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RACE AND GENDER PAY DIFFERENTIALS

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ABSTRACT

In this paper we review research findings from the 1980s and early 1990s on race and gender pay gaps. In addition, we present some evidence from the Current Population Surveys (1972, 1982 and 1989) regarding the impact of shifts in the industrial composition of employment and in interindustry wage differentials on these gaps. The gender gap in pay was stable in the 1970s but fell steadily in the 1980s; the opposite patterns were observed for black-white wage differentials--a trend towards convergence in the 1970s and stability in the 1980s. Understanding these new trends comprised the unifying theme of our review. Existing studies suggest that changes in wage structure, changing relative skill levels by race and sex, and, possibly, changes in the implementation of government policies all played a role in producing the observed outcomes, although impacts were sometimes countervailing. Our own results indicate that total industry effects (representation plus coefficient effects) had little impact on the male-female pay gap during the 1970s, but accounted for a small portion of the closing of the male-female pay gap for both blacks and for whites in the 1980s. In contrast, we found no evidence that total industry effects contributed to black-white wage trends in either period.

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## I. Introduction

In the 1980s, trends in race and gender pay differentials in the U.S. diverged notably from previous patterns. This is illustrated in Figures 1 and 2, which show, respectively, race and gender ratios in weekly earnings for full-time wage and salary workers for the 1967-90 period. The story told by these figures is striking. Specifically, after a steady reduction of racial pay differences from the passage of the Civil Rights Act of 1964 through the late 1970s, black-white wage differentials stopped narrowing and have even widened in some instances.<sup>1</sup> On the other hand, after decades of near constancy at about 60 percent through the 1970s, the female-male pay ratio began to rise at the end of the decade.

Explaining these new trends has been an important focus of research on race and gender pay differentials in the 1980s and early 1990s. The analysis of competing explanations for these trends in the 1980s is the unifying theme of our review of recent industrial relations research in this field. In our survey of this work, we have found several areas where researchers have focused their efforts.

First, an innovative feature of recent research has been to integrate the analysis of race and gender pay gaps into the study of the wage structure in general. Much of this work finds increasing overall wage inequality in the 1980s, and many of the reasons for this trend also affect race and gender wage differentials.<sup>2</sup> In such work, researchers have often studied supply and demand factors as potential explanations of changing pay gaps. In addition, institutional changes such as the decline in unionism have been proposed as important causes of relative wage trends.

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<sup>1</sup> Further, race differentials in economic welfare are understated by focusing on full-time employed workers. For example, there remain major racial differences in joblessness and in the presence of single-parent families, factors that would reduce relative black economic welfare levels even in the absence of pay gaps. See Cotton (1989) and Darity and Myers (1990).

<sup>2</sup> See Levy and Murnane (forthcoming) for a survey of work on inequality.

Second, changes in the composition of the labor force have been a focus of several papers. In this regard, researchers have attempted to gauge changes in the relative productivity of labor market participants from various groups.

Third, a large body of literature has examined the impact of government policy on pay gaps. Such policies range from the enforcement of equal employment opportunity laws and affirmative action requirements for government contractors to the implementation of comparable worth-based pay adjustments. International comparisons in such analyses are particularly useful since labor market policies differ substantially across countries.

While much of the industrial relations research on race and gender in the 1980s and early 1990s has concentrated on these substantive, empirical issues, theoretical and methodological concerns have also received some attention. In particular, Becker's (1957) seminal theory of labor market discrimination has been refined in several ways, as economists have examined the issue of the persistence of discrimination. Further, the problem of measuring workers' productivity-related characteristics has important implications for the interpretation of race and gender wage differentials. Much empirical work in this area has found improved productivity measures, and some statistical research has proposed methods to use when such measures are lacking.<sup>3</sup> In this paper, we first briefly summarize these developments and then turn to our major focus, a review of empirical work aimed at explaining the recent trends in race and gender differentials.

After reviewing these themes of research in the 1980s and early 1990s and presenting some data that bear on specific unanswered questions, we offer suggestions for future work on race and gender differences in labor market outcomes. Some of our prescriptions are primarily methodological, while others call for better integration of race and gender research with recent developments in the analysis of labor markets.

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<sup>3</sup> As noted below, such methods have been controversial and have not been universally implemented. See Goldberger (1984).

## II. Theoretical and Econometric Advances in the Analysis of Discrimination

Becker's (1957) model of discrimination predicted that competition would erode many forms of discrimination. For example, suppose that employers or co-workers were prejudiced against blacks. If there were some nondiscriminating firms, free entry, and constant returns to scale, then competition would undermine the position of firms paying whites a wage premium. The nondiscriminators would have lower costs and would thus increase their market shares. This competitive pressure would either drive the discriminators out of business or force them to maximize profits by ending their discriminatory practices. This reasoning would imply that under competition, observed race or gender wage differentials could not be due to discrimination. A corollary of this analysis is that discrimination should be less prevalent in competitive than in monopolistic or oligopolistic markets.<sup>4</sup>

Some research in the 1980s has attempted to devise models in which discrimination can persist even under competition. The implication of such models is that race and gender wage differentials could still at least in part reflect discrimination even if there were competition. We thus cannot rely on competition to eliminate the effects of prejudice.

First, Goldberg (1982) argues that prejudice may result from a positive preference for whites or men rather than an aversion to women or minorities. If this is true, then discriminating firms willingly earn below normal profits and are compensated by employing members of their favored groups. Prejudiced and non-prejudiced firms can co-exist even with competition.

Second, Lundberg and Startz (1983) extend an imperfect information model first introduced by Aigner and Cain (1977). In this model, firms can more easily predict the performance of whites or men than of minorities or women. In such a world, firms offer different wage schedules to, say, whites and blacks: the white wage-education schedule is

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<sup>4</sup> Ashenfelter and Hannan (1986) find evidence supporting this prediction about discrimination and product market structure in the case of the banking industry.

steeper, reflecting the more accurate predictions of productivity for this group.<sup>5</sup> Workers then respond to their own wage schedule: whites invest more in education than blacks. Thus, differential treatment results in differential investment in a self-fulfilling prophecy.<sup>6</sup> In Lundberg and Startz's (1983) view, only a government policy outlawing the separate wage schedules can eliminate the pay gap. Competition will not suffice.

Third, some authors have focused on the idea of customer prejudice as leading to discrimination that will not be eroded by competition. Customer prejudice differs from firm or co-worker prejudice in that the buyer places a different valuation on the identical output of, say, whites and minorities. Cain (1986) questions the argument that customer discrimination will result in pay differentials. In his view, if there is customer discrimination, then blacks will only take jobs in the sector with no producer-consumer contact; occupational differences will result, but not a pay gap.

However, Borjas and Bronars (1989) show that in a world with imperfect information and search costs, customer prejudice can lead to long run, discriminatory wage gaps. Evidence from the incomes of the self-employed (who must necessarily deal directly with consumers) is consistent with this model of customer discrimination (Borjas and Bronars, 1989). Further, Kahn (1991a) argues that customer prejudice can lead to discriminatory wage gaps if the customer-prejudice sector is large or if minorities have a comparative advantage in such sectors. Evidence from a variety of professional sports confirms the presence of customer discrimination in that sector of the entertainment industry (Kahn, 1991b).

While the continued existence of race and gender earnings gaps has prompted some interesting new models seeking to explain how discrimination can persist in the face of competitive pressures, other theoretical developments have taken a different tack, seeking to

<sup>5</sup> O'Neill's (1990) finding that AFQT scores have a larger effect on the log of black male than on white male wages casts some doubt on this particular version of the statistical discrimination model.

<sup>6</sup> Arrow (1973) made a similar argument about the feedback effects of initial employer prejudices.

explain why men and women with similar measured characteristics might not in fact be perfect substitutes. In particular two recent papers have focused on the division of labor within the family, originally identified by Mincer and Polachek (1974) as an important factor in influencing male-female differences in human capital investments. Becker (1985) developed a model in which married women's lower pay and occupational attainment are due to the lesser effort they expend on their jobs due to their responsibility for child care and housework. Similarly, in a variant of statistical discrimination models, Lazear and Rosen (1990) suggest that women are less likely to be promoted than men of similar ability due to their higher expected separation rate, where this higher separation rate is again due to the division of labor in the family.<sup>7</sup>

These papers present cogent arguments regarding the impact of gender roles within the family for sex differences in economic outcomes. However, it is important to bear in mind that, as suggested by our discussion of Lundberg and Startz's (1983) paper above, the division of labor within the family may be affected by gender pay gaps caused by labor market discrimination. Such feedback effects of gender discrimination have been emphasized by a variety of scholars (e.g., Arrow 1973 and 1976; Blau 1984; Blau and Ferber, 1986 and 1992; Weiss and Gronau, 1981; and Gronau 1988).

As the theoretical analysis of race and gender differentials has been refined in the 1980s, so have empirical techniques for measuring the causes of these pay gaps. One issue of some concern in this regard has been sample selection bias. To compare differences in wage offers, we need to look at more than just the set of employed workers, if the nonemployed differ in ways not directly measurable.

