

Measuring Economic Discrimination of Hispanic-Owned Architecture and Engineering Firms in South Florida

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Using data developed for the U.S. District Court, this study compared the performance of Hispanic-owned firms and two groupings of non-Hispanic-owned firms in three South Florida markets: architecture (n = 176), structural engineering (n = 144), and civil engineering (n = 200). Within each market, firms' earnings are expressed as functions of longevity, production capacity, location, and whether the firm is owned by a woman. Separate earnings functions are developed for each ethnic classification, and a decomposition technique is applied to test for discrimination. The results show that the three markets do not convert firms' characteristics into economic outcomes in the same manner for Hispanic and for non-Hispanic owners. The projected earnings of firms owned by Hispanics constitute a fraction of what non-Hispanic-owned firms with identical characteristics are expected to earn. Within each ethnic classification, the earnings of women-owned firms are lower than the earnings of firms with identical characteristics not owned by women.

Keywords: *discrimination; earnings disparities; gender comparisons; South Florida firms*

The wage distribution literature is replete with evidence on ethnic disparities in pay before and after controlling for education, experience, and other variables recognized by economic wisdom as affecting earnings across ethnic groups (Arrow, 1998; Baldwin & Johnson, 1996; Cancio, Evans, & Maume, 1996; Cotter, DeFiore, Hermsen, Kowalewski, & Vanneman, 1996; Darity & Mason, 1998; Darity, Myers, & Chung, 1998; Durden & Gaynor, 1998; Hogan & Perrucci, 1998; Lundberg & Startz, 1998; Mason, 1998; Utendorf, 1998; Wilson & Sakura-Lemessy, 2000). The procedure most commonly used, also applied in the analysis of gender-based differences, is a decomposition technique. Separate earnings functions are estimated for minority and nonminority workers, and the effect of controlled or "explained"

marketable endowments is separated from the residual or “unexplained” ethnic differences in wages. The latter component usually is attributed to wage-setting rigidities resulting from discrimination (Barkley, Stock, & Sylvius, 1999; Davies, Mosher, & O’Grady, 1996; Hurst, 1997; Monks & Robinson, 2000; Olson, Zuiker, & Montalto, 2000).

Although similar in methodology, ethnic comparisons of firms’ earnings appear less frequently in the literature. This is not surprising because disparities in earnings by firm owner’s ethnic group are the result of multiple, complex, and historically rooted factors that transcend the qualifications or work history of any individual wage earner, and are likely to involve decisions by a myriad of actors (suppliers, workers, customers, professional associations, and government, among others) whose attitudes and opinions often are biased in deeply subconscious ways.

A large portion of studies on minority versus nonminority business enterprises have been developed within the context of affirmative action and its interpretation by the courts (Ayres & Vars, 1998; Bates, 1995, 1998; Bates & Williams, 1995; Cavalluzzo & Cavalluzzo, 1998; Edley, 1996; Myers & Chan, 1996; Rice, 1993; Waldinger & Bailey, 1991). In response to their perception of inequalities in various forms of market accessibility, sales, or earnings, and in an effort to compensate for barriers that allegedly have hindered competition and retarded the development of historically disadvantaged minority-owned firms, state, county, and city governments throughout the United States enact preferential ordinances designed to increase involvement of minority enterprises in public-sector procurement. These ordinances invariably set aside percentages of procurement projects and/or dollars for minority-owned businesses or grant them extra points in the review process, thus sheltering them, or at least providing them with a substantial advantage, vis-à-vis competition by nonminority enterprises (Bates, 2001).

Detractors of these ordinances argue that procurement preferences are politically motivated rather than empirically determined or remedy oriented, and certainly not economically rational. Minority-owned entities, they claim, are younger and smaller than their non-Hispanic White-owned counterparts, incapable of competing for the more attractive government contracts. Consequently, when set-aside restrictions are imposed, the lower bids of more qualified, non-minority-owned firms are not considered, or are rejected, in favor of higher bids submitted by less competent, minority business enterprises, a situation that not only squanders society’s resources but is highly detrimental to nonminority businesses and their owners (LaNoue, 1994, 1995). When state and local governments refuse to abandon their preferential policies, non-Hispanic White-owned firms sue in federal court for reverse discrimination.

After struggling with the issue for most of the 1980s, in its famous 1989 *City of Richmond v. J. A. Crosson Co.* judgment the U.S. Supreme Court declared that all racial classifications and ordinances demand the strictest judicial scrutiny. Two clear guidelines were set forth: One is the insufficiency of past discrimination to establish an affirmative action program; discrimination must exist at the time of implementation, and there must be “strong basis in evidence,” preferably hard rather than anecdotal data, to justify remedial action. Second, if such evidence is presented, the proposed remedy must be narrowly tailored to correct the specific discrimination detected, not other forms of alleged disparity (Day, 2001). In 1995, 6 years later, the Court in *Adarand v. Peña* held that the Crosson decision also applies to federal programs. Within 2 years after Crosson, 33 of the approximately 200 previously enacted state and local minority business development programs were dismantled, and another 65 were being revalued (Boston, 1999).

Recently, the U.S. District Court for the Southern District of Florida, Miami Division, heard arguments in the case of *Hershell Gill Consulting Engineers, Inc. et al. v. Metropolitan Dade County, Florida et al.* Three programs created by the Miami-Dade Board of County Commissioners were at issue in this case: a Black Business Enterprise Program enacted in 1982 and amended in 1994, a Hispanic Business Enterprise Program, and a Women Business Enterprise Program, the latter two enacted in 1994. All three established set-aside and participation goals that, the plaintiffs argued, should not apply to procurement in architecture and engineering. Three distinct markets—architecture, structural engineering, and civil engineering—were identified as meeting the narrowly tailored criterion of the U.S. Supreme Court. (These three markets account for the lion share of the Miami-Dade County architecture-and-engineering procurement business.)

