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Abstract

Objective. We test whether the increasing tendency of women, blacks, and Latinos to study science, technology, engineering, and mathematics (STEM) is decreasing gender and race pay inequality in the federal civil service and the U.S. economy. Method. Using logit analysis on a one percent sample of federal personnel records for college graduates in 1983 and 2003, we examine whether unexplained gender and race pay differences have declined more rapidly for degree-holders in STEM or non-STEM fields. Using logit analysis on a five percent sample of college graduates from the 2000 Census, we examine whether unexplained gender and race pay differences are smaller in STEM or non-STEM fields in the federal and private sectors. Findings. Women and non-Asian minorities earn more, relative to comparable white men, in STEM than in non-STEM fields in both the federal and private sectors. Conclusion. Women and minorities gain even more than white men from studying STEM fields.

KEY WORDS: Discrimination; earnings of scientists and engineers; women and minorities in science; federal-private pay differences.

STEMMING INEQUALITY?

Employment and Pay of Female and Minority Scientists and Engineers in the Federal and Private Sectors

Science, technology, engineering, and mathematics (STEM) occupations have been a major source of gender and racial inequality in earnings in the United States. Pay tends to be especially high in STEM occupations, which traditionally employed an almost entirely white male work force. More recently, Asian Americans' representation in STEM occupations has far out-paced their share of the U.S. population, but women, blacks, and Hispanics continue to lag far behind, largely because they have not had the necessary educational background, but perhaps also because employers were reluctant to hire women and minorities in scientific occupations (Glover, 2000:113). In the past two decades, though, Congress has made eliminating gender and racial inequality in STEM fields a national priority, committing the United States "to encourage men and women, equally, of all ethnic, racial and economic backgrounds to acquire skills in science, engineering and mathematics" (*Science and Engineering Equal Opportunities Act of 1990, § 32(b)*), and the number of women and minorities entering STEM fields has increased dramatically (U.S. Government Accountability Office, 2006; U.S. National Science Foundation, 2008).

We have little research on women's and minorities' career success in STEM fields, however, besides the many studies of female scientists in academic settings (e.g., Long, Allison, and McGinnis, 1993; Fox, 2005). Although "students report that their prospects look best in industry or government" (Fox and Stephan, 2001:113) and although industry and government employ the vast majority of STEM degree-holders at the undergraduate, master's, and even doctoral levels (U.S. National Science Foundation, 2008), few studies have examined gender and race differences in career success in STEM fields in nonacademic settings. We focus on the federal civil service because it employs large numbers of scientists and engineers and pays them well (Lewis and Oh, 2008), because it is the employer of choice for many women and racial minorities (Lewis and Frank, 2002; Blank, 1985), and because we have good data over a 20-year period. Using a one percent sample of federal personnel records for college graduates in 1983 and 2003, we focus on gender disparities in pay for STEM and non-STEM majors and on whether and why they have declined over the past two decades.

We then shift to a five percent sample of the 2000 Census to compare gender and race inequality in earnings among college graduates in STEM and non-STEM occupations in the federal and private sectors. We address whether gender and racial pay gaps are smaller in STEM or non-STEM occupations, whether minorities and women gain as much from STEM occupations as white men, and whether the federal pay advantage is higher for female and minority college graduates in STEM or non-STEM occupations.

Background

Research on the career success of women and minorities in STEM fields has focused heavily on doctoral degree-holders, especially those working in academic settings (Cole and Zuckerman, 1984; Fox, 1983; Leahey, 2006; Long, 1990; Long and Fox, 1995; Xie and Shauman, 1998). In the general economy, the impact of STEM degrees on male-female pay differences has mostly been considered in passing. Field of study has a major impact on the earnings of college graduates, with degrees in engineering, computer science, and business typically leading to higher pay than degrees in social science, humanities, and education (Arcidiacono, 2004; Berger, 1988; Black, Sanders, and Taylor, 2003; Dolton and Makepeace, 1990a, 1990b; Finnie and Frenette, 2003; Gilbreath and Powers, 2006; Loury and Garman, 1995, 1995). Men's greater propensity to study these higher-paying fields may account for one-quarter or more of the gender earnings gap in the general economy (Daymont and

Andrisani, 1984) and nearly half of the male-female pay gap not attributable to demographic and work experience variables (Brown and Corcoran, 1997). The long-run trend for men's and women's choices of majors to become more similar may explain almost all of the large decline in the gender pay gap between 1979 and 1986 (Loury, 1997).