Two approaches have been used to deal with the problem of sample selectivity. First, Heckman (1976, 1979) has devised models which pose a specific selection mechanism: with

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<sup>7</sup> Note, however, that empirical research has generally found that, all else equal, men and women have similar quit rates. See, for example, Blau and Kahn (1981) and Viscusi (1980). Such findings do not support the premise of the Lazear and Rosen model.

distributional assumptions about the unobserved variables that influence employment and wages, these models lead to particular econometric specifications for the wage equations of interest. In addition, using this approach, the extent of the selectivity bias can be directly estimated (and therefore eliminated).<sup>8</sup> On the other hand, such models have been criticized because they depend on specific distributional assumptions for their identification and because their results tend to be very sensitive to the choice of variables in the selection equation (Lewis, 1986; Freeman and Medoff, 1982; Manski 1989).

A second method for dealing with selectivity is more modest. Some authors have made alternative assumptions about the relative productivity of those not employed and tested the sensitivity of results with respect to these assumptions (Smith and Welch, 1989; Blau and Beller, 1992). In such analyses, one can compute reasonable bounds for the impact of selectivity on measured wage differentials.

An additional problem of importance in studying race and gender discrimination is the issue of omitted variables. For example, if, even controlling for the usual explanatory variables, men have higher unmeasured productivity than women, then ceteris paribus wage gaps may in part reflect unmeasured skills rather than discrimination. Of course, if women have higher unmeasured productivity than men, then conventional estimates (i.e. the ceteris paribus wage gap) will understate discrimination. In the early 1980s, a technique was proposed by Roberts (1980) to solve the omitted variable problem in estimating discrimination.

The new technique, termed reverse regression, involves regressing qualifications on wages and race or gender. Roberts (1980) showed that under some circumstances this technique could give an unbiased estimate of discrimination. We ask, in effect, whether to achieve the same pay level, women or minorities need to possess higher levels of labor market skills. In some instances, use of this method led to much lower estimates of labor market

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<sup>8</sup> Examples of studies using this type of selectivity correction in analyzing discriminatory wage differentials include Reimers (1983), Blau and Beller (1988), Wright and Ermisch (1991), and Sorensen (1991).



discrimination than the conventional direct regression techniques (i.e. with log of wages as dependent variable); however, in others the technique led to higher estimates.<sup>9</sup>

While reverse regression held some early promise as a method for solving the omitted variables problem, Goldberger (1984) showed that the technique was, in general, no more likely to result in unbiased estimates than the direct regression method. Only by chance could reverse regression lead to unbiased estimates. Thus, the problem of omitted variable bias remains a potentially serious one for those interested in estimating the extent of discrimination.

### III. Explanations of Race and Gender Relative Wage Trends

#### A. Changes in the Wage Structure

The 1980s were characterized by increasing wage inequality in the U.S. This rising variance occurred both between and within education and experience groups (Katz and Murphy, 1992). Specifically, the returns to education rose dramatically in the 1980s, unlike the fall in returns that occurred in the 1970s. For example, among full time workers, real weekly wages of college-educated men with five years or less of potential experience rose 10.8 percent from 1979 to 1987. In contrast, real weekly wages fell by 19.8 percent for young high school graduates that did not attend college, and by 15.8 percent for young high school dropouts (Katz and Murphy, 1992).

Experience-related wage differentials also increased during this period. Moreover, even within education-experience groups, wage inequality rose in the 1980s. Juhn, Murphy and Pierce (1989) interpret this rise in within-group inequality as an increase in the returns to unobserved skills rather than as an increase in the variance of unobserved ability. This conclusion is based on the finding that older cohorts experienced similar increases in inequality to that of younger cohorts during this period. Thus, the returns to measured and unmeasured skills appear to have increased in the 1980s.

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<sup>9</sup> For example, see Kamalich and Polachek (1982) or Kahn and Sherer (1988).

Accompanying and perhaps helping to explain these trends in inequality were changes in the industrial structure of employment. It is important to note that changes in industrial structure can have two related effects on wage inequality. First, changes in the composition of final demand can lead to changes in the overall demand for skilled labor relative to unskilled labor. For example, the growth of high-tech industries contributed to the rising premium on labor market skills (Bartel and Lichtenberg, 1987); in addition, rising imports have lowered the relative demand for unskilled labor (Murphy and Welch, 1991). Such changes in demand can raise the relative wages of skilled workers in all sectors, even the ones not directly involved in the initial change in product demand composition.

Second, changes in final demand can alter the industrial composition of employment. Such changes can affect a group's wages to the extent that some sectors pay higher wages ("rents") than others for similarly-qualified workers. For example, the 1980s saw a virtual collapse of employment in some high-wage durable goods manufacturing industries (for example in the automobile and steel industries) and a continued rise in relative employment in service industries. Further, the fraction of the nation's employment covered by collective bargaining continued to steadily decrease (Flanagan, Kahn, Smith and Ehrenberg, 1989).

How did these changes in the structure of wages affect race and gender differentials in the 1980s? We first examine race differences. Juhn, Murphy and Pierce (1991) note that the rising return to education in the 1980s has widened race pay gaps since minorities have lower education levels than whites. The authors also argue that minorities have lower unmeasured skill levels (for example, the quality of education), for which, as discussed above, the wage returns have also increased.<sup>10</sup> These increased wage returns are in part explained by findings that shifts in product demand have led to reductions in the demand for unskilled relative to skilled labor (Katz and Murphy, 1992; Bound and Johnson, 1991). For example, reductions in

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<sup>10</sup> Card and Krueger (1992b) present evidence that improvements in the relative quality of schooling for blacks through 1966 helped lower black-white wage differentials from 1960 to 1980.

demand in the durable goods industries eliminated many high-paying, low skill jobs, while increases in demand for financial services raised the demand for college-educated workers (Levy and Murnane, forthcoming).

As noted earlier, in addition to their effects on the overall demand for skill, industrial shifts can lead to changing levels of inequality due to the shrinkage or growth of high-wage sectors. Sorensen (1991) found changes in the industrial distribution of employment accounted for 5 percent of the widening of the black/white pay gap for women and 11 percent of the widening of the gap for men between 1978 and 1984.<sup>11</sup>

At the same time that the industrial composition of demand was changing to the detriment of the relative wages of black workers, so was union coverage. For example, among young male workers (those with less than ten years of potential labor market experience), the unionization rate in 1973 among blacks was 6 percentage points higher than for whites, controlling for education and industry; this gap in unionism was eliminated by 1988 (Bound and Freeman, 1992).<sup>12</sup> This asymmetric pattern of deunionization lowered young blacks' relative wages. Further, Sorensen (1991) finds that among males aged 25-55, the relative deunionization of blacks was responsible for about 13 percent of the widening of the black/white wage gap from 1978-1984. For women, deunionization played very little role in racial pay gaps in the 1980s.

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<sup>11</sup> Sorensen's (1991) wage data came from 1978 (the peak of the black-white wage ratio--see Figure 1) and 1984. Her data source was the Michigan Panel Study of Income Dynamics (PSID). She found a relatively large widening of the racial pay gaps for this limited period and sample--for women, the race gap increased by .04 log points (about 4 percentage points), while for men, the rise was .10 log points (about 11 percentage points). In estimating the effects of sectoral shifts, she measured industry using six dummy variables.

<sup>12</sup> Among all workers, the black-white gap in percent unionized in 1980 was 7.1 percentage points for men and 9.8 percentage points for women. By 1990, the black advantage in unionization was reduced to 5.6 percentage points for men and 6.3 percentage points for women. See Blau and Ferber (1986) and U.S. Bureau of Labor Statistics, 1991.

Finally, on the supply side, Bound and Freeman (1992) argue that one reason for the deteriorating relative wages of young, college-educated blacks in the 1980s was the increase in their relative supply.

Changing industrial structure appears to have had different effects on women's relative wages from its impact on racial differentials. The reduction of the male-female pay gap in the 1980s occurred at the same time that the relative supply of women was rising. Further, according to Katz and Murphy (1992), in the 1963-87 period, changes in women's relative wages and the relative supply of women were positively correlated. Such a pattern suggests that relative demand and/or changes in women's relative human capital levels were part of the explanation.

First, focusing on the demand side, we note that the decline of the durable goods sector raised women's relative wages among those with less than a college education. However, in the 1980s, there were shifts favoring the relative demand for labor in "male" sectors among college graduates. Thus, the fact that women college graduates (of all cohorts) gained relative to men during that period was not due to changing output demand (Katz and Murphy, 1992). As we discuss below, changes in women's human capital levels and occupational attainment play an important role here.

Shifts in industrial representation appear to have contributed to some of the decline in the gender pay gap among white workers. For example, Sorensen (1991) found that from 1978 to 1984, about 11.8 percent of the reduction in this gap was associated with industrial representation; however, O'Neill and Polachek (1991) found that over a longer period (1977 to 1989), such shifts accounted for only about 1.2 percent of the closing of the gender pay gap for white, non-Hispanic workers. Whether this difference in the estimated effects of industry is due to the different time periods covered or the different data bases and methods used

(O'Neill and Polachek used the Current Population Survey in contrast to Sorensen's use of the Michigan PSID) is an open question.<sup>13</sup>

Second, the decline in union representation also raised women's relative wages. For example, in 1980, white men were 9.0 percentage points more likely to be in unions than white women, while the male advantage was 8.3 percentage points among blacks; by 1990, however, the gaps had fallen to 7.1 percentage points for whites and 6.4 percentage points for blacks (Blau and Ferber, 1986 and U.S. Bureau of Labor Statistics, 1991).

