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Working Paper

The impact of affirmative action on the employment of minorities and women over three decades: 1973-2003

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Researching the causes and consequences of unemployment

The Impact of Affirmative Action on the Employment of Minorities and Women over Three Decades: 1973–2003

Upjohn Institute Working Paper No. 15-221

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January 10, 2015

ABSTRACT

What role has affirmative action played in the growth of minority and female employment in U.S. firms? This paper analyzes this issue by comparing the employment of minorities and women at firms holding federal contracts and therefore mandated to implement affirmative action, and at noncontracting firms, over the course of three decades spanning 1973–2003. It constitutes the first study to comprehensively document the long-term impact of affirmative action in federal contracting on the U.S. employment landscape. The study uses a new panel data set of over 100,000 large private-sector firms across all industries and regions, obtained from the U.S. Equal Employment Opportunity Commission, and it exploits rich variation across firms in the timing of federal contracting to identify affirmative action effects. The paper's key results indicate that the primary beneficiaries of affirmative action in federal contracting over 1973–2003 were black and Native American women and men. Analysis of the dynamics of workforce composition around the time of contracting reveals that a large part of the effect of affirmative action on increasing protected group shares occurred within the first four years of gaining a contract, and that these increased shares persisted even after a firm was no longer a federal contractor. The paper also uncovers important results on how the impact of affirmative action evolved over 1973–2003. In particular, it finds that the fastest growth in the employment shares of minorities and women at federal contractors relative to noncontracting firms occurred during the 1970s and early 1980s, decelerating substantially in ensuing years.

JEL Classification Codes: J15, J16, J21, J7, K31, N32, N42, M51

Keywords: Affirmative Action in the Labor Market; Gender; Race; Workforce Composition

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1 BACKGROUND

The primary goal of affirmative action legislation is to increase minority and female representation across American workplaces. However, the dearth of comprehensive data conducive to analyzing the effects of affirmative action in employment on the U.S. labor force has made it difficult to determine the extent of these effects. Long-term trends show that minority and female shares of employment in large U.S. firms have been rising since the 1960s (Figure 1). For example, from 1973 to 2003 the employment share increased from 4.7 to 5.8 percent for black women, from 2.1 to 4.4 percent for Hispanic women, and from 3.7 to 6.7 percent for Hispanic men.[1] What role has affirmative action played in the employment growth of minorities and women in U.S. firms over the past few decades? Using a new, large national data set obtained from the U.S. Equal Employment Opportunity Commission (EEOC), this paper analyzes this question by comparing the employment of minorities and women at firms holding federal contracts and therefore mandated to implement affirmative action, and noncontracting firms, over the three decades spanning 1973 to 2003.[2] The paper exploits rich variation across firms during these decades in the timing of federal contracting to identify affirmative action effects, and it constitutes the first study to comprehensively document the long-term impact of affirmative action in contracting on the U.S. employment landscape.

A major way in which this analysis advances the previous literature is that it identifies affirmative action effects from longitudinal variation in the timing of federal contracting across firms over time, which alleviates selection issues that have plagued this area of research in the

[1] These figures are based on EEOC data, and Current Population Survey (CPS) figures on employment shares by race and gender also reflect these trends.

[2] In a companion paper (Kurtulus 2012), I examine the role affirmative action has played in the occupational advancement of minorities and women from low-wage, unskilled occupations into high-wage, skilled ones.

past. The research design controls for numerous sources of heterogeneity in panel regressions that threaten the identification of affirmative action effects, including time-varying observed firm heterogeneity, time-invariant unobserved firm heterogeneity, and industry-specific, region-specific, and economy-wide trends that may additionally affect the employment growth of minorities and women within firms. Furthermore, dynamic event study analysis around the time of contract gain allows for the examination of possible anticipatory effects and selection into federal contractor status. Finally, analysis of the dynamics of employment around the end of contract durations enables the analysis of persistence of affirmative action effects even after firms no longer hold federal contracts.

The main results of the paper reveal that the cumulative effects of affirmative action in contracting over 1973–2003 were mixed across race and gender groups, with the primary beneficiaries being black and Native American women and men. Specifically, the share of black and Native American women and men grew more on average at federal contractors subject to affirmative action obligation than at noncontracting firms during 1973–2003, and this result is robust to controlling for firm size, corporate and occupational structure, industry-specific shocks, economy-wide shocks, and firm fixed effects. On the other hand, affirmative action in contracting did not increase the employment of Hispanic and Asian women and men, while it decreased white female representation on average during this time.

Moreover, the analysis of the dynamics of workforce composition around the time of contracting reveals that a large part of the effect of affirmative action on increasing protected group shares occurred within the first four years of a firm's gaining a contract. Evaluation of time patterns prior to contracting, with sharp employment increases following contract gain, supports the interpretation of the estimates as causal effects of affirmative action in contracting.

Furthermore, employment dynamics at the end of contract durations show that increased protected group shares persisted even after a firm was no longer a federal contractor.

The paper also uncovers important results on how the impact of affirmative action evolved over 1973–2003; in particular, it finds that the fastest growth in the employment shares of minorities and women at federal contractors relative to noncontracting firms occurred during the 1970s and early 1980s, and that this growth rate decelerated substantially in ensuing years.

Affirmative action in the labor market was made a federal law in 1961 by President John F. Kennedy with Executive Order 10925, which mandated that government contractors "take affirmative action to ensure that applicants are employed and employees are treated during employment without regard to their race, creed, color, or national origin"; it also established the Committee on Equal Employment Opportunity. In 1965, President Lyndon B. Johnson's Executive Order 11246 expanded affirmative action to cover women and established the Office of Federal Contract Compliance Programs (OFCCP), which is the branch of the Department of Labor in charge of affirmative action and nondiscrimination enforcement. Johnson's executive order mandated that federal contractors prepare annual written affirmative action plans that identified the underutilization of women and minorities relative to their representation in the labor market from which they were recruited, and that they develop goals and timetables for their hiring. Furthermore, it stipulated that contractors are subject to compliance reviews by the OFCCP and specified penalties for noncompliance, ranging from revocation of current government contracts to suspension of the right to bid on future contracts.[3]

[3] The OFCCP Federal Contract Compliance Manual, which provides guidelines for affirmative action and equal employment opportunity implementation, states that the geographic area used to determine labor availability of protected groups may vary from local to nationwide as the skill level required for the job increases (OFCCP 1998, Chapter 2, Section G).

During the initial years of the civil rights movement, minorities and women did benefit from affirmative action. In early seminal research using data from the EEOC, Ashenfelter and Heckman (1976), Goldstein and Smith (1976), and Smith and Welch (1984) found a positive affirmative action effect of federal contractor status on increasing the employment of black males from 1966 to 1970, from 1970 to 1972, and from 1970 to 1980, respectively. Heckman and Wolpin (1976) found a similar result in their analysis of firms in the Chicago metropolitan area for the period 1970–1973, and Leonard (1984a,b, 1986) found that affirmative action led to faster growth in the employment of minorities and women from 1974 to 1980.[4,5] The current paper updates and considerably expands our knowledge about the employment effects of affirmative action since these early studies, something that has not been possible until now, owing to the unavailability of appropriate data. This is also the first study to provide a breakdown of affirmative action effects for Hispanics, Asians, and Native Americans individually.

There was a dramatic reversal in federal support for affirmative action in the 1980s. In 1981, the OFCCP came under new leadership that was committed neither to the organization nor to affirmative action. In 1982, a fervent opponent of affirmative action, Clarence Thomas, was appointed to head the EEOC.[6] During the presidency of Ronald Reagan, a serious effort was made to rescind Executive Order 11246, and when that failed, steps were taken to weaken affirmative action enforcement. During the Reagan years, the OFCCP rarely issued sanctions for noncompliance, and the number of employment-discrimination lawsuits plummeted (Anderson

[4] Brown (1982) provides a critical review of some of these early studies.

[5] A related study specific to police officers, McCrary (2007), examined the effect of court-ordered racial hiring quotas imposed on 314 municipal police departments following discrimination lawsuits during 1960–1999, finding a positive effect on new black hires.

[6] Clarence Thomas later became the second African American appointed to the U.S. Supreme Court, an appointment that was made by President George H. W. Bush in 1991. Thomas succeeded Thurgood Marshall, who had been the first African American Supreme Court Justice and had been appointed by President Johnson in 1965.

1996; Donohue and Siegelman 1991; Leonard 1990, 1996).[7] Enforcement activity increased a bit in 1989 when President George H. W. Bush took office, and it accelerated with the inauguration of President Bill Clinton in 1993.[8]

In recent years, there have been efforts to rescind affirmative action at the state level: California prohibited affirmative action in public employment in 1996, Washington in 1998, Michigan in 2006, Nebraska in 2008, and Arizona in 2010. Legislation is pending in several other states, and the future of affirmative action in the United States is uncertain. Rhetoric abounds on both sides of the affirmative action debate, but there is little hard evidence brought to bear to inform policy discussions. As Blau and Winkler (2005) put it, "After four decades, we are still debating how much impact affirmative action can and should have on opportunities and outcomes at work. . . . In all the controversy and rancor, there is one question that is less often asked and even less frequently answered: Does affirmative action in employment actually work?" (p. 38).

