

DO WOMEN AND NON-ECONOMISTS ADD DIVERSITY TO RESEARCH IN INDUSTRIAL RELATIONS AND LABOR ECONOMICS?

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INTRODUCTION

For many academics, it is an article of faith that greater representation of women in scholarly areas in which they are under-represented will result in greater diversity in the topics studied, questions asked, and methods used. However, whether or not academic diversity leads to diversity in scholarly output remains an open question. Simply increasing the representation of women and minorities may not be enough to change the tone of a white-men-dominated discipline. Even if, for example, women entering a field are initially inclined to focus on issues of gender diversity, they may end up conforming to existing standards. A combination of professional socialization and other pressures towards conformity may lead to scholars becoming intellectually homogenized. As was recognized long ago by Thorstein Veblen, intellectual commitments introduce an element of inertia into cognition and practice. New ideas are hard to sell among one's colleagues, and even highly influential scholars must present their ideas as increments to established doctrines [Stigler, 1965]. This is especially true when scholars attempt to publish their ideas. Editors and referees prefer the familiar [Crane, 1967], and some evidence suggests that peer reviewers may be biased against results that run contrary to established theoretical perspectives [Mahoney, 1977]. Some have even argued that journals sift out and reject really original contributions to enforce disciplinary authority [Redner, 1987].¹

To date, noticeably few empirical studies attempt to determine whether or not increases in diversity within professions create differences in those professions. Three recent papers by economists examine various consequences of gender diversity. Canes and Rosen [1995] find that a rising proportion of female professors in a department did not significantly increase the proportion of female majors in the department. Neumark and Gardecki [1998] find little effect on career outcomes for female economics Ph.D. students who have a woman rather than a man for a dissertation

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advisor. Alternatively, Rothstein [1995] finds that the percentage of female faculty is positively associated with the probability that a college's female undergraduates go on to attain an advanced degree.

In this paper, we examine the effects of female authors on research published in the field of industrial relations and labor economics. We choose this field for two reasons. First, it has the highest proportional representation of women of any sub-field within economics. This ensures that there are at least some papers by women to study.² Second, this field has always been relatively interdisciplinary: it was, in fact, the first multi-disciplinary field in American universities [Schatz, 1995]. This has led both to a range of author disciplines within the set of publications, and to numerous articles written in collaboration between authors trained in the assumptions and methods of different disciplines. This allows us also to explore interdisciplinary collaboration within individual articles as an additional source of diversity in research. Interdisciplinary research by its nature is a likely occasion for the challenging of accepted ideas and practices, and the importation of methods from one discipline to another.

While many aspects of scholarly output could be examined, we picked one area that is relatively straightforward to measure and appeared reasonably likely to be affected by diversity. Namely, we examine the effects of women, and of researchers trained in fields other than economics, on the treatment of demographic diversity in *causal modeling*. Specifically, we examine six aspects of the treatment of gender and race among articles performing hypothesis testing with person-level data:³

1. Whether the article drops women from the sample of cases used in the analysis.
2. Whether the article drops groups by race and ethnicity, focusing instead on whites only.
3. Whether the article specifies gender main effects.
4. Whether the article specifies race or ethnic main effects.
5. If the article specifies gender main effects, whether it also specifies interactions between gender and other covariates.⁴
6. If the article specifies race or ethnic main effects, whether it also specifies interactions between race/ethnicity and other covariates.

The exclusion of population subgroups from the data analyzed and whether gender and race are used as explanatory factors are of interest to us for many reasons. Mainly, we think it reflects implicit, "taken for granted" assumptions about men and women; an example of such an assumption is that white men represent a "basic" or fundamental category of individuals [Watkins, 1993]. These assumptions are reflected in the extremely limited attention that gender and race receive in introductory economics textbooks and courses [Bartlett, 1996]. Often, causal models are developed by studying white men, and are modified to accommodate women and non-whites only later, if at all. These habits of mind may be a holdover from the days when white men were, indeed, the overwhelming majority category in economic life. But with the increased prevalence of women and non-whites in the labor force, white men are

no longer the automatic reference category they once were. Maintaining this type of assumption can lead to some surprising patterns in research that appear to lean against larger social trends. For instance, one interdisciplinary study of management journals found a downward trend in the 1980s in research in gender issues at a time when women's participation in the economy experienced some of its most rapid growth [Chusmir, Moore, and Adams, 1990].

In the remainder of this paper, we examine the treatment of gender and race in quantitative research within the field of industrial relations and labor economics. We begin with a survey of historical trends. We then report the results of probit analyses that gauge the power of author characteristics to predict the six characteristics of articles published in the four major industrial relations and labor economics journals. We examine the effect of having one or more women or non-economists among the authors of an article on each of these six methodological characteristics of articles. First, we examine the differences between men and women, economists and non-economists among all articles. Second, we examine gender differences in articles authored only by economists. Third, excluding articles written only by non-economists, we examine the effects of collaboration between economists and non-economists.⁵

Hypotheses

Our hypotheses can be formally stated as follows:

1. We expect female authors to be more attuned to issues of gender, reflected in a lower likelihood of their dropping women from analyses.
2. Regardless of discipline, we also expect female authors to be more sensitive to issues of gender diversity, reflected in a higher likelihood of specifying gender-specific main and interaction effects.
3. We expect non-economists to be more sensitive to issues of gender and race/ethnicity than economists, reflected in lower rates of dropping these groups from analyses.
4. Net of exclusionary practices and historical trends, however, we expect economists to estimate methodologically more sophisticated models. This will be reflected in a lower likelihood of non-economists specifying gender and race main and interaction effects.