Using Sorensen's (1991) estimates in 1979 for the union log wage effect for each race-gender group, the 1980-90 changes in unionization cited above would imply reductions in male-female pay gaps of 0.0059 log points for whites and .0156 for blacks; these changes are about 10-15 percent of the total closing of the pay gaps implied in Figure 2.<sup>14</sup> This is similar to the finding of Even and Macpherson (forthcoming) that deunionization was responsible for about one-seventh of the decline in the gender wage gap between 1973 and 1988.

Finally, while changes in the industrial composition of employment may have favored women in certain instances, it is possible that the aforementioned rise in the returns to unmeasured skill prevented women's relative pay from rising as fast as it otherwise would have. If, even in the 1980s and 1990s, women on average have lower levels of skills (for

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<sup>13</sup> In addition, O'Neill and Polachek (1991) exclude Hispanics, unlike Sorensen (1991). Further, the papers used different age groups (25-55 for Sorensen and 20-59 for O'Neill and Polachek). Moreover, Sorensen (1991) uses a Heckman (1976) correction for selectivity, and, as noted earlier, coefficient estimates can be very sensitive to the implementation of such methods.

O'Neill and Polachek (1991) report very large effects of changes in industry coefficients--such changes purportedly account for 42.3 percent of the closing of the gap. However, unlike the effect of changing industrial distribution of employment, this estimate is highly dependent on which industry is the omitted category; for example, the effect of the "residual trend," which includes the impact of changes in wages in the omitted category was to raise the gap by 64.5 percent of the extent of its ultimate reduction. Below, we propose an alternative measure of industry coefficient effects that has been used by Bound and Freeman (1992) and that is not dependent on the choice of the omitted category.

<sup>14</sup> The return to union membership appears to have been stable in the 1980s (see Freeman, 1986). Thus, any impact of unionization on male-female pay gaps is likely due to changing relative representation rather than to changing returns.

example, those learned through general and firm-specific training) than men, then women have been swimming upstream in a labor market growing increasingly unfavorable to those with lower skill levels. Put differently, in the absence of dramatic increases in women's qualifications in the 1980s, the rising returns to skill could have lowered women's relative wages (i.e. by outweighing any positive effects of industry shifts and deunionization).

Further evidence on the impact of the overall wage structure on male-female inequality comes from an international comparison of wage determination in the 1980s using micro-data from nine industrialized countries (Blau and Kahn, 1991).<sup>15</sup> Using a decomposition technique developed in Juhn, Murphy and Pierce (1991), they found that, in comparison to the other countries, U.S. women had high levels of measured and unmeasured labor market skills (relative to males). However, the pay gap in the U.S. was wider than in most of the other countries in the sample.

A major contributing factor to this finding is the high level of wage inequality in the U.S. that results in a wage distribution that places a much greater penalty on those with below average skills (measured and unmeasured) than in other countries. Put differently, if the U.S. had the same rewards to skills (measured and unmeasured) as exist in any of the other countries in our sample, then the U.S. pay gap would be substantially smaller than it is, all else equal; further under such a hypothetical experiment, the U.S. male-female pay gap would be among the smallest ones in the world.

#### B. Pay Gaps in the 1980s: Further Evidence on the Impact of Wage Structure

In our review of wage structure-based explanations for race and gender trends in relative wages in the 1980s, we considered a variety of explanations for the observed patterns. However, one problem with the existing literature is that studies tend to focus on either the race or gender difference. This makes it difficult to reach firm conclusions regarding potential

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<sup>15</sup> The countries were, in addition to the U.S., Australia, Austria, Britain, Hungary, Norway, Sweden, Switzerland, and West Germany. See also Blau and Kahn (1992).

differences and similarities across these two groups.<sup>16</sup> We thus sought to confirm the general conclusions derived from our review of the literature by undertaking an analysis of race and gender differentials over the 1970s and 1980s employing a consistent data set and framework of analysis for both groups; the 1970s are included for purposes of comparison. Specifically, we analyzed data from three years of the March Current Population Survey (CPS)--1972, 1982, and 1989, covering earnings for 1971, 1981, and 1988 respectively.<sup>17</sup>

Our empirical strategy was to run log annual earnings regressions with successive corrections for time inputs, human capital variables, occupation, and industry. (See Table A-1 for variable definitions.) The controls for time input (part-time employment, weekly work hours and weeks worked) in effect transform the dependent variable into a (log) wage. The human capital variables include education (with, as described in Table A-1, splines), and potential experience (and its square). We also add controls at this stage for region, urban residence, marital status and number of children. Occupation and industry are measured at the 1-digit level. The successive additions of new variables allow us to examine the impact of each type of factor on pay gaps.<sup>18</sup>

The issue which we particularly address in this analysis is the importance of industry shifts in explaining the observed trends. The total industry effect on male-female and black-white pay gaps is composed of two kinds of potential industry-related effects. First is a

<sup>16</sup> In addition, most studies of race differences are limited to males; see Blau and Beller (1992) for an exception. However Blau and Beller do not examine the impact of industry shifts on the trends. As noted, Sorensen (1991) analyzes race-gender groups separately but only in detail for the 1978-84 period. Our brief examination of Current Population Survey data covers the 1971-88 years, thus providing additional coverage of the 1980s and an examination of the 1970s for comparison as well.

<sup>17</sup> Our sample is restricted to individuals aged 18 to 64 who worked at least one week in the previous year and whose wage and salary income was at least \$100. We excluded individuals with any self-employment income, members of the military, and those who were in school.

<sup>18</sup> For convenience and brevity of reporting, we pool by race and gender and include three race-gender dummy variables (with white males the omitted category). However, as may be seen in Table A-1, we do allow the effects of marital status and children to differ across gender-race groups. The overall ratios reported in Table 1 are evaluated at the means of the marital status and number of children variables for each group.

**representation effect** due to changes in the representation of each group in the various industries. If, for example, males disproportionately lost jobs in high-paying industries, then this factor would lower the male-female pay gap. Second is a **coefficient effect** due to changes in the returns to being employed in particular industries. For example, if the wage return to working in a male-dominated industry fell, then this factor would lower the male-female pay differential. The **total industry effect** is equal to the sum of the representation and coefficient effects. It may be noted that another potential impact of industry shifts on relative wages cannot be identified by this type of approach. Changes in industry demands for labor may alter the returns to skill and, to the extent that different race-gender groups are differentially endowed with these skills, the race-gender differentials.

We analyze the impact of industry in two ways. First, we compare the "+hc" and "+ind" specifications. This comparison does not control for occupation and gives perhaps a maximum effect of industry. The industry effects in this analysis account for the impact of the following kind of phenomenon: it is possible that many operatives in durable goods manufacturing were laid off and took jobs as service workers in service industries; for such workers, the full effect of the shift in industry demand includes the change in occupation as well as industry. Second, we compare the "+occ" and the "+occ/ind" specifications. This portion of the analysis examines the impact of industry changes controlling for occupation. In this case, one would examine, for example, the impact on the gender differential of male operatives losing their durable goods manufacturing jobs and changing industries but remaining in the same occupation.

Within each of these two types of specifications, the full industry effect on changing differentials is the difference in the reduction of the relevant gap (say, between 1981 and 1988) between the regression specification without and the one with industry included. This full industry effect is then decomposed into representation and coefficient effects. In decomposing industry effects, we use as units of measurement the differences in the (hours adjusted) log of



earnings, as is conventional in such analyses (Bound and Freeman, 1992; Blau and Beller, 1992). The industry representation effect is computed as follows.

Take the case of the 1981 to 1988 changes for white men vs. white women. Let  $B_{181}$  be the vector of industry regression coefficients for 1981 (these are the same for everyone); and let  $X_{IWM81}$ ,  $X_{IWM88}$ ,  $X_{IWF81}$  and  $X_{IWF88}$  be, respectively, the vectors of industry dummy variables for white males in 1981 and 1988 and white females in 1981 and 1988. Then the industry representation effect on the closing of the gap (measured as the difference between the log of male and the log of female wages) from 1981 to 1988 is:

$$B_{181}(X_{IWM88}-X_{IWM81}) - B_{181}(X_{IWF88}-X_{IWF81}).$$

The industry coefficient effect, is then defined as the difference between the total industry effect and the representation effect.<sup>19</sup>

Table 1 contains estimates for the full sample of the female/male and black/white pay ratio with the varying controls. The race/gender ratios corrected for time input differ somewhat from those in Figures 1 and 2 due to differences in samples and in the definition of the earnings measure.<sup>20</sup> In particular, the gender ratios are slightly higher than those in Figure 2, since, even among full-time workers, men typically work more hours per week than women (O'Neill 1985). In Table 1, we include both part-time and full-time workers, but control in considerable detail for gender differences in time input. However, the trends in the wage ratios (i.e., earnings ratios adjusted for time input) shown in Table 1 are similar to those in Figures 1 and 2.

For white women relative to white men, there was slow progress between 1971 and 1981 and more rapid progress between 1981 and 1988. For black women relative to black men, the percentage point decrease in the gap was somewhat larger from 1981 to 1988 than

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<sup>19</sup> Bound and Freeman (1992) use a similar scheme to estimate the impact of differing variables on changes in black-white wage differentials among young men.