The federal civil service is a good place to study the impact of STEM education on race and gender earnings disparities because it employs large numbers of scientists and engineers and pays them well (Lewis and Oh, 2008). Although women and minorities still earn less than comparably educated and experienced white males in the federal service, the white male pay advantage is smaller in government than in the private sector (e.g., Asher and Popkin, 1984; Perloff and Wachter, 1984; Smith, 1977). Minorities and women are more likely than comparable white men both to work for the government (Blank, 1985) and to prefer government employment (Lewis and Frank, 2002).

Economists generally find that federal employees earn more than private sector workers of the same race and sex with equivalent levels of education and work experience (Gyourko and Tracy, 1988; Smith, 1976, 1977; Venti, 1987; Broder and Langbein, 1989; Belman and Heywood, 1989, 1990; Moulton, 1990; Hundley, 1991; Moore and Raisian, 1991; U.S. General Accounting Office, 1994). Most studies that separate findings by race and sex find that the public pay advantage is larger for women and minorities than for white males (e.g., Asher and Popkin, 1984). Federal studies, however, find that private sector employees *in the same occupations* earn more than federal workers (e.g., President's Pay Agent, 1995). None of these studies, however, has focused on STEM workers.

Data and Methods

We first examine annual salaries in the federal service, using a 1% sample of the Central Personnel Data File (CPDF), which the U.S. Office of Personnel Management (OPM) maintains as the federal government's personnel records. We use 1983 and 2003 samples of full-time, white-collar employees who are college graduates. We divide college graduates by sex, [1] by year, and by whether their most recent degree was in engineering, mathematics, or biological, computer and information, or physical science or in a non-STEM field. We compare men and women in the same year in the same field, focusing on mean salaries and the characteristics likely to influence them: federal experience, age (as a proxy for previous work experience), highest degree, field of study, and race/ethnicity. Using regression analyses with the natural logarithm of annual salary as the dependent variable, we next examine differences in expected salaries by sex and race, holding those characteristics constant. The regression coefficients translate roughly into proportional differences in earnings, but negative coefficients understate differences and positive ones overstate them, so we convert coefficients into expected percentage differences men by exponentiating the coefficients, subtracting 1, and multiplying times 100.

Our key independent variables are dummy variables coded 1 for women, African-Americans, Hispanics, and Asian-Americans. We measure educational attainment with two dummy variables distinguishing those with master's and doctoral degrees from those with bachelor's degrees, the reference group. Within STEM fields, we use four dummy variables to distinguish other majors from biological science, the reference group; for non-STEM fields, we use 19 dummy variables to identify specific majors. We enter federal service and age in both years and years-squared to allow for the curvilinear impact of work experience on earnings – pay rises much more rapidly early than late in the career.

To compare gender and race pay disparities for STEM and non-STEM employees in the federal and private sectors, we switch to the 5% Public Use Microdata Sample (PUMS-5) from the 2000 Census. We restrict the sample to college graduates who are full-time, full-year employees of either the federal government or private, for-profit firms. (That is, we

[1] Sample sizes are too small, especially for STEM degree-holders, to also break employees out by race/ethnicity.

drop all part-time employees and all those who work for themselves, for nonprofit organizations, and for state and local governments). The sample is huge – over 700,000 workers – which allows us to examine Asian, African-American, Hispanic, and non-Hispanic white men and women separately. (We drop members of other races or ethnicities).

Because the Census has no information on the field of study of the person's highest degree, we use its 23 broad occupational categories to group college graduates into STEM and non-STEM workers. We treat those in the "computer and mathematical," "architecture and engineering," and "life, physical, and social science" broad occupational categories (excluding the architects and social scientists) as STEM workers. This is not as clean a measure as in the CPDF, because people can work in STEM occupations without formal education in STEM fields (e.g., most federal computer scientists do not have computer science degrees (Lewis and Hu, 2005) and the most successful employees with STEM educations may be managers rather than working in STEM occupations.

