

APPENDIX F.

Business Ownership in the Portland Construction and Professional Services Industries

About 11 percent of all workers in the Portland Metropolitan Statistical Area (MSA) were self-employed in 2006-2008. Workers in the local construction and professional services industries each had higher rates of business ownership at about 23 percent and 13 percent, respectively. Focusing on these industries, BBC Research & Consulting (BBC) examined business ownership for different race, ethnicity and gender groups in the Portland MSA, Oregon and the United States.¹ This appendix includes summary statistics and regression models for evaluating the determinants of business ownership in Portland. “Self-employment” and “business ownership” are used as interchangeable terms in the following discussion.

Business Ownership Rates

Many studies have explored differences at the national level between minority and non-minority rates of business ownership. Although overall self-employment rates have increased for minorities and women over the years, a number of studies indicate that gender, ethnicity and race continue to affect opportunities for entrepreneurship.² The extent to which such individual characteristics may limit ownership opportunities differs across industries and from state to state.

BBC used Public Use Microdata Samples (PUMS) from the 1980 and 2000 U.S. Census of Population and the 2006-2008 American Community Surveys (ACS) to study business ownership rates in the construction and professional services industries.

Construction industry. Compared to other industries, construction has a relatively large number of business owners. In 2006-2008, about 11 percent of workers across all industries were self-employed in the Portland MSA; about 23 percent of those in the construction industry were business owners. Figure F-1 shows the percentage of workers in the construction industry by race/ethnicity and gender that were self-employed in 1980, 2000 and 2006-2008. It also reports corresponding sample sizes for each percentage shown in the figure.

¹ In the marketplace appendices, the Portland MSA comprises the following 7 counties (unless otherwise noted): Clackamas, Clark, Multnomah, Washington, Skamania, Yamhill and Polk. Collectively, these counties are referred to as the Portland MSA, or simply Portland. Further detail is provided in Appendix I.

² See, for example, Waldinger, Roger and Howard E. Aldrich. 1990. *Ethnicity and Entrepreneurship*. Annual Review of Sociology. 111-135.; Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations*. The Journal of Human Resources, Volume 31, Issue 4, 757-793.; Fairlie, Robert W. and Alicia M. Robb. 2006. *Why are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families Inheritances and Business Human Capital*. Forthcoming Journal of Labor Economics.; and Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses*. Russell Sage Foundation.

Figure F-1.
Percentage of workers in the construction industry who were self-employed,
1980, 2000 and 2006-2008

Portland MSA	1980	2000	2006-08	Sample size		
				1980	2000	2006-08
Race/ethnicity						
African American	11.5 %	12.0 %	10.3 % **	26	50	36
Asian-Pacific American	19.0	16.1	44.6 **	21	60	44
Hispanic American	3.6 **	10.8 **	9.2 **	28	278	230
Native American	9.5	24.1	14.0	21	59	43
Non-Hispanic white	22.0	25.2	25.2	2,100	2,916	1,837
Gender						
Female	14.2 % **	18.9 %	18.4 %	204	413	278
Male	22.2	24.2	23.3	1,993	2,967	1,912
All individuals	21.4 %	23.5 %	22.8 %	2,197	3,380	2,190
Oregon						
				Sample size		
	1980	2000	2006-08	1980	2000	2006-08
Race/ethnicity						
African American	9.7 % **	14.2 %	10.9 % **	31	49	34
Asian-Pacific American	21.4	18.1	42.2	28	80	57
Hispanic American	10.8 **	11.7 **	10.0 **	74	374	410
Native American	15.4	22.6	16.3 **	39	147	93
Non-Hispanic white	24.7	28.6	28.6	4,029	5,519	3,482
Gender						
Female	17.6 % **	20.3 % **	21.4 % **	357	722	472
Male	24.9	27.9	26.4	3,846	5,485	3,608
All individuals	24.3 %	27.0 %	25.9 %	4,203	6,207	4,080
United States						
				Sample size		
	1980	2000	2006-08	1980	2000	2006-08
Race/ethnicity						
African American	9.0 % **	15.2 % **	17.9 % **	24,357	26,752	15,372
Asian-Pacific American	10.9 **	21.0 **	23.9 **	2,360	5,746	4,829
Hispanic American	10.6 **	12.2 **	14.4 **	19,590	66,531	58,547
Native American	10.6 **	19.3 **	21.3 **	2,571	7,640	4,463
Non-Hispanic white	19.4	25.4	27.3	281,094	371,152	241,237
Gender						
Female	9.8 % **	16.8 % **	18.3 % **	26,096	46,791	33,461
Male	18.7	23.3	24.1	304,368	433,678	292,387
All individuals	18.0 %	22.6 %	23.5 %	330,464	480,469	325,848

