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William J. Carrington, Kenneth R. Troske

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GENDER SEGREGATION IN SMALL FIRMS

By

William J. Carrington*

Kenneth R. Troske**

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ABSTRACT

This paper studies interfirm gender segregation in a unique sample of small employers. We focus on small firms because previous research on interfirm segregation has studied only large firms and because it is easier to link the demographic characteristics of employers and employees in small firms. This latter feature permits an assessment of the role of employer discrimination in creating gender segregation. Our first finding is that interfirm segregation is prevalent among small employers. Indeed men and women rarely work in fully integrated firms. Our second finding is that the education and gender of the business owner strongly influence the gender composition of a firm's workforce. This suggests that employer discrimination may be an important cause of workplace gender segregation. Finally, we estimate that interfirm segregation can account for up to 50% of the gender gap in annual earnings.

Keywords: Gender, Segregation, Intra-firm, Wage Gap

* The Johns Hopkins University

** Center for Economic Studies, Bureau of the Census

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I. Introduction

While explanations of why women earn less than men remain controversial, one popular view is that discrimination segregates women into a few low-paying occupations. This explanation has some appeal since men and women are highly segregated by occupation and because predominantly female occupations tend to be poorly paid (Bergmann, 1986; Blau and Ferber, 1986; Blau, 1989). Yet the focus on occupational segregation has been driven as much by data limitations as by any belief that occupation is the only dimension in which men and women are segregated. Indeed, while certain theories of discrimination predict segregation, they are often silent on the dimensions in which segregation will occur (e.g. Becker, 1971; Arrow, 1972). It is unfortunate, therefore, that only a few authors have studied interfirm segregation of men and women (McNulty, 1967; Buckley, 1971; Blau, 1977; Bielby and Baron, 1984; Pfeffer and Davis-Blake, 1987; Groshen, 1991). This neglect is particularly regrettable since these few papers find that, even within occupations, interfirm segregation is quite prevalent, and that it plays an important role in women's reduced pay. Unfortunately, the generality of these few studies is limited because their analyses were restricted to large employers in a few industries or locales.¹ This paper partially remedies this gap in the literature by studying interfirm segregation in a national sample of small employers drawn from a broad range of industries.

Our focus on small employers is further motivated by two additional facts. First, there are numerous reasons to believe that sex discrimination will manifest itself differently in small and large firms. On the one hand, the fact that federal anti-discrimination rules are primarily targeted at large firms may make large firms less likely to discriminate. On the other hand, the increased

¹Our knowledge is also limited by the fact that, with the exception of Pfeffer and Davis-Blake (1987) and Groshen (1991), these authors studied data from the 1960's and early 1970's. Given the significant changes in female labor market activity over the past two decades, there is a good chance that the earlier findings do not reflect current labor market conditions.

monopoly power and greater separation of ownership and management may make large firms more likely to discriminate. While these views differ, they both suggest that the extent and impact of interfirm segregation in small firms may be quite different from that found in previous work on large firms.

Second, at least since the work of Becker (1971), employer discrimination has been theoretically identified as a potential source of gender segregation. However, it has been difficult to firmly establish a role for employer discrimination because other theories (e.g. customer discrimination, employee discrimination) carry similar implications for segregation. One distinctive implication of employer discrimination is that women are segregated into those employers with, in the language of Becker, the lowest "tastes for discrimination." Since it is impossible to get direct measures of such tastes for discrimination, the only practical approach is to make a priori theoretical links between observable employer characteristics and discriminatory tastes. Yet there have been few attempts to empirically link the demographic characteristics of employers to the sex of their employees. This absence of even indirect evidence of employer discrimination is partially due to difficulties in identifying the hiring officers in the large firms where most people work. In contrast, in small firms it is easier to identify the person responsible for hiring decisions, since it is usually the business owner that makes such decisions. Using a recently developed Census Bureau data set, we relate the characteristics of small business owners to the gender composition of the business' work force. This lets us assess, relatively directly, the role of the employer in determining a firm's work force.

Our analysis centers on the 1982 Characteristics of Business Owners survey that records demographic information on the owners and employees of small businesses. While these data do have limitations, they carry important new information on the causes and effects of interfirm gender segregation. We use these data to establish the following facts. First, we find that small firms are highly segregated by sex. Indeed, most men work in firms that employ primarily

men, and most women work in firms that employ primarily women. Second we find that the demographic characteristics of the business owner, particularly sex, strongly influence the gender composition of a firm's work force. Finally, we find that firms which primarily employ women typically pay much less than do firms which primarily employ men, but that this difference is largely accounted for by the larger revenues of the male-employee firms.

These results carry important implications for our understanding of both the causes of women's reduced earnings and the likely effect of any widespread comparable worth program. In particular, the results indicate that interfirm segregation may account for a substantial component of the male/female gap in annual earnings, and that this segregation is potentially due to discrimination on the part of male employers. At the same time, the results raise questions about the effectiveness of comparable worth policies that seek to eliminate intrafirm differences in pay between men and women.

The paper proceeds as follows. Section II provides theoretical background, develops hypotheses, and reviews previous research on interfirm segregation. Section III describes our use of the Characteristics of Business Owners data set. Section IV measures gender segregation in large and small firms and analyzes the role of the business owner in determining the gender composition of a firm's work force. Section V assesses the role of interfirm gender segregation in creating gender differences in annual earnings. Section VI concludes.

II. Background

A. Employer Discrimination and Segregation

This section briefly outlines the empirical implications of Becker's (1971) theory of discrimination, with special attention given to the role that employer discrimination plays in creating gender segregation and male/female earnings differences. Becker's model is based on the assumption that some employers have a distaste for economic contact with female employees. The model further posits

that this distaste for contact may be measured by a "taste for discrimination" which indicates the monetary cost of the psychic disutility incurred by the discriminating employer if a woman is employed.² The final key assumption of Becker's model is that not all employers have the same taste for discrimination against women. Some employers may have a strong distaste for women employees, but other employers may be indifferent between men and women, or even have a preference for women employees.

Several implications are immediately obtained in Becker's model. First, male and female employees will be segregated into those employers that do and do not, respectively, have a taste for discrimination against women. Therefore, women will work for the least discriminatory employers and men will work for the most discriminatory employers. Second, the equilibrium difference between male and female wages will be related to the distribution of tastes for discrimination across employers and to the relative proportions of male and female employees. If there are enough non-discriminatory employers (i.e. employers with no taste for discrimination) then the model predicts that men and women will be segregated, but that there will be no wage gap for similarly skilled men and women. However, if there are more female employees than can be hired by the non-discriminatory employers, then women will be forced to seek employment at the discriminating firms. Since discriminatory firms will only hire women if they are paid less than men, this will lead to an equilibrium wage gap between men and women.³

²For example, if an employer has a taste for discrimination against women of \$1 per hour, then this implies that the employer will be indifferent between two otherwise identical employees, one male and one female, if the man's hourly wage is \$1 more than the women's hourly wage.

³While this briefly summarizes the static implications of Becker's model, Becker and Arrow (1972) also discuss the dynamic implications of the model. We do not address these dynamic implications because our empirical work is essentially static.

While Becker's model emphasizes the role of employer discrimination, the model also points to the potential role of discrimination on the part of customers and fellow employees. For example, suppose that some customers discriminate in the sense that they are willing to pay a higher price for goods or services produced by men. Further, suppose that firms are heterogeneous in the extent to which their customers discriminate against women.⁴ In such a case, Becker's model suggests that interfirm gender segregation can arise even in the absence of employer discrimination. Similarly, suppose that male employees have a taste for discrimination against women in the sense that some men are indifferent between a low-paying job with all male coworkers and a higher-paying job with female coworkers. Becker shows that these circumstances can also lead to interfirm gender segregation, even in the absence of employer discrimination.⁵

Whereas Becker's and certain other models (e.g. Bergmann, 1974) interpret gender segregation and the male/female earnings gap as evidence of discrimination, Mincer and Polachek (1974) and others emphasize the role of human capital in creating gender differences in the labor market. In particular, Mincer and Polachek argue that child care and other responsibilities lead women to invest less heavily in market human capital. If true, then this differential investment could lead to lower earnings for women and to segregation of women into occupations and firms where less human capital is required. While sharing many of the empirical predictions of discrimination theory, this human capital view implies that women are paid less simply because they are less productive.

⁴It is a bit difficult to imagine why two otherwise identical firms would be heterogeneous on this dimension. However, it is easy to imagine that firms in slightly different lines of business might differ. For example, men's and women's clothing stores might face quite different pressure from their customers with regard to the gender of their employees.

⁵While employee discrimination can generate gender segregation, it is unlikely to result in male/female wage differences unless augmented with some other type of discrimination.

B. The Role of the Employer

There has been a substantial amount of research showing that employers treat male and female job applicants differently. Such research has generally proceeded by sending otherwise identical male and female applicants (or resumes) to employers advertising job openings. Male applicants for traditionally female positions (e.g. secretary) and female applicants for traditionally male positions (e.g. mechanic) are often discouraged by employers (Levinson, 1975; Powell, 1987; Riach and Rich, 1987), and when employers move to fill open positions, they are often influenced by the sex of the incumbent (Konrad and Pfeffer, 1991). Yet while such activity certainly could be due to employer discrimination, Becker's theory emphasizes that such employer behavior may also result from discrimination on the part of employees or customers. For example, even restaurant owners with no taste for discrimination may favor male applicants if their customers prefer to be served by waiters rather than waitresses. As a result, such findings are rather indirect evidence of employer discrimination.