METHODOLOGICAL TRENDS IN INDUSTRIAL RELATIONS AND LABOR ECONOMICS RESEARCH

To generate the data used in our analyses, we conducted a content analysis of all articles published in the four leading labor economics and industrial relations journals, from the time each was established through 2002.⁶ The journals, number of articles per journal, and time periods covered are:

Industrial and Labor Relations Review: 1986 articles, through 55 (3); 10/47-4/02

Industrial Relations: 1237 articles, through 41 (2); 10/61-4/02

Journal of Human Resources: 1323 articles, through 37 (2); Summer/66-Spring/02

Journal of Labor Economics: 617 articles, through 20 (2); 1/83-4/02

This yielded a total sample size of 5163 articles, spanning the period October 1947 through April 2002. Of these 5,163 articles, 3,352 (65 percent) perform hypothesis-testing (that is, they are not exclusively theoretical, rhetorical, or descriptive with respect to data use). The percentage of articles that contain hypothesis-testing has increased over time: 1947-1960: 18%; 1961-1970: 39%; 1971-1980: 64%; 1981-1990: 74%; 1991-2002: 84%. From this point on, we confine our discussion to those articles that contain hypothesis testing of empirical data.

Two trends are immediately apparent. The first is that regression analysis has risen in use (77 percent of all hypothesis-testing papers; 83 percent of papers written exclusively by economists). This “rise of regression” is important to us because multivariate techniques are necessary for specifying gender and race main effects. The second trend is an increase in the use of micro-level rather than grouped, or aggregated data—in particular the increased use of persons as the basic unit of analysis (60 percent of all hypothesis-testing papers, 62 percent of papers written exclusively by economists). Statistics by time period on the percentage of hypothesis-testing papers utilizing person-level investigation and/or regression analysis show this clearly:

<u>Time period</u>	<u>% using regression analysis</u>	<u>% using person-level data</u>
1947-1960	0	21
1961-1970	32	42
1971-1980	70	55
1981-1990	83	60
1991-2002	91	69

This abrupt appearance and takeoff of regression in the 1960s was noted at the time in economics by Bronfenbrenner [1965]; it paralleled the trend towards increased quantitative sophistication in both theoretical and empirical economics observed by Stigler [1965]. These journals did not publish any papers using regression analysis before 1962. After then, the percentage rose sharply and continued to increase.

Person-level data were available before 1960, but only in data that were collected by the researchers themselves. Prior to 1960, U.S. Census data were only available to researchers in aggregated form. As the availability of large nationally representative samples (and a host of other more specialized data sets) increased over time, person-level data has become the rule rather than the exception for papers where the theoretical focus is on individual-level outcomes (although many studies still focus on a different unit of observation, such as a bargaining unit, a school, or a firm). From this point on, we focus exclusively on those articles that include formal hypothesis testing using person-level data.

Trends in the Dependent Variables

The methodological practices we focus on in this paper are the decision to drop women or non-whites from the analysis and the inclusion of gender or race as explanatory variables through the use of dummy variables or interaction effects. Twenty-two percent of hypothesis-testing papers using person-level data exclude women (25 percent among articles written exclusively by economists). Thirty-two percent used this or other exclusionary criteria (36 percent among economists), including 7 percent that dropped a particular racial group or groups, or dropped a particular ethnic group or groups—generally Hispanics and/or Asians.⁷ The use of exclusionary criteria to reduce the sample size below that available in the data source has changed over time:⁸

<u>Time period</u>	<u>% dropping women</u>	<u>% using (race/ethnic) exclusion criteria</u>	
1947-1960	22	22	(0)
1961-1970	24	26	(2)
1971-1980	25	34	(10)
1981-1990	26	37	(8)
1991-2002	17	29	(5)

The data show a slight upward trend in dropping women, followed by a drop-off in the 1990s through early 2002; an exclusion of any type has generally increased over time, although excluding race or ethnic subgroups remains relatively low.

The next set of statistics depicts the treatment of gender within regressions. These researchers—economists and non-economists—used only a gender dummy variable in 23 percent of the articles, and specified some form of gender interaction effect 25 percent of the time. This coding is inclusive of even results that are not reported in full; we scour the text and footnotes of the papers for evidence that alternative specifications were estimated in cases where the main results reported do not have gender/race modeled explicitly. The trends over time were as follows:

<u>Time period</u>	<u>% using gender dummy</u>	<u>% using gender interactions</u>
1947-1960	NA ⁹	17
1961-1970	5	20
1971-1980	17	24
1981-1990	25	22
1991-2002	27	29

The data show a continuing rise in the use of a dummy variable to model gender differences, whereas the use of gender interactions rose but then dipped in the 1980s before rising again more recently. The percentage of papers using either of these two methods to consider gender differences has increased consistently over time.

