	9.62	16.3	13.6
2004	14.5	10.3	10.9	8.33	7.14	14.3	3.57	10.0	21.4	15.6
2005	14.3	6.06	16.0	10.5	9.09	14.3	3.57	11.8	20.0	15.2
2006	11.8	6.06	17.0	12.8	8.89	12.5	3.85	12.0	18.2	15.6
2007	13.2	8.57	13.0	15.8	10.9	10.3	4.76	12.7	16.3	13.3

Table 3: Share of females in economics PhD class by institution and year

Year	Berkeley	Chicago	Harvard	MIT	NYU	N-western	Penn	Princeton	UCLA	Yale
1989	33.3	15.4	4.55	18.5	23.1	14.3	6.67	30.8	26.7	20.0
1990	21.9	4.55	16.7	4.76	45.5	11.1	19.0	10.0	15.8	6.25
1991	26.7	21.7	20.6	10.5	14.3	42.9	21.9	27.3	8.70	12.5
1992	23.5	9.38	26.5	14.3	14.3	0.00	14.3	7.69	15.0	8.00
1993	30.8	10.0	27.5	29.4	50.0	36.4	41.2	43.8	9.52	18.8
1994	29.4	21.9	14.7	25.0	60.0	28.6	30.0	12.5	26.3	33.3
1995	33.3	9.68	34.5	16.0	30.8	42.9	25.0	19.2	0.00	23.5
1996	26.9	20.0	17.4	31.0	30.8	13.3	21.4	23.5	7.69	21.7
1997	34.3	7.69	17.1	32.4	36.4	20.0	23.8	11.1	18.2	13.0
1998	42.9	17.2	34.3	34.8	38.9	35.3	16.7	21.4	15.8	17.2
1999	35.3	12.0	29.4	18.5	15.4	50.0	15.4	20.0	18.2	26.1
2000	17.1	15.8	22.9	28.0	35.3	10.0	11.8	38.1	18.8	16.7
2001	23.1	31.3	44.4	33.3	18.8	15.0	23.5	29.4	33.3	7.69
2002	34.9	10.7	35.1	26.1	31.8	0.00	33.3	44.4	38.9	23.8
2003	31.9	5.71	20.0	30.4	11.8	23.5	12.5	20.0	16.7	32.0
2004	36.7	12.5	9.38	38.5	40.0	9.52	33.3	29.4	21.4	41.2
2005	38.2	28.1	27.3	17.9	27.3	7.69	8.70	25.0	33.3	31.0
2006	38.1	24.3	33.3	39.3	37.5	16.7	27.3	22.2	29.0	35.3

Table 4: OLS regressions of share of female in entering PhD class

	(1)	(2)	(3)	(4)
Female faculty share	0.598***	0.774***	0.714***	0.711***
	(0.177)	(0.262)	(0.261)	(0.260)
Minority-Economics			0.136**	0.142**
			(0.067)	(0.067)
Gender-University				0.418
				(0.284)
Trend	0.253	0.189	0.124	-0.125
	(0.167)	(0.173)	(0.175)	(0.243)
Chicago		-6.674	-8.745*	-9.062**
		(4.511)	(4.586)	(4.575)
Harvard		-0.645	-1.052	-3.708
		(3.956)	(3.925)	(4.308)
MIT		1.329	2.635	8.509
		(4.194)	(4.205)	(5.788)
NYU		10.408**	7.992	0.508
		(4.821)	(4.924)	(7.068)
Northwestern		-1.744	-1.657	-2.982
		(4.383)	(4.344)	(4.421)
Penn		-1.428	-3.606	-7.214
		(4.347)	(4.440)	(5.059)
Princeton		-0.771	-0.601	1.049
		(3.930)	(3.895)	(4.041)
UCLA		-6.212	-9.624**	-11.941***
		(3.789)	(4.116)	(4.394)
Yale		-0.775	-2.484	-4.922
		(4.461)	(4.501)	(4.782)
Constant	16.7***	16.7***	13.7***	0.695
	(1.804)	(4.323)	(4.526)	(9.943)
R^2	0.105	0.254	0.271	0.281
Adjusted R^2	0.0945	0.2047	0.2191	0.2245

Dependent variable: Share of women in entering PhD class. 180 observations. Berkeley is the benchmark category for fixed effects.