<sup>20</sup> The published data are for the median earnings of each group; our ratios are calculated on the basis of the geometric means. Our sample restrictions are detailed above.

from 1971 to 1981. Further, while the percentage reduction in the gap for black women was about the same for 1981-88 (12.0 percent) as for 1971-81 (12.2 percent), the 1980s reduction was achieved in three fewer years, again indicating more rapid progress in the 1980s than the 1970s. For black workers relative to whites, there was progress between 1971 and 1981 with stagnation in relative wages after 1981.

We begin by discussing the contribution of industry shifts to trends in the female/male wage gap. The gender difference in log earnings controlling for time input serves as a base.<sup>21</sup> For whites, we obtain ambiguous results for the 1971-81 period. With occupation excluded, the gap closes faster with industry included (+ind) than with industry excluded (+hc) by .079 log points compared to .074 log points.<sup>22</sup> This finding would indicate that the total industry effect is to reduce the growth of white women's relative wages. However, with occupation included, adding industry lowers the growth in female relative wages (from .083 to .080), suggesting that the total industry effect is to raise women's relative wage growth somewhat. In either case, the total industry effect is relatively small in magnitude for whites in the 1970s: the total effect of industry is -6.2  $((.074-.079)/.081)$  to 3.7  $((.083-.080)/.081)$  percent of the total relative change in the female-male ratio.

Decomposing these 1970s industry effects for white women relative to white men, we find that for both specifications (i.e. occupation included or excluded), the effect of changes in representation was to lower the pay gap, while the coefficient effect raised the pay gap. In the 1970s, white women's changes in their industry representation relative to men lowered the gap in log earnings by .0085 to .0129 log points; these effects represented 10.5 percent to 16.0 percent of the total hours-corrected reduction in the log earnings differential. However, in each case industry wage premia changed to the detriment of women's relative wages and led to

<sup>21</sup> Note that Table 1 shows for both whites and blacks in 1988 that the addition of the human capital variables reduces the female/male earnings ratio. In each case, women have higher levels of education than men, a factor contributing to this result.

<sup>22</sup> The changes in the difference of the log of earnings are approximately equal to the percent changes in the earnings ratios shown in the final three columns of Table 1 (divided by 100).

the total industry effects of -6.2 percent to +3.7 percent of the change in the female/male log wage gap.

For the 1980s, the main focus of the analysis, both specifications give similar answers for the industry effect on the closing of the white female-white male wage gap. The total industry effect is to reduce the female-male pay gap by 8.0-10.0 percent of the total reduction in the gap of .127 log points. Decomposing this industry effect, we find that 43-56 percent of it is due to changes in industrial representation, and 44-57 percent is due to coefficient changes, each of which favored women. Thus, in the 1980s, industry changes are a modest part of the explanation of the reduction in white female-white male pay gap, with the industry impact roughly equally divided between industry representation effects and interindustry wage structure (i.e., coefficient) effects. These industry representation effects (of approximately 4 to 5 percent) are bracketed by the estimates of Sorensen (1991) and O'Neill and Polachek (1991).<sup>23</sup>

For black women relative to black men, controlling for occupation makes a much more important difference in the analysis of industry effects than for whites. In the 1970s, black women moved significantly out of the private household occupation (in the personal services industry). Counting this development as an occupational rather than an industrial shift, which seems most appropriate to us, Table 1 shows only a small industry effect in the closing of male-female wage gaps among blacks. That is, the total industry effect accounted for about 1.8 percent of the closing of the pay gap from 1971 to 1981 and 3.9 percent from 1981 to 1988. In each period, favorable (to women) changes in industry means worked against adverse changes in coefficients. The industry representation effects accounted for 24.9 percent of the total closing of the black male-black female pay gap from 1971 to 1981 and 5.3 percent

<sup>23</sup> Our estimated industry representation effects combine industry and union representation impacts to the extent that unionism is correlated with industry, since we are unable to control for union status. O'Neill and Polachek (1991) also did not control for unionism, while Sorensen (1991) did. It is thus perhaps surprising that Sorensen (1991) still finds the largest industry representation effects. As noted earlier, it is possible that such findings are sensitive to the choice of time period or to her use of a specific selectivity-bias correction technique.

from 1981 to 1988.<sup>24</sup> The industry representation effect for black women is thus larger (in absolute value) than that for white women during the 1970s, and about the same magnitude as that for white women during the 1980s.

The main conclusion, then, with respect to the impact of industry shifts on gender pay gaps is that changes in the industry representation of men and women have been raising women's relative pay since at least 1971. The 1980s "deindustrialization" effect appears to be a continuation and, for whites, an acceleration of trends from the 1970s. However, countervailing forces in the 1970s such as adverse changes in industry wage coefficients and in women's relative experience levels (the latter to be discussed below) prevented women's relative pay from rising faster than it did. In the 1980s, in addition to positive industry representation effects, white women benefited from favorable changes in industry coefficients as well as from increases in their relative experience levels.

Industry effects analyzed in this way had relatively little overall impact on the changing race differences in pay when we control for occupation. In the 1970s, the total industry effect for men (.0011 log points favoring blacks) accounted for only 2.2 percent of the closing of the gap; and the total industry effect for women was only .0001 log points, or about 0.1 percent of the closing of the gap. In each case there were favorable (to blacks) shifts in industrial distribution and adverse changes in coefficients.

For men in the 1970s, the industry representation effect amounted to 4.9 percent of the reduction in the black-white log wage gap; for women, changes in industry means accounted for 27.0 percent of the reduction in the pay gap, a relatively large effect. The coefficient effect offset about 55 percent of the means impact for men and roughly the entire means effect

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<sup>24</sup> Sorensen (1991) finds that industry means raised the male-female pay gap for blacks from 1978 to 1984 by .025 log points (even though the overall pay gap fell by .128 points); however, union status changes lowered the gap by .047 points. Thus, combining industry and union effects, as our estimates to some extent do, Sorensen's (1991) results imply that changing industry and union representation together account for 17.2 percent of the falling pay gap. This combined total is larger than our estimate of 5.3 percent for the industry representation effect over the longer 1981-88 period.

for women. Not controlling for occupation, we see a large effect for black women relative to white women of moving out of the personal services industry in the 1970s.<sup>25</sup> But, as noted above, we believe this is more appropriately viewed as an occupational rather than an industrial shift.

Table 1 shows that in the 1980s, convergence in racial pay gaps greatly slowed down, as can also be seen in Figure 1. The hours-corrected black-white earnings ratio for men rose from 74.6 percent in 1981 to 75.7 percent in 1988; for women, this ratio hardly increased at all, going from 88.0 percent to 88.2 percent. Total industry effects, while large compared to these minimal rates of change in the overall black-white pay gap, were very small in themselves. For men, the total industry impact lowered the black-white pay gap by .0044 log points (28.2 percent of the total reduction), while for women, the total industry effect actually raised the gap by .0016 log points. Industry representation effects were very small but worked to reduce the black-white pay gap for both sexes: such effects were .0003 log points for men and .0006 log points for women.<sup>26</sup>

Our findings are similar to Sorensen's (1991) regarding the lack of importance of industry shifts for explaining changes in the black-white female pay gap. However, for men she found larger industry effects for this short time period than we have for the 1981-88 period. Specifically, industry representation and union status effects together raised the black-white pay gap for men .024 log points, or by 24 percent of the total increase in the pay gap.<sup>27</sup> At the beginning of the 1978-84 period, the black-white pay ratio was at its peak (Figure 1); further, the racial pay gap in this period is likely to have been heavily influenced by the

<sup>25</sup> Blau and Beller (1992) report a similar result.

<sup>26</sup> Not controlling for occupation, industry effects served to reduce racial gaps for both men and women in the 1980s. While such effects were larger in absolute value than they were within occupations, they remained small. For men, the total industry effect not controlling for occupation was .0068 log points, while for women it was .0063 log points. Industry representation effects in this specification were .0004 log points for men and .0051 log points for women, both serving to slightly reduce racial pay gaps.

<sup>27</sup> The industry representation effect was .011, and the union status effect was .013.

recessions of 1980 and 1982-3. In contrast, our 1981-88 period does not include the first recession and includes four years of expansion after 1984. These differences in time period may explain our finding of a smaller industrial representation effect for black men vs. white men than Sorensen (1991).

Our race findings may at first appear inconsistent with the conclusion above that shifts in industry demand had a negative effect on the relative wages of blacks. However, these findings merely suggest that if such an adverse effect did occur it operated via an increase in the returns to skill, rather than specifically through coefficient and mean effects associated with the industry variables. Further, to the extent that blacks were more negatively affected than whites by these shifts, it may have been reflected in employment rather than wage effects.

#### C. Changes in Work Force Composition--The Impact of Changing Levels of Labor Market Skills

Even if the structure of the demand for labor had remained the same in the 1980s as in the 1970s, changes in labor market skills of minorities and women could still have had important effects on pay gaps. Research in the 1980s has placed considerable emphasis on such skills.

