7.0 PRIVATE SECTOR AND NON-GOAL ANALYSES

In *Croson*, the Court established that a "municipality has a compelling government interest in redressing not only discrimination committed by the municipality itself, but also discrimination committed by private parties within the municipality's legislative jurisdiction, so long as the municipality in some way participated in the discrimination to be remedied by the program."[1] This argument was reinforced by the Court of Appeals decision in *Adarand*, concluding that there was a compelling interest for a government DBE program, based primarily on evidence of private sector discrimination.[2] According to this argument, discriminatory practices found in the private sector marketplace may be indicative of government's passive or, in some cases, active participation in local discrimination. To remedy such discrimination, *Croson* provided that government "can use its spending powers to remedy private discrimination, if it identifies that discrimination with the particularity required by the Fourteenth Amendment."[3]

The purpose of the private sector analysis is to evaluate the presence or absence of discrimination in the private sector marketplace, and to determine if there is evidence to support anecdotal comments from **Chapter 8.0** regarding difficulties minorities have in securing work on private sector projects. Passive discrimination was examined in a disparity analysis of the utilization of minority construction subcontractors by majority prime contractors on non-ODOT funded projects in the state of Oregon's construction market. A comparison of public sector minority utilization with private sector utilization allows for an assessment of the extent to which majority prime contractors have tended to hire minority subcontractors only to satisfy public sector requirements. Thus, the following questions are addressed:

---

[1] *Croson*, 488 U.S. 46, 109 S.Ct. at 720-21, 744-45.
[2] *Adarand v. Slater*, 228 F.3d 1147 (10th Cir. 2000).
[3] See *Richmond v. Croson*, 488 U.S. 492 (1989).

- Are there disparities in the utilization of Minorities as prime contractors for commercial, private sector construction projects relative to their availability in the relevant market area?

- Are there disparities in the utilization of Minorities as subcontractors for commercial, private sector construction projects relative to their availability in the relevant market area?

- To what extent are minority subcontractors utilized for ODOT projects also utilized in private sector construction projects?

7.1   *Collection and Management of Data*

MGT selected one sources of data for its private sector analysis, which is data provided by Reed Construction Data Corporation (RCD). The value in examining RCD data, is to provide information on both general construction and construction-related professional service projects in a given market area at both the prime contractor and subcontractor level.[4]

7.2   *Private Sector Utilization Analysis by Race/Gender/Ethnicity of Business Ownership for Construction Subcontractors*

MGT examined the RCD private sector data for the State of Oregon and concluded that the data contained only nine subcontracting bids. However, the contract associated with these nine bids was not awarded. Therefore we were unable to draw a conclusion from the insufficient data.

7.3   *State Subcontractor Analysis*

In order to perform further comparison of subcontractor utilization, MGT analyzed the utilization of subcontractors on state funded contracts. As shown in **Exhibit 7-1**, of the $91.2 million dollars awarded to subcontractors on state funded contracts, minorities received $32.4 million. Nonminority women-owned subcontractors received 24.6 percent of the 35.5 percent awarded to minorities, followed by Hispanic Americans receiving 7.8

---

[4] RCD data were also reviewed but proved to be incomplete for this analysis.

percent. African Americans were not utilized as subcontractors on state funded contracts.

EXHIBIT 7-1
STATEWIDE
UTILIZATION OF
CONSTRUCTION SUBCONTRACTORS
ON STATE FUNDED CONTRACTS
IN THE RELEVANT MARKET AREA
BY RACE/ETHNICITY/GENDER CLASSIFICATIONS
OCTOBER 1, 1999 THROUGH SEPTEMBER 30, 2007

Fiscal Year	African Americans		Hispanic Americans		Asian Americans		Native Americans		Nonminority Women		Minority Subtotal		Nonminority Total		Total State Dollars Awarded[2]
	$	%[1]	$	%[1]	$	%[1]	$	%[1]	$	%[1]	$	%	$	%[1]	$
2000	$0.00	0.00%	$10,395.85	0.11%	$0.00	0.00%	$77,806.00	0.83%	$2,867,732.00	30.46%	$2,955,933.85	31.40%	$6,457,445.83	68.60%	$9,413,379.68
2001	$0.00	0.00%	$0.00	0.00%	$0.00	0.00%	$0.00	0.00%	$7,620.00	18.09%	$7,620.00	18.09%	$34,500.00	81.91%	$42,120.00
2002	$0.00	0.00%	$4,780.00	0.12%	$13,653.10	0.35%	$397,777.17	10.16%	$557,939.36	14.25%	$974,149.63	24.88%	$2,941,354.49	75.12%	$3,915,504.12
2003	$0.00	0.00%	$86,090.00	1.65%	$5,710.00	0.11%	$74,820.00	1.43%	$490,183.00	9.37%	$656,803.00	12.56%	$4,574,160.00	87.44%	$5,230,963.00
2004	$0.00	0.00%	$411,966.00	3.69%	$352,802.00	3.16%	$509,649.00	4.57%	$945,142.00	8.47%	$2,219,559.00	19.90%	$8,936,656.00	80.10%	$11,156,215.00
2005	$0.00	0.00%	$6,107,715.00	13.98%	$1,450.00	0.00%	$706,366.00	1.62%	$15,216,700.00	34.82%	$22,032,231.00	50.41%	$21,669,708.00	49.59%	$43,701,939.00
2006	$0.00	0.00%	$444,154.00	4.20%	$0.00	0.00%	$694,965.00	6.57%	$944,571.00	8.93%	$2,083,690.00	19.70%	$8,491,794.00	80.30%	$10,575,484.00
2007	$0.00	0.00%	$61,010.00	0.85%	$0.00	0.00%	$22,685.00	0.32%	$1,390,210.00	19.42%	$1,473,905.00	20.59%	$5,684,287.00	79.41%	$7,158,192.00
Total	$0.00	0.00%	$7,126,110.85	7.81%	$373,615.10	0.41%	$2,484,068.17	2.72%	$22,420,097.36	24.59%	$32,403,891.48	35.53%	$58,789,905.32	64.47%	$91,193,796.80

Sources: Oregon Department of Transportation

[1] Percent of Total Dollars Awarded.

[2] The Total State Dollars Awarded is the actual amount given to prime contractors and subcontractors combined.

7.4   *Non-Goal Analysis*

For further comparison, MGT performed a non-goal analysis. This analysis shows the statewide utilization of subcontractors on ODOT federally funded contracts that did not have a minority goal assigned. **Exhibit 7-2** indicates that $170.9 million were awarded to subcontractors on federal projects that did not have an assigned goal. Of the $170.9 million awarded, minorities received $65.5 million. Nonminority women-owned firms received the highest participation acquiring $42.5 million (24.9 percent) of the federal project dollars with no goals. Native American-owned firms followed receiving

$13.7 million (8 percent). African Americans received the lowest minority participation, receiving $253 thousand (.15 percent).