This study is the first to present comprehensive evidence on the implications of affirmative action on the employment growth of minorities and women based on a large national panel data set uniquely suited to the analysis of this topic. The data set contains detailed information on both federal contractors bound by affirmative action obligation and noncontracting firms across all industries and regions of the United States. A further contribution of this study is that it is the first to present evidence on how the effect of affirmative action has evolved over three decades that have spanned political administrations with drastically different

[7] From 1979 to 1985, EEOC staff was reduced by 20 percent, while real expenditures were held virtually constant; and the OFCCP reduced its employment by 10 percent and its budget by 20 percent. A stark example of the consequences of the reductions in OFCCP staffing, budget, and enforcement power during this time was the case involving the Los Alamos National Laboratory in New Mexico in which an OFCCP review that should have taken 60 days ended up taking five years to complete (House Committee on Education and Labor 1987).

[8] See Holzer and Neumark (2000) for a detailed review of affirmative action legislation and enforcement since the 1960s.

views about affirmative action, allowing us to assess the long-term impact of affirmative action on the employment of minorities and women. The EEOC firm reports have only recently become available to scientific researchers for the first time since the early 1980s. With more than 100,000 firms and a span of over 31 years, these data constitute the largest and longest available panel of U.S. firms with information on gender and race composition. The paper's research design exploits variation in the timing of contracting to identify the causal impact of affirmative action in federal contracting on increasing minority and female representation at U.S. firms. The research design is able to control for numerous sources of heterogeneity in panel regressions that threaten the identification of the effect of affirmative action, including time-varying observed firm heterogeneity, time-invariant unobserved firm heterogeneity, and industry-specific, region-specific, and economy-wide trends that may additionally affect the employment growth of minorities and women.

2 DATA

The source of the firm-level data is the confidential annual EEO-1 Employer Information Reports for 1973 and for each year from 1978 through 2003, which have been collected by the U.S. Equal Employment Opportunity Commission as mandated by Title VII of the U.S. Civil Rights Act of 1964. These reports summarize the occupation, race, and gender composition of employees at all U.S. private-sector firms with at least 100 employees and private-sector federal contractors with at least 50 employees.[9,10] This data set is exceptional for several reasons. First,

[9] The 1974–1977 EEO-1 records were unavailable from the U.S. Equal Employment Opportunity Commission.

[10] EEO-1 reporting requirements prior to 1983 were for firms with at least 50 employees and federal contractors with at least 25 employees to submit records. As a robustness check, I estimated the baseline regressions restricting the pre-1983 sample to firms with at least 100 employees and federal contractors with at least 50 employees to match the post-1983 EEO-1 reporting requirements. The results matched those reported in the paper

it contains records on more than 100,000 firms during the period 1973–2003. Second, it is longitudinal, allowing me to follow firms over time and thereby enabling me to use panel regression methods to control for unobserved attributes of firms that may be correlated with female and minority representation and derive sharper econometric estimates of the effect of affirmative action. EEO-1 reports have only recently become available to scientific researchers, and I have gained access to these data through use of an Intergovernment Personnel Act agreement with the Equal Employment Opportunity Commission.

EEO-1 reports contain employment counts at each firm, by gender, of five race or ethnic groups—1) White, 2) Black, 3) Hispanic, 4) Asian or Pacific Islander, and 5) Native American or Alaskan Native. These occur across nine occupational categories: 1) Managers and Officers, 2) Professionals, 3) Technicians, 4) Sales Workers, 5) Office and Clerical Workers, 6) Craft Workers, 7) Operatives, 8) Laborers, and 9) Service Workers. In their reports, firms are instructed to not include temporary or casual employees hired for a specified period of time or for the duration of a specified job but to include leased employees as well as both part-time and full-time employees. Robinson et al. (2005) compare employment covered in the EEO-1 data to employment estimates from the U.S. Bureau of Labor Statistics and report EEO-1 coverage to typically be between 40 and 50 percent of all U.S. private-sector employment, with higher proportions in industries comprising larger firms, such as manufacturing and transportation. In addition, EEO-1 reports contain information on the firm's industry, geographic location, whether the firm is a federal contractor, and whether the firm is a multiestablishment organization. Table 1 displays summary statistics for the variables I use in my empirical analysis.

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very closely. I also estimated the baseline regressions limiting the sample to firms with at least 100 employees, and the results were also very similar to the reported results.

3 EMPIRICAL STRATEGY

In my empirical analysis, the key explanatory variable is federal contractor status. About 43 percent of firms in the analysis sample are contractors (Table 1). Federal contractors are required by law to implement affirmative action and are subject to compliance reviews by the Office of Federal Contract Compliance Programs, with penalties for noncompliance ranging from revocation of current government contracts to suspension of the right to bid on future contracts. My empirical approach is thus to investigate the relationship between firm federal contractor status and changes in female and minority shares of employment in order to study the impact of affirmative action.[11] Using contracting status to understand the effects of affirmative action was also the approach taken in the earlier studies that used EEO-1 records (Ashenfelter and Heckman 1976; Goldstein and Smith 1976; Heckman and Wolpin 1976; Leonard 1984a,b, 1986; Smith and Welch 1984).[12]

I estimate fixed-effects regressions of the relationship between firm federal contractor status and the shares of women and men of different races. Identification of the federal contractor effects comes from variation in a given firm's race and gender composition as the firm's

[11] Another element that would have enriched the analysis but that I do not have data on is which contracting firms underwent formal OFCCP compliance reviews. However, it has been argued that the mere threat of enforcement can actually have a larger effect than enforcement action (Heckman and Wolpin 1976; Leonard 1985, 1996). In addition, survey evidence shows that fear of litigation or debarment from government contracting is a strong deterrent against violation of affirmative action laws even in the absence of OFCCP reviews (Badgett 1995). Therefore, I believe that the examination of the link between federal contractor status and firm workforce composition will largely account for the impact of affirmative action on advancing the employment of minorities and women.

[12] The unit of analysis in these earlier studies was an establishment, while in mine the unit of analysis is a firm. However, since the entity being awarded a government contract is the firm and not individual establishments within the firm, there is no variation at the establishment level within a given firm in my main explanatory variable, and so the firm is the more appropriate unit of analysis for the purposes of the current study. Another way in which my methodology differs from these early studies is that I control for firm fixed effects and industry-specific, region-specific, and economy-wide shocks. I take a longitudinal approach in my regressions, observing firms in each year, while the early studies used cross-sectional methods to examine employment changes either between two periods in time—1974 and 1980 in the case of Leonard (1984b, 1986); 1966 and 1970 in the case of Ashenfelter and Heckman (1976); and 1970 and 1972 in the case of Goldstein and Smith (1976)—or each year during 1970–1973 in the case of Heckman and Wolpin (1976) and every four years during 1966–1980 in the case of Smith and Welch (1984).

contractor status changes.[13] During the sample period of 1973–2003, a firm was observed for 8.1 years on average. Approximately 8 percent of noncontractors switched to being contractors the following year, and around 10 percent of contractors became noncontractors the following year. Federal contractors held their contractor status for 5.9 years on average.

The estimating equation is

(1) $\%(g)_{i,t} = \alpha Fed_{i,t} + X'_{i,t}\beta + \theta_i + \lambda_t + Industry_i \times \lambda_t + Region_i \times \lambda_t + \varepsilon_{i,t}$.

The dependent variable $\%(g)_{i,t}$ is the percentage of workers at firm *i* belonging to demographic group *g* in year *t*, where the demographic groups to be examined are $g = \{$*White Female*, *Black Female*, *Hispanic Female*, *Asian American or Pacific Islander Female*, *Native American or Alaskan Native Female*, *White Male*, *Black Male*, *Hispanic Male*, *Asian American or Pacific Islander Male*, and *Native American or Alaskan Native Male*$\}$. The key independent variable, $Fed_{i,t}$, is a dummy variable equaling one if firm *i* is a federal contractor in year *t*. My main interest is in estimating α, or the coefficient on $Fed_{i,t}$, which measures the *total* change in the share of demographic group *g* associated with becoming a federal contractor on average during 1973–2003. $X_{i,t}$ is a vector that includes a constant term and several time-varying firm controls, including firm size in year *t*, whether the firm is a multiestablishment organization in year *t*, and the percentage of workers at the firm in year *t* who are in white-collar nonclerical occupations; θ_i is a firm fixed effect; λ_t is a year fixed effect; $Industry_i \times \lambda_t$ represents interactions between industry dummies and year dummies; and $Region_i \times \lambda_t$ represents interactions between census region dummies and year dummies.

[13] I also include firms that are never contractors in the analysis sample, as these firms help identify the other coefficients in the regression model. The regression results are robust, however, to excluding never contractors, as explained later in the empirical results section.

My goal is to estimate the effect of federal contractor status on the race and gender composition at the firm, net of economy-wide and firm-specific factors that may also be influencing the evolution of firm diversity. I include firm fixed effects in Equation (1) to control for time-invariant unobserved firm attributes that may influence changes in the firm's share of minorities and women. I also include year fixed effects to control for any economy-wide shocks and general trends affecting the share of minorities and women symmetrically across *all* firms. Additionally, there may be factors influencing the share of women and minorities that vary within the firm, the firm's industry, and the firm's geographic region over time, which could bias my estimates of the relationship between contractor status and female and minority representation if such factors do not change at a national level and get picked up by the year fixed effects. Therefore, I control for such firm-specific, industry-specific, and region-specific factors as may also be increasing the firm's share of women and minorities over time.

One way to do this would be to include firm-specific time trends in Equation (1), but this is not feasible given the large number of firms in my sample. Instead, I include interactions of industry dummies with year dummies ($Industry_i \times \lambda_t$) to account for industry-specific shocks to female and minority representation. For instance, many firms in a particular industry may react to a high-profile gender discrimination lawsuit brought against a similar firm by increasing the share of women over a period of time; incorporating industry-year dummies allows me to control for such phenomena, resulting in more accurate estimates of the influence of federal contractor status net of any industry trends toward higher levels of gender and race diversity. Similarly, I also incorporate interactions of region dummies with year dummies ($Region_i \times \lambda_t$) to account for region-specific changes in available female and minority labor pools that firms face, which influence the extent to which firms can implement affirmative action hiring.