A comparable pattern obtains for the treatment of race. Thirty-one percent of hypothesis-testing papers utilizing person-level data used only a dummy variable to model racial differences. Seventeen percent of papers specify some type of interaction to model racial differences.

<u>Time period</u>	<u>% using race dummy</u>	<u>% using race interactions</u>
1947-1960	NA	11
1961-1970	9	18
1971-1980	21	24
1981-1990	37	14
1991-2002	36	15

The data show a rising trend in the use of a dummy variable to model racial differences; however, the use of racial interactions rose until the 1970s but has since decreased notably and has been fairly constant over the last two decades. Even if early on, minorities were often dropped because of small sample sizes (although it is not self-evident why this would be preferable to explicitly modeling their presence in a regression format), this pattern of flattening-off is inconsistent with their increased representation in data samples over this period.

In summary, while studies appear increasingly likely to give gender and race some consideration as explanatory variables, the studies do not appear likely to treat gender and race in a comprehensive way, often preferring instead to “control” for gender and race effects through use of the sparsest method: use of an intercept shift term. This is somewhat surprising given the increasing ease of performing statistical analysis and the increased prevalence of large micro-data sets that contain numbers of women and minorities sufficient to specify complex interaction models.

Characteristics of the Authors

For the sample of 5,163 papers, 3,892 different author names appear. Individually, 82 percent are men and 67 percent were trained as economists. At the level of articles, 20 percent have at least one female author¹⁰ and 81 percent have at least one economist author (while 14 percent have at least one female economist author). The composition of authorship in these industrial relations and labor economics articles has changed over time. Several trends appear. The proportion of female and economist authors have risen steadily:

<u>Time period</u>	<u>% at least one woman</u>	<u>% at least one (female) economist</u>
1947-1960	8	69 (3)
1961-1970	8	71 (4)
1971-1980	13	78 (8)
1981-1990	23	84 (15)
1991-2002	33	87 (24)

These rising trends imply that part of the methodological content patterns we saw above may potentially be attributable to changes in the demographic composition of

the profession. Given the increasing domination of this field by researchers trained in economics departments,¹¹ and the continuing under-representation of women within labor economics, our focus on interdisciplinary collaboration is especially critical.

CONFIRMATORY ANALYSES

Methods

We estimated a series of regressions using the various binary characteristics of articles mentioned above as dependent variables. These regressions allow us to consider whether author characteristics help predict the methodology used in published articles. While some of the author characteristic variables were deduced directly from the content analysis of the journal articles, others were merged in from a variety of professional directories or from information contained on author's personal webpages.¹² We have at least some biographical data available for 87 percent of the authors. These data include highest degree held, field of highest degree, and the year that degree was earned. They allowed us to determine which persons were formally trained in economics versus other fields, the "vintage" of the person's degree, and where the person was trained.

The author gender and discipline variables are coded whether at least one author is a woman, and whether at least one author was trained in a discipline other than economics. In addition to these, we include cohort effects, in the form of the average year of the authors' highest degree, and the number of authors listed in the article.¹³ We also control for the historical trends described above, in the form of a quadratic for time (with 1947 = 1). Finally, we include dummy variables for each of the journals, with *Industrial and Labor Relations Review*, the oldest of the four, as the omitted category. Hence, we have tried to control for three other sources of variation in the sample that seem *a priori* like plausible potential influences on methodology. These data display relatively minor multicollinearity as measured by pairwise correlations and coefficients on the control variables are not greatly influenced (do not switch from significance to insignificance, or vice-versa) if they are in turn deleted from the specification. The means for each of the variables included in the models are provided in Table 1. In this table, columns 1-3 correspond to the subsamples used in the regressions reported in the first two columns of Tables 2 through 4.

Given the binary nature of the dependent variables, we used limited dependent maximum likelihood estimation methods for these regressions. We report probit specifications in our tables (normally-distributed error terms); use of logit specifications (Weibull-distributed error terms) made no difference to the inferences reported. Estimations were done using TSP V4.3A and pseudo-R-squareds computed using the McKelvey and Zavoina method.¹⁴ Overall explanatory value of our equations is not spectacular, as can be seen by the low R-squareds across the board, but individual coefficients are nonetheless robust to specification variation in both the statistically significant and statistically insignificant cases. Nested logit specifications for the potentially trichotomous models (allowing for no modeling of gender/race, dummy variable modeling, or interaction modeling) also cast no additional light on the pat-

TABLE 1
Means for Dependent and Independent Variables for Hypothesis-Testing Articles Using Person-Level Data