A more direct way to assess the role of employer discrimination is to measure the relationship between an employer's discriminatory attitudes and the gender composition of his or her employees. It is of course difficult to measure discriminatory attitudes independently of actions. One could survey employers about their attitudes, but, given the current legal environment, employers are unlikely to directly express their discriminatory attitudes. ⁶

⁶We should note, however, that a famous study by LaPiere (1934) suggests that employers may discriminate less than they lead on. In that study, LaPiere toured the U.S. with a Chinese couple and visited 251 hotels and restaurants. While the threesome was denied access to only one establishment, in response to a later questionnaire over 90 percent of the same establishments said that they would not accept Chinese patrons. We naturally suspect that these results would not be repeated

An alternative approach is to first establish a priori theoretical links between discriminatory attitudes and observable demographic characteristics, and to then examine the relationship between these characteristics and segregation. Popular culture suggests that the sex of the employer is the demographic characteristic most likely to be correlated with tastes for sex discrimination. While some sociological and psychological research suggests that men and women are both prejudiced against women (Goldberg 1968; Kanter 1977), the preponderance of evidence (e.g. Kanter, 1977; Ferber and Huber, 1975) suggests that male employers are more likely than female employers to discriminate against female employees. Therefore, our working hypothesis is that male employers have a relative preference for hiring male employees, other things equal. In Becker's model, this hypothesis leads to the prediction that, relative to female-owned firms, male-owned firms will employ more male workers and may pay higher wages.

There are of course finer hypotheses that might be entertained. For example, any given employer's preferences might depend crucially on the particular occupation or job title being filled (e.g. an employer may want male mechanics but female secretaries). The data we examine is sufficiently coarse, however, that we restrict attention to the broader hypothesis that male employers prefer male employees.

C. Discrimination in Small and Large Firms

There are several reasons why sex discrimination might manifest itself differently in large and small firms. First, federal anti-discrimination policy disproportionately targets large firms. The Civil Rights Act of 1964 bans sex discrimination in employment, but only for those firms with more than fifteen employees, and the federal government's affirmative action program is explicitly restricted to federal contractors with more than fifty employees. In addition to these explicit size distinctions, federal policy also creates implicit size

today.

distinctions between firms that are all above the explicit limits. This occurs because civil rights and affirmative action litigation often turns on the interpretation of statistical evidence as to whether a firm treats women fairly (Smith and Welch, 1984). Since strong statistical evidence is naturally harder to come by in small firms, discriminatory behavior is more likely to be detected and punished in large firms. This combination of explicit and implicit pressure leads to a strictly increasing relationship between firm size and federal pressure to employ women. This in turn suggests that sex discrimination may be most pervasive in small employers.⁷

Other perspectives, however, suggest that small firms will be the least likely to discriminate. Becker's theory of discrimination argues that discriminatory behavior is costly to firms. The logic is that a non-discriminating firm that hires women will pay lower labor costs than a discriminatory firm that hires men of the same skill level. If this is true, then larger firms may be more likely to engage in discrimination for at least two reasons. First, Alchian and Kessel (1962) predict that firms with monopoly power face a very high effective tax rate on profits, as a result of implicit (or explicit) government regulation of profits. The high effective tax rate encourages the owner and/or managers of monopoly firms to indulge themselves in nonpecuniary benefits that escape taxation. While these nonpecuniary benefits will often take the form of posh offices and other amenities, they might also take the form of increased indulgence in costly discrimination. This reasoning leads Alchian and Kessel (1962) and Becker (1962) to argue that monopolists will be more likely to discriminate, a hypothesis that finds support in a recent study

⁷Another distinction is that large firm personnel offices often have no post-hire contact with employees, whereas small firm owners or managers typically work with each employee on a daily basis. If hiring officers are primarily concerned with whether they will personally come into contact with women employees, then this distinction suggests that large firms may be less likely to discriminate.

by Ashenfelter and Hannan (1986). Since there is some evidence that market power is positively correlated with firm size (Hall and Weiss, 1967), this logic predicts that large firms will be more likely to discriminate against women.

A second reason why large firms might discriminate more frequently is that large firms are much more likely to have separation of ownership and management. Just as monopolists often receive little return on increased profits, non-owner managers are often imperfectly rewarded (or punished) for changes in profits (Jensen and Murphy, 1990). As in the case of monopolists, this means that non-owner managers may indulge themselves in discriminatory practices more frequently than owner managers who bear the full pecuniary cost of discrimination. This reasoning led Ashenfelter and Hannan (1986) to conclude that large firms are more likely to discriminate against women.

In summary, there are several theories of why the effect of sex discrimination may vary by firm size. These theories lead to the hypothesis that women's employment may be segregated into large or small firms. To some extent, however, men and women may choose the size of their employer independently of discriminatory issues.⁸ Taking this view to the extreme leads to a second hypothesis that segregation among large firms may be more or less severe than segregation among small firms.

D. Previous Empirical Work on Interfirm Gender Segregation

While there is a long history to the idea that occupational segregation plays an important role in women's relatively low earnings (e.g. Bergmann, 1974; Bergmann, 1986; Blau and Ferber, 1986), interfirm segregation of men and women has received much less attention. This section reviews previous studies of interfirm gender segregation and places our work in their context. In following this discussion, the reader may find it useful to refer to Table 1 which

⁸For example, women may have a relative preference for the increased benefits offered by large employers (Brown, Hamilton, and Medoff, 1990).

documents the main features of selected data sets pertinent to interfirm gender segregation. The table is organized around the data sets rather than the papers themselves because research on this topic has been heavily circumscribed by the nature of the available data.

The Equal Pay Act of 1963 outlawed differential pay for men and women in the same occupation and the same firm, and it was initially thought that this might eliminate the intraoccupational component of the gender earnings gap. However, McNulty (1967) and Buckley (1971) used unpublished BLS data to show that relatively little of the intraoccupational wage gap was due to intrafirm pay differences. Instead, McNulty and Buckley showed that a more important cause of the male/female wage gap was the segregation of women into low-paying firms.⁹ Blau (1977) generalized these results with a study of the 1970 Area Wage Surveys (AWS) of Boston, New York, and Philadelphia. Blau found that, even within narrowly defined occupations, men and women rarely work in the same firms and that interfirm segregation played an important role in the intraoccupational male/female wage gap.¹⁰

⁹As an example, Buckley examined the wages of male and female elevator operators. He found that firms with only male operators paid wages that were 54% higher than the wages paid by firms with only female operators. In contrast, men received wages that were only 18% higher in firms that employed both men and women as elevator operators.

¹⁰As an example, among firms employing order clerks in Boston, Blau found that 42 out of the 67 firms in her sample employed only women, while 13 of the remaining 25 employed only men. Only 12 out of the 67 firms were in any way integrated. While this is an extreme example, Blau found that, within occupations, interfirm segregation was the rule rather than the exception. As for the contribution of interfirm segregation to the gender earnings gap, Blau found that male accounting clerks in Philadelphia had hourly wages that were 23% higher than female accounting clerks in that city. Of this 23% gap, 20% was accounted for by the fact that men worked in relatively high-paying firms while only 3% of the gap was due to different pay within establishments.

Bielby and Baron (1984) studied gender segregation across firms and "job titles" in a sample of 393 California firms surveyed in the late 1960's and early 1970's.¹¹ They found almost complete gender segregation by job title and, in the few instances where job titles were integrated, men and women almost never worked in the same firm. In their study of college administrators, Pfeffer and Davis-Blake (1987) find that women and men working in predominantly female workplaces earn substantially less than workers of the same sex and occupation that were employed in largely male workplaces. Finally, Groshen (1991) studied five specific industries and found that interfirm segregation was prevalent in all industries and an important factor in male/female wage differentials in some, but not all, industries.¹² Table 1 also refers to the Equal Employment Opportunity data set that has been developed as a by-product of the reporting requirements of Title VII of the Civil Rights Act. These data would potentially be quite useful, but no one has (to our knowledge) used them to study gender segregation issues, and the EEOC has regrettably stopped releasing the data except in extremely aggregated form.¹³

In summary, previous research provides support for the following conclusions: 1) within a given occupation, men tend to be segregated into higher-paying firms, and 2) within a given firm, men tend to be segregated into higher-paying occupations. Previous research has been limited, however, because of

¹¹The term "job title" refers to the actual name of a job within an establishment. One way to think of this classification system is as an extremely fine occupational classification system.

¹²As an example, Groshen found that roughly half of the male/female wage gap in the nonelectrical machinery industry was attributable to interfirm segregation and that, for this industry, occupational segregation played a relatively minor role.

¹³For many years, the EEOC did release these data. To our knowledge, Becker (1980) is the only study of segregation using these data, but he restricts attention to racial segregation.

their uniform focus on larger firms in specific industries and regions. One of the purposes of this study is to extend some of the earlier results to smaller firms in a wide variety of industries and regions.