EXHIBIT 7-2
STATEWIDE
UTILIZATION OF
CONSTRUCTION SUBCONTRACTORS
ON FEDERAL PROJECTS WITH NO MINORITY GOALS
IN THE RELEVANT MARKET AREA
BY RACE/ETHNICITY/GENDER CLASSIFICATIONS
OCTOBER 1, 1999 THROUGH SEPTEMBER 30, 2007

Fiscal Year	African Americans		Hispanic Americans		Asian Americans		Native Americans		Nonminority Women		Minority Subtotal		Nonminority Total		Total Federal Dollars Awarded[2]
	$	%[1]	$	%[1]	$	%[1]	$	%[1]	$	%[1]	$	%	$	%[1]	$
2000	$0.00	0.00%	$455,162.00	15.32%	$2,565.00	0.09%	$75,699.00	2.55%	$408,230.00	13.74%	$941,656.00	31.70%	$2,028,852.00	68.30%	$2,970,508.00
2001	$0.00	0.00%	$47,125.00	4.83%	$38,565.00	3.95%	$37,346.00	3.82%	$187,116.00	19.16%	$310,152.00	31.76%	$666,340.00	68.24%	$976,492.00
2002	$0.00	0.00%	$127,253.00	3.28%	$9,526.00	0.25%	$346,445.00	8.92%	$951,917.00	24.51%	$1,435,141.00	36.95%	$2,448,484.00	63.05%	$3,883,625.00
2003	$3,232.00	0.02%	$1,223,447.00	9.05%	$21,245.00	0.16%	$1,313,099.00	9.71%	$3,927,441.00	29.05%	$6,488,464.00	48.00%	$7,029,568.00	52.00%	$13,518,032.00
2004	$0.00	0.00%	$86,875.00	0.99%	$12,583.00	0.14%	$867,605.00	9.85%	$2,501,687.00	28.40%	$3,468,750.00	39.38%	$5,340,247.00	60.62%	$8,808,997.00
2005	$249,763.00	0.89%	$2,280,963.00	8.13%	$104,720.00	0.37%	$726,328.00	2.59%	$11,892,637.00	42.38%	$15,254,411.00	54.36%	$12,808,154.00	45.64%	$28,062,565.00
2006	$0.00	0.00%	$2,764,660.00	7.29%	$135,658.00	0.36%	$1,677,069.00	4.42%	$13,623,371.00	35.92%	$18,200,758.00	48.00%	$19,721,358.00	52.00%	$37,922,116.00
2007	$0.00	0.00%	$750,366.43	1.00%	$1,061,082.12	1.42%	$8,621,587.35	11.54%	$8,986,042.75	12.02%	$19,419,078.65	25.98%	$55,322,856.27	74.02%	$74,741,934.92
Total	$252,995.00	0.15%	$7,735,851.43	4.53%	$1,385,944.12	0.81%	$13,665,178.35	8.00%	$42,478,441.75	24.86%	$65,518,410.65	38.34%	$105,365,859.27	61.66%	$170,884,269.92

Sources: Oregon Department of Transportation

[1] Percent of Total Dollars Awarded.

[2] The Total Federal Dollars Awarded is the actual amount given to prime contractors and subcontractors combined.

7.5 *PUMS Analysis- Analysis of Race/Gender/Ethnicity Effects on Self-Employment Propensity and Earnings*

The purpose of this analysis was to examine the effects of race and gender, along with other individual economic and demographic characteristics, on individuals' participation in the private sector as self-employed business operators, and on their earnings as a result of their participation in five categories of private sector business activity in the state of Oregon. Findings for minority business enterprises were compared to the self-employment participation and earnings record of nonminority male business owners to determine if a disparity in self-employment rates and earnings exists, and if it is attributable to differences in race, gender or ethnicity. Applying the methodology and

variables employed by a City of Denver disparity study (see City of Denver v. Concrete Works), data for this investigation originated from the Public Use Microdata Samples (PUMS) data derived from the 2000 Census of Population and Housing, to which we apply appropriate regression statistics to draw conclusions.

To guide this investigation, three general research questions were posed. Questions and variables used to respond to each, followed by a report of findings, are reported below:

Question 1: Are racial, ethnic and gender minority groups less likely than nonminority males to be self-employed?

This analysis examined the statistical effects of the following variables on the likelihood of being self-employed in the study market area: Race, ethnicity, and gender of business owner (African American, Asian American, Hispanic American, Native American, nonminority women, nonminority males), Marital Status, Age, Self-reported health-related disabilities, Availability of Capital (Household property value, Monthly total mortgage payments, Unearned income) and other characteristics (Number of individuals over the age of 65 living in household, Number of children under the age of 18 living in household) and Level of education.

Question 1 Findings:

- In all industries in the state of Oregon nonminority males were roughly twice as likely to be self-employed as African Americans, Hispanic Americans, and nonminority women.[5]

- In the state of Oregon, a nonminority male was over four times as likely as nonminority women to be self-employed in professional services.

- In the state of Oregon, nonminority males are nearly twice as likely as Hispanic Americans to be self-employed in the goods and supplies services industry.

---

[5] These 'likelihood" characteristics were derived from Exhibit 1 by calculating the inverse of the reported odds ratios.

- African Americans were less likely to be self-employed than were nonminority males in all industries.

- In general, cell sizes for business type by race for Native Americans were of insufficient size to permit valid interpretations.

Question 2: Does race/gender/ethnicity status have an impact on individual's self-employment earnings?

This analysis examined the statistical effects of the following variables on income from self-employment for business owners in the market area: Race, ethnicity, and gender of business owner (African American, Asian American, Hispanic American, Native American, nonminority women, nonminority males), Marital Status, Age, Self-reported health-related disabilities, and Availability of Capital (Household property value, Monthly total mortgage payments, Unearned income and Level of education).

Question 2 Findings:

- In the state of Oregon, Native Americans, and nonminority women reported significantly lower earnings in all business type categories.

- In the other services industry, African Americans, Hispanic Americans, and nonminority women reported significantly lower earnings than nonminority males in the state of Oregon: 45.6 percent, 50.0 percent, and 42.1 percent, respectively.

- The most egregious affect on earnings elasticities can be found in other services for Hispanic Americans. In other services Hispanic Americans earned 50.0 percent less than nonminority males.