Even after controlling for firm fixed effects, year fixed effects, region-specific time effects, and industry-specific time effects, there may still remain differences across firms in factors such as management practices that vary over time and that influence the evolution of minority and female representation at the firm, biasing the estimates of the effect of affirmative action on minority and female representation. To reduce this potential source of bias, Equation (1) also includes controls for a set of observable time-varying firm characteristics that are likely to be correlated with unobservable factors such as management practices and that may influence the effect of contractor status on the share of protected groups at the firm. For example, large firms are more likely to have formalized personnel policies and recruitment programs that may reduce barriers to the hiring of women and minorities, so one might expect larger firms to have better affirmative action track records.[14] As well, one might expect contractor status to be positively correlated with firm size. In this case, a positive revealed relationship between contractor status and growth in female and minority employment shares might be spurious, picking up the correlation between protected group share and firm size. Equation (1) therefore includes controls for firm size and whether the firm is a multiestablishment organization. It also controls for the proportion of white-collar nonclerical employees at the firm, since firms with occupational structures that draw more heavily from the white-collar nonclerical workforce may exhibit smaller growth in female and minority representation because women and minorities are underrepresented in the high-skill labor markets from which these firms hire.[15]

[14] A number of past studies have found a positive relationship between employer size and the rate of black and female employment since the 1970s, including Carrington, McCue, and Pierce (2000) and Holzer (1998).

[15] See the appendix for detailed variable definitions.

4 EMPIRICAL FINDINGS

4.1 Main Results

Table 2 presents the total cumulative effect of affirmative action on the employment of women and men of different races during 1973–2003. Focusing on the coefficient estimates that are statistically significant, we see that the primary beneficiaries of affirmative action over these three decades were black and Native American women and men. In particular, becoming a federal contractor was associated with a 0.041 percentage point increase on average in the share of black women at firms and a 0.008 percentage point increase in the share of Native American women. As shown in Figure 1, the mean employment shares in 1973 of black women and Native American women were 4.706 percent and 0.206 percent, respectively, so the implied contribution of affirmative action in federal contracting to these groups was to increase their employment shares by 0.871 percent for black women and 3.883 percent for Native American women. Affirmative action also increased black men's employment share by 0.040 percentage points and Native American men's share by 0.014 percentage points, on average. Given that in 1973 black and Native American men composed 6.636 percent and 0.353 percent of employment, affirmative action amounted to a 0.603 percent and 3.966 percent increase in the shares of black and Native American men, on average.

Table 2 further reveals that affirmative action increased the employment of black and Native American women and men at the expense of white women: becoming a federal contractor resulted in a 0.122 percentage point decrease in the employment share of white women on average during 1973–2003. Although this result is contrary to a priori expectation, in that affirmative action legislation is intended to increase female representation including that of white females, it is in fact consistent with the limited amount of previous evidence that exists from the

1970s: while reporting large gains for black women and men, Leonard (1984b) finds much smaller gains for white women; Goldstein and Smith (1976) find that affirmative action increases black male employment and reduces white female employment. A possible reason for why affirmative action has not benefited white women is that firms may demonstrate a greater propensity for affirmative action implementation along both race and gender lines (e.g., hiring a black female) rather than along only gender (hiring a white female), especially in the presence of constraints on the number of employees they are able to hire. Another finding in Table 2 that is contrary to a priori expectation is that becoming a federal contractor was associated with a 0.09 percentage point increase in the share of white men in the firm on average during 1973–2003.[16] However, in a companion paper (Kurtulus 2012), I show that contractor status was associated with growth in white men's representation only in managerial occupations during 1973–2003, which is what drives this trend.[17] Finally, affirmative action did not increase the employment of Hispanic and Asian women and men by a statistically discernible amount over 1973–2003.[18]

4.2 Inferring Causality from the Timing of Federal Contracting

The estimates discussed in the previous section pertain to the average effects of affirmative action over the three decades under study, but they do not provide a sense of the *dynamics* of a firm's employment response to becoming a federal contractor, to which I now turn. One may argue that the positive relationship between federal contractor status and protected

[16] The early study by Goldstein and Smith (1976) also find that the relative share of white men increased at contractors.

[17] Gaining a federal contract brings with it greater need for managerial oversight and an expansion of the firm's managerial workforce, which firms are more likely to fill with white male managers, given their greater labor market availability compared to minority and female managers.

[18] As a robustness check, I also estimated Equation (1) limiting the estimation sample to firms that were ever contractors (i.e., excluding firms that never held a federal contract during the 31 years under study). The estimates and statistical significance on the *Fed* coefficients were nearly identical to those reported in Table 2, indicating that selection into contractor status is not a source of bias in the results reported in Table 2. These additional results are available from the author.

group representation found earlier reflects selection rather than contractor response to affirmative action obligation—that is, firms that had high minority and female representation in the first place were more likely to be awarded government contracts than those that were not as diverse. In response to this concern, first it is important to note that government contract bidding and selection procedures do not solicit information on workforce race and gender composition of prospective contractors, using highest technical merit and lowest bid price among candidates as the primary selection criteria (U.S. General Services Administration 2005). Furthermore, changes in employment around the actual time of gaining contractor status provide important evidence on the direction of causality between contractor status and employment by evaluating trends prior to the contract gain: Is it firms that are increasing their minority and female representation that are awarded a federal contract? That is, is there reverse causality in the relation between federal contractor status and employment gains for protected groups? Dynamics around the time of gaining a federal contract also provide evidence on how long affirmative action takes to change the employment landscape of a firm: how quickly does minority and female employment change after a firm becomes a federal contractor, and does this impact accelerate or stabilize? Identification of the dynamic response to becoming a federal contractor is feasible, since different firms become contractors at different times. Figure 2, which illustrates the histogram of contract gain years among firms that became contractors during my analysis period, demonstrates that there is rich heterogeneity in the timing of contract gain across firms.

To explore these factors, I use a dynamic specification that replaces the federal contractor status indicator in Equation (1) with leads and lags of contract gain. Specifically, the following model is estimated for each gender-race group in turn:

(2) $\%(g)_{i,t} = \sum_{j=-3}^{+2} \alpha_j Fed_{i,tj} + \alpha_{-4} Fed_{i,t-4\,forward} + X'_{i,t\beta} + \theta_i + \lambda_t + Industry_i \times \lambda_t + \mathrm{Re}\,gion_i \times \lambda_t + \varepsilon_{i,t}$,

where $Fed_{i,t+2}$ and $Fed_{i,t+1}$ are dummy variables equaling one in only the two years or year prior to contract gain, and the coefficients on these indicate whether the prepost federal contract results presented in the previous section (Equation [1]) are consistent with a causal interpretation. In particular, a causal interpretation would be supported by coefficient estimates that are statistically significantly negative or not statistically significant. $Fed_{i,t0}$ is a dummy variable equaling one only in the year of contract gain, and $Fed_{i,t-1}$ *to* $Fed_{i,t-3}$ indicate one, two, and three years after contract gain; these four dynamic variables capture the transitory effects of contract gain. $Fed_{i,t-4\ forward}$ is a variable equaling one in every year beginning with the fourth year after contract gain for the duration of contracting, and it captures the long-term effects of contract gain. The specification thus allows us to identify whether there are anticipatory effects, and whether the largest impacts of affirmative action occur in the short run or long run. The remaining variables in the model are identical to those in Equation (1).[19]

Table 3 provides estimates from this dynamic model. Nearly all the coefficients on contractor leads ($Fed_{i,t+2}$ and $Fed_{i,t+1}$) are not statistically significant at conventional levels, indicating little evidence of reverse causality in the relation between federal contract status and employment gains for protected groups. Put differently, affirmative action appears to work not by selection of firms with good records of protected group employment into contractor status but, rather, by inducing contractors to employ more minorities and women. In the first years of becoming a federal contractor there are increases in the employment of black women, Native American women, and Native American men (i.e., three of the four demographic groups that were found to have experienced a positive average benefit from affirmative action in Section 4.1), which is indicated by the positive and statistically significant coefficients on the contractor

[19] I have also explored regression models with windows of different lengths around the time of contracting; these yielded very similar results to those reported here.

gain lags. For example, one year after having gotten a contract, firms have increased their share of black women by 0.059 percentage points, and this increment holds steady after two years and grows slightly after three years of the firm's having become a contractor. The first years of contracting also increase Native American female and male employment shares. The affirmative action effect for black women dissipates following the fourth year after having become a contractor, as indicated by the fact that the coefficient on the four-year forward lag is not statistically significant at conventional levels. On the other hand, the impact of affirmative action is more of a long-term phenomenon for Native American women and men, as well as Asian women and men, as indicated by the positive and statistically significant coefficients on the four-year forward lags for these groups.[20]

4.3 Persistence of Affirmative Action after Loss of Federal Contractor Status

Do gains in protected group employment revert once a firm loses its contract, or is there persistence in minority and female representation even after the firm is no longer a federal contractor? Affirmative action in federal contracting can have a persistent impact if, for example, greater exposure to minorities and women eliminates negative stereotypes and reduces taste-based discrimination by firms (Charles and Guryan 2008; Coate and Loury 1993). There can also be long-lasting network and role model effects (Athey, Avery, and Zemsky 2000; Cornell and Welch 1996; Kurtulus and Tomaskovic-Devey 2012). To explore the presence of such persistence, I augment Equation (1) with indicators for one and two periods following the loss of contractor status (*Post1fed* and *Post2fed*). In the case of all the protected groups that were found

[20] The sample of firms driving the identification of the coefficients on the indicators of the years following contract gain gets smaller as the time elapsed since contract gain becomes greater. For this reason, I also estimated Equation (2) using a "long sample" of firms that had held their contracts for five continuous years or more. The resulting estimates, which are not reported here but are available from the author, were qualitatively very similar to those reported in Table 3, and some of the coefficients were larger in magnitude but also had had larger standard errors because of the restricted sample size.

to have experienced a positive average benefit from affirmative action in the baseline results of Section 4.1, we can now see in Table 4 that the estimated coefficients on the postcontract variables are either not statistically significant, indicating that firms do not reduce their protected group shares once they are no longer contractors (black men and Native American men), or the estimates are actually statistically significantly positive, indicating the firms continue to diversify even after their federal contract has ended (black women and Native American women).