Before the U.S. District Court, among other things, was the task to ascertain whether gender and/or ethnic disparities in marketplace earnings exist among firms in each of the three markets, and, if disparities do exist, determine whether they can be attributed to discrimination. The current study addresses the performance of Hispanic-owned (compared to two groupings of non-Hispanic-owned) firms and, within each grouping, the performance of women-owned (compared to non-women-owned) firms, from the data sets generated and analyzed for the Court. The focus on Hispanic enterprises is especially appealing for two reasons: One is that most ethnic studies are limited to racial classifications, effectively bypassing Hispanics, who constitute now the largest single minority in the United States; the other is the wealth of data provided by a sizeable number of observations, resulting not only from the many Hispanics living in South Florida but also their prolific entrepreneurial nature (Carvajal, 1999; Peterson, 1995).

The rest of this article is divided into six parts. The next section explains the procedure used to identify and gather the data. It is followed by an analysis of differentials between Hispanic- and non-Hispanic-owned firms and a specification of the model of earnings determination developed here. Then the empirical estimates are presented, and annual earnings are projected for Hispanic and non-Hispanic enterprises with identical characteristics. Finally, there is a discussion section.

Method

The first step toward developing the architecture, structural engineering, and civil engineering market data sets consists of identifying the universes of firms servicing Miami-Dade County in summer 2000. The three universes are configured by selecting the name, address, and telephone number of firms appearing in the local telephone book; from a list of Miami-Dade entities offering architecture and/or engineering services, along with their address and telephone number, compiled by infoUSA;¹ and from a list of firms registered for technical certification with Miami-Dade County's Department of Public Works. (Enterprises that desire to do business with Miami-Dade County Government must register with, and receive technical certification from, the Department of Public Works before they are eligible to bid for projects; certification is granted, and renewed annually, based on qualifications and experience in the application-related market.) In addition, for architecture firms only, these sources are complemented by a list of Miami-Dade entities that have been issued an architecture professional license by the State of Florida Department of Business and Professional Regulation.

The next step is trying to obtain information from each entity identified in each of the three markets. A survey instrument is designed to ascertain whether the enterprises are indeed in business and servicing Miami-Dade County, and, if they are, to record pertinent data. The data solicited include firm's ownership gender/ethnic classifications, experience/size input variables (i.e., number of years in business and number of employees), and annual volume of business or earnings as a measure of performance.

At least three attempts are made to contact each enterprise by telephone. If a firm showed missing data after the interview (e.g., the informant could not, or preferred not to, provide sensitive information such as annual earnings), a follow-up call is made to fill the gap. The outcome of the survey reveals not only a very high success rate, but also a large number of observations for statistical purposes, in all three markets: 379 architecture firms (64.2% success rate), 159 structural engineering firms (63.6% success rate), and 204 civil engineering firms (67.1% success rate).²

Virtually all engineering entities that completed the survey (144 of the 159 structural engineering firms and 200 of the 204 civil engineering firms) have attained technical certification by the Miami-Dade County Department of Public Works. In architecture, however, the situation is different; only 176 of the 379 enterprises have ever been technically certified. The annual earnings mean value of these firms is about 10 times greater than the annual earnings mean value of firms not technically certified, which suggests the existence of two heterogeneous availability pools, apparently serving two heterogeneous submarkets, in the field of architecture.³ For purposes of standardization, using the licensing criterion as a necessary, although not sufficient, condition for qualification (Lunn & Perry, 1993), only entities in the three markets that have been technically certified by the Department of Public Works are included in the study.⁴ Thus, the data sets analyzed here comprise 176 architecture firms, 144 structural engineering firms, and 200 civil engineering firms.

Observed Hispanic/Non-Hispanic Differentials

This section seeks to compare unadjusted earnings and related variables between Hispanic- and non-Hispanic-owned architecture, structural engineering, and civil engineering firms. Two groups of non-Hispanic-owned firms are identified for comparison purposes. One is limited to enterprises owned by non-Hispanic Whites, the classical nonminority group; the other consists of all non-Hispanic-owned observations, which include entities owned by a mixture of individuals (non-Hispanic Whites, African Americans, and Asian Americans) as well as publicly traded and employee-owned enterprises. Obviously, firms owned by non-Hispanic Whites are a subset of all non-Hispanic-owned firms.

The two groups are identified explicitly because publicly traded and employee-owned entities tend to be larger, and more economically powerful, than enterprises owned by individuals, even non-Hispanic Whites. Thus, it could be argued that whatever disparities detected in Hispanic- vis-à-vis the totality of non-Hispanic-owned firms could be biased by the inflated nature of the larger group (i.e., with the presence of publicly traded and employee-owned firms). The counterargument, of course, is that Hispanic enterprises compete for business with all others, not only firms owned by non-Hispanic Whites. Identifying explicitly the two groupings of non-Hispanic-owned entities allows two different kinds of comparisons of the estimated earnings of Hispanic-owned firms, along with the separate implications of such comparisons. The means and standard deviations of the variables for the three groups in the three markets appear in Table 1.