III. The Characteristics of Business Owners Survey

The Characteristics of Business Owners is a survey of the people that own businesses in any of three legal ownership categories: individual proprietorships, partnerships, or subchapter S corporations.¹⁴ Although these ownership forms comprise a large fraction of small businesses, many small firms were excluded from the survey. For example, a small business was not surveyed if it had annual sales of less than \$500, if it was owned exclusively by a U.S. non-resident, if it had more than nine partners or shareholders, or, most importantly, if it was a Chapter C corporation.¹⁵ Corporations with fewer than

¹⁴In particular, firms were surveyed if they filed their tax return with one of the following IRS forms: 1040 (Schedule C), 1065, or 1120S. Corporations filing a regular 1120 tax return were excluded. The first of these IRS classifications corresponds to individual proprietorships, or unincorporated businesses that are owned by an individual. This category includes self-employed workers. The second classification includes unincorporated businesses owned by two or more persons. The final classification corresponds to subchapter S corporations that are legally incorporated businesses with 35 or fewer shareholders who, because of tax advantages, elect to be taxed as individuals rather than corporations. This discussion is drawn from U.S. Bureau of the Census (1987).

¹⁵We tried to assess the extent to which the CBO samples the entire universe of small firm employment. Using CBO sample weights, the CBO samples a population of 6.9 million employees of firms owned by 2.9 million business owners (restricting attention to firms with 100 or fewer employees). Therefore, the CBO samples a population of roughly 9.8 million employees. We then compared this with estimates of small firm employment drawn from two alternative sources: the May, 1983 CPS and the 1982 Enterprise Statistics. Although the comparison is complicated by

35 owners are free to choose between incorporation under the statutes of Chapter C or subchapter S and a firm's choice between the two is generally driven by tax considerations.¹⁶ States differ in the relative advantages of the two forms and, as a result, in some states most small corporations are Chapter C while in some others most small companies are subchapter S. This causes our sample to be better represented in some states than others.¹⁷

The CBO is also selective because it oversampled minority and women-owned businesses. The Census Bureau created five "panels" of 25,000 business owners each, where each panel was drawn solely from one of the following groups: hispanics, blacks, other minorities, women, and non-minority men. In order to achieve these equal-sized panels, the CBO oversampled businesses owned by women and, particularly, minorities. There are several methods for generating a

the fact that more than 15% of the respondents "don't know" how many employees work at their firm, the CPS figures match up reasonably well with the CBO. Using a variety of assumptions about the actual firm size of the non-respondents, it appears that the CBO covers 45 to 50 percent of small-firm employment. The CPS figures are somewhat different from the Enterprise Statistics that are drawn from establishment surveys. These data suggest that the CBO sample universe accounts for only 30% of small firm employment. Frankly, we do not know how to reconcile these figures. What is clear is that the CBO surveys a population that accounts for a substantial fraction of small-firm employment. Unfortunately, we can say little about whether that fraction is .50 or .30.

¹⁶Chapter C corporations eventually pay out profits to owners as dividends. This means that C corporation profits are taxed once at the corporate level and a second time upon distribution as income to owners. In contrast, profits from subchapter S corporations are taken directly by owners as personal income and taxed as such.

¹⁷We do not view this as a big problem for the issue at hand. With the exception of Williams and Register (1986), there is little evidence that gender segregation or discrimination is worse in some regions than others. To be safe, however, when appropriate we do control for geographical region in the ensuing analysis so as to minimize the impact of our geographically uneven sample.

representative sample of small businesses from the CBO. One can use the sampling weights assigned by the Census Bureau, or one can focus on the women and non-minority male samples since these two groups comprise the vast bulk of small businesses in the U.S.¹⁸ We follow the latter route because of concerns about the reliability of the sampling weights. However, we have computed most of the results reported here for the entire CBO, both with and without sampling weights, and the results are generally insensitive to the choice of sample.

The peculiar timing of the CBO also deserves mention. The survey was administered by the Census Bureau in 1986 to business owners that filed 1982 IRS tax returns. The survey included questions on the demographic characteristics of the business owner, the 1982 financial condition of the firm, and the racial and gender composition of the firm's 1982 work force. The answers to these questions were then matched with IRS information on the firm's 1982 employment and payroll.¹⁹

Our sample selection decisions were quite simple. First, we excluded the few firms in our sample that employ more than 100 employees. This exclusion emphasizes our focus on small firms and facilitates comparisons of annual earnings between the CBO and the CPS.²⁰ Second, we measure segregation and

¹⁸For the three organizational forms surveyed in the CBO, the Census Bureau estimates that 92% of the firms are owned by women or non-minority men (U.S. Bureau of the Census, 1987).

¹⁹This retrospective sample design is unfortunate because Akerlof and Yellen (1985) have shown that the passage of time can alter people's answers to certain questions. One effect of the retrospective survey design is that the CBO survey response rate was only 79.2%, much lower than that found in most contemporaneous surveys. Further, there is evidence that business owners were more likely to answer the survey in 1986 if their 1982 business was still in operation (Nucci, 1989).

²⁰The May, 1983 CPS asked workers about the number of people that worked for their employer. These answers were bracketed into five groups: 0-25, 25-99, 100-499, 500-999, and 1000+. The 100 employee limit was the most natural choice for our focus on small firms.

earnings gaps among the employees and not the owners of small businesses, a factor that immediately eliminates those small businesses with no employees. We exclude the owners because the information on their income is not directly comparable to the income data available for employees.

On a final note, we use the CBO as a sample of firms even though it is essentially a sample of firm owners. This causes some complications when we try to identify firms as being owned by people with particular characteristics. Linking owner characteristics to the firm is trivial for firms owned by one person, but multi-owner firms are slightly tricky because not all owners are alike. Following the work of previous CBO users (Bates, 1988; Nucci, 1989), we use the cross-owner mean for continuous variables (such as education) and the cross-owner mode for discrete variables (such as sex or race). In cases of ties for the discrete variables, we use the mode containing the owner that reports spending the most hours per week at the business. ²¹

Table 2 presents selected summary statistics on the firms and owners in our CBO sample. The "all firms" column reports data for our entire sample while the next two columns report results separately for male- and female-owned

²¹For example, if a firm has two male and one female owners, then we describe the firm as being "male-owned." If a firm has one male and one female owner, then we describe the firm as "male-owned" if the man reports working more weekly hours at the firm and as "female-owned" if not. Single-owner firms account for 64% of the firms and 45% of the employment in our sample.

At the suggestion of a referee, we looked into the possibility of a more extensive system of classifying firms as "male-owned" or "female-owned." After all, it's easy to imagine that there might be a fairly complicated relationship between number of owners, number of female owners, and the degree to which a firm discriminates against women. For example, Kanter (1977) argues that "token" women in a large organization will often discriminate against other women, whereas women that are not in an overwhelming minority will tend to be more supportive of other women. Unfortunately, there are not enough sexually integrated, multiple-owner firms in our sample to support much analysis along these lines.

businesses.²² Rows (1) show that there are no significant differences in the distribution of male and female owners across age groups. Row (2) shows that at the average business owner has some college education and that male owners are slightly more educated on average. Rows (3) report the frequency with which firms fall into various categories of "percent female employees." An example of how to read these numbers is that the ".221" at the top of the "all firms" column indicates that 22.1% of all the firms in our sample have no female employees. The figures indicate that almost three quarters of the firms have work forces that are either 75-100% or 0-9% female, so that largely segregated workplaces are the rule rather than the exception. The figures also show that female-owned firms are significantly more likely to employ predominantly female work forces. A chi-square test strongly rejects the hypothesis that male and female-owned firms are identically distributed across these categories.

Rows 4 through 9 of Table 2 report mean characteristics of the firms themselves. The first column shows that the average firm in our sample had about five employees, between one and two owners, roughly \$300,000 in receipts, and that it paid out roughly \$9500 per employee. Given the nonnegativity of these variables, the large standard deviations indicate that the sample distributions are highly skewed. The next two columns show that male-owned firms have more employees, more owners, higher receipts, and higher payroll per employee than do female-owned firms. On most dimensions, therefore, male-owned firms are larger than female-owned firms.

We should note that while the CBO has some unique advantages, it also has

²²Although the CBO surveys 25,000 non-minority male owners and 25,000 female owners, we end up with many fewer businesses in our sample. This is primarily because we exclude businesses with no employees, but a secondary factor is that many businesses have more than one owner. The number of women-owned firms is particularly reduced because women owners are more likely to be in the gender minority, more likely to own a business with no employees, and less likely to be the owner spending the most hours per week at the business.

some attendant limitations. First, the CBO's sample universe does not span the entire spectrum of small business, particularly since it omits small Chapter C corporations. Second, while we know firm-wide average payroll for each business, we know nothing about the interfirm distribution of that payroll between male and female employees. Third, the survey records no information on the human capital or occupational characteristics of a firm's employees. This last limitation of the CBO is potentially the most troublesome, since prior research has documented an important role for occupational segregation in creating the gender earnings gap. Given the CBO's lack of occupational information, one might ask whether it really carries important new information. We believe that it does, partly because occupations and job titles are less likely to be sharply defined in small firms and that, as a result, there is less occupational segregation in small than in large firms. This view receives support from the work of Baron and Bielby (1986) and from our own analysis of data from the Current Population Survey. ²³

But this point aside, the fact is that we know so little about interfirm segregation in small firms and so little about the role of the employer in creating segregation that the unique characteristics of the CBO make it an interesting data source in spite of these limitations. However, the reader

²³We analyzed data from the May Current Population Surveys (CPS) of 1979, 1983, and 1987, because in those months the CPS asked workers about the size of their firm as well as the usual questions on occupation. We were interested in testing the hypothesis that there is less occupational differentiation in small firms. We tested this by dividing our data into two samples: those who worked for firms with more than 100 employees and those who worked for firms with less than 100 employees. For entire sample and separately for 2-digit industries, we computed the fraction of employment accounted for by the four largest detailed CPS occupations and the fraction accounted for by the two largest major CPS occupations. We found that for the all industry sample and for the vast majority of the 2-digit industries, small firm employment is more concentrated in a few occupations than is large firm employment. This finding lends support to the notion that occupational segregation is less of an issue in small firms than in large firms.

should keep these drawbacks in mind when evaluating the analysis that follows.