Question 3: If minority and nonminority males shared similar traits and marketplace "conditions" (i.e., similar "rewards" in terms of capital and asset accrual), what would be the effect on rates of self-employment by race, ethnicity and gender?

Derived from a similar model employed by a City of Denver disparity study, MGT created a model that leveraged statistical findings in response to the first two questions to determine if race, gender and ethnicity effects derived from those findings would persist if nonminority male demographic and economic characteristics were combined with minority self-employment data. More precisely, in contrast to Question 1, which permitted a comparison of self-employment rates based on demographic and economic

characteristics reported by the 2000 census for individual minority categories and nonminority males, <u>respectively</u>, this analysis posed the question, "How would minority rates change, if minority's operated in a nonminority male business world and how much of this change is attributable to race, gender or ethnicity?"

Question 3 Findings:

- Overall, comparing self-employed nonminority males with self-employed for African Americans in the state of Oregon, over two thirds of the disparity in self-employment rates was attributable to race differences.

- Overall, comparing self-employed nonminority males with self-employed Hispanic Americans in the state of Oregon, over two thirds of the disparity in self-employment rates was attributable to race differences.

- Comparing self-employed nonminority males with self-employed Native Americans in the state of Oregon construction industry, over 93 percent of the disparity in self-employment rates was attributable to race differences.

- Comparing self-employed nonminority males with self-employed nonminority women in the state of Oregon professional industry, over 86 percent of the disparity in self-employment rates was attributable to gender differences.

7.6   *Self-Employment Analysis*

This report analyzes the availability of minority, nonminority women, and nonminority male firms in five categories of private sector business activity in the state of Oregon. The goal of this investigation is to examine the effects of race and gender, along with other individual economic and demographic characteristics, on individuals' participation in the private sector as self-employed business operators, and on their earnings as a result of their participation. Ultimately, we will compare these findings to the self-employment participation and earnings record of nonminority male business owners to determine if a disparity in self-employment rates and earnings exists, and if it is attributable to racial/gender discrimination in the marketplace. Data for this

investigation are provided by the Public Use Microdata Samples (PUMS) data derived from the 2000 Census of Population and Housing, to which we apply appropriate regression statistics to draw conclusions. **Exhibit 7-3** presents a general picture of self-employment rates by race, median earnings, and sample sizes (n's) in the state of Oregon, calculated from the Five Percent PUMS census sample.

The next section will discuss the research basis for this examination to lay the groundwork for a description of the models and methodologies to be employed. This will be followed by a presentation of findings regarding minority status effects on self-employment rates, self-employment earnings, and attributions of these differences to discrimination, per se.

EXHIBIT 7-3
PERCENTAGE SELF-EMPLOYED/1999 EARNINGS BY
RACE/GENDER/ETHNICITY CATEGORY FOR STATE OF OREGON

Race/Ethnic/Gender Category	Percent of the Population Self-Employed	Sample Census n	Median Earnings
	State of Oregon	**State of Oregon**	**State of Oregon**
Nonminority Males	17.25%	3,726	$38,000.00
African American	7.20%	48	$30,000.00
Hispanic American	6.53%	164	$22,650.00
Asian American	14.44%	185	$28,600.00
Native American	10.06%	94	$30,000.00
Nonminority Women	9.16%	1,430	$23,625.00
	13.25%	5,647	$32,000.00

7.6.1 *Self-Employment Rates and Self-Employment Earnings Analysis as An Analog of Business Formation and Maintenance*

Research in economics consistently supports the finding of group differences by race and gender in rates of business formation (see *Journal of Econometrics*, Vol, 61, Issue 1, devoted entirely to the econometrics of labor marked discrimination and segregation). For a disparity study, however, the fundamental question is, "How much of this difference is due to factors that would appear, at least superficially, to be related to group differences other than race, ethnicity, or gender, and how much can be attributed

to discrimination effects related to one's race/ethnic/gender affiliation?" We know, for instance, that most minority groups have a lower median age than do non-Hispanic whites (Census of Population and Housing, 2000, Public Use Microdata Samples).[6] We also know, in general, that the likelihood of being self-employed increases with age (PUMS, 2000). When social scientists speak of nonracial group differences, they are referring to such things as general differences in religious beliefs, for instance, as these might influence group attitudes toward contraception, and, in turn, both birthrates and median age. A disparity study, therefore, seeks to examine these other important demographic and economic variables in conjunction with race and ethnicity, as they influence group rates of business formation, to determine if we can assert that discrimination against minorities is sufficiently present to demand public sector legal remedies such as affirmative action and minority set-aside contracting.

Questions about marketplace dynamics affecting self-employment—or, more specifically, the odds of being able to form one's own business and then to excel (i.e., generate earnings growth)—are at the heart of disparity analysis research. Whereas, in general, early disparity studies focused on gross racial disparity, merely documenting these alone is insufficient for inferring discrimination effects, per se, without "partialling out" effects due to nondiscriminatory factors. Moreover, to the extent that discrimination exists, it is likely to inhibit both the formation of minority business enterprise and the profits and growth of these. Consequently, earlier disparity study methodology and analysis has failed to account for the effects of discrimination on minority self-employment in at least two ways: (1) a failure to account adequately for the effects of discriminatory barriers minorities face "up front" in attempting to form businesses; and

---

[6] Hereafter referred to as PUMS, 2000. *Concrete Works v. City and County of Denver*, 321 F.3 950 (10th Cir 2003).

(2) a failure to isolate and explain methodologically discrimination effects once minority businesses are formed.

The next section addresses these shortcomings, utilizing 2000 Public Use Microdata Sample data derived from the 2000 U.S. Census to answer research questions about the effects of discrimination on self-employment and self-employment earnings using multiple regression statistics.

7.6.2   *Research Questions, Statistical Models, and Methods*

Two general research questions were posed in the initial analysis:

- **Are racial, ethnic, and gender minority groups less likely than nonminority males to be self-employed?**

- **Does race/gender/ethnicity status have an impact on individuals' earnings?**

A third question, to be addressed later—How much does race/ethnicity/gender discrimination influence the probability of being self-employed?—draws conclusions based on findings of questions one and two.

To answer the first two questions, we employed two multivariate regression techniques, respectively: logistic regression and linear regression. To understand the appropriate application of these regression techniques, it is helpful to explore in greater detail the questions we are trying to answer. The dependent variables in questions one and two—that is, the phenomenon to be explained by influences such as age, race, gender, and disability status, for example (the independent or "explanatory" variables)— are, respectively: the probability of self-employment status (a binary, categorical variable based on two possible values: 0 = not self-employed/1 = self-employed); and 1999 earnings from self-employment (a continuous variable). In our analysis, the choice of regression approach is based on the scale of the dependent variable (in question one, a categorical scale with only two possible values; and in question two, a continuous scale

with many possible values). Because binary logistic regression can "handle" an analysis in which the dependent variable is categorical, it was employed for the analysis of question one[7]. To analyze question two, in which the dependent variable is continuous, we used simple linear regression.