Differences in earnings are substantial, although there is considerable variation within the groups, as evinced by their large standard deviations relative to their means. In the architecture and structural engineering markets, the average earnings of both non-Hispanic groups are very similar, whereas in civil engineering the group including publicly traded and employee-owned firms reports, on average, twice the earnings of enterprises owned by non-Hispanic Whites. Hispanic-owned firms' annual earnings amount to a small fraction of what non-Hispanic-owned firms earn across the board. These disparities are not necessarily indicative of discrimination. As LaNoue (1995) pointed out, they may merely reflect less experience and/or productive capacity by Hispanic-owned firms that restrict their ability to provide certain services, especially in jobs that generate large volumes of earnings. An important Crosson criterion for a valid claim of discrimination requires evidence that earnings disparities occur because of unequal treatment of entities and not because of unequal qualifications. Thus, any meaningful earnings comparison between Hispanic- and non-Hispanic-owned firms also must account for differences in earnings determinants.

One of these determinants is firm's experience, measured in the current study by number of years in business. One would expect that, other things equal, firms with more experience have had more opportunity than younger firms, presumably with less experience, to test the market, grow, and adjust to changing conditions. Therefore, a positive relationship is anticipated between firms' longevity and earnings. An analysis of this variable reveals consistent results in all three markets—on average, both groups of non-Hispanic-owned firms have provided services for almost 30 years, while Hispanic-owned firms have been in business for only about 20 of those years. Consequently, at least a portion of the observed Hispanic/non-Hispanic earnings disparities seems to be attributable to differences in experience.

Another commonly recognized earnings determinant is size of firm. Larger firms are expected to generate more earnings than smaller firms. Of course, it can be argued that minority business enterprises are kept artificially smaller than non-minority enterprises by the presence of multiple discriminatory barriers, especially old-boy networks (Bates & Howell, 1998). The importance of firm's size increases when one considers that larger entities usually offer greater employment stability, more frequent on-the-job training, and better prospects for professional advancement at all levels, so they are more suitable than smaller firms for attracting premium workers capable of producing a higher quality output (Winter-Ebmer, 2001). The size indicator used in the current study is number of employees. Substantial ethnic differences are detected in this indicator in all three markets. Because both

Table 1. Means and Standard Deviations (in parentheses) of Earnings and Related Variables of Hispanic- and non-Hispanic-Owned Architecture, Structural Engineering, and Civil Engineering Firms Technically Certified by Miami-Dade County, Summer 2000

Variable	Firms Technically Certified by Miami-Dade County											
	Architecture			Structural Engineering			Civil Engineering					
	Non-Hispanic Owned (All)	Non-Hispanic White Owned	Hispanic Owned	Non-Hispanic Owned (All)	Non-Hispanic White Owned	Hispanic Owned	Non-Hispanic Owned (All)	Non-Hispanic White Owned	Hispanic Owned	Non-Hispanic Owned (All)	Non-Hispanic White Owned	Hispanic Owned
Number of observations	89	55	87	100	60	44	136	85	64			
Annual earnings (U.S. dollars)	37,452,809 ^b (129,929,850)	37,754,546 (151,489,716)	4,592,672 ^b (19,108,061)	56,663,250 ^c (241,141,698)	54,175,000 (259,244,681)	4,024,970 ^b (6,683,254)	87,534,743 ^a (321,748,288)	43,331,471 (224,153,927)	3,750,370 ^a (5,759,571)			
Years in business	30.4 ^a (26.1)	29.0 ^a (24.8)	19.1 ^a (13.8)	31.7 ^a (26.7)	31.4 ^a (25.9)	19.9 ^a (15.2)	29.3 ^a (27.2)	27.2 ^c (27.1)	20.0 ^{a,c} (17.9)			
Number of employees	386.7 (2,152.7)	458.6 (2,707.0)	19.2 (28.4)	455.7 ^c (2,539.1)	602.3 (3,239.9)	35.1 ^c (52.8)	474.7 ^b (2,363.8)	433.1 (2,722.2)	35.3 ^b (48.1)			
Percentage of owners outside county	24.7 ^a	21.8 ^a	2.3 ^a	39.0 ^a	41.7 ^a	9.1 ^a	46.3 ^a	48.2 ^a	7.8 ^a			
Percentage owned by women	9.0 ^a	14.5 ^c	26.4 ^{a,c}	6.0 ^a	10.0	20.5 ^a	9.6	15.3	12.5			
Earnings ratio of Hispanic- to non-Hispanic-owned firms	.123	.122	.071	.074	.043	.087						

a. Means of non-Hispanic- and Hispanic-owned firms significantly different from each other ($\alpha \leq .01$).

b. Means of non-Hispanic- and Hispanic-owned firms significantly different from each other ($\alpha \leq .05$).

c. Means of non-Hispanic- and Hispanic-owned firms significantly different from each other ($\alpha \leq .10$).

groups of non-Hispanic-owned firms are so much larger than their Hispanic-owned counterparts, this differential also seems to be partly responsible for the observed ethnic disparities in earnings.

A third determinant of earnings, closely associated with size, is whether the firm resides locally or has its headquarters outside Miami-Dade County. Although local firms may be large or small, it seems plausible to expect that most firms with headquarters outside Miami-Dade County are large (i.e., with many employees and big volumes of business); otherwise they would not be able to compete in a market beyond their immediate area. It also seems plausible to argue that if Hispanic ownership were underrepresented within nonresident entities, the difference would contribute to explain Hispanic/non-Hispanic earnings disparities. The empirical evidence presented in Table 1 confirms this suspicion. In each market both groupings of non-Hispanic-owned enterprises show similar percentages of outside-county residence (more than 1 of 5 architecture firms, 2 out of 5 structural engineering firms, and slightly less than one half of civil engineering firms) all far superior to the outside-county residence percentages of firms owned by Hispanics.