An often-noted feature of black-white pay gaps measured through 1980 is the decline in black-white wage ratios with age in any cross-section. This decline has been interpreted as reflecting improved quality and quantity of schooling of new black workers (Smith and Welch, 1989). Further, in successive cross-sections through 1980, the decline in the wage ratio with age has become more pronounced, an additional finding consistent with the "new vintage" effect. In addition, Card and Krueger (1992b) find direct evidence from data on segregated schools in the South that measures of black and white school quality had substantially converged by 1966.<sup>28</sup>

In contrast to the pre-1980s pattern, in the 1980s, experienced black males' relative wages have risen slightly, while those of new entrants have fallen (Smith and Welch, 1989, p.

<sup>28</sup> These measures were teacher salaries, class size, and the length of the school year.

558; Blau and Beller, 1992); a similar pattern characterizes black-white differences among women (Blau and Beller, 1992). These findings suggest that the vintage effect has ceased to operate in the 1980s.

Smith and Welch (1989) speculate that the relative quality of schooling for blacks entering the labor market in the 1980s may have deteriorated.<sup>29</sup> The evidence on this conjecture is mixed. On the one hand, O'Neill (1990a) reports that at each level of education at or above the third year of high school, racial differences in Armed Forces Qualification Test (AFQT) scores for 19-21 year old males widened between 1950 and 1980; for education levels lower than the third year of high school, racial differences narrowed.<sup>30</sup>

On the other hand, Bound and Freeman (1992) report that between 1978 and 1986, math proficiency test scores for 17 year old blacks rose by 12 points, compared to a 2 point rise for whites. This finding casts doubt on the hypothesis of a deterioration in relative schooling in the 1980s for blacks.<sup>31</sup>

It is important to point out that focusing on hourly wages can give a misleading picture of the relative labor market success of black and white workers. While our focus is on the

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<sup>29</sup> While a rising return to skill could explain the deterioration in black new entrants' relative wages in the 1980s, it would not by itself explain the divergent trends for experienced blacks and new black entrants. These divergent trends are consistent with a deterioration in the relative quality of schooling for blacks. However, as we note below, there may be other explanations of the deterioration in relative pay for younger blacks as well. Further, the assertion that relative quality of black schooling in the 1980s has fallen has also been challenged (see below).

<sup>30</sup> Use of AFQT score, as opposed to school expenditures, as an indicator of school quality is controversial. On the one hand, O'Neill (1990a) found that this variable is significantly positively related to earnings for both whites and blacks, suggesting that it does measure market-related skills. On the other hand, in a review of 147 studies, Hanushek (1986) found that school expenditures did not have an influence on test scores, perhaps suggesting that expenditures do not indicate quality. However, Card and Krueger (1992a) found that school expenditures did affect the students' subsequent earnings, placing expenditures on an equal footing with test scores as labor market predictors.

<sup>31</sup> Bound and Freeman (1992) also examine crime as a possible explanation for the deterioration in young black males' relative labor market position in the 1980s. They find that increases in crime among young blacks in the 1980s contributed to a lowering of employment rather than to lowered wages among the employed.

wage structure, some discussion of overall income is important for two reasons. First, trends in overall earnings (by far the major component of total income) give us a better picture of economic well-being than do trends in hourly wages. Second, changes in the fraction of the population that is employed influence the average productivity of those who are employed and thus our interpretation of the hourly wage differences themselves. This selectivity factor relates directly to changes in the relative labor market skills of black and white workers.

Among men, there are larger differences in average annual earnings between blacks and whites than in hourly wages. For women, the racial gaps between annual and hourly earnings are similar, with the hourly gap actually slightly wider (Blau and Beller, 1992). Further, black relative family incomes have deteriorated in the 1980s. For example, in 1967 median black family incomes were 59 percent of whites'; by 1975, this ratio had increased to 62 percent, reflecting the improvement in black labor market outcomes. However, by 1987, the black-white ratio in median family incomes had fallen to 56 percent (Cotton, 1989). Much of this decline is associated with the growth of female-headed families among blacks, a phenomenon linked to employment problems among black males (Darity and Myers, 1990).

The effect of labor force selectivity on measured wage gaps depends not only on relative employment rates. It also depends on which groups do not find or seek employment. For example, Butler and Heckman (1977) argued that the least productive would drop out of the labor force. Thus, rising relative nonemployment rates for blacks led to an overestimate of the degree of black-white convergence in wage offers. Further, Darity and Myers (1990) point out that those obtaining college educations could also drop out to continue their schooling. Again, focusing on employed workers would understate black-white wage differentials since whites are more likely to attend college than blacks.<sup>32</sup>

While studies have used a variety of methodologies to correct for selectivity, empirical work on this issue suggests that selectivity partially explains black gains in the 1970s;

<sup>32</sup> In fact, Blau and Beller (1988) find negative selectivity effects for men, results consistent with Darity and Myers' (1990) claim.



however, even after controlling for selectivity, black workers made relative gains in wage offers in the 1970s.<sup>33</sup>

In the 1980s, selectivity appears to also explain some of the apparent deterioration in the relative wages of young black workers. That is, between 1981 and 1988, the black-white wage ratio for those with nine or fewer years' potential experience fell from 81.1 percent to 75.4 percent for men and from 91.5 percent to 87.6 percent for women. However, when we allow for changes in selectivity, the declines are smaller and in some cases are eliminated (Blau and Beller, 1992). School enrollment, participation in the military and self-employment affected sample inclusion (in addition to unemployment and nonparticipation). But these results suggest that, among younger workers in the 1980s, the white labor force was becoming more selective relative to the black labor force.<sup>34</sup>

The major development in the 1980s affecting the relative labor market skills of women has been the increasing work experience of the female labor force. Women's labor force participation rates rose steadily in the 1970s and 1980s. However, in the 1970s increases in female labor force participation led to reductions in the relative experience levels of the average employed woman (Polachek, 1990). This development was due to the entry (or re-entry) of large numbers of women with relatively low experience levels.<sup>35</sup> By the 1980s, women's increasing degree of labor force commitment led to rising relative experience levels. Polachek (1990) finds that most of the acceleration in white women's relative earnings during

<sup>33</sup> See, for example, Brown (1984), Smith and Welch (1989), and Blau and Beller (1992).

<sup>34</sup> In the 1980s, older workers were much less affected by the selectivity adjustment than younger workers. Sorensen (1991) also finds a small role for selectivity in explaining rising black-white wage differentials among workers aged 25-55 in the 1978-84 period.

<sup>35</sup> Goldin (1990) reports that a small decline in female experience levels which occurred between 1960 and 1980 "was produced by changes in the age distribution of the employed female population rather than by changes in work experience at each age" (p. 41). This "youthening" of the female labor force most likely results from the large post-1960 increases in labor force participation of younger women, including married women with preschool children, a shift which could be expected to increase women's experience and earnings in the long run. For additional evidence on experience trends for women, see O'Neill (1985), Smith and Ward (1984), and O'Neill and Polachek (1991).

1980-87 relative to 1974-79 is associated with these changes in actual labor market experience.<sup>36</sup> Further, O'Neill and Polachek (1991) find over the 1976-87 period that changes in actual labor market experience accounted for 26.7 percent of the closing of the male-female pay gap, and changes in the returns to experience for women relative to men accounted for another 41.7 percent.<sup>37</sup> This latter finding reflected the growing female relative return to actual experience, which the authors interpreted as an indication of the growing labor force commitment and therefore levels of on-the-job training for women.<sup>38</sup>

Additional evidence consistent with the conclusions of Polachek (1990) and O'Neill and Polachek (1991) concerns lifetime labor force participation patterns for women. Prior to the 1980s, the labor force participation rate of a cohort of women would decline from ages 22 to 30, reflecting career interruptions to raise children. However, recent cohorts have actually increased their labor force participation in these age groups, reflecting an increased commitment to market work (O'Neill, 1990b).<sup>39</sup> Further, a larger percentage of young

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<sup>36</sup> Polachek's (1990) accounting is based on regressions that control only for education and experience. When he constrains men and women to have the same returns to these variables, actual labor market experience changes account for 75 percent of the difference in growth rates in the female/male wage ratio between 1974-9 and 1980-7. Changes in relative education levels accounted for the rest of the acceleration in the wage ratio. When he estimates separate regressions for men and women, changes in the two types of human capital together explain 92 percent of the acceleration in the wage ratio. While the increase in women's relative levels of actual work experience undoubtedly reflects an improvement in labor market skills, other explanations exist for the relationship between work experience and earnings. Specifically, Gronau (1988) finds that earnings opportunities can also affect women's propensities to accumulate labor market experience. That is, feedback effects discussed above may well be important.

<sup>37</sup> O'Neill and Polachek (1991) pooled by race and did not allow whites and nonwhites to have different returns to the explanatory variables.

<sup>38</sup> These coefficient changes may also reflect changes in the labor market treatment of women.

<sup>39</sup> To some degree, such a change may reflect delayed child-bearing decisions. However, among the cohort born between 1946 and 1955 (a relatively recent one), there is no downturn in labor force participation for ages 30-40 (O'Neill, 1990b, p. 28). Thus, even accounting for delayed child-bearing, there does appear to be an increased level of labor force commitment among women.

women surveyed in the 1980s planned to be in the labor force at age 35 than was the case in 1968 (O'Neill, 1990b).