7.6.3   *Deriving the Logistic Regression Model from the Simple Linear Model*

The logistic regression model can be derived with reference to the simple linear regression model expressed mathematically as:

$$Y = \beta_0 + \beta_l X_l + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots + \varepsilon$$

Where:

Y = a continuous variable (e.g., 1999 earnings from self-employment).

β_0 = the constant, representing the value of Y when $X_l = 0$

β_l = coefficient representing the magnitude of X_i's effect on Y

X_l = the independent variables, such as age, human capital (e.g., level of education), availability of capital, race/ethnicity/gender, etc.

ε. the error term, representing the variance in Y unexplained by X_i

This equation may be summarized as:

$$E(Y) = \mu = \sum_{k=1}^{K} \beta_k \, x_k$$

in which Y is the dependent variable and μ represents the expected values of Y as a result of the effects of *β*, the explanatory variables. When we study a random distribution of Y using the linear model, we specify its expected values as a linear combination of K unknown parameters and the covariates or explanatory variables. When this model is

---

[7] Logistical regression, or logit, models generate predicted probabilities that are almost identical to those calculated by a probit procedure, used in the Denver Concrete Works case. Logit, however, has the added advantage of dealing more effectively with observations at the extremes of a distribution. For a complete explanation, see *Interpreting Probability Models* (T.F. Liao, Text 101 in the Sage University series.)

applied to data in the analysis, we are able to find the statistical link between the dependent variable and the explanatory or independent variables.

Suppose we introduce a new term, η, into the linear model such that:

$$\eta = \mu = \sum_{k=1}^{K} \beta_k \, x_k$$

When the data are randomly distributed, the link between η and μ is linear, and a simple linear regression can be used. However, to answer the first question, the categorical dependent variable was binomially distributed. Therefore, the link between η and μ becomes $\eta = \log[\mu/(1-\mu)]$ and logistic regression is utilized to determine the relationship between the dependent variable and the explanatory variables, calculated as a probability value (e.g., the probability of being self-employed when one is African American). The logistic regression model is expressed mathematically as:

$$\log[\mu/1(1-\mu)] = \alpha + \beta_i X_n + \varepsilon$$

Where:

$(\mu/1-\mu)$ = the probability of being self-employed

α = a constant value

β_i = coefficient corresponding to independent variables

X_n = selected individual characteristic variables, such as age, marital status, education, race, and gender

ε = error term, representing the variance in Y unexplained by X_i

This model can now be used to determine the relationship between a single categorical variable (0 = not self-employed/1 = self-employed) and a set of characteristics hypothesized to influence the probability of finding a 0 or 1 value for the categorical variable. The result of this analysis illustrates not only the extent to which a characteristic can increase or decrease the likelihood that the categorical variable will be a 0 or a 1,

but also if the effect of the influencing characteristics is positive or negative in relation to being self-employed.

7.6.4   *Results of the Self-Employment Analyses*

Question 1: Are Racial, Ethnic, and Gender minority Groups Less Likely Than Nonminority Males to be Self-Employed?

To derive a set of variables known to predict employment status (self-employed; not self-employed), we used the PUMS 2000 Five Percent Sample data. Binary logistic regression was used to calculate the probability of being self-employed, the dependent variable, with respect to socioeconomic and demographic characteristics selected for their potential to influence the likelihood of self-employment. The sample for the analysis was limited to labor force participants according to the following criteria:

- resident of the state of Oregon;

- self-employed individuals in construction, professional services, other services, architecture and engineering,[8] and goods and supplies;

- full-time employees (more than 35 hours a week);

- 18 years of age or older; and

- individuals employed in the private sector.

Next, we derived the following variables hypothesized as predictors of employment status (self-employed/not self-employed):

- ***Race and Sex***: African American, Asian American, Hispanic American, Native American, nonminority women, nonminority males.

- ***Availability of Capital***: home ownership, home value, mortgage rate, unearned income, residual income.

- ***Marital Status.***

- ***Ability to speak English well.***

- ***Disability status***: from individuals' reports of health-related disabilities.

---

[8] Due to inadequate sample numbers for all races in the Architecture and Engineering PUMS 2000 data, A & E was merged with the Professional Services category.

- ■ **Age and Age**^{2}: squaring the age variable acknowledges the positive, curvilinear relationship between each year of age and earnings.

- ■ **Owner's level of education**.

- ■ **Number of individuals living in a household over the age of 65.**

- ■ **Number of children who are living in a household under the age of 18**.

Question 1 Findings:

Binary logistic regression analysis provided estimates of the relationship between the independent variables described above and the probability of being self-employed in the four types of business industries. In **Exhibit 7-4**, odd ratios are presented by minority group reporting the effect of race/ethnicity/gender on the odds of being self-employed in 1999, holding all other variables constant. Full regression results on all the variables are presented in **Appendix A.**

EXHIBIT 7-4
SELF-EMPLOYMENT "ODDS RATIOS" OF MINORITY GROUPS RELATIVE TO NONMINORITY MALES AFTER CONTROLLING FOR SELECTED DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Race/Ethnic Group	All Industries	Construction	Professional Services	Other Services	Goods & Supplies
State of Oregon					
African American	**0.467**	**0.389**	**0.393**	**0.602**	0.509
Hispanic American	**0.482**	**0.613**	**0.409**	**0.612**	**0.658**
Asian American	0.877	0.530	**0.339**	1.297	**1.708**
Native American	**0.637**	**0.633**	0.588	**0.648**	0.992
Nonminority Women	**0.499**	**0.528**	**0.228**	1.001	0.939

Source: PUMS data from 2000 *Census of Population* and MGT of America, Inc., calculations using SPSS.
Note: **Bold** indicates that the estimated "odds ratio" for the group was statistically significant. The A&E business industry was excluded from this analysis because of the lack of sufficient data.
The results indicate the following:

- ■ In all industries in the state of Oregon nonminority males were roughly twice as likely to be self-employed as African Americans, Hispanic Americans, and nonminority women.[9]

---

[9] These 'likelihood" characteristics were derived from Exhibit 7-4 by calculating the inverse of the reported odds ratios.

- In the state of Oregon, a nonminority male was over four times as likely as nonminority women to be self-employed in professional services.