A fourth factor affecting earnings considered here is female ownership of firm. The literature contains many studies documenting gender disparities in wage and firms' earnings (Ashraf, 1996; Avalos, 1996; Carvajal & Grenier, 1993; Darity et al., 1998; Durden & Gaynor, 1998; Hundley, 2000; Jasso & Webster, 1999; Loury, 1998; Robinson, 1998; Weiler & Bernasek, 2001), and most of these disparities are detected when considering gender globally, that is, not within ethnic groups. If Hispanic-owned architecture and engineering entities in Miami-Dade County were disproportionately owned by women, part of the observed Hispanic/non-Hispanic earnings differential might be influenced by the forces responsible for the relatively lower female income, which may apply to Hispanic enterprises only indirectly. The data indicate that this might be the case in the architecture and structural engineering markets.

In summary, Hispanic-owned architecture, structural engineering, and civil engineering firms in Miami-Dade County report less longevity, fewer employees, more widespread local residence, and greater incidence of female ownership than do non-Hispanic-owned firms, and many of the differences are statistically significant. Consequently, the earnings disparities detected between Hispanic- and both groups of non-Hispanic-owned entities cannot be attributed solely to the ethnic classification of their owners. Least-squares analysis is needed to determine if these disparities persist after the firms' experience/size indicators, residence, and female ownership are taken into consideration.

Empirical Model of Earnings Determination

This section presents and discusses a semilog earnings determination model for Hispanic and two groupings of non-Hispanic enterprises that is tested with samples consisting of 176 architecture firms, 144 structural engineering firms, and 200 civil engineering firms servicing Miami-Dade County in summer 2000. The model interprets, for each ethnic classification in each market, the natural logarithm of a firm's annual earnings as a function of its experience, productive capacity, residence, and female ownership, as follows:

$$\ln E_{ijk} = \beta_{0ij} + \beta_{1ij} Y_{ijk} + \gamma_{1ij} Y_{ijk}^2 + \beta_{2ij} M_{ijk} + \beta_{3ij} L_{ijk} + \beta_{4ij} W_{ijk} + u_{ijk}$$

where

E_{ijk} is the annual earnings dollar amount reported by the k th firm of the j th ethnic classification in the i th market;

Y_{ijk} is the number of years in business reported by the k th firm of the j th ethnic classification in the i th market;

M_{ijk} is the number of employees reported by the k th firm of the j th ethnic classification in the i th market;

L_{ijk} is a dummy variable that receives a value of one if the headquarters of the k th firm of the j th ethnic classification in the i th market are located outside the boundaries of Miami-Dade County, a value of zero otherwise;

W_{ijk} is a dummy variable that receives a value of one if the k th firm of the j th ethnic classification in the i th market is owned by a woman, a value of zero otherwise;

u_{ijk} is a normally and independently distributed stochastic disturbance for the k th firm of the j th ethnic classification in the i th market;

$\beta_{0ij}, \dots, \beta_{4ij}$ and γ_{1ij} are least-squares coefficients estimated for the j th ethnic classification in the i th market; and where

$i = 1$ for architecture firms, $i = 2$ for structural engineering firms, and $i = 3$ for civil engineering firms;

$j = 1$ for the group consisting of all non-Hispanic-owned firms, $j = 2$ for the group consisting of non-Hispanic White-owned firms, and $j = 3$ for the group consisting of Hispanic-owned firms;

$k = 1, \dots, n_{ij}$; and

n_{ij} is the number of firms in the data set that corresponds to the j th ethnic classification in the i th market.

Firm's annual earnings, the variable being explained, are logged to reduce the impact of outliers and allow interpretation of relative differences rather than absolute amounts (Altonji, Doraszelski, & Segal, 2000; Cancio et al., 1996; Haberfeld, Semyonov, & Addi, 1998; Hampton & Heywood, 1999; Hurst, 1997; Powell & Parcel, 1997). This means that, at any level, an addi-

tion of 0.693147 units to the value of the dependent variable doubles earnings; a subtraction of 0.693147 units cuts annual earnings in half.

Years in business, a proxy for experience, appears in each equation with a linear and a quadratic term to accommodate the positive but diminishing influence of experience on earnings reported in the human capital literature (Barkley et al., 1999; Darity et al., 1998; Duncan, 1996; Haberfeld et al., 1998; Reimers, 1997). A curvilinear relationship is expected between the two variables, the linear term positive and the quadratic term negative.

The least-squares coefficients of number of employees, a proxy for productive capacity, are anticipated to be positive, reflecting the direct effect of firm's size on earnings. Positive coefficients also are anticipated for the headquarters location variable because firms with residence beyond Miami-Dade County are relatively larger and report a greater volume of business than local firms. Finally, the coefficients of female ownership should be negative if, in fact, after adjusting for experience, size, and location, the earnings of women-owned enterprises are lower than the earnings of their non-women-owned counterparts within the same ethnic classification. Because there is a definite expectation for the sign of the coefficients of each variable, based on either economic theory or plain common sense, all z tests of hypotheses for the least-squares coefficients are one tailed.