IV. Gender Segregation and Employment in Small Firms

A. Measuring Segregation

Table 3 presents some preliminary evidence on the distribution of male and female workers across firms of various size. The data are drawn from the May, 1983 Current Population Survey that asked workers questions about size of firm and establishment. The table makes two points. First, firms with less than 100 employees account for a substantial fraction of all U.S. employment and, as a result, previous studies of large firms have omitted a large segment of the economy.²⁴ Second, women are slightly more likely than men to work in small firms. One reading of this fact is that large firms are more likely to discriminate against women, perhaps because of their greater monopoly power or because of the greater separation between the ownership and management of large firms. Alternatively, small firms may simply have more need for the skills and occupations of women.

Table 4 presents evidence on the distribution of male and female employment across firms with varying degrees of female employment.²⁵ An example of how to

²⁴The figures in Table 3 refer to firm size and not establishment size. For those unfamiliar with this distinction, a firm is a legal corporate entity while an establishment is a physical place of business.

²⁵Business owners do not directly report the number of male and female employees. Instead, they report the fraction of female employment within six bands: 0%, 1-9%, 10-24%, 25-49%, 50-74%, 75-100%. We combine this answer with information on the number of total employees to arrive at an estimate of each firm's female and male employment. We use a two-step procedure. The first step is to see if there is a unique division of the firm's work force into male and female workers that yields the reported fraction of female employees (e.g. 50-74%). If there is such a unique division, then we use this division to impute the firm's

interpret the table is that the second row of the column (1) indicates that 2.0% of all female employees work in firms where women account for between 1 and 9 percent of employment. Continuing with the second row as an example, we see that firms where women account for between 1 and 9 percent of the work force account for 35.2% of all male employment and 21.2% of total employment. More substantively, column (1) shows that the median woman employed in small firms works in a firm where 75 to 100 percent of the employees are female. Similarly, column (2) shows that the median male employed in a small firm works in a firm where fewer than 10% of the employees are female. Bielby and Baron (1984) have shown that it is quite rare for men and women to share the same job title within a given organization. Our results show that, within small firms, it is quite rare for men and women to work in truly integrated organizations, regardless of occupation.

While it indicates a substantial degree of gender segregation in small

male and female employment. For example, if a firm has five employees and between 50 and 74% female employees, then we assume that the firm has three female and two male employees. In many cases, however, there is no unique division of employees. For example, if a firm has nine employees and between 50 and 74% female employees, then the firm could have either 5 or 6 female employees. Since we have no way of assessing which is the correct number in such cases, our second step is to assume that the actual female fraction was the midpoint of the band. For example, if a firm has nine employees and between 50 and 74% female employees, we imputed the firm as having 5.58 (.62 x 9) female employees and 3.42 (.38 x 9) male employees. There are two ways to interpret our non-integer imputations. The first interpretation is that this is simply the best we can do given the limited information available. The second interpretation is that worker turnover may generate fluctuations in the percent female over time. If owners answer the question as if it referred to their average female employment over time, then our imputations may accurately reflect the average male and female employment within a firm.

We should note that we have conducted all of the following analyses using only step two above (i.e. always impute the midpoint of the band). The choice of method causes only trivial differences in any of the following results.

firms, Table 4 is difficult to compare with prior results. In order to facilitate such comparisons, we briefly review two commonly used indices of segregation. The most widely used segregation index is the Duncan Index (Duncan and Duncan, 1955) that measures the fraction of women (or men) that would have to change firms in order to completely integrate the work force. Analytically, the index is computed as

$$(1) \quad S_D = \frac{1}{2} \sum_f |m_f - w_f|$$

where m_f and w_f are the fraction of the economy-wide male and female work force, respectively, that work in firm f . We also use a slightly different index devised by Groshen (1991). If we let

$$r_f = \text{fraction of female employees within firm } f,$$

then the Groshen index is computed as

$$(2) \quad S_G = \sum_f r_f (w_f - m_f),$$

which may be interpreted as the difference between men and women in the average fraction of female coworkers. The Groshen and Duncan indices are both measures of actual segregation relative to a theoretical maximum, so they are both bounded between 0 and 1, with 0 representing no segregation and 1 representing complete segregation. As a result, the two indices are closely related, but the Groshen index will generally be smaller than the Duncan index. ²⁶

Table 5 presents our estimates of the Groshen and Duncan indices for our entire CBO sample and, separately, for selected two-digit industries. Column (1) reports the number of firms represented in our sample. Column (2) reports the small firm Duncan index for the entire sample, and broken out by the sex of the business owner. The TOTAL row of that column shows that 66% of men (or women) would have to move in order to eliminate interfirm segregation. In comparison,

²⁶See Groshen (1991) for a comparison of the two indices.

Blau (1989) estimates that the Duncan index for detailed occupations was .59 in 1983. Therefore, while occupational segregation has received much more attention in the literature, interfirm segregation among small firms is similarly prevalent.²⁷ The TOTAL row also indicates, perhaps surprisingly, that there is relatively little difference in segregation between male and female-owned firms.

In examining small firms, it is important to note that models of random hiring (as well as models of discriminatory hiring) imply a non-zero Duncan index. As an example, in the extreme case where all firms have one employee the Duncan index will be unity no matter how workers are distributed across firms. It is thus important to gain some idea of how far the observed distribution of male and female employees strays from the distribution implied by a random hiring model.²⁸ We do this by employing the chi-square test proposed by Blau (1977).²⁹ In Table 5, an asterisk to the right of each industry's SIC code indicates that

²⁷One needs to be careful in comparisons of segregation indices across different classification systems. Blau's occupation index was based on classification system of 311 occupations. In contrast, our study is based on over 5000 firms. It is possible that our high measure of interfirm segregation is merely a product of our finer classification system.

²⁸By "random hiring," we simply mean that firms take independent draws from the pool of available workers, where the probability of picking a female worker on any given draw is equal to the proportion of female workers in the available pool. The available pool may be defined as all the workers in the economy, or as all the workers in a particular industry.

²⁹The test proceeds as follows. First, compute the actual distribution of firms across size of firm (one employee, two employees, etc.). A model of random hiring implies an approximate binomial distribution of the number of female employees within firms of any given size. This in turn implies a distribution of firms across our ranges for fraction of female employees (0%, 1-9%, etc.). The second step is to sum across firm sizes to generate the distribution of firms across fraction female that is predicted by random hiring. The final step is to compare (with a chi-square test) the predicted with the actual distribution of firms. See Blau (1977) for a more complete discussion.

a random hiring model was rejected at the 99% level. The ALL INDUSTRIES row clearly rejects the hypothesis of random hiring.

Much of the interfirm segregation measured in the TOTAL row may come from the fact that men and women work in different industries. Therefore, the bottom rows of Table 5 report segregation indices for selected 2-digit industries. The fact that the industry-specific segregation indices are generally lower than the aggregate indices shows that aggregate segregation is partially due to the interindustry distribution of men and women. Yet the cross-industry mean index is .55, so there is still substantial segregation within these 2-digit industries.³⁰ Among food stores, for example, 51% of men or women would have to change firms in order to integrate the work force. Yet, we should also note that a random hiring model can not be rejected in many of the industries, including some where we have a large number of firms and hence a reasonable chance of detecting non-random hiring (e.g. special trade contractors).

Has the fact that small firms slip under the federal anti-discrimination effort caused them to be more segregated than large firms? Alternatively, has the fact that large-firm managers don't bear the full pecuniary cost of discrimination caused large firms to be more segregated than small firms? We address these questions with a comparison of our small-firm findings with the results of Groshen (1991) who computed her index for large firms in a few selected industries.³¹ The left half of column (3) contains our estimates of the Groshen index for small firms while the right half of column (3) reports

³⁰This estimate is based on an unweighted average of sixty-seven separate industries.

³¹The average size of firms in Groshen's samples varied from industry to industry. The modal firm in her sample was 100-249 (miscellaneous plastics products and computer and data processing), 2500+ (nonelectrical machinery and banking), or 5000+ (life insurance). Clearly, these all substantially exceed the average firm size for our CBO sample (since we truncated the few firms with more than 100 employees).

Groshen's (1991) analogous estimates for large firms. In several instances Groshen studied 3-digit industries that were not heavily represented in our CBO sample and, as a result, some of our comparisons are between Groshen's 3-digit industry and the corresponding 2-digit parent industry in the CBO.

Our first comparison is between Groshen's .29 estimate for large firms in the Miscellaneous Plastics Products (SIC 307) and our .27 estimate for small firms in the parent Rubber and Plastics industry (SIC 30). The second comparison is in the Nonelectrical Machinery (SIC 35) industry where the index is .43 for large firms and .33 for small firms. For these two comparisons, there is obviously little evidence that small firms are any more segregated than large firms in the same industry. However, small firms are substantially more segregated for our last three comparisons: Banking (SIC 60), Insurance Agents (SIC 63) vs. Life Insurance (SIC 631), and Business Services (SIC 73) vs. Computer and Data Processing (SIC 737). Thus, there is no systematic evidence of increased segregation among small firms, but there are differences between large and small firms in some industries. Regrettably, it is difficult to assess the significance of these differences because random hiring implies more segregation among small firms than among large firms. We are unaware of any segregation index that allows for uniformly meaningful comparisons across two populations with different sized firms and, in any case, we could not compute them for Groshen's sample. As a result, the interpretation of the differences between our results and Groshen's must remain quite tentative.