- In the state of Oregon, nonminority males are nearly twice as likely as Hispanic Americans to be self-employed in the goods and supplies services industry.

- African Americans were less likely to be self-employed than were nonminority males in all industries.

- In general, cell sizes for business type by race for Native Americans were of insufficient size to permit valid interpretations.

Question 2: Does Race/Gender/Ethnicity Status Have an Impact on Individuals' Earnings?

To answer this question, we compared self-employed, minority and women entrepreneur earnings to earnings of nonminority males in the state of Oregon, when the effect of other demographic and economic characteristics was controlled or "neutralized." That is, we were able to examine the earnings of self-employed individuals who have similar education levels, are of similar age, and so on, to enable earnings comparisons by race/gender/ethnicity.

To derive a set of variables known to predict earnings, the dependent variable, we used 1999 wages from employment for self-employed individuals, as reported in the PUMS 2000 Five Percent sample. These included:

- *Race and Sex*: African American, Asian American, Hispanic American, Native American, nonminority women, nonminority males.

- *Availability of Capital*: homeownership, home value, mortgage rate, unearned income, residual income.

- *Marital Status.*

- *Ability to speak English well.*

- *Disability status*: From individuals' reports of health-related disabilities.

- *Age and Age^2*: squaring the age variable acknowledges the positive, curvilinear relationship between each year of age and earnings.

- *Owner's level of education.*

Question 2 Findings:

Results of the linear regression model estimating the effects of selected demographic and economic variables on self-employment earnings are reported in **Exhibit 7-5**. Each number (i.e., coefficient) in the exhibit represents a percent change in earnings. For example the corresponding number for an African American in all industries is -.178, meaning that an African American will earn 17.8 percent less than a nonminority male when the statistical effects of the other variables in the equation are "neutralized". Full regression results on all the variables are presented in **Appendix A.**

EXHIBIT 7-5
EARNINGS ELASTICITIES OF MINORITY GROUPS RELATIVE TO
NONMINORITY MALES AFTER CONTROLLING FOR
SELECTED DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Race/Ethnic Group	All Industries	Construction	Professional Services	Other Services	Goods & Supplies
State of Oregon					
African American	-0.178	-0.367	0.389	**-0.456**	0.366
Hispanic American	**-0.365**	0.070	**-0.452**	**-0.500**	**-0.471**
Asian American	**-0.276**	-0.171	0.079	**-0.429**	0.021
Native American	**-0.220**	-0.068	-0.114	**-0.293**	-0.342
Nonminority Women	**-0.449**	**-0.345**	**-0.481**	**-0.421**	**-0.443**

Source: PUMS data from 2000 *Census of Population* and MGT of America, Inc., calculations using SPSS.
Note: **Bold** indicates that the estimated "elasticities" for the group was statistically significant. The A&E business industry was excluded from this analysis because of the lack of sufficient data.

The results indicate the following:

- In the state of Oregon, Native Americans, and nonminority women reported significantly lower earnings in all business type categories.

- In the other services industry, African Americans, Hispanic Americans, and nonminority women reported significantly lower earnings than nonminority males in the state of Oregon: 45.6 percent, 50.0 percent, and 42.1 percent, respectively.

- The most egregious affect on earnings elasticities can be found in other services for Hispanic Americans. In other services Hispanic Americans earned 50.0 percent less than nonminority males.

7.6.5   *Disparities in Rates of Self-Employment:*

Question 1: How Much Can Be Attributed to Discrimination?

Results of the analyses of self-employment rates and 1999 self-employment earnings revealed general disparities between minority and nonminority self-employed individuals, whether their businesses were located in the state of Oregon.

Exhibit 7-6 presents the results of these analyses. Column A reports observed employment rates for each race/gender group, calculated directly from the PUMS 2000 data. To obtain values in columns B and C, we calculated two predicted self-employment rates using the following equation:

$$\Pr ob(y=1) = \sum_{k=1}^{K} (e^{\beta_k x_k} / 1 + e^{\beta_k x_k})$$

Where:

$\Pr ob(y=1)$ **=**   represents the probability of being self-employed:

β_k **=**   coefficient corresponding to the independent variables used in the logistic regression analysis of self-employment probabilities

x_k **=**   the mean values of these same variables

The first of these predicted self-employment rate calculations (in column B) presents nonminority male self-employment rates as they would be if their characteristics (i.e., x_k, or mean values for the independent variables) were applied to minority market structures (represented for each race by their β_k or odds coefficient values). The second self-employment rate calculation (in column C) presents minority self-employment rates as they would be if they were rewarded in a similar manner as nonminority males in the nonminority male market structure: that is, by multiplying the minority means (i.e., characteristics) by the estimated nonminority coefficients for both race and the other independent variables.

EXHIBIT 7-6
OBSERVED AND PREDICTED SELF-EMPLOYMENT RATES

Business/Race Group	STATE OF OREGON				
	Observed Self-Employment Rates	White Characteristics and Own Market Structure	Own Characteristics and White Market Structure	Disparity Ratio (column A divided by column C)	Portion of Difference Due to Discrimination
	(A)	(B)	(C)	(D)	(E)
Overall					
Nonminority Males	0.1725	0.1725	0.1725	1.000	
African American	0.0720	0.1028	0.1429	0.5036	70.55%
Hispanic American	0.0653	0.1058	0.1411	0.4626	70.73%
Asian American	0.1444	0.1771	0.2022	0.7141	n/d
Native American	0.1006	0.1353	0.1648	0.6106	89.28%
Nonminority Women	0.0917	0.1091	0.1847	0.4965	n/d
Construction					
Nonminority Males	0.2880	0.2880	0.2880	1.000	
African American	0.1429	0.1461	0.2453	0.5823	70.61%
Hispanic American	0.1383	0.2123	0.2477	0.5585	73.07%
Asian American	0.2075	0.1889	0.2822	0.7354	92.84%
Native American	0.1800	0.2178	0.2806	0.6416	93.13%
Nonminority Women	0.1792	0.1885	0.2907	0.6165	n/d
Professional Services					
Nonminority Males	0.2132	0.2132	0.2132	1.000	
African American	0.0570	0.1132	0.1554	0.3668	62.98%
Hispanic American	0.0603	0.1173	0.1514	0.3985	59.58%
Asian American	0.0641	0.0990	0.2588	0.2475	n/d
Native American	0.0833	0.1604	0.1438	0.5795	46.56%
Nonminority Women	0.0428	0.0690	0.1902	0.2248	86.50%
Other Services					
Nonminority Males	0.1932	0.1932	0.1932	1.0000	
African American	0.1004	0.1462	0.1482	0.6776	51.47%
Hispanic American	0.0922	0.1483	0.1610	0.5725	68.15%
Asian American	0.2321	0.2695	0.2401	0.9664	n/d
Native American	0.1221	0.1557	0.1932	0.6321	99.97%
Nonminority Women	0.1817	0.2217	0.2086	0.8713	n/d
Goods & Supplies					
Nonminority Males	0.0797	0.0797	0.0797	1.000	
African American	0.0301	0.0585	0.0576	0.5229	55.40%
Hispanic American	0.0279	0.0744	0.0518	0.5375	46.22%
Asian American	0.1111	0.1727	0.1020	1.0894	29.06%
Native American	0.0605	0.1081	0.0696	0.8692	47.32%
Nonminority Women	0.0682	0.1030	0.1014	0.6727	n/d