Empirical Estimates

The estimated least-squares coefficients, their standard errors, and levels of significance are presented in Table 2. By and large, all variables act as expected and are generally significant, the F ratios are highly significant, and the adjusted R^2 values are relatively high for cross-sectional data. More longevity leads Hispanic- and non-Hispanic-owned firms alike to greater earnings at a decreasing rate. With the exception of both groups of non-Hispanic architecture enterprises, all linear and quadratic terms of this variable possess statistical significance. The influence of years of experience on earnings for the three ethnic classifications, however, cannot be determined solely from the size of the least-squares coefficients, because not only the earnings distributions but also the distributions of years in business differ for the three groups. Assessing the magnitude of such influence requires the estimation of experience elasticities of earnings.

These elasticities (see Table 3), computed at the means of the variables, show, for example, that for a non-Hispanic-owned civil engineering firm, a 10% rise in years in business is expected to increase earnings by 13.6%, whereas the same 10% rise in experience for a Hispanic-owned civil engineering firm is expected to increase its earnings by only 6.3%. Whereas in the

Table 2. Values of Least-Squares Coefficients, Standard Errors (in parentheses), and Levels of Significance (one-tailed) of the Earnings Determination Model Estimated for Hispanic- and Non-Hispanic-Owned Architecture, Structural Engineering, and Civil Engineering Firms Technically Certified by Miami-Dade County, Summer 2000

Variables in the Equation	Least-Squares Coefficients, Standard Errors, and Levels of Significance											
	Architecture Firms ($j = 1$)			Structural Engineering Firms ($j = 2$)			Civil Engineering Firms ($j = 3$)					
	Non-Hispanic Owned (All) ($j = 1$)	Non-Hispanic White Owned ($j = 2$)	Hispanic Owned ($j = 3$)	Non-Hispanic Owned (All) ($j = 1$)	Non-Hispanic White Owned ($j = 2$)	Hispanic Owned ($j = 3$)	Non-Hispanic Owned (All) ($j = 1$)	Non-Hispanic White Owned ($j = 2$)	Hispanic Owned ($j = 3$)	Non-Hispanic Owned (All) ($j = 1$)	Non-Hispanic White Owned ($j = 2$)	Hispanic Owned ($j = 3$)
Number of observations (n_j)	89	55	87	100	60	44	136	85	64			
Constant term (β_{0j})	13.988490	14.384621	12.523063	13.653916	13.700292	12.166364	13.720316	13.813666	12.912520			
Years in business (β_{1j}) (linear term)	.026806 (.021636)	.003245 (.029059)	.062040 ^b (.029256)	.078800 ^a (.022632)	.085178 ^a (.027358)	.087405 ^a (.034328)	.079348 ^a (.020116)	.058734 ^a (.020883)	.046490 ^b (.021828)			
Years in business (γ_{1j}) (quadratic term)	-.000093 (.000214)	.000040 (.000313)	-.000775 ^c (.000485)	-.000576 ^c (.000222)	-.000676 ^c (.000272)	-.000740 ^b (.000539)	-.000579 ^a (.000196)	-.000365 ^b (.000204)	-.000392 ^c (.000271)			
Number of employees (β_{2j})	.000295 ^a (.000092)	.000301 ^a (.000118)	.030115 ^a (.005225)	.000255 ^a (.000070)	.000234 ^a (.000065)	.017406 ^a (.003241)	.000317 ^a (.000070)	.000258 ^a (.000062)	.018209 ^a (.003031)			
Outside county ownership (β_{3j})	1.768364 ^a (.395782)	1.687864 ^a (.504958)	2.185999 ^a (.845936)	4.87136 ^c (.363842)	.323719 (.427253)	.372943 (.567728)	.601581 ^b (.329142)	.428709 (.344748)	2.49958 (.519635)			
Female ownership (β_{4j})	-1.310096 ^b (.572766)	-1.346205 ^b (.596931)	-.469087 ^c (.299855)	-.844332 (.740449)	-.841819 (.693784)	-.187070 (.401867)	-1.183564 ^b (.562721)	-1.095213 ^b (.488526)	-1.170846 (.416271)			
F statistic	13.829 ^a	7.676 ^c	16.735 ^c	9.094 ^a	7.765 ^a	12.948 ^a	14.985 ^a	11.779 ^a	12.432 ^a			
Adjusted R^2	.422	.382	.478	.290	.364	.581	.341	.391	.476			

a. Statistically significant ($\alpha \leq .01$).

b. Statistically significant ($\alpha \leq .05$).

c. Statistically significant ($\alpha \leq .10$).

architecture market, the validity of ethnic comparisons of experience elasticities of earnings is clouded by the lack of statistical significance of the least-squares coefficients for the two non-Hispanic classifications, in structural and civil engineering the values of the experience elasticities are smaller for Hispanic- than for the two groupings of non-Hispanic-owned firms. Thus, the earnings of non-Hispanic-owned firms appear to be more responsive to longevity than the earnings of Hispanic-owned entities. This relationship raises a fundamental question: As time goes by and Hispanic and non-Hispanic enterprises gain experience, are there barriers to entry in the structural and civil engineering markets that keep Hispanic entities from benefiting from additional experience as much as entities owned by non-Hispanic Whites and others seem to benefit? The value of the experience elasticities of earnings of Hispanic-owned architecture firms, whose coefficients are statistically significant, is virtually identical to the elasticity value for Hispanic-owned civil engineering firms, thus lending consistency to the empirical findings.