	By Author Discipline			By Author Gender		
	All Articles	Economists Only	Non-economist only	Men Only	Women Only	Collaboration
Dependent variables						
Drop women (1=yes)	0.22	0.25	0.23	0.12	0.16	0.14
Drop some race/ethnic group (1=yes)	0.07	0.08	0.08	0.03	0.10	0.05
Model gender (1=yes)	0.48	0.49	0.50	0.34	0.53	0.59
Model race/ethnic group (1=yes)	0.49	0.55	0.53	0.22	0.47	0.58
Interact gender (1=yes)	0.25	0.27	0.27	0.14	0.32	0.30
Interact race/ethnic group (1=yes)	0.17	0.20	0.19	0.08	0.17	0.18
Independent variables						
Author characteristics						
At least one woman	0.27	0.26	0.28	0.27	1.00	1.00
At least one non-economist	0.23	—	0.12	1.00	0.19	0.35
At least one female economist	0.22	0.25	0.25	—	0.87	0.74
At least one female non-economist	0.06	—	0.04	0.27	0.19	0.26
Average year of highest degree	1978	1979	1979	1974	1982	1981
Number of authors	1.67	1.56	1.68	1.62	1.23	2.40
Journal distribution						
<i>Industrial Relations</i>	0.16	0.12	0.13	0.40	0.12	0.15
<i>Journal of Human Resources</i>	0.40	0.43	0.42	0.22	0.37	0.45
<i>Journal of Labor Economics</i>	0.17	0.20	0.19	0.02	0.19	0.13
<i>Industrial and Labor Relations Review</i>	0.27	0.25	0.26	0.36	0.32	0.27
Number of Observations	1940	1494	1705	235	226	307

terns reported herein.¹⁵ We also ran weighted versions of these specifications, where articles were weighted by their length measured in number of pages.¹⁶ Again, there were no differences in the resulting inferences.

Descriptive Statistics

Before turning to the results of the probit analyses, we can anticipate some of the findings by examining the mean values of the independent variables across articles classed by disciplinary authorship, reported in columns 2-5 of Table 1. Contrasting articles written exclusively by economists with those written exclusively by non-economists, we find that economists were over twice as likely to drop women and about three times as likely to drop non-whites. As expected, however, economists are much more likely to specify more complex causal models in the form of gender and race effects, especially non-white interactions (at two-and-a-half times the rate of non-economists). Contrasting articles written exclusively by economists to those written in collaboration with non-economists, the latter group saw the rates at which women and non-whites were excluded cut in half. Conversely, articles written by non-economists in collaboration with economists dropped women and non-whites at about the same rate as those written exclusively by non-economists (though these rates are still substantially lower than the rates among articles written exclusively by economists). At least based upon this bivariate evidence, the flow of interdisciplinary ideas seems to run more in one direction than in the other: non-economists seem to have a greater influence on economists than *vice versa*, at least in terms of exclusionary practices. However, in terms of the causal complexity of the models specified, the economists seem to have shared their methodological skills with their non-economist coauthors: collaborative articles were much more likely to report examinations of both types of gender and race effects than those written by non-economists only.

Finally, we compare the means for articles written exclusively by men, by women, or in collaboration between men and women (irrespective of discipline), and report these in Table 1, columns 6-8. These show that articles written exclusively by women are less likely to exclude women, but more likely to exclude non-whites. Women were also somewhat more likely to include gender main and interaction effects. Most interestingly, however, articles reflecting collaborative work had both the lowest levels of exclusionary practices and the highest levels of gender and race specifications. Although for brevity's sake we do not report directly comparable regressions, some of these gender differences are reflected in the models that follow.

Probit Analyses

All Articles. Among all articles (Table 2), those with one or more female authors and those with one or more non-economist authors are significantly less likely to drop women. Those with at least one non-economist author were also less likely to drop non-whites. Articles with non-economist authors are far less likely to specify gender and race main effects, but those with female authors were more likely to

TABLE 2
Probit Analyses of Exclusion Criteria and Model Choice
for the Full Sample of Articles