We begin by examining differences in mean salaries, educational levels, and ages of STEM and non-STEM employees by sector, sex, and race. We next examine how salaries differ by race and sex within each sector and occupation type by running regressions analyses with the natural logarithm of 1999 earnings as the dependent variable. Our key independent variables are seven dummy variables distinguishing white females and Asian, black, and Latino males and females from white males, the reference group. We include three dummy variables to distinguish those with master's, professional, and doctoral degrees from those with bachelor's degrees. In place of the major field of study variables in the CPDF analysis, we include dummy variables to represent broad occupational categories (or 475 detailed occupations, in unreported analyses that did not meaningfully change the findings). As a proxy for work experience, we enter age and age-squared. We add dummy variables to identify those who have limited English proficiency, are not U.S. citizens, are naturalized citizens, or have a disability that impedes work. We also include 50 dummy variables for state of residence as proxies for labor market conditions. All information is self-reported, so earnings information is likely to be less accurate than in federal personnel records. Further, we know total 1999 earnings and the site of the respondent's primary job at the time of the Census, but we do not know whether total earnings were from that employer; the employee might have worked multiple jobs or changed jobs during the year.

We run regression analyses separately by sector and by whether the occupation is STEM or non-STEM. To determine whether women and minorities benefit disproportionately from working in STEM occupations, we repeat the earnings analyses separately by race and sex, but combining both sectors and all occupations. To determine whether female and minority STEM workers benefit disproportionately from federal employment, we repeat those analyses separately for STEM and non-STEM workers.

Findings

Federal Personnel Data. The percentage of federal employees with degrees in STEM fields who were women doubled between 1983 (10.4%) and 2003 (22.3%), while women's mean salary rose from 75 to 91 percent of men's among STEM degree-holders (Table 1). The male-female difference in mean salaries dropped from $9,300 to $7,000, even while women's mean salary rose from $27,800 to $71,900. Women's rising qualifications clearly contribute to that progress. Female STEM majors' mean level of federal experience rose by 4.8 years, shrinking the male-female difference from 5.7 to 3.1 years. The percentage of women who had graduate degrees rose from 23 to 33 percent, eliminating the male-female difference. The percentage of STEM women with degrees in the best-paying fields (computer science and engineering) more than doubled over these 20 years. STEM men were still nearly twice as likely as STEM women to have engineering degrees in 2003, but they had been over four times as likely to do so in 1983. Women were three times as likely as men to have studied the lowest-paying field (biological science) in 1983, but only twice as likely to have done so in 2003. Racial diversity increased for both female and male STEM majors, though women remained more diverse. In 1983, 78.8% of women and 91.8% of men were white, but both percentages dropped at least 10 points by 2003, with increases most rapid for Asians and Hispanics.

--- --- --- Table 1 about here --- --- ---

Similar changes are occurring among college graduates in other fields, though not as rapidly. Women rose from 27 to 42 percent of college graduates in non-STEM fields, while their mean salary rose from 73 to 89 percent of men's. Women's gains in federal experience were even more striking than in STEM fields, though their educational gains were slower. Declines in the white percentages were comparable, but minorities were strikingly more likely to be African-American in non-STEM fields.

Even when comparing those with the same level of education, field of study, federal experience, age, and race, STEM women earned 7.2 percent less than STEM men in 1983 (Table 2). By 2003, that "unexplained" pay difference had disappeared. Most of the race/ethnicity coefficients are not statistically significant in either year; this is partly due to the small number of minorities in the sample, but the point estimates are small as well. Asians are the largest minority group; their unexplained pay gap relative to whites dropped from a statistically significant disadvantage of 6.3 percent in 1983 to an insignificant 0.7 percent advantage in 2003. A master's degree boosted expected salary by 11 to 13 percent relative to bachelor's degree-holders, and a doctorate raised it by 32 to 40 percent. In 1983, those with engineering degrees earned 25 percent more than those with degrees in biological science, the reference group, but that advantage shrank somewhat by 2003 while the advantage to studying computer science nearly caught up.

--- --- --- Table 2 about here --- --- ---

In the non-STEM fields, women, blacks, and Latinos lagged further behind comparably experienced and educated white males in the same majors. Even in 2003, women earned 8 percent less than comparable men, and African-Americans and Hispanics earned 4 or 5 percent less than non-Hispanic whites. Unexplained gender differences in pay shrank at about the same rates in STEM and non-STEM fields, but lower educational levels hurt women in non-STEM fields, where graduate degrees paid relatively more compared to bachelor's degrees. As the average STEM major earned about 10 percent more than a non-STEM major with the same characteristics in both years (in unreported regressions), women and minorities reap a double-reward for studying STEM fields – the pay is higher and the pay disadvantage relative to white men is smaller.