All least-squares coefficients for number of employees are highly significant and positive, which confirms the seemingly obvious: Larger size leads to more earnings for everybody. Of far greater relevance is the picture that emerges when the size elasticities of earnings are derived, also at the means of the variables (see Table 3). These elasticities are considerably smaller than the experience elasticities of earnings, especially for both groups of non-Hispanic enterprises. In fact, Hispanic-owned firms' earnings in all three markets are much more responsive to changes in size than are non-Hispanic-owned firms, namely, the opposite of what happens with experience elasticities. This pattern may be indicative of substantial economies of scale that have yet to be attained by architecture and engineering firms owned by Hispanics in South Florida.

The nine outside-county residence coefficients are positive, as expected; however, only in the architecture market do they show statistical significance throughout the three ethnic classifications. In the structural and civil engineering markets, only the residence coefficient for the classification including publicly traded and employee-owned enterprises shows significance, which suggests that many of the publicly traded and employee-owned entities in these two markets are not local and generate a large volume of business.

When evaluating the behavior of the location variable with respect to earnings, it is important to realize that conclusions are applicable only within each ethnic classification in each market. For example, the earnings of out-of-county, Hispanic-owned civil engineering firms are compared to the earnings of local, Hispanic-owned civil engineering firms, and the earnings of

Table 3. Experience and Size Elasticities of Earnings Derived From the Estimated Coefficients Shown in Table 2

Quantitative Variables in the Equation	Market	Earnings Elasticities		
		Non-Hispanic- Owned Firms (All) (<i>j</i> = 1)	Non-Hispanic White-Owned Firms (<i>j</i> = 2)	Hispanic- Owned Firms (<i>j</i> = 3)
Years in business (Y_{jk})	architecture (<i>i</i> = 1)	.650 ^a	.162 ^a	.630
	structural engineering (<i>i</i> = 2)	1.369	1.372	1.186
	civil engineering (<i>i</i> = 3)	1.362	1.078	.625
Number of employees (M_{jk})	architecture (<i>i</i> = 1)	.114	.138	.586
	structural engineering (<i>i</i> = 2)	.116	.141	.616
	civil engineering (<i>i</i> = 3)	.151	.112	.649

a. Neither the linear nor the least-squares coefficient is statistically significant.

out-of-county, non-Hispanic White-owned civil engineering entities are compared to the earnings of local, non-Hispanic White-owned civil engineering enterprises. At no time can comparisons be made between the earnings of, say, out-of-county, non-Hispanic White-owned civil engineering firms and the earnings of local, Hispanic-owned civil engineering entities, much less make generalizations regarding the behavior of the location variable for the entire civil engineering market. Doing so would require the estimation of coefficients for a merged data set of Hispanic- and non-Hispanic-owned enterprises, which is beyond the scope of this article.

The same argument could be made regarding the female ownership variable. No overall conclusions can be reached here with respect to how much women-owned entities in general earn vis-à-vis men- or non-women-owned enterprises; conclusions are circumscribed to how much women-owned firms, within a specific ethnic classification, earn relative to non-women-owned firms of the same classification and, of course, within the same market. The negative least-squares coefficients for female ownership are systematically greater for both groups of non-Hispanic- than for Hispanic-owned firms. (In fact, the coefficients for Hispanic-owned structural and civil engineering firms lack statistical significance.) This suggests that firms owned by non-Hispanic women are much worse off relative to non-women-owned firms, within the same ethnic classification, than are firms owned by Hispanic women relative to firms owned by Hispanic men. The absence of statistical significance for the female ownership coefficients in both non-Hispanic classifications of the structural engineering market also suggests that the hypothesized disadvantaged position of women in this market is not as apparent as it is in architecture or civil engineering.

Projection of Annual Earnings

The main advantage of estimating separate earnings functions for Hispanic- and both groups of non-Hispanic-owned firms is that disparities in outcome (i.e., the ethnic earnings gap) can be disaggregated into components attributable to differences in inputs or characteristics (i.e., experience, size, and location) of Hispanic versus non-Hispanic enterprises and differences in how these characteristics affect outcomes (Darity et al., 1998; Finnie & Wannell, 1996; Monks & Robinson, 2000). Several decomposition variants have been developed for this purpose throughout the last 3 decades. They were first proposed by Oaxaca (1973) and Blinder (1973) and later have been refined, among others, by Conway and Roberts (1983), Cotton (1988), Jackson and Lindley (1989), Myers (1993), Myers and Chan (1996), and Neumark (1988).

These decomposition techniques permit the estimation of earnings that non-Hispanic business enterprises would receive if they had the same market attributes as their Hispanic business counterparts. Contrasting firms of different ethnic classifications with identical longevity, number of employees, and residence status allows one to control for some of the most salient characteristics, and thus compare how they fare with respect to one another, in each of the three markets.

Using the least-squares coefficients from Table 2, average earnings are projected for firms in each ethnic classification—all non-Hispanic-owned firms, non-Hispanic White-owned firms, and Hispanic-owned firms—in each of the three markets (architecture, structural engineering, and civil engineering) with selected market characteristics representative of Hispanic enterprises shown in Table 1. These characteristics are as follows: For architecture firms, 20 years in business and 20 employees, and for structural and civil engineering firms, 20 years in business and 35 employees. Because relatively few Hispanic-owned entities reside outside Miami-Dade County, a value of 0 is entered for the location dummy variable (L_{ijk}). Alternative earnings projections are obtained for non-women- and women-owned enterprises using values of 0 and 1, respectively, for the female-ownership variable (W_{ijk}) in each ethnic classification within each market. The earnings projection for the whole ethnic classification is obtained by assigning to W_{ijk} the percentage of women-owned firms in the j th ethnic classification of the i th market.