4.4 Evolution of Affirmative Action Effects over 1973–2003

The previous sections presented evidence on the total effects of affirmative action over the 31 years spanning 1973–2003, but also of interest is the *evolution* of affirmative action effects during those years. To study how the effects of affirmative action evolved, I estimate a specification that replaces the federal contractor indicator $Fed_{i,t}$ with interactions of each of the year dummies ($\lambda_{1973}, \ldots \lambda_{2003}$) with $Fed_{i,t}$:

$$(3)\ \%(g)_{i,t} = \sum_{j=1973}^{2003} \alpha_j(\lambda_j \times Fed_{i,t}) + X'_{i,t}\beta + \theta_i + \lambda_t + Industry_i \times \lambda_t + Region_i \times \lambda_t + \varepsilon_{i,t}\ .$$

The coefficients on the $\lambda_j \times Fed_{i,t}$ interactions measure the average difference between federal contractors and noncontractors in demographic group shares each year—that is, the marginal effect of federal contractor status in each year. I plot the estimated coefficients on the $\lambda_j \times Fed_{i,t}$ interactions over 1973–2003 to illustrate the evolution of the effects of federal contractor status in Figure 3 for each demographic group in turn, where the solid lines denote the coefficient estimates and the dashed lines reflect the robust 95 percent confidence intervals (clustered at the firm level) for each point estimate. Of primary interest in these figures is whether there are regions of rapid increase (or decrease) in the contractor coefficient for the relevant demographic group, indicating that that particular type of employment grew (or shrank) faster at contractors

than at noncontractors during that period. Furthermore, the steeper the slope, the more rapid was the relative growth (or decline).[21]

Figure 3 illustrates several important results. During the 1970s and early 1980s (pre- and early Reagan years), there were rapid increases in the effect of affirmative action on advancing the employment of white women, black women, Asian women, Native American women, Asian men, and Native American men. Contractors grew their shares of these groups more rapidly than noncontractors during this time, while decreasing their relative shares of white men and Hispanic men. For instance, between 1973 and 1983, the share of black women went from being only 0.050 percentage points higher to being 0.242 percentage points higher at contractors than at noncontractors, and the share of Native American women went from being 0.077 percentage points lower to being 0.012 percentage points higher. After the early 1980s, however, advances in the impact of affirmative action on the employment of minorities and women decelerated or vanished entirely, especially for black women and men. This slowdown was concurrent with the major shifts in political attitudes toward affirmative action that began when President Reagan took office, including efforts to rescind affirmative action legislation and steep cuts to EEOC and OFCCP budgets, as described in the introduction. Specifically, the share of black women employed by federal contractors relative to noncontractors declined sharply during the 1980s to below its 1973 levels, stabilized during the early 1990s, and continued to decline during the late 1990s and 2000s. The relative share of black men also began declining rapidly starting in 1981, stabilized somewhat during the late 1980s and early 1990s, and started slowly increasing beginning in 1995, soon after President Clinton took office. Among other interesting trends depicted in Figure 3 is that the share of Hispanic women employed by contractors relative to noncontractors was fairly stable throughout the 1970s and 1980s, but it exhibited a sharp and

[21] I report the regression estimates on which these figures are based in the appendix.

persistent decline beginning in the early 1990s, around the time of the first President Bush's appointment of Justice Thomas to the U.S. Supreme Court. Also during the early 1990s, the relative shares of Asian women and Hispanic men shrank, while those of Native American women and white men grew. Finally, the federal contractor premium increased for Asian men throughout 1973–2003.

5 CONCLUSION

Using a new panel of over 100,000 large private-sector firms across all industries and regions from the U.S. Equal Employment Opportunity Commission, this study quantifies the long-term impact of affirmative action in federal contracting during the three decades spanning 1973–2003.

The paper's key findings reveal that the cumulative effects of affirmative action over 1973–2003 were mixed across race and gender groups, with the primary beneficiaries being black and Native American women and men. Specifically, the share of black and Native American women and men grew more on average at federal contactors subject to affirmative action obligation than at noncontracting firms during 1973–2003. In particular, becoming a federal contractor increased black women's employment share by 0.041 percentage points on average (or by 0.871 percent) and increased Native American women's share by 0.008 percentage points (or by 3.883 percent). Becoming a federal contractor also increased black men's and Native American men's employment shares by 0.040 and 0.014 percentage points, respectively (or by 0.603 and 3.966 percent). These represent a substantial contribution of affirmative action to the growth of protected group employment in the U.S. workforce over the three decades under study.

On the other hand, affirmative action did not increase the employment of Hispanic and Asian women and men by a statistically discernible amount over 1973–2003, and it was associated with a decline in the employment share of white women, on average. Analysis of the dynamics of employment around the time of contracting indicates that selection was not driving these results, that a large part of the effect of affirmative action on increasing protected group shares occurred within the first four years of becoming a contractor, and that contractors maintained these increased shares even after they no longer held a federal contract. The paper additionally uncovers important results on how the impact of affirmative action evolved over the three decades under study, in particular the finding that the fastest growth in the employment shares of minorities and women at federal contractors relative to noncontracting firms occurred during the 1970s and early 1980s, decelerating substantially during the Reagan era. This illustrates the sensitivity of affirmative action effects to political attitudes toward affirmative action and underscores the importance of strong government commitment.

There continues to be heated debate over affirmative action in the labor market. Several states have prohibited affirmative action in public employment in recent years, and the future of affirmative action in the United States is uncertain. Rhetoric abounds on both sides of the affirmative action debate, with little hard evidence brought to bear to inform policy discussions. This study has presented large-sample evidence with detailed controls showing that representation of particular female and minority groups did in fact increase more on average at federal contractors subject to affirmative action obligation during 1973–2003. It has also presented evidence of long-term affirmative action effects that persist even after firms no longer hold federal contracts. Overall, the study suggests that government policy has contributed to increasing diversity at U.S. workplaces.

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Table 1 Descriptive Statistics by Federal Contractor Status

	Fed = 1			*Fed* = 0		
	Mean	Std. dev.	*N*	Mean	Std. dev.	*N*
Size (100)	16.553	93.033	434,076	7.357	45.030	581,291
Multiestablishment	0.598	0.490	434,076	0.473	0.499	581,291
% White collar	0.368	0.236	434,075	0.354	0.247	581,283
Agriculture	0.006	0.078	432,802	0.009	0.096	579,956
Mining	0.012	0.110	432,802	0.008	0.090	579,956
Construction	0.079	0.269	432,802	0.029	0.169	579,956
Manufacturing	0.332	0.471	432,802	0.300	0.458	579,956
Transportation	0.056	0.230	432,802	0.051	0.220	579,956
Wholesale	0.056	0.229	432,802	0.068	0.251	579,956
Retail	0.036	0.186	432,802	0.124	0.329	579,956
Finance	0.190	0.393	432,802	0.071	0.257	579,956
Service	0.233	0.423	432,802	0.340	0.474	579,956
Northeast	0.240	0.427	433,414	0.245	0.430	580,622
Midwest	0.263	0.440	433,414	0.291	0.454	580,622
South	0.308	0.462	433,414	0.301	0.459	580,622
West	0.189	0.392	433,414	0.164	0.370	580,622
% White female	0.328	0.240	434,075	0.365	0.246	581,283
% Black female	0.045	0.083	434,075	0.061	0.108	581,283
% Hispanic female	0.028	0.066	434,075	0.034	0.078	581,283
% Asian female	0.013	0.035	434,075	0.013	0.036	581,283
% Nat. Am. female	0.002	0.013	434,075	0.002	0.012	581,283
% White male	0.464	0.247	434,075	0.400	0.248	581,283
% Black male	0.052	0.082	434,075	0.056	0.086	581,283
% Hispanic male	0.047	0.096	434,075	0.054	0.111	581,283
% Asian male	0.017	0.040	434,075	0.013	0.037	581,283
% Nat. Am. male	0.004	0.018	434,075	0.002	0.015	581,283

NOTE: Based on the full EEO sample of N = 1,015,881 firm years during 1973–2003. Descriptive statistics based on the samples used in all the regressions in the paper closely match the above figures.