Dependent variable:	Drop Women	Drop some Race/ethnic Group	Model Gender	Model Race/ethnic Group	Interact Gender	Interact Race/ethnic Group
At least one woman	-0.24 ^f (-3.02)	0.05 (0.44)	0.17 ^e (2.49)	0.12 ^d (1.80)	0.19 ^e (2.06)	0.08 (0.85)
At least one non-economist	-0.41 ^f (-4.35)	-0.32 ^e (-2.36)	-0.18 ^e (-2.33)	-0.59 ^f (-7.55)	-0.31 ^f (-2.65)	0.23 ^d (1.71)
Year (1947=1)	-0.02 (0.82)	0.11 ^c (2.75)	0.04 ^b (1.98)	0.09 ^c (4.01)	-0.15 ^c (-3.62)	-0.24 ^c (-5.64)
Year ² /100	-0.06 ^b (-2.00)	-0.16 ^c (-3.20)	-0.03 (-1.05)	-0.11 ^c (-3.67)	0.17 ^c (3.40)	0.27 ^c (5.40)
Journal (<i>Industrial and Labor Relations Review</i> omitted)						
<i>Industrial Relations</i>	-0.05 (-0.45)	-0.10 (-0.58)	0.01 (-0.12)	-0.01 (-0.08)	-0.12 (0.90)	0.17 (1.17)
<i>Journal of Human Resources</i>	0.10 (1.24)	0.33 ^c (2.88)	-0.10 (-1.32)	0.15 ^b (2.00)	0.14 (1.33)	0.21 ^a (1.92)
<i>Journal of Labor Economics</i>	0.49 ^c (4.76)	0.21 (1.39)	-0.38 ^c (-4.03)	-0.13 (-1.42)	0.46 ^c (3.37)	0.25 ^a (1.77)
Average year of highest degree	0.01 ^b (2.48)	0.01 (0.81)	0.00 (0.69)	0.01 ^a (1.80)	-0.01 (-1.18)	0.00 (0.01)
Number of authors	-0.05 (-0.97)	-0.09 (-1.28)	0.10 ^b (2.39)	-0.01 (-0.33)	-0.03 (-0.43)	-0.05 (-0.67)
Intercept	-27.79 ^b (-2.54)	-15.71 (-1.03)	-8.10 (-0.85)	-19.13 ^b (-2.01)	20.37 (1.41)	4.65 (0.30)
Pseudo \bar{R}^2	0.08	0.06	0.07	0.09	0.07	0.10
Proportion of correct predictions	0.67	0.67	0.63	0.64	0.63	0.65
Number of cases	1940	1940	1940	1940	927	953

T-statistics in parentheses. p-values: two tailed (a) significant at .10 level; (b) signif. at .05 level; (c) signif. at .01 level. One-tailed (d) significant at .10 level; (e) significant at .05 level; (f) significant at .01 level.

specify gender interactions.¹⁷ In unreported models adding interaction effects for female non-economists, the results are consistent with these, with one exception: for gender interaction, while the positive effect of female authors is strengthened, articles with female non-economist authors are significantly less likely to specify gender-specific effects.

Articles Written Exclusively by Economists. Next we examine the effect of author gender among articles written exclusively by economists, reported in Table 3. Those articles with female economist authors are, indeed, substantially less likely to drop women from their analyses when compared to those written exclusively by men. There is no equivalent difference in retaining non-whites. This interest in women extends to the specification of gender-specific effects: articles with one or more fe-

TABLE 3
Probit Analyses of Exclusion Criteria and Model Choice for
Economist-Only Articles

Dependent variable:	Drop some Drop Women	Drop some Race/ethnic Group	Model Gender	Model Race/ethnic Group	Interact Gender	Interact Race/ethnic Group
At least one female economist	-0.33 ^f (-3.68)	0.09 (0.77)	0.25 ^f (3.22)	0.08 (0.99)	0.29 ^f (2.72)	0.07 (0.69)
Year (1947=1)	0.03 (1.13)	0.07 ^a (1.67)	0.02 (0.88)	0.12 ^c (4.53)	-0.12 ^b (-2.41)	-0.29 ^c (-5.65)
Year ² /100	-0.08 ^b (-2.67)	-0.11 ^b (-2.20)	0.00 (0.03)	-0.16 ^c (-5.33)	0.14 ^b (2.33)	0.33 ^c (5.50)
<i>Journal (Industrial and Labor Relations Review omitted)</i>						
<i>Industrial Relations</i>	-0.06 (-0.48)	0.04 (0.24)	0.11 (0.93)	0.10 (0.77)	-0.04 (-0.26)	0.12 (0.76)
<i>Journal of Human Resources</i>	0.01 (0.15)	0.33 ^c (2.61)	0.08 (0.95)	0.05 (0.64)	0.05 (0.48)	0.14 (1.22)
<i>Journal of Labor Economics</i>	0.44 ^c (3.96)	0.22 (1.41)	-0.37 ^c (-3.66)	-0.19 ^a (-1.93)	0.39 ^c (2.65)	0.19 (1.31)
Average year of highest degree	0.02 ^c (3.13)	0.01 (1.00)	0.00 (0.02)	0.01 ^b (2.09)	-0.01 (-1.58)	-0.01 (-0.63)
Number of authors	-0.04 (-0.09)	-0.08 (-1.03)	0.08 (1.52)	0.02 (0.40)	0.02 (0.25)	-0.01 (-0.07)
Intercept	-39.35 ^c (-3.21)	-18.90 (-1.15)	-1.13 (-0.11)	-24.96 ^b (-2.34)	27.65 ^a (1.74)	16.01 (0.98)
Pseudo \bar{R}^2	0.07	0.04	0.06	0.04	0.04	0.09
Proportion of correct predictions	0.65	0.64	0.62	0.58	0.59	0.64
Number of cases	1494	1494	1494	1494	732	816

T-statistics in parentheses. p-values: two-tailed (a) significant at .10 level; (b) signif. at .05 level; (c) signif. at .01 level. One-tailed (d) significant at .10 level; (e) significant at .05 level; (f) significant at .01 level.

male authors are significantly more likely to incorporate gender main and interaction effects (but not race-specific effects).¹⁸