These findings for women's increasing relative experience levels, lifetime participation patterns and work plans suggest an increased commitment to market work among women. This commitment has been associated with increases in the quality of work force experience obtained by women (as suggested by their increasing relative returns to labor market experience) and in their preparation for market work. For example, in 1968, women received 8 percent of MDs, 3 percent of MBAs, and 4 percent of law degrees; by 1986, these figures had risen dramatically to 31 percent for MDs and MBAs and 39 percent for law degrees (O'Neill, 1990b). And occupational segregation by sex continued to decline in the 1980s, although at a somewhat slower pace than in the 1970s, again reflecting an improvement in the quality of women's labor market experience (Blau 1988).<sup>40</sup>

#### D. The Effects of Public Policy

In the U.S., the major instances of government regulation of race and gender differences in labor market outcomes involve the Equal Pay Act of 1963, Title VII of the Civil Rights Act of 1964, and Executive Order 11246 implemented in 1965.<sup>41</sup> The Equal Pay Act required equal pay for equal work for men and women but was silent on the issue of employment opportunities. Title VII was comprehensive in that it banned all forms of employment discrimination (e.g., wages, hiring, layoffs, promotions) on the basis of race, gender or national origin. The Equal Employment Opportunity Commission (EEOC) gives aid to plaintiffs in their anti-discrimination lawsuits. The Executive Order set up the Office of Federal Contract Compliance Programs (OFCCP) to monitor the hiring practices of

<sup>40</sup> The potentially positive effect of decreased occupational segregation *per se* on relative female wages was off-set during both the 1970s and 1980s by adverse (for women) changes in occupational premia. That is, increasing returns to employment in male occupations worked to lower the relative earnings of women who, despite recent gains, continued to be underrepresented in these jobs (Blau and Beller, 1988 and O'Neill and Polachek, 1991).

<sup>41</sup> See Leonard (1986), Gunderson (1989), and Brown (1982) for further discussion of such governmental efforts.

government contractors. These companies were required to report such practices and to ensure that "affirmative action" was taken to guarantee non-discriminatory treatment of women and minorities.

Studies evaluating the impact of government policies generally compare states with different levels of EEOC activity or contractor firms with noncontractors. Such evidence thus ignores any spillover effects to states with low EEOC activity or to noncontractors; on the other hand, OFCCP enforcement may lead to a re-shuffling of employment from non-contractors to contractors with no overall change in the relative success of women or minorities. Further, the decision to bring a lawsuit or to become a government contractor may be related to existing pay differentials based on race or gender. Thus, comparisons between contractors and noncontractors or between areas with high and those with low EEOC activity may give a misleading picture of policy effectiveness. With these qualifications in mind, we note that evidence from 1970s data suggests the following conclusions regarding the effectiveness of government policies.

First, Title VII lawsuits (or their threat) in the 1960s and 1970s appear to have improved the employment and occupational status of blacks (Leonard, 1984a; Heckman and Payner, 1989). Second, between 1967 and 1974, enforcement of Title VII lowered male-female pay gaps and reduced occupational segregation by sex (Beller, 1979 and 1982). Third, affirmative action (OFCCP) activities contributed to rising black employment and black occupational upgrading between 1974 and 1980 (Leonard, 1984b; Smith and Welch, 1984). However, OFCCP activities have not raised the occupational status of white women (Leonard, 1989).

While there have been fewer studies of the impact of government policy in the 1980s than of its impact in the 1970s, some researchers have noted the decrease in government budgets devoted to affirmative action enforcement activity (Smith and Welch, 1984; Bound and Freeman, 1992; Leonard, 1990). Further, Leonard (1990) points out that the government has eliminated the threat of contract debarment as a punishment for failure to meet affirmative

action requirements. In addition, back pay awards enforced on government contractors (to redress race and gender gaps) were reduced in the 1980s. Moreover, in the late 1980s, the Federal Government (Executive Branch and Supreme Court) moved to make it more difficult for plaintiffs to prove discrimination in Civil Rights Act lawsuits (Leonard, 1990).<sup>42</sup> Finally, while the annual number of employment discrimination suits was constant during the 1980s, the number of class action suits fell (Bound and Freeman, 1992).

These recent trends toward weaker enforcement of antidiscrimination laws in the 1980s appear to have had some consequences for race and gender pay gaps. First, Leonard (1990) notes that in contrast to the 1970s, between 1980 and 1984, black and female employment grew more slowly at contractors than at noncontractors. Second, Bound and Freeman (1992) note that among young males, the black-white pay gap for college-educated workers widened between 1976 and 1988. The authors attribute such losses in part to weakened affirmative pressures in the 1980s (and, as mentioned earlier, to an increased supply of such workers).

As noted, government policies in the 1970s had some effect on reducing occupational segregation by gender. However, despite continued declines, such segregation remains an important feature of the U.S. labor market (Blau 1988) and appears to continue to have major effects on male-female pay differentials.<sup>43</sup> Its wage effects may be due to female "crowding" into women's jobs, raising relative labor supplies there (Bergmann, 1974). To the extent that such crowding represents the effects of employer (or union) exclusion rather than worker choice, government policies aimed at eliminating hiring and promotion discrimination can reduce these wage effects.<sup>44</sup> However, because integration of occupations can take many

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<sup>42</sup> A Civil Right Act passed by Congress in 1991 reinstated many of the original interpretations of the civil rights laws that had been affected by these Court decisions.

<sup>43</sup> See Johnson and Solon (1986), Sorensen (1990), Blau (1988), and Blau and Beller (1988).

<sup>44</sup> See Reskin, et al (1986) for a survey of explanations for occupational segregation. There appears to be evidence supporting hypotheses about pre-labor market socialization and employer exclusion as causes of segregation. See also, Reskin and Roos (1990) and Strober (1984).

years, some have advocated a more immediate solution to the segregation-related portion of the gender pay gap.

This solution has been termed "comparable worth," or the principle of equal pay for jobs that are determined to be of equal value to the employer. As of 1987, 20 states had set aside money to use in making comparable worth adjustments in the salary schedules for their state government employees. In a study of the impact of comparable worth policies among two groups of public employees (Minnesota state and San Jose municipal workers), Killingsworth (1990) found that comparable worth adjustments lowered male-female pay gaps by 5.8-9.9 percentage points. Thus, comparable worth policies have the potential to noticeably affect the gender pay gap in a relatively short time period. However, employers responded to the new administered wages by reducing relative employment in the jobs with the highest pay adjustments. The result was a 3.5-6.7 percentage point fall in the female-male employment ratio, all else equal. An analysis of the implementation of comparable worth in Washington State by O'Neill, Brien and Cunningham (1989) also finds a narrowing of the gender pay gap coupled with a decline in the share of employment in occupations receiving comparable worth pay adjustments.<sup>45</sup> These employment effects and the inefficiencies caused by administered wages lead many economists to oppose comparable worth policies in favor of opening up access to men's jobs (Lazear, 1989).

While comparable worth policies appear to be spreading among state governments in the U.S., the private sector has been largely untouched by this policy. However, in other countries, comparable worth principles have been enforced throughout the economy (OECD, 1988). For example, in Australia, comparable worth was phased in during the 1972-75 period

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<sup>45</sup> Orazem and Mattila (1990) found that the ultimate impact of comparable worth on the wage structure of employees in Iowa was greatly modified by various interest groups. Potential gains of 8.8 percentage points in female pay relative to male pay under the original plan ended up as a gain of only 1.4 percentage points after full implementation. For estimates of the potential impact of an economy-wide comparable worth policy, see Sorensen (1990) and Johnson and Solon (1986). For other empirical studies related to the comparable worth issue, see Michael, Hartmann, and O'Farrell (1989).

for the economy at large (Gregory and Daly, 1990). This decision followed a 1969 ruling that had required equal pay for equal work.<sup>46</sup> Australia has had a long history of government intervention in private sector wage determination, with minimum wages for many occupations set by tribunal. Thus, the comparable worth decision of 1972 was implemented through the existing tribunal system (Gregory and Daly, 1990).

The decisions in Australia requiring equal pay for equal work (1969) and comparable worth (1972) were followed by a sharp upturn in the female-male hourly earnings ratio in manufacturing: from 1969 to 1972, this ratio rose from about 63 percent to 68 percent; by 1975, the ratio stood at about 79 percent and has been at roughly that level through 1989 (Blau and Kahn, 1991). Such a dramatic cut in the pay gap provides some circumstantial evidence that Australian tribunal policies may have influenced relative pay.<sup>47</sup> In addition, Blau and Kahn (1991) find smaller gender pay gaps in countries with centralized wage determination systems such as Austria, Sweden and Norway, in addition to Australia (see also Rosenfeld and Kalleberg, 1990).

The evidence from Australia and from countries with centralized wage-setting systems suggests that government policies can affect gender gaps in pay. However, evidence on the negative employment effects of comparable worth in Minnesota, Washington State, and San Jose (Killingsworth 1990; O'Neill, Brien, and Cunningham 1989), as well as evidence that such policies have adversely affected female relative employment in Australia (Killingsworth, 1990), remind us that such policies also impose costs.

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<sup>46</sup> Prior to 1969, women's rates were set at 75 percent of the male pay rate (Gregory and Daly, 1990).

<sup>47</sup> There is some controversy about whether the comparable worth decision had a permanent effect on future tribunal wage awards. On the one hand, Gregory and Daly (1990) argue that there was a permanent impact. However, Killingsworth (1990) provides some econometric evidence that in the long run, wage tribunals would have eventually moved women's relative pay awards up anyway. In his view, the comparable worth decision merely sped up the process. Whichever view is correct, considerable power to move wage rates and change the male-female pay gap rests in the hands of the wage tribunals in Australia.