In sum, the number of female and minority college graduates working for the federal service has risen substantially over the past quarter-century, but the increase has been most striking in science, technology, engineering, and mathematics. Although women, blacks, and Latinos remain badly under-represented in these fields, they have more than doubled their numbers, and their salaries have risen meaningfully relative to comparable white men. Women with degrees in STEM fields earned 91% as much as men in 2003, despite lower experience levels and greater concentration in lower-paying sub-fields; controlling for these differences completely erased expected differences in pay between men and women. Although women and minorities with degrees in non-STEM fields have also made gains in numbers and earnings, women lag a bit further behind in mean salaries, and differences in education and experience explain very little of the difference in mean salaries. STEM fields offer the prospect that women and minorities who obtain the necessary education and find federal jobs will earn as much as comparable white men.

Census Data. Federal STEM workers are both more and less diverse than those in the private sector. Women and blacks comprised 24 and 7 percent, respectively, of college graduates in STEM occupations in the federal government and only 20 and 4 percent of those in the private sector (Table 3). On the other hand, whites held a bigger share of federal STEM jobs (82 *versus* 77 percent), primarily because Asians were twice as common in the private sector (16 *versus* 8 percent). Among non-STEM college graduates, the federal diversity advantage is clearer: Federal workers are 4 percentage points more to be women, 7 points more likely to be black, 1 point more likely to be Latino, 7 points *less* likely to be white, and only 1 point less likely to be Asian.

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Gender and race differences in pay tended to be smaller in the federal sector and in STEM occupations, but the pattern is complicated. Among STEM workers, black males and white females lagged $5,500 and $9,100, respectively, behind white men's mean salary in the federal sector, while they lagged $10,800 and $14,200 behind in the private sector. Because white men's mean salary was $16,000 higher in the federal than in the private sector, however, both black men and white women made about $1,000 more in the private than in the federal sector. Asian STEM workers did better relative to white men in the private sector; otherwise, gender and race differences are always smaller in the federal sector.

Race and gender pay differences are also smaller in STEM occupations, though this effect is over-stated because white males comprise an especially large percentage of managers, doctors, and lawyers, who earned $34,000 more than those in other non-STEM occupations, on average. When we drop those occupations, the race and gender differences in the remaining non-STEM occupations become much more similar to those for STEM workers in the federal sector, though in the private sector pay gaps for non-STEM workers remain about twice as high as those for STEM workers. Mean salaries vary by gender, race, sector, and occupation type due to other characteristics of workers, of course. White men tend to be more experienced and better educated: their mean age is almost always higher than other groups in the same sector and occupation type, and their mean level of education is usually higher. The remaining analyses control for those differences.

White men still earn significantly more than women and minorities in both STEM and non-STEM occupations and in both the federal and private sectors even after controlling for experience, education, broad occupational category, and state of residence. Among federal workers in STEM occupations, the pay gaps for men ranged from a statistically insignificant 3.8 percent for Hispanics to 8.3 percent for African-Americans; the pay gaps for women were as small as 8.6 percent for whites and as large as 13.4 percent for Asians (Table 4). Although Asian STEM workers did better relative to white men in the private sector, pay gaps were smaller in the federal service both for black and Hispanic men (by about 2.5 percentage points) and for non-Asian women (by about 5 percentage points).

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Race and gender pay gaps tend to be smaller in STEM than in non-STEM occupations.[2] Among federal workers, unexplained pay differences relative to white men are only about a percentage point wider for Asians and for Hispanic men in non-STEM occupations, but they are 3 to 7 percentage points bigger for black men and non-Asian women. In the private sector, unexplained pay gaps are 9 to 19 percentage points wider in non-STEM occupations for all groups. White women and non-Asian minorities do best relative to white men when they work in STEM occupations in the federal service and worst relative to white men in non-STEM occupations in the private sector.

Thus, women and minorities gain more than white men from working in STEM fields. Separate regressions by race and sex, with STEM and non-STEM workers in the federal and private sectors combined, make this clearer (Table 5). As in Table 4, the dependent variable is the natural logarithm of 1999 earnings and the control variables are the same. Coefficients

[2] Dropping managers, doctors, and lawyers had far less impact in the regression analysis than in the analysis of mean salaries, so we focus on patterns for non-STEM occupations as a whole.

on the dummy variables for the broad occupational categories show expected differences in earnings relative to comparable employees in business and finance, the reference group, which paid about average for college graduates.