Table 5: IV regressions of share of female in entering PhD class

	(1)	(2)	(3)
First stage			
Publications (the IV)	-0.057***	-0.051***	-0.052***
	(0.017)	(0.019)	(0.019)
Minority-Economics		0.021	0.021
		(0.020)	(0.020)
Gender-University			0.036
			(0.083)
Trend	0.548***	0.526***	0.508***
	(0.070)	(0.080)	(0.091)
R^2	0.681	0.677	0.678
Adjusted R^2	0.661	0.654	0.652
Second stage			
Female faculty share	0.548	0.123	0.337
	(1.202)	(1.297)	(1.266)
Minority-Economics		0.153*	0.153**
		(0.078)	(0.077)
Gender-University			0.422
			(0.286)
Trend	0.271	0.328	0.001
	(0.460)	(0.472)	(0.485)
R^2	0.250	0.249	0.272
Adjusted R^2	0.201	0.195	0.215

Dependent variables: First stage — Female faculty share ; Second stage — Share of women in entering PhD class. 180 observations. Institution FEs are included in all first and second stage regressions They are not statistically significant in the second stage.

Table 6: Logit regressions of the probability that new hire is female

	(1)	(2)	(3)	(4)	(5)	(6)
L.Female faculty share	-0.155**	-0.287***	-0.294***			
	(0.070)	(0.100)	(0.102)			
L.Female faculty				-0.511***	-0.829***	-0.864***
				(0.175)	(0.254)	(0.258)
L.Male faculty				-0.044	0.042	0.029
				(0.059)	(0.081)	(0.083)
Share female hired	7.833***	7.897***	8.557***	8.466***	8.277***	9.207***
(supply of females)	(1.955)	(2.336)	(2.435)	(2.041)	(2.508)	(2.664)
Number hired at inst	0.825***	0.922***	0.954***	0.878***	1.005***	1.040***
(demand)	(0.231)	(0.324)	(0.327)	(0.240)	(0.341)	(0.349)
L.Publications	-0.036**	-0.044**	-0.053**	-0.042***	-0.046**	-0.060**
	(0.015)	(0.022)	(0.024)	(0.016)	(0.023)	(0.026)
Minority-Economics		0.006	0.010		0.010	0.014
		(0.026)	(0.026)		(0.027)	(0.027)
Gender-University			0.135			0.161
			(0.099)			(0.104)
Trend	0.215***	0.308***	0.261**	0.301***	0.330**	0.298**
	(0.075)	(0.114)	(0.122)	(0.094)	(0.139)	(0.144)
Chicago	-0.807	-2.684*	-2.796*	-2.484*	-3.291*	-3.607**
	(1.128)	(1.523)	(1.551)	(1.452)	(1.683)	(1.703)
Harvard	2.528*	0.815	0.372	2.921*	0.704	0.432
	(1.366)	(1.701)	(1.761)	(1.520)	(2.122)	(2.170)
MIT	0.541	-1.321	0.622	-0.358	-1.793	0.515
	(1.070)	(1.478)	(2.048)	(1.154)	(1.535)	(2.122)
NYU	-2.391*	-5.782***	-8.177***	-3.776**	-6.379***	-9.467***
	(1.425)	(2.154)	(2.826)	(1.585)	(2.263)	(3.065)
Northwestern	-1.643	-5.063***	-5.863***	-2.827**	-5.774***	-6.897***
	(1.203)	(1.905)	(2.061)	(1.339)	(1.948)	(2.158)
Penn	-1.669	-4.563**	-6.121***	-2.652*	-5.343***	-7.302***
	(1.355)	(1.905)	(2.277)	(1.418)	(1.943)	(2.383)
Princeton	0.002	-1.543	-1.054	-0.140	-1.847	-1.204
	(0.992)	(1.270)	(1.313)	(1.028)	(1.399)	(1.446)
UCLA	0.047	-2.066	-2.950*	-0.751	-2.436	-3.600**
	(1.010)	(1.477)	(1.634)	(1.110)	(1.547)	(1.731)
Yale	-0.429	-4.012**	-5.089***	-1.070	-4.624***	-5.963***
	(1.096)	(1.654)	(1.893)	(1.121)	(1.705)	(1.985)
Constant	-2.056	0.294	-3.559	-0.343	-0.868	-4.996
	(1.434)	(1.948)	(3.459)	(2.177)	(2.633)	(3.783)
Observations	177.000	133.000	133.000	177.000	133.000	133.000
Pseudo-R^2	0.254	0.314	0.326	0.276	0.337	0.352

Dependent variable: Indicator of whether a woman was hired. The sample is limited to years in which institutions did hire. Berkeley is the benchmark category for fixed effects.