#### IV. Conclusions and Directions for Research in the 1990s

In this paper we have reviewed research findings from the 1980s and early 1990s on race and gender pay gaps. In addition, we have presented some evidence from the Current Population Surveys (1972, 1982 and 1989) regarding the impact of shifts in the industrial composition of employment and in interindustry wage differentials on these gaps. The gender gap in pay was stable in the 1970s but fell steadily in the 1980s; the opposite patterns were observed for black-white wage differentials--a trend towards convergence in the 1970s and stability in the 1980s. Understanding these new trends comprised the unifying theme of our review. Existing studies suggest that changes in wage structure, changing relative skill levels by race and sex, and, possibly, changes in the implementation of government policies all played a role in producing the observed outcomes, although impacts were sometimes countervailing.

In our own investigation of the impact of industry shifts, we identified a total industry effect which was composed of a representation effect due to employment shifts and a coefficient effect due to changes in the returns to employment in particular industries. Our results suggest that total industry effects had little impact on the male-female pay gap during the 1970s, but accounted for a small portion of the closing of the gap for both blacks and for whites in the 1980s. In contrast, we found no evidence that total industry effects contributed to black-white wage trends in either period.

While changes in the industrial representation of women and men have been raising the relative pay of women since the 1970s, they were offset by adverse (for women) changes in industrial wage premia in the 1970s. In the 1980s, however, white women benefited from a small positive effect of changes in industry wage coefficients as well, while industry coefficient effects had only a small negative effect on the relative wages of black women which was more than offset by the convergent industry representation effect. Overall, total industry effects accounted for 11 to 16 percent of the closing of the gender gap among whites and 4 percent among blacks.



Our results for the impact of industry on race differentials suggest that to the extent that changes in the composition of demand for output have influenced these racial pay gaps, their effects have been felt across industries. So, for example, even though a reduction in the demand for unskilled labor may have originated in industries such as durable goods manufacturing, wages for unskilled workers in other industries are likely to have been adversely affected as well. It may also be noted that a related development, the movement of black women out of the private household occupation, was an important factor in raising their earnings relative to both white women and black men during the 1970s.

We conclude our review of research trends in the 1980s and early 1990s with some suggestions for future work in the area of race and gender earnings differentials. First, the use of international comparisons in statistical analyses can be greatly expanded. Since countries vary considerably in race and gender-specific policies, overall wage structures and, particularly gender earnings ratios, such comparisons can yield considerable insights into the causes of differentials and the efficacy of various policies. Blau and Kahn's (1991, 1992) finding that wage structure (i.e., wage inequality) played a major role in explaining cross-country differences gender ratios among a sample of industrialized countries suggests the potential fruitfulness of this approach. Also intriguing is Rosenfeld and Kalleberg (1990) reporting of bivariate correlations (and regressions with two explanatory variables) between country characteristics and the gender pay gap, for a sample of nine countries. Larger time-series, cross-sectional data bases could be built, and the pay gap for a given country at a given time treated as a dependent variable.

Second, with the growth of immigration, racial differences take on more dimensions than the familiar black-white comparisons. The relative progress of a variety of ethnic groups is an area ripe for study in the 1990s.<sup>48</sup>

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<sup>48</sup> For studies of the relative wages of Hispanics, see Reimers (1983), Borjas (1982), McManus, Gould, and Welch (1983) and Carlson and Swartz (1988). For a study of the relative earnings of Asian-Americans, see Chiswick (1983).

Third, while the use of corrections for sample selectivity or omitted productivity variable bias has become less popular in recent years, these issues still pose problems in hypotheses testing. To some degree, improved surveys can alleviate such problems by providing information on previously unobserved characteristics. Examples have included the collection of actual experience and wage offer information in data bases such as the Michigan Panel Study of Income Dynamics or the National Longitudinal Surveys. However, we can do a better job of measuring productivity than is currently done in standard data bases. Inclusion of such measures might well make omitted variable bias correction techniques less necessary.

Fourth, with the growth of computing power and the availability of large data bases, very detailed controls for industry and occupation can be constructed. We can thus produce more precise estimates of the impact of occupational segregation and industrial structure on pay gaps than has been possible in the past.

Fifth, in considering the impact of policies (for example, EEO laws), we need to take heed of Ehrenberg's (1989) warning that such policies may be endogenous. A rapid rise, for example, in women's relative earnings around the time of a change in laws may have occurred for the same underlying reasons that the laws themselves were changed. A start in the direction of modeling the behavior of wage-regulating bodies has been made by Gregory and Daly (1990) and Killingsworth (1990) and should be continued.

Finally, the analysis of race and gender wage differentials can be better integrated with recent developments in labor economics. Specifically, the "New Economics of Personnel" (as these developments were termed in the October 1987 issue of the Journal of Labor Economics) has examined questions of employee motivation under varying compensation schemes. Some attempts to relate such compensation methods to race and gender pay gaps have been made. For example Goldin (1986) examines the reasons women in the 1890s were more likely to be paid in piece rates than men were. And Bulow and Summers (1986) explore the implications of an efficiency wage model (in which firms find it profit-maximizing to pay above-market wage levels) for discrimination. Again, such efforts should be continued.

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**Figure 1**  
**Black/White Earnings Ratios, 1967-90**