Articles Written by Economists with or without Collaboration with Non-economists. Finally, in Table 4, we contrast articles written by only economists with those written in collaboration between economists and non-economists. Consistent with the results reported for all articles, those with at least one female or non-economist author are significantly less likely to drop women. This may reflect the interests of those economists willing to work with non-economists, the subtopics within labor research that lend themselves more readily to collaboration, or possibly even that economists interested in gender and race issues are more likely to seek female and non-economist collaborators. In unreported models, we also examine the addi-

TABLE 4
Probit Analyses of Exclusion Criteria and Model Choice for
Articles with at Least One Economist Author

Dependent variable:	Drop some Drop Women	Race/ethnic Group	Model Gender	Model Race/ethnic Group	Interact Gender	Interact Race/ethnic Group
At least one woman	-0.28 ^f (-3.31)	0.03 (0.30)	0.20 ^e (2.76)	0.14 ^e (2.01)	0.27 ^f (2.73)	0.10 (0.93)
At least one non-economist	-0.33 ^e (-2.51)	-0.18 (-1.02)	0.01 (0.11)	-0.37 ^f (-3.53)	-0.30 ^e (-2.10)	-0.19 (-1.10)
Year (1947=1)	0.02 (0.90)	0.09 ^b (2.16)	0.03 (1.46)	0.11 ^c (4.45)	-0.13 ^c (-2.93)	-0.27 ^c (-5.62)
Year ² /100	-0.07 ^b (-2.33)	-0.13 ^c (-2.60)	-0.02 (-0.67)	-0.14 ^c (-4.67)	0.16 ^c (3.20)	0.30 ^c (5.00)
Journal (<i>Industrial and Labor Relations Review</i> omitted)						
<i>Industrial Relations</i>	0.01 (0.10)	-0.09 (-0.50)	0.00 (0.67)	0.04 (0.42)	-0.07 (-0.51)	0.19 (1.24)
<i>Journal of Human Resources</i>	0.04 (0.41)	0.27 ^b (2.28)	-0.14 ^a (-1.84)	0.04 (0.57)	0.10 (0.85)	0.16 (1.40)
<i>Journal of Labor Economics</i>	0.43 ^c (4.08)	0.18 (1.22)	-0.39 ^c (-4.07)	-0.18 ^a (-1.90)	0.41 ^c (2.90)	0.21 (1.48)
Average year of highest degree	0.01 ^b (2.37)	0.01 (0.73)	0.00 (0.71)	0.01 ^a (1.94)	-0.01 (-1.49)	0.00 (-0.51)
Number of authors	-0.06 (-1.03)	-0.10 (-1.27)	0.09 ^a (1.80)	-0.02 (-0.32)	-0.02 (-0.24)	-0.06 (-0.79)
Intercept	-27.98 ^b (-2.43)	-14.20 (-0.91)	-8.19 (-0.82)	-21.41 ^b (-2.14)	-25.47 ^a (-1.70)	13.32 (0.85)
Pseudo \bar{R}^2	0.08	0.04	0.06	0.05	0.06	0.10
Proportion of correct predictions	0.65	0.64	0.62	0.60	0.61	0.65
Number of cases	1705	1705	1705	1705	847	901

T-statistics in parentheses. p-values: two tailed (a) significant at .10 level; (b) signif. at .05 level; (c) signif. at .01 level. One-tailed (d) significant at .10 level; (e) significant at .05 level; (f) significant at .01 level.

tional effect of collaboration with female non-economists; while the coefficients are sometimes substantial, none approaches statistical significance.¹⁹

Articles with at least one female author are more likely to specify gender main and interaction effects. Those written in collaboration with non-economists are less likely to specify race main effects, but less likely to specify gender interaction effects. The addition of an interaction effect for female non-economist authors makes articles with female authors more likely to specify gender-specific effects, and articles with non-economist authors more like to include race-specific effects, even though the interaction variable is not itself significant. This also may say something about the interests of economist authors who seek female or non-economist collaborators. However, as noted in our review of the descriptive statistics for the different catego-

ries of articles (collaborative, all-economist, all-non-economist), articles written by economists in collaboration with non-economists are more likely to adopt the non-exclusionary practices of the non-economist coauthor, whereas non-economist coauthors are more likely to adopt the more complex causal models of the economists.

Control Variables

Among all articles, the historical trend effects mirror those reported in the descriptive section. Fitting quadratic terms of historical time, we find downward or inverted U-shaped trends for dropping women and minorities. That is to say, in the earlier years, when confirmatory hypothesis testing was first gaining currency, authors were more likely to drop women and non-whites from their published analyses. One possible interpretation of this is that growth in the representation of women in the social sciences accelerated in the 1970s. Another interpretation is that while there was increasing recognition of the importance of subgroup heterogeneity among researchers, the technical (computing) resources for dealing with more complex causal models did not become widely available until later. However, the latter interpretation is not supported by the trends in modeling race and gender. The proportion of articles specifying race main effects has been dropping since the mid 1980s. We suspect this is due at least in part to the establishment of *Journal of Labor Economics*, which was first published in 1983 (see below). However, the proportion of articles specifying gender and/or race interaction effects is trending upwards, after having reached a minimum in the late 1980s/early 1990s.