B. The Determinants of Female Employment in Small Firms

Having documented the existence of interfirm gender segregation, we now ask why there is so much interfirm variation in the fraction of female employment, with particular attention devoted to the role of the business owner. Table 6 presents CBO estimates of the fraction of women employed by firms with owners of varying demographic characteristics. The first two columns report figures for female-owned firms while the last two report figures for male-owned firms. An

example of how to read this table is that the second column of the first row indicates that 52.0% of the employees of female-owned firms are women. The TOTAL row indicates, not surprisingly, that female owners employ women more regularly than do male owners. This may occur because female owners tend to own businesses in industries with more women workers, because female owners have a relative preference for women employees, or, most likely, some combination of both.

The next few rows investigate the role of the business owner's educational attainment and age. Education appears to play little role among female-owned firms, but male college graduates are much more likely to employ women than are men with less education. Conversely, there is some evidence that younger women owners are more likely to employ women than are older women owners, but there is no indication of an age effect among male owners. The final rows investigate the role of firm size in gender segregation. There is no evidence of firm-size effects among female-owned businesses, but larger male-owned firms employ proportionately more women than do their smaller counterparts. In sum, Table 6 suggests that the demographic characteristics of the owner and the size of the firm may play important roles in the sex composition of a firm's work force. However, these simple tabulations may be misleading because many other factors surely influence a firm's choice of work force. Of particular concern is the fact that men and women tend to work in different industries and occupations so that Table 6 could only reflect the fact that the businesses owned by women, the young, and the highly educated are located in sectors of the economy that generally employ women. To address these concerns, we turn to regression methods in an effort to more systematically analyze the determinants of a firm's gender composition.

As noted in an earlier footnote, business owners report the fraction of women employees within six brackets (0%, 1-9%, 10-24%, 25-49%, 50-74%, and 75-100%). In this context, the ordered probit is a natural model to apply. The ordered probit model is similar to the binary probit model in that it starts with a latent regression

$$(3) \quad y^* = \beta'X + u,$$

where $u \sim N(0,1)$. While y^* is not observed, we do observe y where

$$\begin{aligned} y &= 0 \text{ if } y^* \leq \mu_1, \\ &= 1 \text{ if } \mu_1 < y^* \leq \mu_2 \\ &= 2 \text{ if } \mu_2 < y^* \leq \mu_3 \\ &= 3 \text{ if } \mu_3 < y^* \leq \mu_4 \\ &= 4 \text{ if } \mu_4 < y^* \leq \mu_5 \\ &= 5 \text{ if } \mu_5 < y^*, \end{aligned}$$

where $y=0$ corresponds to 0% female employees, $y=1$ corresponds to 1-9% female employees, etc. The μ 's are called cut points and indicate the thresholds for moving from one category to the next, and each observations imputed value of $X'\beta$ is called the score for that observation. The model estimates the β 's and μ 's and uses these to predict the probability that a firm with characteristics X will fall into any of the six ordered categories.

Table 7 reports estimates of various specifications of the ordered probit model. We report estimates for the entire sample (columns 1-2) and separately for male and female-owned businesses (columns 3-4 and 5-6, respectively). As with other non-linear models, it is difficult to interpret ordered probit parameter values since the marginal effect of any particular independent variable on the object of interest (here the probability of falling in a particular cell) will depend on the value of all other independent variables. Therefore, we report for each model the mean score along with estimates of the cut points. This information lets one assess the effect of a change in an independent variable evaluated at the mean of the probability distribution. For example, the mean score in column (3) is 1.125 which, given the estimated cut points, corresponds to the prediction that the mean woman business owner is most likely to have between 50 and 74 percent female employees. Using column (3) again, adding three years of schooling to a female owner with the mean score results in a score of 1.200. This increases the probability of employing mostly women, but leaves her most likely to fall in the 50-74% category.

The first two columns of Table 7 report all-firm estimates of models with and without 1-digit industry dummies. In addition to the variables listed, each regression also includes controls for the owner's age and marital status, the firm's age, and region.³² The first row shows that male business owners typically employ far fewer women than do similar female business owners. While this is perhaps unsurprising, we are unaware of any similar results in the literature. If we accept the premise that male employers have a relative preference for male employees, then this result suggests that employer tastes for discrimination play an important role in creating interfirm segregation. Alternatively, it could be that male employers operate firms that have more need for traditionally male skills and occupations. The second row shows that more educated business owners employ more women, but that the effect is attenuated with the addition of the 1-digit industry dummies, which suggests that the estimated effect of education may be picking up omitted industry effects. The next row shows that education effects are much stronger for male than for female business owners. This may occur because less educated men are more likely to discriminate or, alternatively, because education is still picking up omitted industry effects.

The next few rows of columns (1) and (2) show that larger firms employ more women and that the relationship between size and female employment is slightly stronger among male-owned businesses. One interpretation of these facts is that federal anti-discrimination policy has shifted women's employment towards larger firms. This interpretation has some appeal since the firm size effects seem to be strongest for the male employers who might be expected, a priori, to

³²The coefficients on owner's age, owner's marital status, and region were unremarkable, but the firm age parameters indicate that older firms employ fewer women than younger firms, holding other things constant. This result is consistent with Arrow's (1972) views on the likely persistence of discriminatory patterns within a particular firm. Results of the full regression are available from the authors upon request.

discriminate the most. Alternatively, larger firms may have more need for female-dominated occupations, or they may more easily offer benefits that are particularly important to women.³³ Unfortunately, our analysis of this issue must remain tentative.

The coefficient on "percent women employees in firm's 2-digit industry" is more of an identity than a behavioral relationship. All it says is that firms in predominantly female industries tend to employ a lot of women. Note, however, that the inclusion of this variable is a partial substitute for a more complete set of industry dummies (which we did not use for computational reasons). Finally, the next row reports the relationship between a firm's average per-employee payroll and the fraction of women it employs. While it is apparent that low-paying firms tend to employ women, we defer a full discussion of this issue until the next section. The rest of the table reports analogous models broken out by the sex of the owner, with results highly similar to those of the first two columns.

C. Discussion

This section has shown that men and women are significantly segregated across small firms, and that the sex of the owner plays a strong role in determining the sex composition of a firm's work force. These results are certainly consistent with the hypothesis that employer discrimination, primarily by male employers, forces men and women into different firms. This reading suggests that discrimination has an interfirm component to it, in addition to the interoccupational component documented by so many previous authors. Yet, there are alternative readings of these data. For example, it could be that discrimination operates primarily along occupational dimensions, that firms vary

³³Large firms generally provide better benefits than small firms (Brown, Hamilton, and Medoff, 1990). In addition, large firms are in a better position to accommodate temporary work force exits that are often taken by women with small children.

in their occupational requirements, and hence that interfirm segregation is merely a proxy for interoccupational segregation. An alternative nondiscriminatory interpretation is that men and women simply bring different skills to the market and that some firms need "male" skills and other firms need "female" skills. In this view, interfirm segregation is not the product of discriminatory attitudes, but of simple sorting of workers to the firms where their skills are most in demand. ³⁴

Since we don't measure employee skills or occupation in our data, there is little we can do to directly distinguish between these various hypotheses. Nevertheless, our view is that because there are fewer occupational distinctions in small firms, interfirm segregation in our sample is unlikely to be purely a proxy for occupational segregation. This view is consistent with previous studies of large firms which find substantial intraoccupational interfirm segregation (e.g. Blau, 1977; Bielby and Baron, 1984; Groshen, 1991).

IV. Interfirm Segregation and the Gender Earnings Gap

The previous section documented substantial interfirm gender segregation. In this section we move on to assess the role of segregation in accounting for women's relatively low annual earnings. Most studies focus on male/female differences in hourly wages rather than annual earnings, which is appropriate given the longer annual hours worked by men. ³⁵ Unfortunately, we can not follow

³⁴Note that this explanation must include a rationale for why business owners owned by less educated male owners need male skills more than businesses owned by more educated males or females.

³⁵Comparing male and female wages and earnings using CPS data shows that male earnings are 88% higher than female earnings while male wages are 59% higher than female wages. Thus, differences in hours worked account for roughly one-third of the overall earnings difference between men and women.

this tradition because the CBO only records information about average annual earnings within a firm.³⁶ We therefore study the male/female gap in annual earnings, while acknowledging that these findings will not necessarily apply directly to hourly wages. The fact that we have only firm-wide average annual earnings also means that we can say nothing directly about the contribution of intrafirm earnings inequality to the overall gender earnings gap. However, we combine information from the CBO and the CPS to get a rough measure of the relative contributions of intrafirm and interfirm inequality to the gender gap in annual earnings.