Source: PUMS data from 2000 *Census of Population* and MGT of America, Inc. calculations using SPSS end Excel. n/d: no discrimination was found.

Using these calculations, we were able to determine a percentage of the disparities in self-employment between minorities and nonminority males attributable to discrimination by dividing the observed self-employment rate for a particular minority group (column A) by the predicted self-employment rate as it would be if minority groups faced the same market structure as nonminority males (column C). Next, we calculated the difference between the predicted self-employment rate as it would be if minority groups faced the same market structure as nonminority males and the observed self-employment rate for that minority group, and divided this value by the difference between the observed self-employment rate for nonminority males and the self-employment rate for a particular minority group. In the absence of discrimination this number is zero, which means disparities in self-employment rates between minority groups and nonminority males can be attributed to differences in group characteristics not associated with discrimination. On the other hand, as this value approaches 1.0, we are able to attribute disparities increasingly to discrimination in the marketplace.

Question 1 Findings:

Examining the results reported in **Exhibit 7-6**, we found the following.

- Overall, comparing self-employed nonminority males with self-employed for African Americans in the state of Oregon, over two thirds of the disparity in self-employment rates was attributable to race differences.

- Overall, comparing self-employed nonminority males with self-employed Hispanic Americans in the state of Oregon, over two thirds of the disparity in self-employment rates was attributable to race differences.

- Comparing self-employed nonminority males with self-employed Native Americans in the state of Oregon construction industry, over 93 percent of the disparity in self-employment rates was attributable to race differences.

- Comparing self-employed nonminority males with self-employed nonminority women in the state of Oregon professional industry, over 86 percent of the disparity in self-employment rates was attributable to gender differences.

7.7   *Summary of Findings from the PUMS/Self-Employment Analysis*

In general, findings from the PUMS 2000 data indicate that minorities were significantly less likely than nonminority males to be self-employed and, if they were self-employed, they earned significantly less in 1999 than did self-employed nonminority males. When self-employment rates were stratified by race and by business type, trends varied within individual race-by-type cells, but disparities persisted, in general, for African Americans, Hispanic Americans, and nonminority women. When group self-employment rates were submitted to MGT's disparity-due-to-minority-status analysis, findings supported the conclusion that disparities for these three groups (of adequate sample size to permit interpretation) were likely the result of differences in the marketplace due to race, gender and ethnicity. [10]

7.8   *Regression Analysis*

Whereas **Sections 5.1** and **5.2** reported findings of disparity and nondisparity related to the utilization of vendors in the state procurement activities according to selected race, ethnicity, and gender categories, this section reports findings from a telephone survey of a sample of 639[11] firms representative of The state of Oregon vendors examined in the study to assess race, ethnicity, and gender effects on vendor revenue during the 2006 tax year. To determine these effects, MGT applied a multivariate regression model to survey findings.

There are two key questions for consideration in this analysis. Do minority and woman-owned firms tend to earn significantly less revenue than firms owned by

---

[10] Appendix N reports self-employment rates and earnings in greater detail by race- business type.
[11] In order to provide an accurate and complete regression analysis some responses had to be removed. For example if a person surveyed did not answer the revenue or race question, this response was removed. This number reflects those changes.

nonminority males? If "yes," are their lower revenues due to race or gender status or to other factors?

Case law and social science research provide some guidance for addressing these questions. From research literature, we know that in addition to race and gender, factors such as firm capacity, owner experience, and education bear a relation to a firm's gross revenues. When multiple factors come into play, sometimes a multivariate statistical analysis can improve our understanding of more complex relationships among factors affecting company earnings. In this study, we employ linear regression to analyze variables, including race and gender, that can affect a firm's success.

7.8.1   *An Overview of Multivariate Regression and Description of Analytical Model*

Multivariate regression was employed to examine the influence of selected company and business characteristics—especially owner race and gender—on 2006 gross revenues reported by 639 companies participating in a telephone survey administered during September 2007. For this analysis, gross revenue was the dependent variable, or the variable to be explained by the presence, absence, or strength of "selected characteristics" variables, known as "independent" or "explanatory" variables.

Since disparity analysis is an established domain of research, the independent company characteristics variables selected for this study an extensive review of disparity study research literature. Most economic studies of discrimination are based on the seminal work of Nobel Prize recipient Gary Becker, "*The Economics of Discrimination*."[12] Becker was the first to define discrimination in financial and economic terms. Since Becker, labor economists and statistical researchers including Blinder and Oaxaca,

---

[12]Becker, Gary. 1971, second edition. "The Economics of Discrimination." The University of Chicago Press, Chicago, p. 167.

Corcoran and Duncan, Gwaltney and Long, Reimers, Saunders, Darity and Myers, Hanuschek, Hirsch, Topel and Blau, and others, have adopted a standard in disparity study research of using company earnings, or revenue, as the dependent variable in race and gender discrimination analysis.[13] Comparable worth studies have also proposed regression models using gross revenue as the dependent variable for policy analysis,[14] and the U.S. Department of Commerce employs regression analysis (included in 48 CFR 19) to establish price evaluation adjustments for small disadvantaged businesses in federal procurement programs.[15]

7.8.2   *The Regression Model Variables*

Bates[16] used at least five general determinants, including firm capacity, managerial ability, manager/owner experience, and demographic characteristics such as race and gender, to explain statistical variations in firm gross revenues. These are elaborated below in terms of the dependent/independent variable relationship regression seeks to resolve.

7.8.3   *Dependent Variable*

For this analysis, the dependent variable (the variable to be explained by the independent variables in the model) was defined operationally as "firm 2006 gross revenues." Ideally, this variable is measured as the exact dollar figure for gross revenues. However, years of experience in conducting information and opinion surveys with companies have shown us that firms tend to be reluctant to release precise dollar figures, but more responsive when inquiries about earnings are presented as a dollar

---

[13]"Race and Gender Discrimination Across Urban Labor Markets," 1996. Ed. Susan Schmitz. Garland Publishers, New York, New York, p. 184.