--- --- --- Table 5 about here --- --- ---

White men earn only 2 to 4 percent more in engineering, computer science, and mathematics than they do in business and finance, but for all other groups, the pay advantage to engineering, computer science, and mathematics occupations is 14 to 29 percent. In contrast, white and minority men receive very similar advantages from working in the three top-paying non-STEM occupations, and women gain almost as much. Men make about 25 percent more in management positions than in business and finance; for women, the advantage is about 15 percent. Legal occupations pay 11 to 26 percent better than business and finance for all groups, with white men in the middle with a 17 percent pay advantage. Health care practitioners also fare well, especially men, as low pay for nurses probably pulls down women's earnings in this category.

The bottom panel of Table 5 reports the expected pay difference between comparable federal and private-sector employees from 16 additional regressions, run separately by race, sex, and whether the employees worked in a STEM or non-STEM occupation. Although economists typically find that federal employees earn more than workers with comparable characteristics in the private sector, especially if they are female or minority, we find no evidence of a federal pay advantage for STEM workers of any race or gender. White men in STEM occupations are expected to make 7.5 percent less in the federal service than comparable men working for private, for-profit firms. The apparent pay disadvantage looks even larger for Asians and nearly as large for black and Hispanic men, though it is only about 3 percent for white women and is not statistically significant for either black or Hispanic women.

In contrast, only white men earn significantly less (by 9 percent) working for the federal government than for a private firm if they are in non-STEM occupations. Asian and Hispanic men's expected pay does not differ significantly between the sectors. Black men appear to earn 5 percent more and women earn 7 to 11 percent more in the federal than in the private sector.

In sum, Census data provide a less sanguine picture of gender and race pay disparities among STEM workers in the federal service than do the CPDF data: minority men earn 4 to 8 percent less, and women earn 8 to 20 percent less, than apparently comparable white men. Two data weaknesses suggest that Census data overstate pay disparities, however. First, the age proxy for work experience in the Census data is far less accurate than the direct federal experience measure in the federal personnel records, especially for women, who tend to have spent longer periods outside the labor market. Second, identifying STEM workers by their occupations rather than their degrees majors will suggest discrimination against employees who have entered STEM occupations without full educational credentials. The Census data confirm, however, that pay disparities are smaller in STEM than non-STEM occupations.

Conclusions

Although research on female scientists in academic settings suggests that women still face major obstacles to achieving full equality, our research finds many hopeful signs for female and minority scientists and engineers in government and industry. Diversity is rising and pay disparities are disappearing in STEM fields in the federal service. Women and minorities comprise a rapidly growing proportion of STEM degree-holders in the federal sector. Federal personnel records show that women and minorities with STEM majors earn as much as comparable men and whites. Census data suggest that race and gender pay disparities persist among comparable employees in the federal sector, though weaknesses in work experience and education measures suggest that Census data may overstate the problem.

Both data sets, however, indicate that pay disparities in the federal sector are smaller for STEM than non-STEM workers. Census data show that race and gender pay disparities are smaller for STEM than non-STEM workers in the private sector as well.

Throughout the economy, women and minorities in STEM occupations earn more than female and minority college graduates in other fields. For white men, an occupation in engineering or computer science pays only marginally better than a job in business and finance and markedly less than a management, legal, or health care practitioner occupation. Female and minority engineers and computer scientists, however, generally earn substantially more than comparable women and minorities in business and finance and as much or more than those in legal and health care practice occupations; women in STEM occupations even earn more than comparable women in management occupations.

The Census data confirm earlier findings that race and gender pay disparities are smaller in the federal government than in the private sector, though they do not replicate previous findings that comparable workers earn more in the federal sector. STEM workers, even women and minorities, earn significantly less in the federal sector than comparable workers in the private sector. Although female and minority scientists and engineers are over-represented in the federal government (relative to their numbers in the private sector), that over-representation is smaller than for other college graduates. Though women and non-Asian minorities remain more likely than white men in STEM fields to choose federal employment, female and minority scientists and engineers typically earn more in the private than in the federal sector – a pattern we still do not see for college graduates in other fields. Women and minorities still face major obstacles to obtaining STEM degrees and entering STEM occupations, but those who overcome them typically gain more than do white men. From being a major source of pay disparities, STEM fields are becoming a new path to equality.