In order to assess the relative contribution of interfirm segregation to the male/female annual earnings gap, decompose person i 's earnings at firm j into

$$(4) \quad Y_{ij} = Y_j + \Delta_{ij}$$

where Y_{ij} = person i 's earnings at firm j , Y_j = average earnings at firm j , and Δ_{ij} = the deviation of person i 's earnings from firm j average earnings. Mean earnings for women and men can then be written as

$$(5) \quad \bar{Y}_f = \frac{1}{N_f} \sum_{i=1}^{N_f} (Y_j + \Delta_{ij})$$

$$(6) \quad \bar{Y}_m = \frac{1}{N_m} \sum_{i=1}^{N_m} (Y_j + \Delta_{ij})$$

where N_f and N_m are the number of women and men, respectively, in the sample. By simple extension, we can then decompose the difference between men's and women's mean earnings into the following components:

³⁶To be precise, the survey records each firm's annual payroll and the number of employees for a given week. Each of these figures are gathered from IRS payroll records and not from retrospective questions. To estimate the mean annual earnings for employees of the firm, we divide the annual payroll by the number of employees.

$$(7) \quad \bar{Y}_m - \bar{Y}_f = \left\{ \frac{1}{N_m} \sum_{i=1}^{N_m} Y_{f_i} - \frac{1}{N_f} \sum_{j=1}^{N_f} Y_j \right\} + \left\{ \frac{1}{N_m} \sum_{i=1}^{N_m} \Delta_{if} - \frac{1}{N_f} \sum_{j=1}^{N_f} \Delta_{if} \right\}$$

In this decomposition, the first bracketed term on the right-hand side represents the component attributable to the fact that men work in relatively high-paying firms. We can estimate this interfirm component from the CBO by simply assigning the firm-average earnings to each of the firm's employees, male or female. The second term represents the component due to the fact that, within any given firm, men tend to be paid more than women. Since we don't know how earnings are distributed within our CBO firms, we can not estimate this component directly from either the CBO or the CPS. Nevertheless, we can compute the total earnings gap ($\bar{Y}_m - \bar{Y}_f$) from the CPS and, by subtraction, we can estimate the intrafirm component.

Table 8 presents estimates of this decomposition for the entire sample, and separately for selected 2-digit industries. Column (1) reports our estimate of the contribution of interfirm segregation to the male/female earnings gap, as computed from the CBO. Column (2) reports the total male/female annual earnings gap as computed from the May, 1983 CPS that recorded information on 1982 labor market experience.³⁷ In these tabulations, we restricted our CPS sample to those workers that reported working for a firm with less than 100 employees. We

³⁷Readers familiar with the CPS will recognize that the retrospective information on 1982 labor market experience was actually collected in March, not May. However, the CPS matches the March answers to the May answers prior to distribution. There is a small complication in that the questions about firm size refer to jobs held in May, 1983 while the information on earnings refers to jobs held in 1982. For a small fraction of the population, these may not be the same jobs.

To be included in our CPS sample, a worker had to 1) be between the ages of 18 and 65, 2) be a private sector worker, 3) not be self-employed, 4) have worked more than five weeks in 1982, 5) have worked more than five hours per week in 1982, 6) be currently in the labor force, and 7) have earned more than 500 dollars in 1982.

computed column (2) for the entire sample of workers that worked for such small firms and, separately, for a sample that excluded managers and other professional occupations.³⁸ The rationale for this latter exclusion is that our focus on the employees (as opposed to the owners) of small businesses eliminates most managers and professionals from our CBO sample. Therefore, the non-manager/non-professional CPS sample is perhaps closer to the occupational mix that we survey in the CBO. Column (3) reports the fraction of the total male/female small-firm earnings that is potentially attributable to interfirm segregation. This fraction is simply computed as the ratio of (1) to the appropriate column of (2). Again, we do this for both the all-occupation and the non-manager/non-professional CPS samples.

We emphasize the word "potentially" in describing column (3) because firms can vary in the occupations, human capital, and annual work hours of their employees and, as a result, interfirm differences in earnings may merely reflect interfirm segregation on these other dimensions. While it is impossible to address this issue directly with the data at hand, column (4) of Table 8 presents a tentative assessment of the ability of these other dimensions to completely explain the role of interfirm segregation. In particular, we estimated industry-specific OLS regressions in which the dependent variable was log annual earnings. The independent variables included quadratic terms in education, age, and log annual hours, dummy variables for the CPS' major occupations, and a female dummy. Column (4) reports for each industry the value of

$$(\text{raw log earnings gap} - \text{estimated female dummy}) \div (\text{raw log earnings gap}),$$

³⁸We should note that average employee earnings in the CBO are about 25% less than average earnings in the CPS. This occurs because CPS earnings include income from moonlighting jobs, black market income, and certain other sources whereas the CBO only records IRS-reported income from a single employer. As a result, these decompositions may misstate the relative contribution of interfirm segregation to the gender earnings gap. Unfortunately, we can only guess at the likely direction of any biases imparted.

which gives an indication of the fraction of the within-industry earnings gap that is explained by age, education, hours, and major occupation.³⁹

The TOTAL row of Table 8 is our estimate of the decomposition for the entire small-firm economy. Among all occupations, mean women's log earnings are .64 less than mean men's log earnings. Of this overall difference, .35, or 55%, is potentially attributable to the different distribution of men and women across small firms. The TOTAL decomposition is largely unaffected by the exclusion of managers and professionals. Column (4) indicates that gender differences in education, age, annual work hours, and major occupation can explain roughly 49% of the gender earnings gap. The similar fractions accounted for by interfirm segregation and the other factors means that, for interfirm segregation to be solely a proxy for these other factors, there would have to be almost zero intrafirm gender differences in annual hours, major occupation, etc. Since we suspect that there are intrafirm gender differences in these factors, we ascribe some role to interfirm segregation in generating the gender earnings gap.

Because the apparent role of interfirm segregation may be an artifact of the different industrial distributions of men and women, the rest of Table 8 reports the results of within-industry decompositions. The results are varied. While interfirm segregation explains almost none of the gender earnings gap in industries such as apparel manufacturing or health services, interfirm segregation plays quite a large role in many other industries. For example, interfirm segregation can explain 81% of the earnings gap within the nonelectrical machinery industry and 61% of the gap within apparel and accessory stores. If we exclude managers and professionals, then interfirm segregation can explain 132% (!) of the earnings gap among small firms in the personal services

³⁹It would have been preferable to include more detailed occupational measures, but the within-industry samples were too small to support such a specification.

industry.⁴⁰ In summary, it appears that interfirm segregation is often an important source of women's lower earnings.

Before moving on, we should emphasize once again the tentative nature of these results. The results suggest that within many industries, interfirm segregation explains a larger fraction of the gender earnings gap than do gender differences in age, education, annual hours, and major occupation. It is well-known, however, that there is substantial gender segregation within narrowly defined occupations or job titles (Bielby and Baron, 1984), so it is possible that wage differences ascribed here to interfirm segregation may only reflect interfirm differences in the use of detailed occupations. While there is little we can do with the present data to address this issue, previous authors (e.g. McNulty, 1967; Buckley, 1971; Blau, 1977; Groshen, 1991) have studied intraoccupational interfirm segregation, and they have typically found an important role for interfirm segregation, even within quite narrowly defined occupations. Therefore, our tentative conclusion is that interfirm intraoccupational segregation is an important source of the small firm gender earnings gap.

Table 8 shows that firms that employ women pay less than firms that employ men. Why is this so? Table 9 explores this issue by estimating firm-level OLS regressions where the dependent variable is payroll per employee. We compute the regressions for our full sample and separately by the sex of the owner. Our primary interest is in the coefficients on the fraction of the firm's employees that are women, which are listed in the top rows of the table. The left out group is those firms with between 75 and 100 percent female employees, so that the coefficients estimate the effect of being in a particular group relative to a similar firm with almost entirely female employees. In addition, each regression also includes reported controls for firm size (a spline), education

⁴⁰The implication here is that women tend to work in low-paying firms, but that they tend to get paid more than men within any given firm.

of owner, sex of owner, and fraction of women employees in the firm's 2-digit industry, as well as unreported controls for the age and marital status of the owner, firm age, and region.⁴¹ Within each of the three samples, we compute regressions without controls (Columns 1, 3, and 5) and with controls (Columns 2, 4, and 6) for log receipts per employee.

The coefficients on "Percent women employees within the firm" in Column (1) show that firms with mostly male employees pay substantially more than similar firms with very few male employees. For example, Column (1) suggests that firms with between 10 and 24 percent women employees paid their employees roughly 40% more than similar firms that had almost entirely female work forces. It is a bit puzzling that the relationship between "percent female" and average earnings is non-monotonic. One hypothesis is that firms with no women tend to employ blue-collar men whereas the firms with a few women tend to be a mix of many professional men and a few administrative women. Whatever the explanation, it remains true that the general relationship between "percent female" and average earnings is decreasing.

While our primary interest is in the "Percent women employees" coefficients, the other independent variables have sensible measured effects. For example, the coefficients on the log employment spline indicate that employees of larger firms receive higher annual pay, a result consistent with earlier work on hourly wages (e.g. Brown, Hamilton, and Medoff, 1990). We also find a fairly strong link between the education of the owner and employee pay, which may occur because highly educated owners employ more high-skill, high salary workers.⁴² We find that male owners pay substantially more than female owners, holding these other things constant. And finally, we find a strong relationship between annual pay

⁴¹These unreported coefficients were, in our view, either small or unremarkable. Results of the full regressions are available from the authors upon request.

⁴²For example, lawyers are likely to employ other lawyers while carpenters are likely to employ other carpenters.

and the proportion of women employees in the two-digit industry, even controlling for the fraction of women in the firm. This may reflect the fact that industries that employ mostly women tend to use more part-time workers and workers in low-paying occupations. Alternatively, industry segregation, something we do not study here, may itself be an important determinant of women's reduced earnings.