For the other control variables, there are few significant effects at the .05 probability level. Author vintage is significantly positively associated with dropping women. Among all articles and those with at least one economist author, those with a larger number of authors are more likely to model gender main effects.

Finally, a few words about journal effects. Contrasted with the “core” industrial relations/labor economics journal (*Industrial and Labor Relations Review*), there are two results. Papers published in the *Journal of Human Resources* are both more likely to drop racial/ethnic groups, and more likely to specify racial main or interaction effects. Articles in the *Journal of Labor Economics* are much more likely to drop women from their analyses, and less likely to model gender or race at all—but if gender is modeled, it is more likely to be modeled using interaction effects. This likely reflects the dominance of economists in that journal; differences along other observable dimensions, such as proportion of female editorial board members (low in all cases) and quality of either school where highest degree was attained or current affiliation, do not vary significantly between the journals.

CONCLUSION

In summary, author characteristics do matter, and in the anticipated ways. Female authors are more likely to retain women in their analyses, and are somewhat more likely to specify gender-specific effects. Female authors are apparently not, however, comparably likely to include race/ethnicity effects. As noted in the intro-

duction, not as yet enough non-whites publish in these journals for us to be able to examine whether there is a parallel higher probability of non-white authors to consider issues of modeling explicitly race/ethnic—and gender—effects. Articles with at least one non-economist author, however, are also significantly less likely to drop non-whites, as well as women; this may be in part to the relatively greater presence of non-whites within the other disciplines. The disciplinary effects we uncover here, and the analogy that may be drawn from the gender effects, suggest that steps to encourage the increased presence of non-whites in industrial relations and labor economics research will deepen the attention to issues of diversity within this literature. Given the decentralized nature of publication decision-making in the academic profession, this would require those involved in the editorial process to be vigilant. At a minimum, routine queries by referees and editors as to why particular groups are excluded, why particular modeling choices were made, and what alternative specifications, if any, were estimated, would help to give a more complete picture of what research decisions were made and why. A discussion regarding research standards is overdue in general, however, both in economics and in the social sciences more broadly writ, and would need to be carried out in a coordinated fashion by the various journal editors and Association governing committees. The implicit assumption that the current system screens out bad research and lets through good may not stand up to scrutiny.

At the same time, non-economists are less likely to specify the more complex model specifications, even when controlling for historical trends. Both our descriptive and confirmatory analyses, however, show that non-economists working with economists are significantly more likely to specify more complex causal models examining gender and race effects. Ideally, we would hope that social scientists combine the sensitivity to heterogeneity issues exhibited by female and non-economist researchers with the methodological sophistication of researchers with training in economics. As the sophistication of the quantitative methodology used by researchers trained in other social science disciplines continues to increase, we would expect the substantive sensitivity of non-economists to gender and race diversity to also be increasingly reflected in their causal models.

The limitations of our exploratory research are many. These data do not allow us to say definitively that researchers change the ways in which they do research directly because they work with members of other disciplines or of the opposite sex. It is equally plausible that a scholar's choice of heterogeneous collaborators itself indicates his or her own preexisting disposition to focus on social diversity. But even short of such direct evidence, we think most readers will agree that simply by providing a mode of cross-gender and cross-discipline communication, such research creates the opportunity for the dissemination of variant ideas and methods.

This research agenda could be extended in multiple directions. The collection of direct evidence on methodological choices would be a valuable addition to our knowledge of how knowledge is created. While our data could provide a starting point towards that information (we know whether people are matched by cohort and by academic affiliation), we have only rough measures of such social diversity. Such a study would be more appropriately conducted by interviewing researchers directly

regarding their collaboration patterns. We are also unable to draw inferences about the wider field of research in economics and related fields, both because we have surveyed only a subset of journals (in particular, ones that are generally “orthodox” in their subscription to neoclassical modeling), because we have set aside discussion of theoretical modeling, and because we have not observed research that is either rejected by these journals or never submitted in the first place. This latter point of sample selection is particularly intriguing; such information would also probably be best collected by polling researchers directly about their publication histories.

Whatever the effects may be of inter-gender and interdisciplinary collaboration on the sensitivity of industrial relations and labor economics researchers, in the end, we should not lose sight of one overarching reality: the exclusion of large groups of individuals from the population studied continues to be a common practice, even in the 1990s and early 2000s. Articles published in these four influential journals in the 1990-2002 period delete available data on some group in the sample 29 percent of the time. In the same period, articles specifying race or gender effects of any type moved into a slight majority. Although the historical trend is in the inclusive direction, these exclusionary practices appear a long way from being eliminated. There appears to still be room for continuing collaboration and increased attention to diversity within this important field of social research.