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Table 1. Mean Characteristics of College Graduates in the Federal Service, by Field and Year

	STEM Majors				Others			
	1983		2003		1983		2003	
	Female	Male - Female Difference	Female	Male - Female Difference	Female	Male - Female Difference	Female	Male - Female Difference
Composition (%)	10.4		22.3		27.1		42.4	
Salary ($1,000s)	27.8	9.3***	71.9	7.0***	24.6	8.9***	64.0	7.7***
Federal experience (years)	9.0	5.7***	13.8	3.1***	8.6	5.0***	15.8	1.7***
Age (years)	36.7	6.5***	42.8	4.2***	38.2	4.4***	45.6	2.8***
Education (%)								
Bachelor’s degree	76.6	-5.8	67.1	0.0	76.9	-4.4*	71.2	-2.7
Master’s degree	17.5	3.7	24.6	-1.4	21.5	2.4	26.9	1.0
Doctoral degree	5.8	2.1	8.3	1.4	1.6	2.1**	1.9	1.6**
Race and/or ethnicity (%)								
Asian	4.4	-1.5	10.9	-2.2	2.5	-1.0	5.7	-2.0**
Black	12.4	-8.7***	13.4	-8.0***	16.8	-10.7***	21.1	-12.0***
Hispanic	4.4	-2.8*	7.7	-3.6**	1.8	0.5	4.5	0.5
White	78.8	13.0***	67.9	13.9***	78.9	11.1***	68.7	13.6***
Major field of study (%)								
Biological science	35.0	-23.7***	34.8	-18.2***				
Computer science	4.4	-1.9	11.5	-5.3**				
Engineering	13.9	45.7***	30.0	25.6***				
Mathematics	24.8	-17.1***	8.9	-2.9				
Physical science	21.9	-3.0	14.7	0.7				
Sample size	137	1177	313	1088	766	2058	1429	1939

Differences significant at * .05 level, ** .01 level, *** .001 level.
Source: Calculated by authors from U.S. OPM, Central Personnel Data File, 1% sample, 1983 and 2003.

Table 2. Expected Percentage Differences in Salaries, by Field and Year

	STEM Majors		Others	
	1983	**2003**	**1983**	**2003**
Female	-7.2***	0.1	-13.3***	-7.6***
	(3.84)	(0.05)	(11.41)	(7.80)
African-American	-2.9	-1.9	-4.3*	-3.8**
	(1.09)	(0.78)	(2.50)	(2.75)
Latino	4.3	-3.2	9.6**	-4.7*
	(1.02)	(1.16)	(2.96)	(2.15)
Asian-American	-6.3*	0.7	-2.5	-1.3
	(2.05)	(0.35)	(0.68)	(0.54)
Master's Degree	11.1***	12.8***	17.9***	19.5***
	(7.64)	(8.20)	(13.29)	(15.97)
Doctorate	32.5***	39.3***	49.2***	44.1***
	(12.69)	(14.46)	(13.57)	(12.25)
Computer science	13.2***	19.4***		
	(3.38)	(6.72)		
Engineering	25.1***	21.9***		
	(12.86)	(11.91)		
Mathematics	18.1***	16.6***		
	(7.20)	(5.74)		
Physical science	14.8***	8.6***		
	(7.06)	(4.07)		
Observations	1312	1372	2818	3347
R-squared	0.65	0.46	0.55	0.39

Absolute value of t statistics in parentheses
Differences significant at * .05 level, ** .01 level, *** .001 level.

Source: Calculated by authors from U.S. OPM, Central Personnel Data File, 1% sample, 1983 and 2003. Sample restricted to college graduates in full-time positions. All models also include federal experience and age in years and years-squared. The non-STEM models also include 19 dummy variables for major fields of study. The dependent variable is the natural logarithm of salary. We exponentiated coefficients, subtracted 1, then multiplied times 100 to convert to percentage differences.