Column (1) is quite consistent with Becker's theory in that employers with a taste for discrimination employ men, but they pay a higher price for indulging that taste. However, Becker's theory carries the additional implication that discriminating employers do not generally sell the product of their employees' labor for a higher price. In contrast, theories of segregation based on gender differences in human capital argue that women are paid less because they are less productive (e.g. Mincer and Polachek, 1974). Extending this logic, the discrimination hypothesis posits that the earnings of "female" firms should be lower even when we control for the receipts of the firm, while the human capital hypothesis posits that earnings of "female" firms should be no different from those of "male" firms once we have controlled for receipts.⁴³ Column (2) of Table 9 evaluates these hypotheses by extending the specification of Column (1) to include log receipts per employee. Inspection of Column (2) shows that the coefficients on "percent women employees," while still significant, are greatly attenuated by the addition of log receipts to the equation. This suggests that a primary reason for the reduced earnings of women is that their labor output is less valuable. While this finding is consistent with theories of segregation based on human capital differences or on discrimination by customers, it is somewhat difficult to square with the hypothesis that gender segregation and the gender earnings gap are due to employer discrimination.

Columns (3) through (6) of Table 9 present another imperfect way of trying to get a handle on the role of discrimination in the gender earnings gap in these

⁴³We are grateful to an anonymous referee for suggesting this specification.

small firms. In these columns, we repeat the regressions of columns (1) and (2) separately for our samples of male- and female-owned businesses. Inspection shows that there is little difference between the two samples in the relationship between "percent female" and average employee earnings. Therefore, it doesn't appear that female-owned businesses are any less likely to pay male workers more than female workers.

In sum, this section has shown that interfirm segregation accounts for a substantial portion of the male/female earnings gap. Firms that employ primarily men typically pay substantially higher salaries than do firms that employ primarily women. To an unknown extent, the estimated effect of interfirm segregation is merely a proxy for male/female differences in annual hours and occupation that also have an interfirm component. However, previous research on hourly wages suggests that interfirm segregation is unlikely to be only a proxy for these other factors. Although we can say little about the fundamental cause of women's reduced earnings, interfirm segregation is probably an important factor in women's reduced earnings among small firm employees.

V. CONCLUSION

This paper has studied interfirm segregation in the small firms that were missed by previous studies of interfirm segregation. Consistent with earlier studies of large firms, we found substantial segregation of women into lower paying firms. This fact can be interpreted with models of discrimination (e.g. Becker, 1971) or with models of differential human capital accumulation (e.g. Mincer and Polachek, 1974). More detailed analysis provided mixed support for both models. On one hand, the male employers who are perhaps most likely to discriminate do employ fewer women and do pay higher wages, facts both consistent with models of employer discrimination. On the other hand, the higher salaries of male-employee firms are largely explained by their higher revenues, a fact consistent with the human capital explanation or with theories of customer

discrimination. In the final analysis, both phenomena are probably important and we are only marginally more able to sort out their relative importance than were previous authors.

We conclude by noting that these findings have important implications for the likely effect of proposed comparable worth programs. As Johnson and Solon (1986) have emphasized, the most widely mooted comparable worth policies are designed to reduce the interoccupational wage gap within firms. Yet our results, in conjunction with earlier studies of large firms, suggest that a substantial component of the gender wage gap is due to interfirm segregation. In this regard, it is irrelevant whether interfirm segregation proxies for segregation by job title or occupation. The fact is that reducing within-firm differences in pay will still leave a large fraction of the gender earnings gap untouched.

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TABLE 1

Characteristics of Selected Surveys Used in Research on Interfirm Gender Segregation

<u>Survey Instrument (years administered)</u>	<u>Studies using this survey</u>	<u>Sampling Universe of the Survey</u>	<u>Survey information on individuals' earnings</u>	<u>Survey information on individuals' human capital</u>	<u>General findings</u>
1. Area Wage Surveys (Annually)	Blau (1977) McNulty (1967) Buckley (1971)	Surveys are generally limited to firms with more than 50 employees, but in some industries firms are only surveyed if they have more than 100 employees. However, the survey design varies slightly from year to year and from SMSA to SMSA.	Weekly and hourly earnings are reported by the firm for each employee.	Detailed occupational classification that varies from industry to industry, sex	Substantial interfirm segregation that accounts for large fraction of gender wage gap.
2. Industry Wage Surveys (Annually)	Groshen (1991)	Surveys are generally limited to firms with more than 50 employees, but in some instances firms are surveyed if they have fewer than 50 employees. As with the AWS, the survey design varies slightly from year to year and from industry to industry.	Weekly and hourly earnings are reported by the firm for each employee.	Detailed occupational classification that varies from industry to industry, sex	Substantial interfirm segregation that often accounts for large fraction of gender wage gap.
3. EEO-1 Reports (Annually since 1966)	Smith and Welch (1984) Becker (1980)	All private sector firms with more than 100 employees and all federal contractors with more than 50 employees (and \$50,000 in federal contracts).	None	Broad occupational classification, sex, race	No work to date on interfirm gender segregation.
4. Characteristics of Business Owners (1982)	Bates (1988)	Survey is restricted to firms whose ownership is classified as individual proprietorship, partnership, or subchapter S corporation.	Firm's annual payroll, average number of employees in a given week.	Sex, race	No work to date on interfirm gender segregation.

TABLE 2

Characteristics of Small Firms and Their Owners
By Sex of Owner

<u>Variable</u>	<u>All Firms</u>	<u>Sex of Owner</u>	
		<u>Male</u>	<u>Female</u>
1. Age of owner			
Under 25	.018	.016	.022
25-34	.156	.154	.161
35-44	.269	.263	.284
45-54	.267	.276	.245
55-64	.209	.210	.206
65 or over	.082	.082	.083
2. Education of owner*	13.5 (3.09)	13.7 (3.12)	13.0 (2.95)
3. Percent female employees*			
0%	.221	.261	.125
1-9%	.201	.210	.180
10-24%	.049	.055	.034
25-49%	.091	.102	.064
50-74%	.122	.123	.120
75-100%	.316	.250	.488
4. Number of employees*	5.53 (9.33)	5.60 (9.83)	4.88 (7.97)
5. Firm receipts*	349043 (1177800)	367766 (1248993)	237092 (799649)
6. Log(firm receipts)*	11.82 (1.26)	11.96 (1.24)	11.49 (1.26)
7. Annual payroll/employees*	9637 (13072)	10423 (14969)	7751 (6178)
8. Log(annual payroll/employees)*	8.88 (.81)	8.97 (.80)	8.67 (.82)
9. Number of owners of firm*	1.65	1.69	1.53
10. Number of firms in sample	4835	3414	1421

Notes: All data drawn from the 1982 Characteristics of Business Owners survey. The numbers for "owner's age" and "percent female employees" refer to the fraction of firms that fall into any particular category. All of the other figures are variable means except for those in parentheses, which are standard deviations. A * indicates that a t-test (or a chi-square test for the categorical variables) rejected the hypothesis of equality of the means for male- and female-owned firms, at the 99% level. The hypothesis that male and female owners share the same age distribution could not be rejected at the 90% level.

TABLE 3Male and Female Employment
By Firm Size

<u>Size of Firm</u> <u>(# of employees)</u>	<u>Percentage of Employees in Firms of This Size</u>		
	<u>All</u>	<u>Male</u>	<u>Female</u>
1-24	28.7	27.7	30.0
25-99	14.1	14.1	14.0
100-499	13.9	13.1	14.9
500-999	5.6	5.1	6.2
1000+	37.7	39.9	34.9

Notes: Data drawn from the May, 1983 Current Population Survey. An example of how to read this table is that 28.7% of all workers say that they work in firms with between 1 and 24 employees. The hypothesis that men and women are evenly distributed across firm sizes was rejected by a chi-square test at the 99% level.

TABLE 4

Male and Female Employment in Small Firms
By Proportion Female Employees

Percent women employees <u>in the firm</u>	Percentage of employees that work in firms of this type		
	(1) <u>Female Employees</u>	(2) <u>Male Employees</u>	(3) <u>All Employees</u>
0%	0.0	20.7	11.9
1-9%	2.0	35.2	21.2
10-24%	3.6	12.8	8.9
25-49%	12.8	16.2	14.8
50-74%	22.5	10.5	15.5
75-100%	59.1	4.6	27.6

Notes: All data drawn from the 1982 Characteristics of Business Owners survey. An example of how to interpret these figures is that 2.0% of the female employees in our sample work in firms where women comprise between 1 and 9 percent of the firm's workforce.