Table 2 The Effects of Federal Contractor Status on Employment Shares by Gender and Race during 1973–2003

Panel A: Women

	Dependent variable				
	% White female	% Black female	% Hispanic female	% Asian female	% Nat. Am. female
	(1)	(2)	(3)	(4)	(5)
Fed	−0.00122***	0.00041**	−0.00018	0.00009	0.00008**
	(0.00035)	(0.00019)	(0.00016)	(0.00008)	(0.00004)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.34915***	0.04662***	0.02378***	0.00440***	0.00199***
	(0.00101)	(0.00049)	(0.00036)	(0.00021)	(0.00013)
Observations	1,011,729	1,011,729	1,011,729	1,011,729	1,011,729
Number of firms	123,511	123,511	123,511	123,511	123,511
Adjusted *R*-squared	0.0522	0.0370	0.0729	0.0683	0.0012

Panel B: Men

	Dependent variable				
	% White male	% Black male	% Hispanic male	% Asian male	% Nat. Am. male
	(1)	(2)	(3)	(4)	(5)
Fed	0.00090**	0.00040**	−0.00058***	−0.00003	0.00014***
	(0.00037)	(0.00018)	(0.00022)	(0.00009)	(0.00005)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.45980***	0.06198***	0.04272***	0.00643***	0.00314***
	(0.00104)	(0.00045)	(0.00043)	(0.00022)	(0.00015)
Observations	1,011,729	1,011,729	1,011,729	1,011,729	1,011,729
Number of firms	123,511	123,511	123,511	123,511	123,511
Adjusted *R*-squared	0.1001	0.0157	0.1021	0.0464	0.0007

NOTE: Robust standard errors clustered by firm are in parentheses. * significant at the 0.0 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 3 The Dynamic Effects of Federal Contractor Status on Employment Shares by Gender and Race during 1973–2003

Panel A: Women

	Dependent variable				
	% White female	% Black female	% Hispanic female	% Asian female	% Nat. Am. female
	(1)	(2)	(3)	(4)	(5)
Fed_{t+2}	−0.00003	0.00023	0.00022	−0.00007	0.00003
	(0.00045)	(0.00026)	(0.00020)	(0.00012)	(0.00005)
Fed_{t+1}	−0.00064	0.00027	0.00009	−0.00000	0.00005
	(0.00047)	(0.00026)	(0.00021)	(0.00011)	(0.00005)
Fed_{t0}	−0.00124***	0.00034	0.00004	−0.00011	0.00008*
	(0.00047)	(0.00025)	(0.00021)	(0.00011)	(0.00005)
Fed_{t-1}	−0.00074	0.00059**	−0.00014	0.00005	0.00014**
	(0.00054)	(0.00028)	(0.00024)	(0.00013)	(0.00006)
Fed_{t-2}	−0.00030	0.00058*	−0.00013	0.00028**	0.00010*
	(0.00058)	(0.00031)	(0.00025)	(0.00014)	(0.00006)
Fed_{t-3}	−0.00024	0.00069**	−0.00015	0.00021	0.00008
	(0.00061)	(0.00031)	(0.00026)	(0.00014)	(0.00006)
$Fed_{t-4\ forward}$	0.00064	−0.00005	−0.00093***	0.00035**	0.00013**
	(0.00066)	(0.00034)	(0.00028)	(0.00016)	(0.00006)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.36134***	0.04694***	0.02410***	0.00482***	0.00228***
	(0.00119)	(0.00058)	(0.00041)	(0.00025)	(0.00017)
Observations	806,644	806,644	806,644	806,644	806,644
Number of firms	104,048	104,048	104,048	104,048	104,048
Adjusted *R*-squared	0.0465	0.0359	0.0630	0.0597	0.0011

Panel B: Men

	Dependent variable				
	% White male	% Black male	% Hispanic male	% Asian male	% Nat. Am. male
	(1)	(2)	(3)	(4)	(5)
Fed_{t+2}	0.00015	−0.00031	−0.00041	0.00009	0.00010
	(0.00045)	(0.00022)	(0.00026)	(0.00012)	(0.00009)
Fed_{t+1}	0.00081*	−0.00016	−0.00033	−0.00018	0.00010
	(0.00047)	(0.00023)	(0.00027)	(0.00011)	(0.00009)
Fed_{t0}	0.00151***	−0.00005	−0.00045	−0.00031**	0.00020***
	(0.00048)	(0.00023)	(0.00028)	(0.00012)	(0.00007)
Fed_{t-1}	0.00064	0.00020	−0.00072**	−0.00021	0.00019**
	(0.00055)	(0.00028)	(0.00033)	(0.00014)	(0.00009)
Fed_{t-2}	0.00062	−0.00025	−0.00098***	−0.00005	0.00009
	(0.00059)	(0.00030)	(0.00036)	(0.00015)	(0.00009)
Fed_{t-3}	−0.00013	0.00023	−0.00102***	0.00018	0.00017
	(0.00062)	(0.00031)	(0.00037)	(0.00016)	(0.00011)
$Fed_{t-4\ forward}$	0.00013	0.00014	−0.00147***	0.00077***	0.00030***
	(0.00068)	(0.00034)	(0.00041)	(0.00017)	(0.00010)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.44798***	0.06013***	0.04168***	0.00742***	0.00331***
	(0.00120)	(0.00054)	(0.00050)	(0.00024)	(0.00019)
Observations	806,644	806,644	806,644	806,644	806,644
Number of firms	104,048	104,048	104,048	104,048	104,048
Adjusted *R*-squared	0.0883	0.0150	0.0919	0.0384	0.0008

NOTE: Robust standard errors clustered by firm are in parentheses. * significant at the 0.01 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Table 4 Exploring Persistence in the Effects of Federal Contractor Status on Employment Shares by Gender and Race during 1973–2003

Panel A: Women

	Dependent variable				
	% White female	% Black female	% Hispanic female	% Asian female	% Nat. Am. female
	(1)	(2)	(3)	(4)	(5)
Fed	−0.00177***	0.00058**	−0.00012	0.00019*	0.00010***
	(0.00044)	(0.00024)	(0.00020)	(0.00011)	(0.00004)
Post1fed	−0.00193***	0.00074***	0.00023	0.00019*	0.00009**
	(0.00041)	(0.00023)	(0.00020)	(0.00010)	(0.00004)
Post2fed	−0.00114***	0.00064***	0.00022	0.00009	0.00000
	(0.00040)	(0.00023)	(0.00019)	(0.00010)	(0.00004)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.36391***	0.05536***	0.02052***	0.00936***	0.00168***
	(0.00439)	(0.00281)	(0.00331)	(0.00109)	(0.00032)
Observations	934,634	934,634	934,634	934,634	934,634
Number of firms	107,922	107,922	107,922	107,922	107,922
Adjusted *R*-squared	0.0573	0.0337	0.0717	0.0656	0.0014

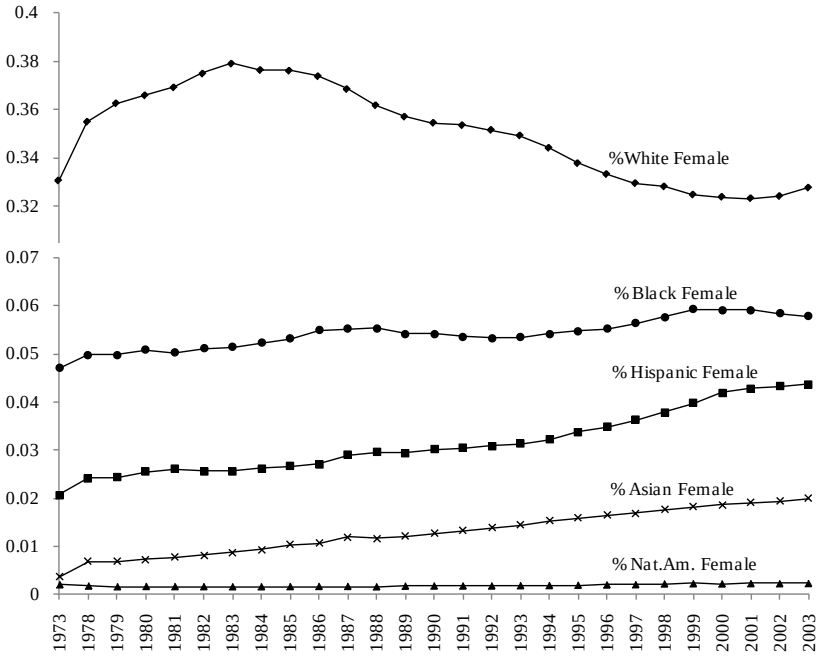
Panel B: Men

	Dependent variable				
	% White male	% Black male	% Hispanic male	% Asian male	% Nat. Am. male
	(1)	(2)	(3)	(4)	(5)
Fed	0.00094**	0.00040*	−0.00057**	0.00008	0.00018***
	(0.00045)	(0.00022)	(0.00028)	(0.00011)	(0.00006)
Post1fed	0.00004	0.00025	0.00014	0.00026**	−0.00002
	(0.00042)	(0.00021)	(0.00026)	(0.00011)	(0.00007)
Post2fed	−0.00053	0.00019	0.00018	0.00032***	0.00002
	(0.00040)	(0.00020)	(0.00025)	(0.00010)	(0.00008)
Firm controls	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry X Year dummies	yes	yes	yes	yes	yes
Region X Year dummies	yes	yes	yes	yes	yes
Constant	0.43345***	0.06224***	0.04188***	0.00890***	0.00269***
	(0.00454)	(0.00303)	(0.00524)	(0.00155)	(0.00053)
Observations	934,634	934,634	934,634	934,634	934,634
Number of firms	107,922	107,922	107,922	107,922	107,922
Adjusted *R*-squared	0.0871	0.0166	0.1024	0.0452	0.0006

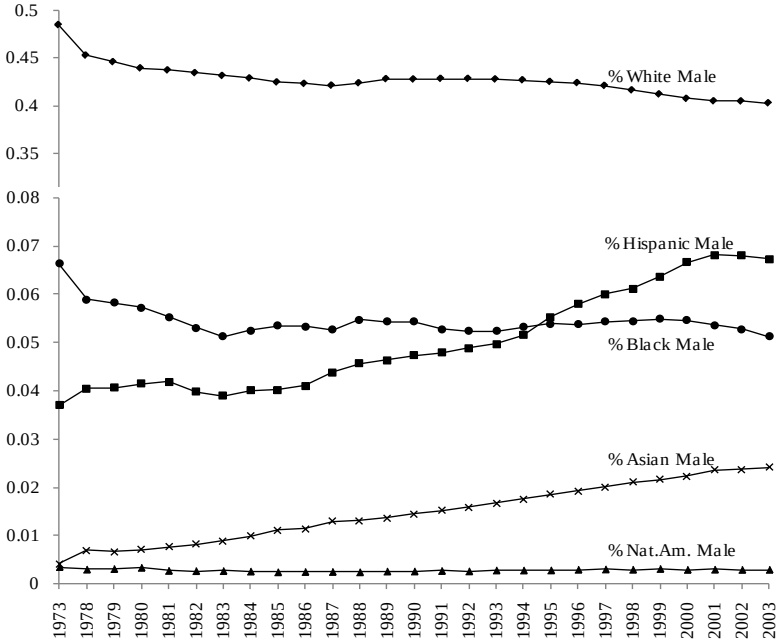
NOTE: Robust standard errors clustered by firm are in parentheses. * significant at the 0.01 level; ** significant at the 0.05 level; *** significant at the 0.01 level.