Table 3. Characteristics of College Graduates, by Field and Sector

STEM Occupations

	Federal Sector				Private Sector			
	Salary	**Educ**	**Age**	**Percent**	**Salary**	**Educ**	**Age**	**Percent**
White Male	65.0	17.1	44.5	64.0	71.2	16.7	39.9	62.9
Difference from White Males:								
Black Male	-5.5	-0.3	-2.0	3.8	-10.8	-0.2	-2.2	2.5
Hispanic Male	-4.4	-0.1	-2.9	2.7	-9.4	-0.1	-3.2	2.5
Asian Male	-2.3	0.6	-1.0	5.7	0.1	0.6	-3.2	11.8
White Female	-9.1	0.0	-3.3	17.6	-14.2	-0.1	-3.0	14.3
Black Female	-11.4	-0.4	-4.7	3.3	-20.0	-0.3	-4.7	1.4
Hispanic Female	-13.2	-0.1	-5.4	1.1	-17.3	-0.1	-5.2	0.7
Asian Female	-14.0	0.6	-4.6	1.8	-11.2	0.5	-4.4	3.8

Non-STEM Occupations

	Federal Sector				Private Sector			
	Salary	**Educ**	**Age**	**Percent**	**Salary**	**Educ**	**Age**	**Percent**
White Male	62.8	16.9	43.3	53.8	85.7	16.7	41.5	53.4
Difference from White Males:								
Black Male	-9.1	-0.2	-0.3	5.8	-29.3	-0.1	-1.9	2.6
Hispanic Male	-7.3	-0.2	-2.5	3.4	-28.0	0.1	-3.1	2.7
Asian Male	-6.1	0.0	0.7	3.3	-14.4	0.2	-0.9	3.4
White Female	-9.7	0.0	-0.6	22.8	-33.4	-0.1	-3.5	30.2
Black Female	-15.3	-0.3	-1.8	6.5	-42.9	-0.2	-3.9	2.9
Hispanic Female	-14.1	-0.1	-3.3	2.0	-44.1	0.0	-5.3	1.9
Asian Female	-14.1	-0.2	0.5	2.4	-38.2	-0.1	-2.5	2.9

Non-STEM Occupations, Excluding Managers, Doctors, and Lawyers

	Federal Sector				Private Sector			
	Salary	**Educ**	**Age**	**Percent**	**Salary**	**Educ**	**Age**	**Percent**
White Male	56.2	16.7	42.5	55.0	69.0	16.4	40.7	51.5
Difference from White Males:								
Black Male	-6.7	-0.2	0.3	6.3	-22.0	0.0	-1.4	3.1
Hispanic Male	-6.0	-0.1	-2.2	3.6	-23.5	0.2	-2.8	3.0
Asian Male	-7.3	-0.2	1.5	3.5	-15.1	0.2	-0.2	3.4
White Female	-8.7	0.0	-0.3	20.5	-23.7	0.0	-3.1	30.7
Black Female	-12.0	-0.2	-1.3	6.8	-31.2	-0.1	-3.6	3.2
Hispanic Female	-12.3	-0.1	-2.9	1.9	-33.5	0.1	-4.8	2.1
Asian Female	-13.9	-0.2	1.3	2.4	-29.9	0.0	-1.7	3.1

Source: Calculated by authors from U.S. Bureau of Census, 2000 Census, 5% Public Use Microsample.

Table 4. Expected Percentage Differences in 1999 Earnings

Occupations	STEM Occupations		Non-STEM Occupations		Non-STEM Excluding M, D, & L	
	Federal Sector	Private Sector	Federal Sector	Private Sector	Federal Sector	Private Sector
Asian Male	-4.5*	1.2*	-6.1***	-10.6***	-5.4***	-11.4***
	(2.49)	(2.06)	(4.81)	(20.47)	(3.64)	(17.93)
Black Male	-8.3***	-10.9***	-11.1***	-20.6***	-10.8***	-19.8***
	(4.96)	(13.24)	(13.80)	(43.20)	(11.71)	(36.38)
Hispanic Male	-3.8	-6.3***	-4.2***	-16.6***	-1.9	-15.5***
	(1.81)	(7.32)	(3.66)	(31.92)	(1.44)	(25.31)
White Female	-8.6***	-13.8***	-13.7***	-26.4***	-13.4***	-23.6***
	(9.93)	(36.93)	(29.54)	(152.45)	(23.55)	(109.51)
Asian Female	-13.4***	-9.6***	-14.6***	-28.1***	-14.9***	-27.6***
	(5.26)	(12.44)	(10.58)	(56.13)	(9.01)	(45.85)
Black Female	-11.8***	-19.3***	-18.9***	-32.8***	-18.7***	-30.1***
	(6.66)	(18.70)	(25.01)	(77.14)	(21.36)	(59.85)
Hispanic Female	-10.0**	-14.9***	-14.4***	-31.4***	-13.6***	-29.2***
	(3.27)	(9.73)	(10.60)	(57.22)	(8.17)	(45.07)
Observations	10,974	107,113	45,095	534,196	30,352	332,162
R-squared	0.31	0.20	0.32	0.31	0.28	0.25

Absolute value of t statistics in parentheses
Differences significant at * .05 level, ** .01 level, *** .001 level.