[14]Gunderson, Morley. 1994. "Male-Female Wage Differentials and Policy Responses." In "Equal Employment Opportunity: Labor Market Discrimination and Public Policy," pp.207-227.

[15]"Federal Acquisition Regulations for Small Disadvantaged Businesses; Notice and Rules." June 30, 1998. Memorandum for Office of Federal Procurement Policy, Economic and Statistics Administration, Department of Commerce.

[16]Bates, Timothy. "The Declining Status of Minorities in the New York City Construction Industry." Reprinted from *Economic Development Quarterly*, Vol. 12., No. 1, February 1998, pp. 88-100.

range. Accordingly, to encourage greater participation in this study's telephone survey, nine company gross revenue categories were defined, ranging from Category 1, "Up to $50,000" to Category 9, "More than $10 million."

7.8.4   *Independent Variables*

The independent (i.e., explanatory) variables were those characteristics hypothesized as contributing to the variation in the dependent variable (2006 gross revenues). For this study, independent variables included:

- *Number of full-time employees*—The more employees a company has, the greater product volume it is likely to have to generate higher revenues.

- *Owner's years of experience*—The longer a company owner has been in a particular business, the more likely it is that the owner has knowledge of how to acquire contracts and the skills and experience to succeed in that business.

- *Owner's level of education*—The research literature consistently reports a positive relationship between education and level of income.

- *Age of company*—It is argued that a company's longevity is an indicator of both success and owner managerial ability.

- *Race/Ethnic group/gender of firm owners*—The proposition to be tested was whether there is a statistically significant relationship between race/ethnicity/gender of minority firm owners and firm revenue. In the analysis, the category "Non-minority" served as a reference group against which all other race and gender groups were compared.

Finally, since companies tend to be organized around a business concentration (e.g., Professional Services, Goods and Supplies, and Other Services), type of business was introduced as a moderator variable to determine if the model, given adequate sample size, behaved differently as a predictor of gross revenue when respondents' line of business was considered.

Participants' responses to the survey provided the data to examine the relative importance of these factors. The operational relationship between these constructs (i.e.,

firm capacity, capability, experience, race, and gender) and measures derived from survey items is presented in **Exhibit 7-7**.

EXHIBIT 7-7
MODEL CONSTRUCTS, VARIABLES, AND MEASURES

Model Constructs	Variables	Measures
Capacity	Number of Employees	Number of Full-time and Part-time Employees reported
	Private Contracting	% Total Revenue from Private Sources
Owner's Managerial Ability	Owner's Education	Level of Education (from "some high school" to "postgraduate degree")
	Owner's Experience	Years of Experience
	Company Age	2003 minus reported "year of establishment"
Demographics	Business Owner Groups	African American, Hispanic American, Asian American, Native American, Nonminority Woman, and Non-minority Firms
	Sex of Company Owner	Sex of Company Majority Owner or Shareholder

Source: OOCEA, Telephone Survey Data methodology.

7.8.5   Exploring Variable Relationships: How Regression Analysis Works

Multiple regression analysis permits simultaneous examination not only of the effects on the dependent variable of *all* independent variables in the multivariate model, but also the effect of each unique variable (i.e., controlling for the effects of the other independent variables in the equation). The effect of each predictor (independent) variable on the dependent variable is expressed as the magnitude of the change in the dependent variable (y) for each unit change in the independent variable (x) plus an "error term." Since the independent variable is never a perfect predictor of the dependent variable—that is, X is expressed as an imperfect predictor of Y such that one unit change in X *never* leads to one unit change in Y—the "error term," ε, is postulated to acknowledge the residual change in the value of Y that X cannot explain.

The goal in sound regression modeling, therefore, is to minimize residual values associated with the independent variables and to maximize their explanatory power. In other words, a good model that seeks to explain what causes revenue earnings, in this

case, will hypothesize a combination of independent variables based on solid research findings having sufficient explanatory power to account for case-by-case differences in company revenue, while minimizing that portion of variation in revenue values that the independent variable cannot explain (i.e., minimizing the difference between Y values predicted by the X's in the model and *actual* Y values).

7.8.6   *Assessing Variables in the Model*

As suggested earlier, in a model with multiple independent, or predictor, variables, the effect of each individual independent variable is expressed as the expected change in the dependent variable (y) for each unit change in the independent variable (x), holding constant (or controlling for) the values of all the other independent variables (i.e., the effect on Y of the other X's in the equation). When X and Y values are plotted on a graph, linear regression attempts to find a straight line of best fit (also known as the least-squares line) that minimizes the differences between actual Y and predicted Y values as a function of X. The slope of this line represents the statistical relationship between the predicted values of Y based on X. The point at which this regression line crosses the Y axis (otherwise known as the constant) represents the predicted value of Y when X = 0. If the effect of X on Y is determined to be statistically significant (e.g., a significance level of $p < 0.05$ asserts that the calculated relationship between X and Y could occur due to chance only 5 times in 100), it can be asserted that X may indeed play a role in determining the value of Y (in the case of this study, company revenues). For example, if the slope coefficient of the variable representing one of the specific racial groups is determined to be statistically significant, then, all other things being equal, the hypothesis that race of the owner of a firm affects the annual revenue of the firm has only a 5 percent chance of being false. In disparity research, theory asserts that the negative effect of race on revenue earnings associated with being a minority-owned business is likely a product of discrimination.

7.8.7 *Multivariate Regression Model*

Mathematically, the multivariate linear regression model is expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \ldots + \varepsilon$$

Where: Y = annual firm gross revenues

β_0 = the constant, representing the value of Y when $X_1 = 0$

β_1 = coefficient representing the magnitude of X_1's effect on Y

X_1 = the independent variables, such as capacity, experience,

managerial ability, race, and gender.

ε = the error term, representing the variance in Y unexplained by X_1

This equation describes the hypothesized relationship between the dependent variable and the independent variables and was used to test the hypothesis that there is no difference in 2006 revenue earnings for minority firms when compared with non-minority firms. Traditionally, the hypothesis of no difference (known as the null hypothesis) is represented as: $H_0 : Y_1 = Y_2$

We can reject the null hypothesis if the analysis indicates that race and gender have been found to affect firm revenue (i.e., $H_1 : Y_1 \neq Y_2$, the alternate hypothesis). Results are statistically significant if it is determined that the probability of achieving this difference due to chance was less than 5 in 100 (i.e., $p < .05$).