The projected annual earnings for Hispanic- and both groupings of non-Hispanic-owned entities are presented in Table 4. These projections show, for example, that a typical architecture firm owned by a Hispanic (i.e., residing in Miami-Dade County, with 20 years of experience and 20 employees) is

expected to earn \$795,910 if it is owned by a woman and \$1,272,289 if it is not owned by a woman, whereas an architecture enterprise owned by a non-Hispanic White, with the same characteristics as the typical Hispanic enterprise, is expected to earn \$501,554 if it is owned by a woman and \$1,927,378 if it is not owned by a woman. When all architecture firms within each ethnic classification are combined and experience, size, and location are held constant, Hispanic-owned entities earn, on average, \$1,123,902 vis-à-vis \$1,584,627 earned by non-Hispanic White-owned entities and \$1,750,568 earned by all non-Hispanic entities.

The probe into projected earnings becomes more meaningful with the calculation of intramarket earnings ratios of Hispanic to both groupings of non-Hispanic enterprises and, within each ethnic classification, of women- to non-women-owned enterprises (see Table 5). When both groupings of non-Hispanic-owned firms in all three markets are disaggregated by gender of ownership, enterprises owned by women report earning, in general, approximately one third of what their non-women-owned counterparts earn.⁵ Although women-owned entities earn less across the board relative to entities not owned by women, firms owned by non-Hispanic women perform relatively worse than firms owned by Hispanic women. Furthermore, the earnings ratios are very similar for both non-Hispanic groupings in each market, which suggests that whether the earnings of firms owned by non-Hispanic women are compared to the earnings of firms owned by Non-Hispanic White men or to the earnings of the entire set of non-Hispanic-owned firms really does not matter; the disparity is approximately the same, and to the extent that experience, size, location, and ethnic classification are accounted for in the equation, such disparity seems to translate into discrimination.

When all entities within each ethnic classification and each market are taken together, the projected earnings of Hispanic-owned firms turn out to be substantially below those of firms not owned by Hispanics; therefore, the estimated earnings ratios of Hispanic- to both groupings of non-Hispanic-owned firms are well under parity. These estimates range from 0.464 and 0.420 in structural engineering, and 0.510 and 0.682 in civil engineering, to 0.642 and 0.709 in architecture, with respect to all non-Hispanic-owned firms and non-Hispanic White-owned firms, respectively. Although these ratios are much higher than the unadjusted ratios shown in Table 1, a large portion of the earnings differentials in all three markets remains unexplained after the influence of experience, size, and location is taken into account. In other words, essentially equal entities are treated unequally, which strongly points to ongoing discrimination against Hispanic-owned architecture and engineering firms in Miami-Dade County.

Table 4. Projected Annual Earnings of Hispanic- and Non-Hispanic-Owned Architecture, Structural Engineering, and Civil Engineering Firms Residing in Miami-Dade County and Technically Certified by the Miami-Dade Department of Public Works for Selected Values of the Explanatory Variables^a

Market	Projected Annual Earnings of Firms Technically Certified (U.S. dollars)					
	Owned by Non-Hispanics (All)		Owned by Non-Hispanic Whites		Owned by Hispanics	
	Not Owned by Women	Owned by Women	Not Owned by Women	Owned by Women	Not Owned by Women	Owned by Women
Architecture	1,969,346	531,318	1,927,378	501,554	1,272,289	795,910
Men and women combined	1,750,568	1,417,231 ^b	1,584,627	1,123,902	1,510,202	1,252,540 ^b
Structural engineering	3,297,079	3,134,209	3,767,204	1,623,387 ^b	1,453,507	
Men and women combined	3,565,930	1,091,836	2,818,081	942,559	1,660,576	1,399,785 ^b
Civil engineering		3,184,483	2,383,460			
Men and women combined						

NOTE: The second row of numerical data for each market refers to projected earnings for men and women combined (i.e., no difference by gender) within each ethnic grouping.

a. The selected values are values typical of Hispanic-owned firms in all three markets. For architecture firms, the values are 20 years in business and 20 employees, and for structural engineering and civil engineering firms the values are 20 years in business and 35 employees.

b. The least-squares coefficient for gender of ownership lacks statistical significance.

Table 5. Projected Annual Earnings Ratios of Hispanic- to Non-Hispanic-Owned Firms, and, Within Each Group, of Women- to Non-Women-Owned Architecture, Structural Engineering, and Civil Engineering Firms Residing in Miami-Dade County and Technically Certified by the Miami-Dade Department of Public Works

Market	Projected Earnings Ratio of Women-Owned to Non-Women-Owned Firms			Projected Earnings Ratio of Hispanic-Owned Firms with Respect to Non-Hispanic Owned Firms (All)		
	Firms Owned by Non-Hispanics (All)	Firms Owned by Non-Hispanic Whites	Firms Owned by Hispanics	Non-Hispanic-Owned Firms (All)	Non-Hispanic-White-Owned Firms	Non-Hispanic-White-Owned Firms
Architecture	0.270	0.260	0.626	0.642	0.709	0.709
Structural engineering	0.430 ^a	0.431 ^a	0.829 ^a	0.464	0.420	0.420
Civil engineering	0.306	0.334	0.843 ^a	0.510	0.682	0.682

a. The least-squares coefficient for women-owned firms lacks statistical significance.