Source: Calculated by authors from U.S. Bureau of Census, 2000 Census, 5% Public Use Microsample. Sample is restricted to college graduates working full time in either the federal or private, for-profit sector. Models include highest degree (three dummy variables), age, age-squared, disability status, citizenship status, limited English proficiency, state of residence, and 4 or 22 broad occupational categories. The dependent variable is the natural logarithm of salary. We exponentiated coefficients, subtracted 1, then multiplied times 100 to convert to percentage differences.

Table 5. Expected Percentage Differences in 1999 Earnings

	White Men	Asian Men	Black Men	Hispanic Men	White Women	Asian Women	Black Women	Hispanic Women
Management occupations	22.5***	24.9***	26.9***	24.5***	16.6***	15.8***	11.5***	14.0***
	(56.38)	(15.70)	(16.29)	(12.93)	(37.24)	(10.64)	(9.25)	(7.39)
Legal occupations	17.1***	14.8***	15.9***	26.5***	12.3***	21.0***	10.8***	21.3***
	(20.08)	(3.67)	(4.47)	(6.69)	(14.73)	(6.08)	(4.44)	(6.16)
Healthcare practitioners and technical	13.1***	17.8***	15.8***	37.5***	-4.4***	14.6***	6.6***	3.8
	(18.92)	(8.42)	(6.32)	(12.60)	(9.31)	(10.39)	(5.01)	(1.82)
Computer & mathematical	3.6***	20.8***	21.8***	18.2***	14.9***	34.5***	18.6***	23.0***
	(7.76)	(13.85)	(11.36)	(7.95)	(23.78)	(22.34)	(11.56)	(7.75)
Engineering	2.5***	14.1***	20.7***	17.6***	17.6***	25.7***	28.6***	28.4***
	(5.52)	(8.99)	(9.56)	(7.76)	(16.40)	(10.82)	(9.28)	(6.38)
Biological & agricultural science	-21.6***	-20.6***	-4.1	-8.9	-14.7***	-12.0***	-2.2	-6.6
	(22.04)	(7.59)	(0.90)	(1.72)	(12.11)	(4.64)	(0.57)	(1.19)
Other physical science	-11.2***	-8.7***	4.1	-4.3	-3.2*	-1.1	2.9	-8.8
	(13.10)	(3.61)	(0.94)	(0.97)	(2.54)	(0.43)	(0.60)	(1.51)
Observations	391,012	33,982	20,055	19,261	191,402	21,500	20,479	11,779
R-squared	0.24	0.24	0.24	0.31	0.26	0.31	0.27	0.33
Separate Models for STEM and non-STEM Occupations								
Federal employee (STEM)	-7.5***	-9.0***	-6.3**	-6.8*	-2.9**	-9.7**	-0.9	-1.7
	(13.27)	(4.64)	(2.72)	(2.46)	(2.71)	(3.07)	(0.37)	(0.35)
Federal employee (non-STEM)	-9.0***	-1.4	5.3***	2.9	6.9***	9.1***	10.9***	8.7***
	(20.04)	(0.77)	(3.99)	(1.59)	(11.98)	(5.23)	(10.42)	(4.25)

Absolute value of t statistics in parentheses
Differences significant at * .05 level, ** .01 level, *** .001 level.

Source: Calculated by authors from U.S. Bureau of Census, 2000 Census, 5% Public Use Microsample. Sample is restricted to college graduates working full time in either the federal or private, for-profit sector. Model 1 combines STEM and non-STEM workers; Model 2 includes only STEM workers, and Model 3 includes only non-STEM workers. Models include highest degree (three dummy variables), age, age-squared, disability status, citizenship status, limited English proficiency, state of residence, and 23, 4, or 22 broad occupational categories. The business and finance occupational group is the reference group for the occupational groups in Model 1. Employees of private, for-profit firms are the reference group in Models 2 and 3. The dependent variable is the natural logarithm of salary. We exponentiated coefficients, subtracted 1, then multiplied times 100 to convert to percentage differences.