Figure 1 Mean Employment Shares of Women and Men by Race at U.S. Firms during 1973–2003

Panel A: Women

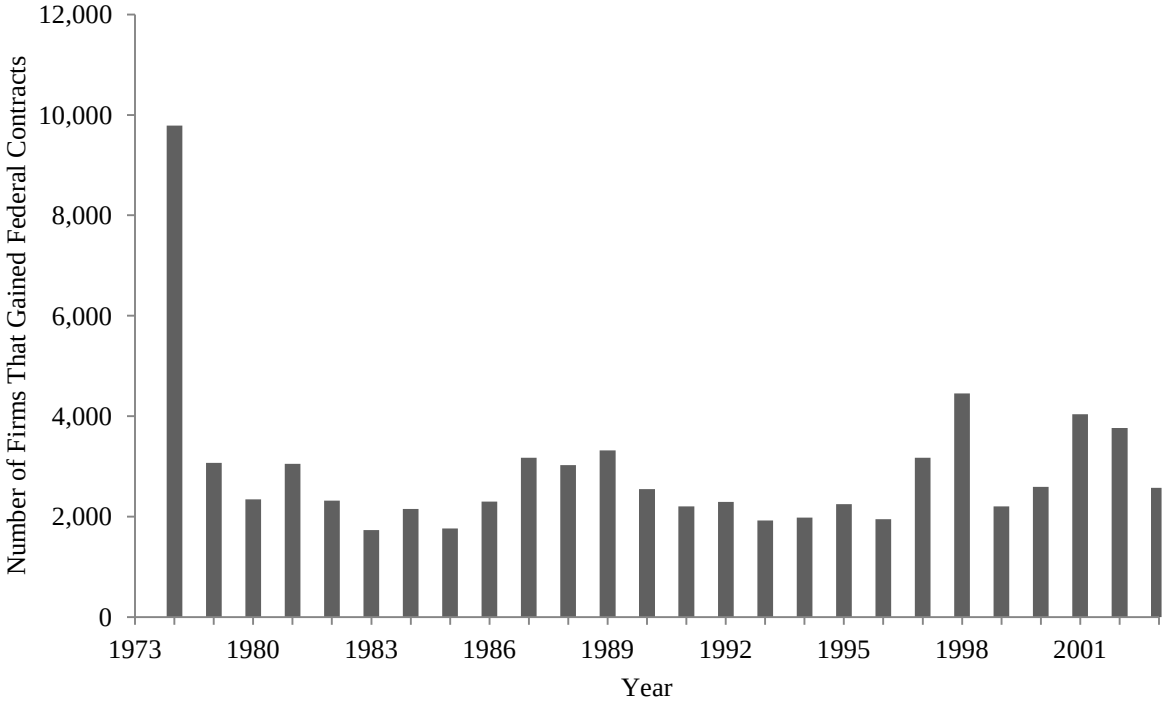


Panel B: Men



SOURCE: U.S. Equal Employment Opportunity Commission EEO-1 reports.
NOTE: In each graph, there is a break in the y-axis so that the white shares at the top are at a greater scale than the minority shares at the bottom.

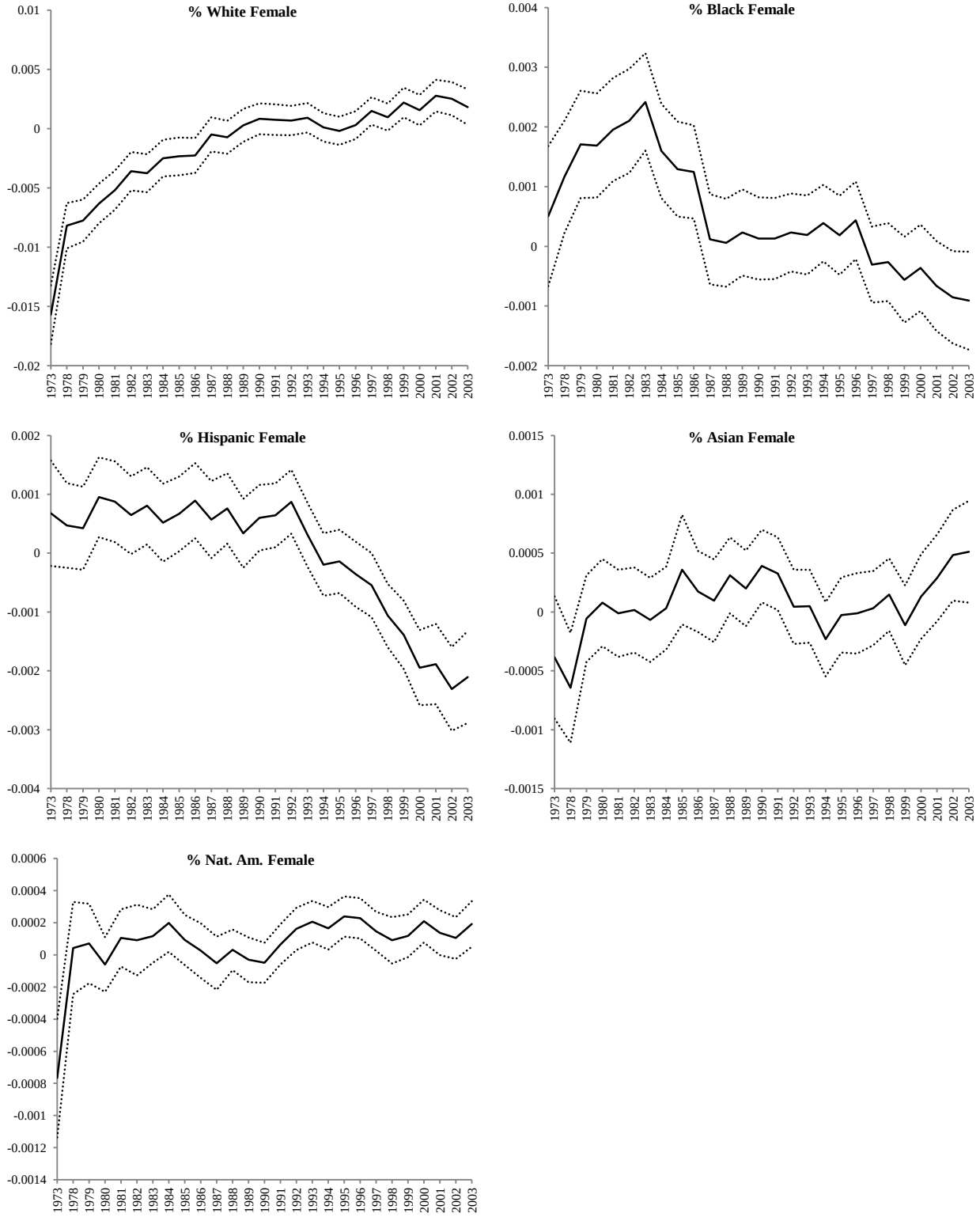
Figure 2 Histogram of Federal Contractor Gain Years