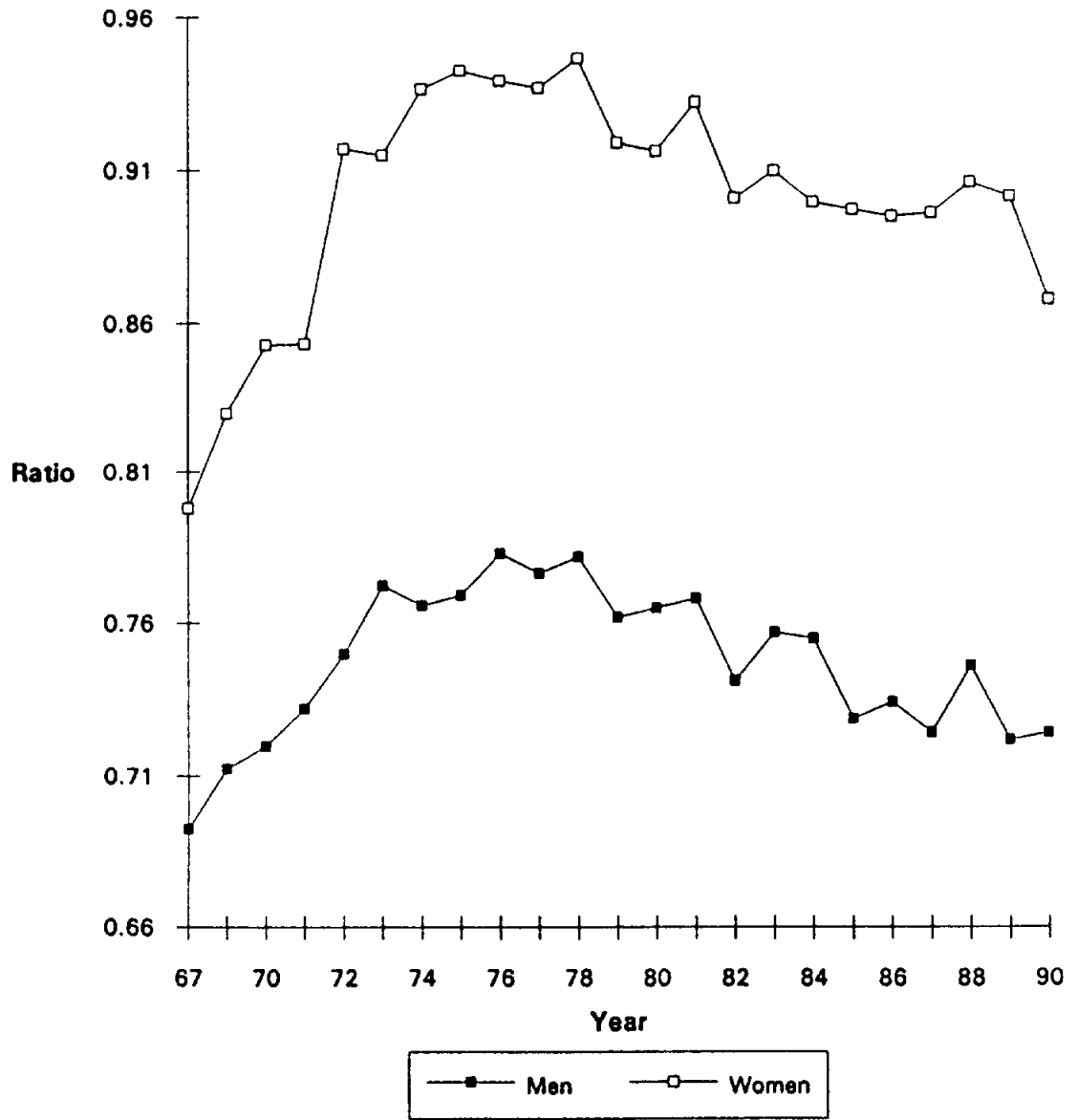


Figure 2  
Male/Female Earnings Ratios, 1967-90

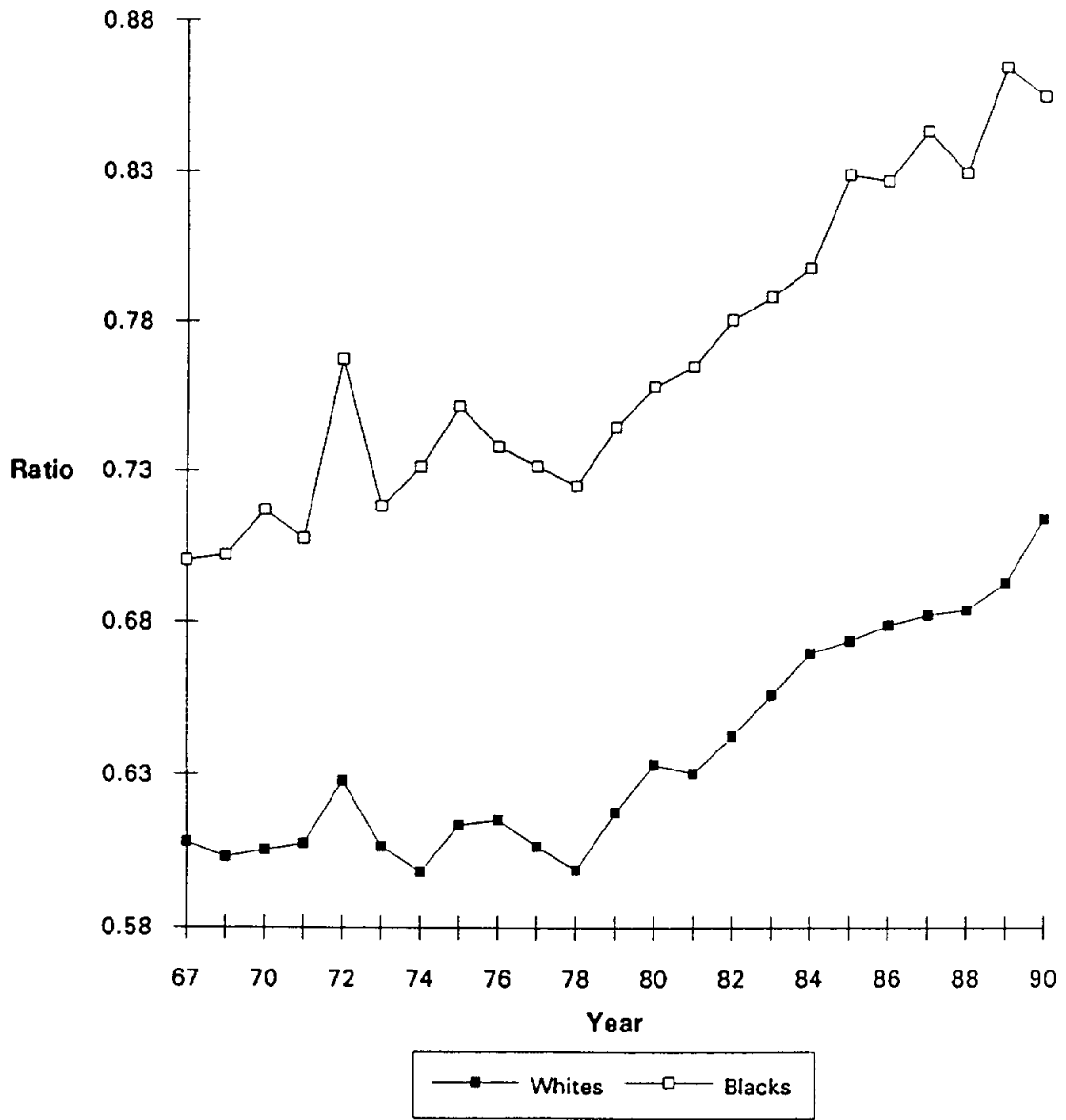


Table 1

## Earnings Ratios by Gender and Race, 1971-88

	Ratios			Percent Changes		
	1971	1981	1988	1971-81	1981-88	1971-88
<b>Women/Men</b>						
<b>Whites</b>						
time input	60.0	65.0	73.8	8.4	13.5	23.1
+ hc	60.5	65.1	71.4	7.7	9.7	18.1
+ occ	61.9	67.3	73.0	8.7	8.5	17.9
+ ind	64.4	69.7	75.5	8.3	8.3	17.3
+ occ/ind	65.5	71.0	76.2	8.3	7.4	16.4
<b>Blacks</b>						
time input	68.4	76.8	85.9	12.2	12.0	25.6
+ hc	65.8	75.5	81.6	14.8	8.1	24.0
+ occ	74.5	79.7	83.4	7.0	4.6	11.9
+ ind	73.2	80.7	86.2	10.3	6.8	17.7
+ occ/ind	77.4	82.7	86.1	6.8	4.1	11.2
<b>Blacks/Whites</b>						
<b>Males</b>						
time input	71.0	74.6	75.7	5.1	1.6	6.7
+ hc	82.8	82.8	84.2	0.0	1.6	1.7
+ occ	86.3	86.0	88.4	-0.3	2.7	2.4
+ ind	83.8	84.0	84.8	0.3	0.9	1.2
+ occ/ind	87.3	87.0	88.9	-0.4	2.3	1.8
<b>Females</b>						
time input	80.9	88.0	88.2	8.7	0.2	8.9
+ hc	90.1	96.1	96.2	6.6	0.1	6.7
+ occ	103.9	102.0	100.9	-1.8	-1.1	-2.9
+ ind	95.3	97.3	96.8	2.1	-0.5	1.6
+ occ/ind	103.3	101.4	100.4	-1.8	-0.9	-2.7

Table A-1

Variable Definitions

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<b>LN</b>	Natural log of annual earnings from wages and salaries.
<b>PART</b>	1 if worked part-time (less than 35 hours per week in the majority of weeks in the previous year and 0 otherwise).
<b>HOURS</b>	Usual hours last year (for 1972, hours last week).
<b>PARTHRS</b>	$PART \cdot HOURS$ .
<b>HRSLWK</b>	1 if hours last week greater than zero and 0 otherwise (1972 only).
<b>LNWW</b>	Natural log of weeks worked in previous year.
<b>WWHITE</b>	1 if white woman and 0 otherwise.
<b>MBLACK</b>	1 if black man and 0 otherwise.
<b>WBLACK</b>	1 if black woman and 0 otherwise.
<b>EDUC</b>	Number of years of school completed.
<b>YRSLT8</b>	For workers with less than 8 years of schooling, the number of years less than 8; 0 otherwise.
<b>YRSGT12</b>	For workers with more than 12 years of schooling, the number of years greater than 12; 0 otherwise.
<b>EXPER</b>	Potential experience, computed as $AGE - EDUC - 6$ .
<b>EXPERSQ</b>	$EXPER$ squared.
<b>MSP</b>	1 if married spouse present and 0 otherwise.
<b>NUMKIDS</b>	Number of children.
<b>MSPWW</b>	$MSP \cdot WWHITE$ .
<b>MSPBM</b>	$MSP \cdot MBLACK$ .
<b>MSPBW</b>	$MSP \cdot WBLACK$ .
<b>KIDSWW</b>	$NUMKIDS \cdot WWHITE$ .
<b>KIDSBM</b>	$NUMKIDS \cdot MBLACK$ .
<b>KIDSBW</b>	$NUMKIDS \cdot WBLACK$ .
<b>NCENT</b>	1 if northcentral and 0 otherwise.
<b>SOUTH</b>	1 if south and 0 otherwise.
<b>WEST</b>	1 if west and 0 otherwise.
<b>URBAN</b>	1 if urban and 0 otherwise.

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Table A-1 Cont'd

Variable Definitions

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**Occupation Dummies**

**PRO** = 1 if professional and 0 otherwise.  
**MGT** = 1 if managerial and 0 otherwise.<sup>a</sup>  
**CLER** = 1 if clerical and 0 otherwise.  
**SALES** = 1 if sales and 0 otherwise.  
**CRAFT** = 1 if craft and 0 otherwise.  
**OPER** = 1 if operative and 0 otherwise.  
**LABOR** = 1 if laborer and 0 otherwise.  
**PHH** = 1 if private household worker and 0 otherwise.  
**FARM** = 1 if farm worker and 0 otherwise.

**Industry Dummies**

**AGR** = 1 if agriculture, forestry and fisheries and 0 otherwise.  
**MINING** = 1 if mining and 0 otherwise.  
**CONSTR** = 1 if construction and 0 otherwise.  
**DUR** = 1 if durable manufacturing and 0 otherwise.  
**NONDUR** = 1 if nondurable manufacturing and 0 otherwise.  
**UTIL** = 1 if transportation, communications and other public utilities and 0 otherwise.  
**WHOLE** = 1 if wholesale trade and 0 otherwise.  
**RETAIL** = 1 if retail trade and 0 otherwise.  
**FIRE** = 1 if finance, insurance and real estate and 0 otherwise.  
**PERSREC** = 1 if personal (including private household), entertainment and recreational services and 0 otherwise.  
**PUBLIC** = 1 if public administration and 0 otherwise.

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<sup>a</sup> Includes farm managers.