TABLE 5

Segregation Indices for Small and Large Firms
By Selected Industries and Sex of Owner

	(1)	(2)			(3)	
	# of firms in CBO	<u>Small Firm Duncan Index</u>			<u>Groshen Index</u>	
		All Firms	Male- owned	Female- owned	Small Firms	Large Firms
ALL INDUSTRIES*	4835	.66	.65	.69	.51	-
<u>Selected Industries (SIC Code)</u>						
Gen. Building Contractors (15)	108	.64	.62	.72	.34	-
Special Trade Contractors (17)	230	.68	.68	.62	.39	-
Food Products Manufact. (20)*	61	.67	.66	.66	.39	-
Apparel Manufacturing (23)	26	.34	.36	-	.14	-
Printing and Publishing (27)	59	.40	.34	.73	.29	-
Rubber and Plastics (30)	19	.55	.60	.42	.27	-
Misc. Plastic Products (307)	-	-	-	-	-	.29
Nonelectrical Machinery (35)	69	.63	.61	.72	.33	.43
Trucking and Warehousing (42)	69	.63	.62	.67	.36	-
General Merchandise Stores (53)*	62	.62	.61	.75	.38	-
Food Stores (54)*	177	.51	.50	.53	.34	-
Apparel/Accessory Stores (56)*	134	.64	.62	.63	.44	-
Banking (60)	14	.68	.61	1.00	.47	.05
Insurance Agents (63)	8	.23	.04	.76	.14	-
Life Insurance (631)	-	-	-	-	-	.05
Real Estate (65)	114	.49	.48	.39	.32	-
Personal Services (72)*	290	.66	.68	.65	.50	-
Business Services (73)*	157	.62	.55	.71	.47	-
Computer/Data Processing (737)	-	-	-	-	-	.26
Auto Repair and Services (75)	149	.62	.68	.38	.32	-
Health Services (80)*	317	.55	.58	.36	.35	-
Cross-Industry Mean	-	.55	.54	.51	.34	-
Cross-Industry Std. Dev.	-	.16	.17	.26	.15	-

Notes: The numbers reported in columns 1 and 2 and left half of column (3) are based on data drawn from the 1982 Characteristics of Business Owners survey. The right half of column 3 is drawn from Groshen (1991). Cross-industry means and standard deviations are based on unweighted averages of 67 2-digit SIC codes. A * indicates that a chi-square test rejects the hypothesis of random hiring at the 95% level.

TABLE 6

Small Firm Employment of Women
By Characteristics of Owner and Firm

	<u>Female-Owned Firms</u>		<u>Male-Owned Firms</u>	
	<u>Number of firms</u>	<u>Percentage of employees that are female</u>	<u>Number of firms</u>	<u>Percentage of employees that are female</u>
TOTAL	1421	52.0	3414	38.7
Education of Owner (years)				
0-8	70	51.4	200	31.8
9-11	139	44.8	256	25.5
12	584	52.2	1116	32.9
13-15	276	58.0	596	34.9
16+	349	58.8	1238	49.7
Age of Owner (years)				
Under 25	30	62.9	54	33.1
25-34	224	56.2	519	44.5
35-44	396	57.5	886	38.8
45-54	342	50.8	930	36.6
55-64	287	49.4	707	38.3
Over 65	116	38.9	275	40.9
Size of Firm				
1-4 employees	1029	58.7	2292	35.8
5-9 employees	234	59.6	646	36.7
10-19 employees	99	42.1	294	37.7
20-49 employees	49	44.2	137	41.9
50-99 employees	10	49.9	44	44.1

Notes: All data drawn from 1982 Characteristics of Business Owners Survey. As an example of how to read this table, the second column of the first row indicates that 51.7% of the employees of female-owned firms are women.

TABLE 7

Ordered Probit Models of Female Employment in Small Firms

<u>Independent Variable</u>	<u>All Firms</u>		<u>Female-owned firms</u>		<u>Male-owned firms</u>	
	(1)	(2)	(3)	(4)	(5)	(6)
sex of owner (male=1)	1.133 (.180)	-1.141 (.180)	-	-	-	-
education of owner (years)	.033 (.011)	.027 (.011)	.025 (.012)	.020 (.012)	.087 (.007)	.081 (.008)
X male dummy	.050 (.013)	.049 (.013)	-	-	-	-
log of firm employment	.142 (.032)	.144 (.032)	.153 (.033)	.152 (.034)	.184 (.020)	.186 (.020)
X male dummy	.044 (.037)	.043 (.037)	-	-	-	-
percent women employees in firm's 2-digit industry	3.099 (.089)	3.022 (.110)	2.985 (.178)	3.040 (.222)	3.172 (.103)	3.019 (.130)
log of average employee earnings for this firm	-.087 (.021)	-.091 (.021)	-.101 (.041)	-.105 (.041)	-.081 (.025)	-.086 (.026)
Controls for 1-digit industry	no	yes	no	yes	no	yes

Mean score (mean of X'§) (S.D. of score)	.934 (.891)	.706 (.898)	1.125 (.767)	.993 (.792)	1.865 (.874)	1.558 (.873)
Cut Points						
0% women 6 1-9% women	-.118	-.349	-.100	-.246	.901	.595
1-9% women 6 10-24% women	.644	.417	.693	.553	1.653	1.353
10-24% women 6 25-49% women	.814	.587	.807	.667	1.847	1.548
25-49% women 6 50-74% women	1.137	.910	1.027	.888	2.218	1.920
50-74% women 6 75-100% women	1.593	1.367	1.416	1.279	2.715	2.418
Number of observations	4561	4561	1331	1331	3230	3230
P ² (degrees of freedom)	2315 (26)	2334 (37)	429 (20)	441 (34)	1698 (23)	1722 (34)
p-value for P ²	.000	.000	.000	.000	.000	.000

Notes: Standard errors are in parentheses. All data drawn from 1982 Characteristics of Business Owners Survey. In columns (2), (4), and (6), professional services is the omitted industry. All regressions also included controls for owner age, owner marital status, firm age, and region.

TABLE 8

Decomposing the Small Firm Gender Earnings Gap
into Interfirm and Intrafirm Components

	(1)	(2)		(3)		(4)
	Interfirm Gender Log Earnings <u>Gap</u> (CBO)	Total Gender Log Earnings Gap (CPS)		Fraction of total gender earnings gap <i>potentially</i> attributable to interfirm segregation: (1) ÷ (2)		Fraction of total gender earnings gap explained by education, age, annual hours, and <u>major occupation</u>
		All <u>occs.</u>	Excluding managers, <u>professio</u> <u>ns</u>	All <u>occs.</u>	Excluding managers, <u>professio</u> <u>ns</u>	All <u>Occupations</u>
TOTAL	.35	.64	.61	.55	.57	.49
<u>Selected Industries (SIC code)</u>						
Gen. Build. Contractors (15)	.07	.48	.43	.15	.16	0
Food Products Manuf. (20)	.07	.58	.56	.12	.13	1.29
Apparel Manufacturing (23)	.00	.59	.49	.00	.00	.56
Printing and Publishing (27)	.15	.54	.50	.28	.30	.29
Rubber and Plastics (30)	.15	.60	.39	.25	.38	-.69
Nonelectrical Machinery (35)	.30	.37	.38	.81	.79	.16
Trucking and Warehouse (42)	.34	.44	.51	.77	.66	.38
Gen. Merchandise Stores (53)	.17	.71	.74	.24	.23	-
Food Stores (54)	.15	.48	.48	.31	.31	.59
Appar. & Access. Stores (56)	.27	.44	.33	.61	.82	.37
Real Estate (65)	.08	.17	.08	.47	1.00	-.08
Business Services (72)	.12	.46	.26	.26	.46	.38

Personal Services (73)	.37	.39	.28	.95	1.32	.37
Auto Repair Services (75)	.22	.35	.36	.63	.61	.29
Health Services (80)	.01	.48	.16	.02	.06	.53
Cross-Industry Mean	.16	.47	.40	.39	.48	.30
Cross-Industry Std. Dev.	.11	.13	.16	.16	.38	.42

Notes: All data drawn from the 1982 Characteristics of Business Owners survey and the May, 1983 CPS. See text for description of the decomposition. The CPS figures in column (2) are computed solely on the basis of those workers employed in firms with less than 100 employees.

TABLE 9

The Determinants of Average Employee Earnings in Small Firms

<u>Variable</u>	<u>All Firms</u>		<u>Male-owned firms</u>		<u>Female-owned firms</u>	
	(1)	(2)	(3)	(4)	(5)	(6)
Percent women employees within the firm						
0%	.186 (.043)	.053 (.034)	.203 (.052)	.068 (.041)	.228 (.084)	.062 (.066)
1-9%	.144 (.038)	.009 (.029)	.170 (.048)	.018 (.038)	.077 (.063)	.008 (.048)
10-24%	.362 (.052)	.108 (.043)	.366 (.060)	.118 (.049)	.368 (.110)	.105 (.092)
25-49%	.259 (.044)	.086 (.036)	.288 (.049)	.125 (.043)	.174 (.101)	-.023 (.075)
50-74%	.093 (.039)	.028 (.031)	.110 (.047)	.053 (.037)	.058 (.071)	-.011 (.055)
Spline in log(# of employees)						
Main effect	.033 (.015)	.202 (.012)	.051 (.017)	.204 (.015)	-.011 (.028)	.197 (.022)
Added effect for firms with more than 15 employees	.037 (.066)	-.230 (.043)	-.012 (.069)	-.234 (.050)	.213 (.123)	-.187 (.084)
Education of owner	.019 (.004)	.006 (.003)	.020 (.005)	.005 (.004)	.017 (.008)	.009 (.006)
Sex of owner (male=1)	.149 (.028)	.014 (.021)	-	-	-	-
Fraction women employees in 2-digit industry	-.272 (.079)	.139 (.065)	-.322 (.093)	.071 (.079)	-.148 (.156)	.264 (.121)
Log(receipts/employees)	-	.551 (.031)	-	.539 (.016)	-	.577 (.023)
1-digit industry dummies	yes	yes	yes	yes	yes	yes
Adjusted R-square	.110	.445	.084	.408	.130	.486
Number of observations	4562	4562	3231	3231	1331	1331

Notes: All data drawn from the 1982 Characteristics of Business Owners survey. Each column reports the coefficients from a regression where the dependent variable is average employee earnings and the unit of observation is a firm. In addition to the independent variables reported above, the regressions also included controls for the age and marital status of the owner, the age of the firm, and region.