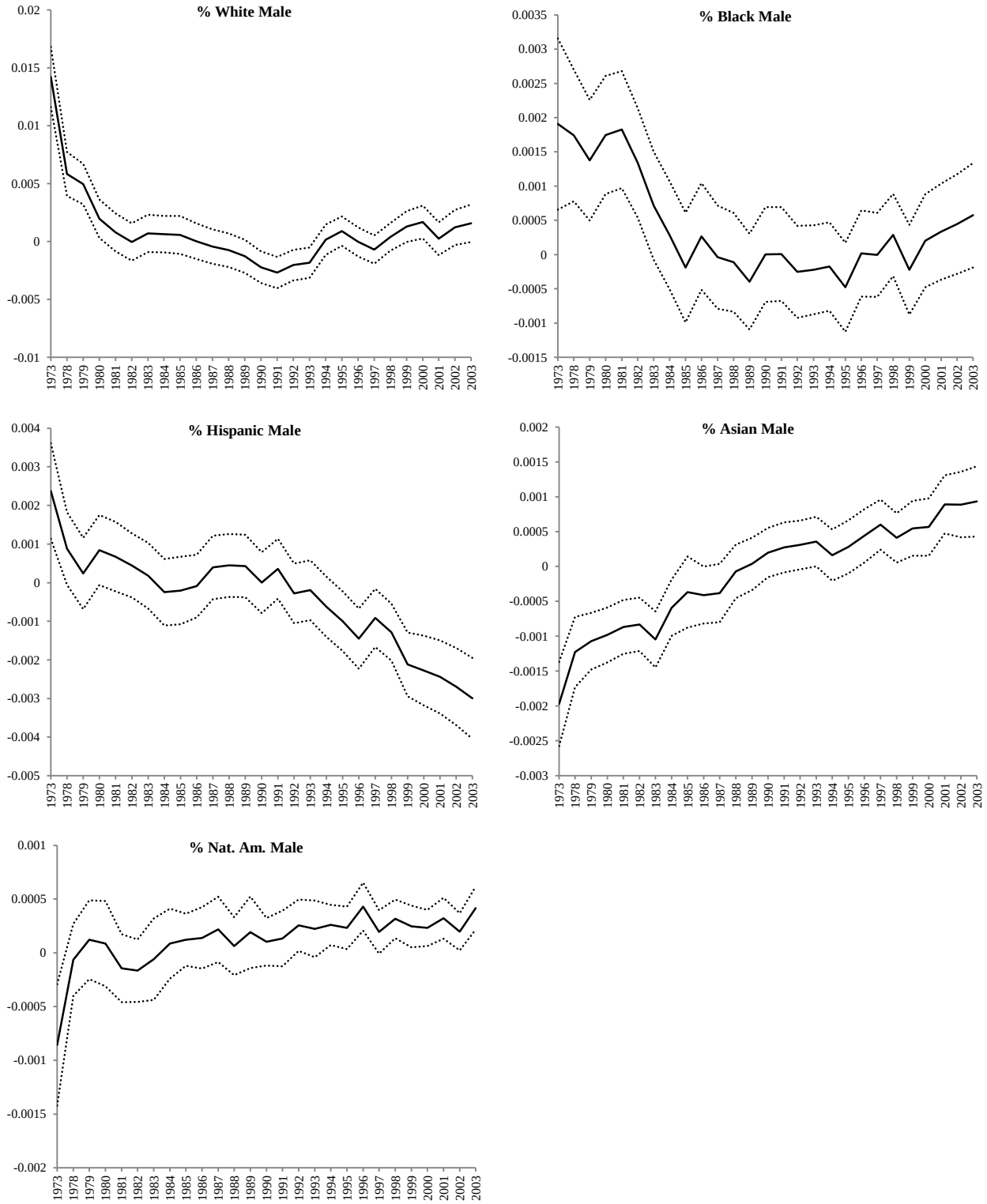
SOURCE: U.S. Equal Employment Opportunity Commission EEO-1 reports.

Figure 3 The Effects of Federal Contractor Status on Employment Shares by Gender and Race during 1973–2003, by Year

Panel A: Women



Panel B: Men



NOTE: In each graph, the solid line illustrates the estimated coefficients on the *YearN X Fed* interactions over the years 1973–2003 in a regression of the percentage of employment of the particular demographic group on *YearN X Fed* interactions and controls for firm size, corporate structure, share of white-collar nonclerical employees, firm fixed effects, year fixed effects, region-specific time effects, and industry-specific time effects. The dashed lines depict the robust firm-clustered 95% confidence interval around the point estimates.

Appendix

Variable Definitions

% White Female	Percentage of workers at the firm who are white women
% Black Female	Percentage of workers at the firm who are black women
% Hispanic Female	Percentage of workers at the firm who are Hispanic women
% Asian Female	Percentage of workers at the firm who are Asian or Pacific Islander women
% Nat. Am. Female	Percentage of workers at the firm who are Native American or Alaskan Native women
% White Male	Percentage of workers at the firm who are white men
% Black Male	Percentage of workers at the firm who are black men
% Hispanic Male	Percentage of workers at the firm who are Hispanic men
% Asian Male	Percentage of workers at the firm who are Asian or Pacific Islander men
% Nat. Am. Male	Percentage of workers at the firm who are Native American or Alaskan Native men
Fed	Dummy variable equaling 1 if the firm is a federal contractor in year *t*; 0 otherwise
Fed_{t+2}	Dummy variable equaling 1 (only) two years before the firm becomes a federal contractor; 0 otherwise
Fed_{t+1}	Dummy variable equaling 1 (only) the year before the firm becomes a federal contractor; 0 otherwise
Fed_{t0}	Dummy variable equaling 1 (only) the year the firm becomes a federal contractor; 0 otherwise
Fed_{t-1}	Dummy variable equaling 1 (only) one year after the firm becomes a federal contractor; 0 otherwise
Fed_{t-2}	Dummy variable equaling 1 (only) two years after the firm becomes a federal contractor; 0 otherwise
Fed_{t-3}	Dummy variable equaling 1 (only) three years after the firm becomes a federal contractor; 0 otherwise
$Fed_{t-4\ forward}$	Dummy variable equaling 1 four years after the firm becomes a federal contractor and beyond for the duration of contracting; 0 otherwise
Post1fed	Dummy variable equaling 1 (only) the year the firm loses its federal contract; 0 otherwise
Post2fed	Dummy variable equaling 1 (only) the year after the firm loses its federal contract; 0 otherwise
Size100	Total number of workers at the firm in year *t* in 100s
Multiestablishment	Dummy variable equaling 1 if the firm is a multiestablishment organization in year *t*; 0 otherwise
% White Collar	Percentage of workers at the firm in year *t* who are in white-collar nonclerical occupations (managers and officers, professionals, technicians, sales workers)
YearN	Dummy variables indicating year *N* = (1973, 1978–2003)
Industry-Year Interactions (9):	
Agriculture X YearN	(Dummy variable equaling 1 if the industry of the firm is Agriculture, Forestry, and Fishing; 0 otherwise) X (*YearN*)
Mining X YearN	(Dummy variable equaling 1 if the industry of the firm is Mining; 0 otherwise) X (*YearN*)
Construction X YearN	(Dummy variable equaling 1 if the industry of the firm is Construction; 0 otherwise) X (*YearN*)
Manufacturing X YearN	(Dummy variable equaling 1 if the industry of the firm is Manufacturing; 0 otherwise) X (*YearN*)
Transportation X YearN	(Dummy variable equaling 1 if the industry of the firm is Transportation, Communications, Electric, Gas, and Sanitary Services; 0 otherwise) X (*YearN*)
Wholesale X YearN	(Dummy variable equaling 1 if the industry of the firm is Wholesale Trade; 0 otherwise) X (*YearN*)
Retail X YearN	(Dummy variable equaling 1 if the industry of the firm is Retail Trade; 0 otherwise) X (*YearN*)
Finance X YearN	(Dummy variable equaling 1 if the industry of the firm is Finance, Insurance, and Real Estate; 0 otherwise) X (*YearN*)
Service X YearN	(Dummy variable equaling 1 if the industry of the firm is Services; 0 otherwise) X (*YearN*)
Region-Year Interaction (4):	
Northeast X YearN	(Dummy variable equaling 1 if the firm's headquarters are located in the Northeast region of the U.S. Census Bureau's primary geographic region classification [Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Jersey, New York, Pennsylvania]; 0 otherwise) X (*YearN*)
Midwest X YearN	(Dummy variable equaling 1 if the firm's headquarters are located in the Midwest region of the U.S. Census Bureau's primary geographic region classification [Indiana, Illinois, Michigan, Ohio, Wisconsin, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota]; 0 otherwise) X (*YearN*)
South X YearN	(Dummy variable equaling 1 if the firm's headquarters are located in the South region of the U.S. Census Bureau's primary geographic region classification [Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, Alabama, Kentucky, Mississippi, Tennessee, Arkansas, Louisiana, Oklahoma, Texas]; 0 otherwise) X (*YearN*)
West X YearN	(Dummy variable equaling 1 if the firm's headquarters are located in the West region of the U.S. Census Bureau's primary geographic region classification [Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming, Alaska, California, Hawaii, Oregon, Washington]; 0 otherwise) X (*YearN*)

Table A1 The Effects of Federal Contractor Status on Employment Shares by Gender and Race during 1973–2003, by Year