Discussion

The current study serves as a vehicle for probing the nature and magnitude of differences in earnings between Hispanic and non-Hispanic architecture, structural engineering, and civil engineering enterprises in Miami-Dade County. After accounting for the influence of longevity, productive capacity, and location, three of the most commonly used earnings determinants, the projected earnings of firms typically owned by Hispanics in all three markets constitute a fraction of what non-Hispanic-owned firms with identical characteristics are expected to earn. Evidently the three markets do not convert firms' characteristics into economic outcomes in the same manner for Hispanic and non-Hispanic owners.

The projected earnings of women-owned firms are consistently, and in some instances considerably, lower than the earnings projected for firms within the same market and ethnic classification not owned by women, although the generality of these comparisons is limited by the absence of statistical significance in four of the nine gender coefficients. Enterprises owned by non-Hispanic women perform less favorably when compared to their non-women-owned counterparts than do entities owned by Hispanic women relative to firms owned by Hispanic men. Thus, the empirical evidence points to the existence of gender discrimination as well.

These conclusions are enhanced by the large number of observations gathered and the high success rates characteristic of the current study in locating, contacting, and obtaining data from pertinent firms. The high success rates virtually eliminate the likelihood that nonresponse bias, a potential threat to any research endeavor of this nature, may be a problem. The statistically significant *F* ratios and relatively high coefficients of multiple determination obtained in estimating the equations, especially for Hispanic-owned entities, also attest to the robustness of the projections. Yet some limitations can be identified.

One such limitation is that the study rests on a survey administered only once. Thus, it is inadequate to ascertain whether earnings differentials, or the influence on earnings of years in business, number of employees, and out-of-county residence within ethnic classification and market, fluctuate over time, or if such fluctuations respond to specific occurrences such as migration or the enactment of gender- and ethnic-oriented preferential practices in public-sector procurement. Future research should use longitudinal data in an attempt to understand better the changing role of earnings determinants over time.

Another limitation has to do with the interpretation of the evidence on gender discrimination. Conclusions are circumscribed to women-owned

enterprises vis-à-vis enterprises not owned by women within each ethnic classification and market. The research design used here is not suitable for comparing, within each market, the earnings reported by women-owned firms of all ethnic classifications to the earnings reported by firms not owned by women. These comparisons, obviously quite relevant, call for a separate study.

A third limitation is related to potential biases that may arise with the use of least-squares analysis (Cavalluzzo & Cavalluzzo, 1998; Darity et al., 1998; Yinger, 1998). One is the omitted variable bias, which occurs when pertinent indicators correlated with ethnic classification are not included in the equation. Although longevity, size, and location probably are the three determinants most commonly used, other indicators such as experience with certain kinds of jobs, reputation, holding special licenses, or knowing “the right people” may have an impact on firms’ earnings. The standard criticism of studies finding evidence of discrimination is that if the effect of omitted variables were taken into account, observed ethnic disparities would disappear (Myers & Chan, 1996).

Different methodological issues are at stake here. Some of these variables may be very difficult or even impossible to measure. Even if they could be measured, including too many regressors in the equation poses the danger that they may be correlated with one another and may create a multicollinearity problem. Or some of the additional regressors may not be legitimate controls (i.e., knowing the right people) because they reflect another aspect of the discrimination phenomenon being studied and, if included in the equation, may lead analysts to conclude that there is no discrimination when, in fact, there might be. In addition, of course, there is the included variable bias, which occurs when some of the regressors are influenced by persons or institutions whose discriminatory behavior is being scrutinized (Killingsworth, 1993).

Still another limitation pertains to errors of reporting or measurement that may have occurred, especially with sensitive variables such as earnings. If overreporting of a variable by some firms is compensated by the underreporting of others, the precision, but not the value, of the estimates would be affected. If either overreporting or underreporting is stronger than the other, and the incidence occurs across the board, the value of the projections, but not the differential, would be affected. Only if the measurement bias is concentrated in a particular ethnic classification or gender would the projected earnings ratios reported here be fundamentally wrong.

Finally, a conceptual limitation addressed by Loury (1998) is worth mentioning. The emphasis in the current study and throughout most of the literature is on the demand side, that is, the extent to which marketable

endowments translate into economic performance. The view that confines evidence of discrimination to underutilization or even underpayment of the longevity, productive capacity, and so forth of women and minority business enterprises is myopic. A logical conclusion of this position, namely, one that justifies excluding from the marketplace women- and/or minority-owned firms that do not possess the experience, skills, or size necessary to take on certain jobs, contributes to perpetuate gender and ethnic disparities. The fact that women and minorities may not possess the experience, skills, capability, or willingness to take on certain jobs may be, in itself, evidence of discrimination. Thus, meaningful future policies must transcend a narrow market context and also look into supply-side factors, such as investments in human, social, and ethnic capital.

Notes

1. The address of infoUSA is 5711 S. 86th Circle, P. O. Box 27347, Omaha, NE 68127; (800) 555-5535. The list was downloaded on June 1, 2000.

2. The success rate for each market is measured by the ratio of number of firms which completed the survey, including annual earnings data, in the numerator, to total number of firms identified minus firms no longer in business, in the denominator.

3. This apparent heterogeneity is substantiated by differences between certified and non-certified firms in experience (24.8 years vs. 17.0 years) and average number of employees (205.0 employees vs. 6.3 employees), respectively.

4. Technically certified structural engineering and civil engineering firms also report, on average, much greater levels of earnings and experience/size indicators than their respective noncertified counterparts, thus supporting the decision to restrict the analysis to technically certified firms.

5. However, the gender coefficients lack statistical significance in the equations estimated for structural engineering.

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