NOTES

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1. Indeed, the authors of many “citation classics” experienced difficulty getting those papers into print [Campanario, 1993].
2. Unfortunately there are still too few minority scholars in labor economics to permit examination of that dimension of author characteristics, as well.
3. Although we use the term race, throughout this paper we use the term to mean any groups other than whites.
4. These interaction effects can take several forms, including interacting a gender or race dummy variable with one or more of the other independent variables or conducting separate analyses by gender or race. The latter is prevalent in research using bivariate methods; for example, when means or other descriptive statistics are calculated separately for sex or race. However, regression was used in almost all articles examining person-level data. Articles performing Oaxaca-type decompositions are coded as having interaction effects by gender and/or race.
5. We would like to have examined non-economists in isolation, especially the effect of their working with economists, but the problem of small numbers limited our ability to perform confirmatory analyses. One effect we were able to find was that in contrast to articles written exclusively by non-economists, those written by non-economists in collaboration with economists were significantly more likely to specify both gender and race main and interaction effects.
6. Gordon and Purvis [1991], in their study of publications records among industrial relations scholars, also select these four journals as the most important journals dedicated solely to papers of labor economics and industrial relations.
7. Means for these can be found in column 1 of Table 1. However, numbers may vary because of loss of cases due to missing data for variables in the probit regressions. Numbers discussed in this section are for all articles in the data set.

8. We only code researchers as having excluded subjects if we know for a fact that the data set they were using actually contained subjects of multiple gender and/or race/ethnic categories and that the researcher could identify who was who in the data. This is not so difficult to do because usually the researchers either explicitly state who were excluded, or because the data used are widely-known sets (for example, the Panel Study of Income Dynamics, the Census) where we know that these categories are coded.
9. No regressions appeared in articles before 1960; consequently, it was not logically possible for researchers to specify gender main effects. Gender and race interactions in this period take the form of separate analyses by gender or race.
10. Among multiple-author papers, women are less likely than men to have one or more female coauthors (14 percent of women have a female coauthor, vs. 25 percent of men), indicating a relatively small proportion of papers with more than one female author. Interestingly, even though most papers follow the custom of listing authors alphabetically, women are somewhat more likely to be one of the latter authors listed on multiple author papers: They comprise 15 percent of authors in the first position, 16 percent of authors in the second position, 21 percent of authors in the third position, and 23 percent of authors in the fourth or higher position, potentially indicating a greater likelihood of lower standing and/or smaller contribution to the paper.
11. It should not be misconstrued that economists were later entrants into the field of labor research. As Derber [1967] points out, it was institutional economists who dominated the field in the first half of the twentieth century. They welcomed the entry of sociologists, psychologists, and political scientists for their ability to add new dimensions to labor research [Derber, 1967, 141]. Derber points out that the institutional economists “lacked the sophistication in certain concepts and techniques that specialists in the noneconomic social sciences developed. This was particularly true of research into the informal processes of small groups and interpersonal behavior, of studies of the attitudes, motives, and aspirations of workers and managers, of controlled experiments in factories as well as in academic laboratories, and of systematic sample surveys using interviews or questionnaires” [1967, 141]. However, although Derber also anticipated the impact of the computer [1967, 152], he did not foresee how regression analysis of large data sets would come to dominate these industrial relations journals—see Jacobsen and Newman [1997] for a discussion of what data sets are utilized in these articles. In addition, a new generation of labor economists with noninstitutional leanings are increasingly represented in the journals.
12. Directories used are American Economic Association [1997, 1993, 1989, 1984, 1979, 1974, 1964]; *American Men of Science* [1956]; Committee on the Status of Women in the Economics Profession [1994, 1992]; *Dissertation Abstracts Online* [2002, 1996]; Industrial Relations Research Association [1994, 1984, 1974]; *Who's Who in American Law* [1985-86, 1977].
13. We also coded for the “quality” of authorial degrees, using National Research Council [1995] department rankings. In preliminary runs we tested for the effect of average quality of the authors, or of the first author of the paper. Neither of these had any effect. We also considered whether having one or more authors that were not university-affiliated had an effect; again no effect. In exploratory work we also considered variables relating to the nature of the data, including: (1) whether the data were from a non-U.S. source; (2) whether the data were self-collected by the researcher; (3) whether the data were proprietary in nature (had limited availability); and (4) whether multiple data sets were used. None of these variables had an effect.
14. McKelvey and Zavoina [1975]. A number of pseudo-R² measures have been proposed for limited dependent variable models; the survey of a number of these measures by Veall and Zimmermann [1996] comes out in favor of this one. We cross-checked our results by running the probits and logits also in SAS V8.2; the results are robust to this change in algorithm and the pseudo-R-squareds generated in SAS are comparable to our calculated ones.
15. We also estimated the equations for gender and race main effects for the subset of articles that did not drop women and non-whites. The effects of the authorship variables were the same, with one exception (as discussed in the main text).
16. We did not adjust for page size or number of words per page across journals; the journals appeared roughly similar in these dimensions.
17. These results were consistent with those in models examining the effects of female and non-economist authors without the other variable.

18. However, in a regression examining only articles that did not drop women from the sample, the effect of female authors on the likelihood of including a gender dummy variable moved to statistical non-significance (possibly due to the smaller sample size).
19. Additionally, the practice of retaining non-whites in the analyses was already perfectly predicted by author gender and discipline.

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