Panel A: Women

	Dependent variable				
	% White female	% Black female	% Hispanic female	% Asian female	% Nat.Am. female
	(1)	(2)	(3)	(4)	(5)
Year1973XFed	−0.01569***	0.00050	0.00068	−0.00039	−0.00077***
	(0.00126)	(0.00060)	(0.00046)	(0.00027)	(0.00019)
Year1978XFed	−0.00819***	0.00116**	0.00047	−0.00064***	0.00004
	(0.00098)	(0.00048)	(0.00037)	(0.00024)	(0.00015)
Year1979XFed	−0.00776***	0.00171***	0.00042	−0.00006	0.00007
	(0.00090)	(0.00046)	(0.00036)	(0.00019)	(0.00013)
Year1980XFed	−0.00632***	0.00169***	0.00095***	0.00008	−0.00006
	(0.00086)	(0.00044)	(0.00035)	(0.00019)	(0.00009)
Year1981XFed	−0.00520***	0.00195***	0.00087**	−0.00001	0.00010
	(0.00084)	(0.00044)	(0.00035)	(0.00019)	(0.00009)
Year1982XFed	−0.00360***	0.00210***	0.00065*	0.00002	0.00009
	(0.00083)	(0.00044)	(0.00034)	(0.00018)	(0.00011)
Year1983XFed	−0.00377***	0.00242***	0.00081**	−0.00007	0.00012
	(0.00082)	(0.00042)	(0.00033)	(0.00018)	(0.00008)
Year1984XFed	−0.00250***	0.00160***	0.00052	0.00003	0.00020**
	(0.00079)	(0.00040)	(0.00034)	(0.00018)	(0.00009)
Year1985XFed	−0.00234***	0.00129***	0.00067**	0.00036	0.00009
	(0.00081)	(0.00041)	(0.00032)	(0.00024)	(0.00008)
Year1986XFed	−0.00227***	0.00124***	0.00089***	0.00017	0.00003
	(0.00075)	(0.00040)	(0.00033)	(0.00018)	(0.00009)
Year1987XFed	−0.00049	0.00012	0.00057*	0.00010	−0.00005
	(0.00074)	(0.00039)	(0.00033)	(0.00018)	(0.00008)
Year1988XFed	−0.00073	0.00006	0.00076**	0.00031*	0.00003
	(0.00071)	(0.00038)	(0.00031)	(0.00016)	(0.00006)
Year1989XFed	0.00027	0.00023	0.00034	0.00020	−0.00003
	(0.00071)	(0.00037)	(0.00030)	(0.00016)	(0.00007)
Year1990XFed	0.00084	0.00013	0.00060**	0.00039**	−0.00005
	(0.00066)	(0.00035)	(0.00028)	(0.00016)	(0.00006)
Year1991XFed	0.00075	0.00013	0.00064**	0.00033**	0.00006
	(0.00066)	(0.00035)	(0.00028)	(0.00016)	(0.00006)
Year1992XFed	0.00069	0.00023	0.00087***	0.00004	0.00016**
	(0.00063)	(0.00033)	(0.00028)	(0.00016)	(0.00007)
Year1993XFed	0.00091	0.00019	0.00031	0.00005	0.00021***
	(0.00063)	(0.00034)	(0.00028)	(0.00016)	(0.00007)
Year1994XFed	0.00010	0.00039	−0.00020	−0.00023	0.00017**
	(0.00061)	(0.00033)	(0.00027)	(0.00016)	(0.00007)
Year1995XFed	−0.00019	0.00019	−0.00014	−0.00003	0.00024***
	(0.00061)	(0.00034)	(0.00027)	(0.00016)	(0.00006)
Year1996XFed	0.00029	0.00044	−0.00036	−0.00001	0.00023***
	(0.00060)	(0.00033)	(0.00028)	(0.00017)	(0.00006)
Year1997XFed	0.00150**	−0.00031	−0.00054*	0.00003	0.00015**
	(0.00059)	(0.00032)	(0.00028)	(0.00016)	(0.00006)
Year1998XFed	0.00096*	−0.00027	−0.00106***	0.00015	0.00009
	(0.00058)	(0.00033)	(0.00027)	(0.00016)	(0.00007)
Year1999XFed	0.00220***	−0.00056	−0.00139***	−0.00011	0.00012*
	(0.00064)	(0.00037)	(0.00030)	(0.00017)	(0.00007)
Year2000XFed	0.00155**	−0.00036	−0.00194***	0.00013	0.00021***
	(0.00066)	(0.00037)	(0.00033)	(0.00018)	(0.00007)
Year2001XFed	0.00278***	−0.00067*	−0.00189***	0.00029	0.00014*
	(0.00068)	(0.00039)	(0.00035)	(0.00019)	(0.00007)
Year2002XFed	0.00252***	−0.00085**	−0.00231***	0.00048**	0.00010
	(0.00072)	(0.00039)	(0.00036)	(0.00020)	(0.00007)
Year2003XFed	0.00181**	−0.00091**	−0.00211***	0.00051**	0.00019***
	(0.00076)	(0.00042)	(0.00040)	(0.00022)	(0.00007)
Constant	0.35427***	0.04653***	0.02343***	0.00457***	0.00228***
	(0.00113)	(0.00055)	(0.00040)	(0.00024)	(0.00017)
Observations	1,011,729	1011729	1011729	1011729	1,011,729
Number of firms	123,511	123,511	123,511	123,511	123,511
Adjusted *R*-squared	0.053	0.037	0.073	0.068	0.001

Panel B: Men

	Dependent variable				
	% White male	% Black male	% Hispanic male	% Asian male	% Nat.Am. male
	(1)	(2)	(3)	(4)	(5)
Year1973XFed	0.01421***	0.00191***	0.00237***	−0.00197***	−0.00086***
	(0.00132)	(0.00064)	(0.00063)	(0.00031)	(0.00029)
Year1978XFed	0.00583***	0.00174***	0.00088*	−0.00123***	−0.00007
	(0.00097)	(0.00049)	(0.00048)	(0.00026)	(0.00017)
Year1979XFed	0.00495***	0.00138***	0.00024	−0.00107***	0.00012
	(0.00089)	(0.00045)	(0.00047)	(0.00021)	(0.00019)
Year1980XFed	0.00196**	0.00175***	0.00084*	−0.00098***	0.00009
	(0.00085)	(0.00044)	(0.00046)	(0.00020)	(0.00020)
Year1981XFed	0.00079	0.00183***	0.00067	−0.00087***	−0.00014
	(0.00083)	(0.00044)	(0.00046)	(0.00020)	(0.00016)
Year1982XFed	−0.00004	0.00134***	0.00044	−0.00083***	−0.00017
	(0.00083)	(0.00041)	(0.00042)	(0.00020)	(0.00015)
Year1983XFed	0.00070	0.00071*	0.00018	−0.00105***	−0.00006
	(0.00082)	(0.00040)	(0.00044)	(0.00021)	(0.00019)
Year1984XFed	0.00062	0.00028	−0.00025	−0.00059***	0.00009
	(0.00080)	(0.00040)	(0.00044)	(0.00021)	(0.00017)
Year1985XFed	0.00057	−0.00019	−0.00020	−0.00037	0.00012
	(0.00084)	(0.00041)	(0.00045)	(0.00026)	(0.00012)
Year1986XFed	0.00003	0.00027	−0.00009	−0.00041**	0.00014
	(0.00078)	(0.00040)	(0.00042)	(0.00021)	(0.00015)
Year1987XFed	−0.00044	−0.00004	0.00039	−0.00038*	0.00022
	(0.00076)	(0.00038)	(0.00042)	(0.00021)	(0.00016)
Year1988XFed	−0.00075	−0.00011	0.00045	−0.00007	0.00006
	(0.00074)	(0.00037)	(0.00042)	(0.00020)	(0.00014)
Year1989XFed	−0.00127*	−0.00039	0.00043	0.00004	0.00019
	(0.00073)	(0.00036)	(0.00041)	(0.00019)	(0.00017)
Year1990XFed	−0.00222***	0.00000	0.00000	0.00020	0.00010
	(0.00070)	(0.00035)	(0.00040)	(0.00018)	(0.00011)
Year1991XFed	−0.00269***	0.00001	0.00036	0.00027	0.00013
	(0.00069)	(0.00035)	(0.00040)	(0.00018)	(0.00013)
Year1992XFed	−0.00204***	−0.00025	−0.00028	0.00031*	0.00026**
	(0.00067)	(0.00034)	(0.00039)	(0.00018)	(0.00012)
Year1993XFed	−0.00183***	−0.00022	−0.00020	0.00036**	0.00022*
	(0.00067)	(0.00033)	(0.00039)	(0.00018)	(0.00013)
Year1994XFed	0.00014	−0.00017	−0.00062	0.00016	0.00026***
	(0.00067)	(0.00033)	(0.00040)	(0.00019)	(0.00009)
Year1995XFed	0.00089	−0.00048	−0.00100**	0.00028	0.00023**
	(0.00065)	(0.00033)	(0.00039)	(0.00019)	(0.00010)
Year1996XFed	−0.00003	0.00002	−0.00145***	0.00044**	0.00043***
	(0.00064)	(0.00032)	(0.00040)	(0.00019)	(0.00011)
Year1997XFed	−0.00070	−0.00000	−0.00091**	0.00060***	0.00020*
	(0.00062)	(0.00031)	(0.00038)	(0.00018)	(0.00010)
Year1998XFed	0.00040	0.00029	−0.00128***	0.00041**	0.00032***
	(0.00061)	(0.00031)	(0.00038)	(0.00018)	(0.00009)
Year1999XFed	0.00128*	−0.00022	−0.00212***	0.00055***	0.00025**
	(0.00068)	(0.00033)	(0.00042)	(0.00020)	(0.00010)
Year2000XFed	0.00169**	0.00020	−0.00228***	0.00057***	0.00023***
	(0.00072)	(0.00035)	(0.00046)	(0.00021)	(0.00009)
Year2001XFed	0.00024	0.00033	−0.00244***	0.00089***	0.00032***
	(0.00073)	(0.00036)	(0.00048)	(0.00021)	(0.00010)
Year2002XFed	0.00121	0.00045	−0.00269***	0.00089***	0.00020**
	(0.00077)	(0.00037)	(0.00051)	(0.00024)	(0.00009)
Year2003XFed	0.00157*	0.00057	−0.00300***	0.00093***	0.00042***
	(0.00082)	(0.00039)	(0.00054)	(0.00026)	(0.00010)
Constant	0.45522***	0.06144***	0.04165***	0.00713***	0.00349***
	(0.00116)	(0.00052)	(0.00049)	(0.00024)	(0.00020)
Observations	1,011,729	1,011,729	1,011,729	1,011,729	1,011,729
Number of firms	123,511	123,511	123,511	123,511	123,511
Adjusted *R*-squared	0.100	0.015	0.102	0.046	0.000

NOTE: All models include controls for firm size, corporate structure, share of white-collar nonclerical employees, firm fixed effects, year fixed effects, region-specific time effects, and industry-specific time effects. Robust standard errors clustered by firm are in parentheses. * significant at the 0.10 level; ** significant at the 0.05 level; *** significant at the 0.01level.