7.8.8 *Multivariate Regression Model Results*

The regression model tested the effects of selected demographic and business characteristic variables on revenue earnings elicited from firms participating in the study, according to the following categories:[17]

---

[17] Despite the ordinal nature of the dependent variable, findings are reported based on a linear regression analysis; specifically, OLS. Menard (1995) notes this as an acceptable and common practice, "particularly when the dependent variable has five or more [ordered] categories. Since this [OLS] is probably the easiest approach for readers to understand, sometimes other approaches are tried, just to confirm that the use of OLS does not…distort the findings." In this case, the nine categories of revenue were also analyzed using ordered Logit (SPSS 11.5), with nearly identical findings to those achieved with OLS with respect to magnitude of effect of the independent variables and both sign and significance. For further discussion, see Menard, S., "Applied logistic regression analysis," (*Sage university papers series. Quantitative applications in the social sciences;* no. 07-106), Thousand Oaks, Calif.: Sage Publications, 1995.

1 = Up to $50,000	4 = $300,001 to $500,000	7 = $3,000,001 to $5,000,000
2 = $50,001 to $100,000	5 = $500,001 to $1 million	8 = $5,000,001 to $10 million
3 = $100,001 to $300,000	6 = $1,000,001 to $3 million	9 = Over $10 million

The tests for multicollinearity among independent variables and variance inflation due to outlier observations revealed no substantive problems with the data.[18] Initial analyses also determined that one independent variable, *Percentage of Business in the Private Sector*, made no substantive contribution to the model, and was, therefore, removed. These adjustments yielded values for the variables listed in **Exhibit 7-8.**

EXHIBIT 7-8
THE STATE OF OREGON TELEPHONE SURVEY DATA
RESULTS OF REGRESSION ANALYSIS

Coefficients			
	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	2.526	0.291	
African Americans (n=25)	-0.318	0.389	-0.029
Hispanic Americans (n=36)	-0.023	0.346	-0.002
Asian Americans (n=34)	-0.591	0.350	-0.060
Native Americans (n=22)	0.149	0.453	0.012
Nonminority Females (n=241)	-0.007	0.183	-0.001
Company Age	0.020	0.005	0.147
Number of Employees	0.506	0.033	0.583
High School	0.765	0.251	0.125
Some College	0.367	0.225	0.069
College Degree	0.084	0.204	0.018
Owner's Years of Experience	0.207	0.073	0.100
Special Trade	0.129	0.222	0.027
Professional Services	-0.027	0.239	-0.005
General/Personal Services	-0.053	0.269	-0.009
Supplies and Equipment	-0.895	0.386	-0.087

Source: The state of Oregon telephone survey.
Bold type indicates statistically significant results ($p \leq .05$).

---

[18] Multicollinearity refers to excessive intercorrelation among the independent variables in a multiple regression model, which obscures the effect of each on the dependent variable to the extent that they behave as one variable and may measure two highly correlated components of the same theoretical factor. Outliers are observations in a data set that are substantially different from the bulk of the data, perhaps because of a data entry error or some other cause that would reasonable explain a data anomaly.

7.8.9   Results of the Regression Analysis

■   The model testing the effects of the variables listed in **Exhibit 7-8** on revenue reported by companies participating in the telephone survey explained 48.6 percent of the variance of the revenue variable (R^2_j = 0.486, F = 28.765, df = 15,472, $p \leq .000$).

■   When controlling for the effects of variables related to company demographics (i.e,, company capacity, ownership level of education and experience), minority status had a negative effect on 2006 company earnings of all minority groups, except Native Americans.

■   When controlling for the effects of variables related to company demographics, minority status had no significant impact on 2006 company earnings.

■   Among the company characteristics variables, other than minority status revenue for all groups increased as a function of owner's experience.

■   Industry type of firm ownership had no significant impact on company revenues, except in supplies and equipment.

7.9   Deriving Predicted Revenue for Race/Gender/Ethnicity Categories

To derive predicted revenue categories for each race/ethnicity/gender group, values from **Exhibit 7-8** were inserted into the regression model. The following equation illustrates how predicted revenue would be calculated for an African American in the Professional Services business category[19]

Gross Revenues = 2.526 – 0.318 African American + 0.020 Company Age + 0.506 Number of Employees + 0.765 High School + 0.367 Some College + 0.084 College Degree + 0.207 Owner's Experience - 0.027.

For instance, using **Exhibit 7-9** below to interpret the effect or race/ethnicity/gender on predicted gross revenue for an African American in the Professional Services, holding all other variables constant, we would add the value of

---

[19] To derive coefficients for the race, ethnicity, and gender categories, the "nonminority" category was used as the reference variable, coded as value "0."

the constant (2.526) to the coefficient value for an African American (–0.318) and the Profession Services business category (-0.027) to obtain a predicted revenue value of 2.180 (rounded to 2, representing the category "$50,001 to $100,000"). Similarly, to derive the effect or race/ethnicity/gender on predicted gross revenue for an African American in the Supplies and Equipment Services, holding all other variables constant, we would simply note the value of the constant (1.313, rounded to 1, representing the category "Up to $50,000").

EXHIBIT 7-9
GROSS REVENUE CATEGORIES FROM TELEPHONE SURVEY

Race/Ethnicity/Gender	Overall	Building Construction	Special Trade	Professional Services	General/Personal Services	Supplies and Equipment
Nonminority Males (n=235)	3	3	3	2	2	2
African Americans (n=25)	2	2	2	2	2	1
Hispanic Americans (n=36)	3	3	3	2	2	2
Asian Americans (n=34)	2	2	2	2	2	1
Native Americans (n=22)	3	3	3	3	3	2
Nonminority Females (n=241)	3	3	3	2	2	2

Gross Revenue Categories:

1 = Up to $50,000	4 = $300,001 to $500,000	7 = $3,000,001 to $5 million
2 = $50,001 to $100,000	5 = $500,001 to $1 million	8 = $5,000,001 to $10 million
3 = $100,001 to $300,000	6 = $1,000,001 to $3 million	9 = Over $10 million

7.9.1 *Summary of Survey Findings*

With regard to the positive significant effects of the non-race/ethnicity/gender variables—company age and number of employees—it would be expected that a firm's revenue might be positively related to its size and age, supporting the logical conclusion that larger, more established firms tend to do more business. However, even when these impacts were considered, minority firms responding to the telephone survey earned significantly less revenue in 2006 than did their nonminority counterparts, supporting the conclusion that minority status is negatively related to earnings when compared with earnings for nonminorities.