Note: ** Denotes that the difference in proportions between the minority and non-Hispanic white groups (or female and male groups) for the given Census/ACS year is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 1980 and 2000 U.S. Census 5% sample and 2006-2008 ACS Public Use Microdata samples. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

Business ownership rates in 2000. In 2000, approximately 25 percent of non-Hispanic whites working in the Portland construction industry were self-employed (in incorporated or unincorporated businesses). A smaller proportion of African Americans, Asian-Pacific Americans and Hispanic Americans owned businesses in the Portland construction industry.

- About 12 percent of African Americans were self-employed, less than one-half the rate for non-Hispanic whites.
- Asian-Pacific Americans had a business ownership rate of about 16 percent.
- Roughly 11 percent of Hispanic Americans working in the construction industry in Portland were self-employed (a statistically significant difference compared to the business ownership rate for non-Hispanic whites).

In 2000, Native Americans owned construction businesses at a similar rate (24%) as non-Hispanic whites. There were too few Subcontinent Asian Americans or other race minorities in the sample to analyze business ownership rates for these groups in the Portland MSA.

Compared to about 24 percent of men, about 19 percent of women working in the construction industry in the Portland MSA were self-employed. This difference, although not statistically significant, is consistent with those seen in Oregon and the United States.

Changes in business ownership rates since 2000. As in 2000, about 25 percent of non-Hispanic whites working in the Portland construction industry were self-employed in 2006-2008. With the exception of Asian-Pacific Americans, each minority group had a lower rate of business ownership in 2006-2008 than 2000.

- In 2006-2008, substantially fewer African Americans (10%) than non-Hispanic whites were business owners in the Portland construction industry (a statistically significant difference).
- The business ownership rate for Hispanic Americans was about 9 percent (also a statistically significant difference compared to the rate for non-Hispanic whites).
- About 14 percent of Native American construction workers owned businesses in the Portland MSA.

At about 45 percent, the self-employment rate for Asian-Pacific Americans in 2006-2008 was substantially greater than that of other racial and ethnic groups, non-Hispanic whites included.

Differences in business ownership rates between women and men working in the Portland construction industry were similar in 2006-2008 and 2000.

Note that for some racial/ethnic groups in the Portland MSA, there were relatively few observations in the 2000 and 2006-2008 samples. Caution should be exercised when analyzing business ownership rates for groups with small sample sizes.

Professional services industry. BBC also examined business ownership rates in the professional services industry. In this and other marketplace appendices, these professional services refer to architectural, engineering and related services.

At approximately 13 percent in 2006-2008, the overall business ownership rate in the professional services industry was slightly greater than that of all industries (11%). Figure F-2 reports self-employment rates for those working in the professional services industry in the Portland MSA, Oregon and the nation. Due to small sample sizes for individual racial and ethnic groups, BBC combined all minority groups into a single category when analyzing business ownership rates in the professional services industry. For the same reason, BBC also did not report the 1980 business ownership rate for minorities working in the Portland and Oregon professional services industries.

Business ownership rates in 2000. In 2000, about 18 percent of non-Hispanic whites working in the Portland professional services industry owned businesses. About 9 percent of minorities working in this industry were self-employed in 2000. The difference between minority and non-minority business ownership rates were similar to patterns found for the state and nation as a whole.

During the same year, approximately 12 percent of women were self-employed compared to 19 percent of men in the Portland professional services industry. In both Oregon and the United States in 2000, women were also less likely than men to own businesses in this industry.

Changes in business ownership rates since 2000. As shown in Figure F-2, the business ownership rates for both non-Hispanic whites and minorities in the Portland professional services industry were lower in 2006-2008 than 2000. However, overall differences in business ownership rates did not change over this time period. Compared to about 14 percent of non-Hispanic whites, only 4 percent of minorities owned businesses in the Portland professional services industry in 2006-2008 (a statistically significant difference).

In the state and U.S. as a whole, trends and patterns of business ownership in the professional services industry were similar to those in the Portland MSA.

Figure F-2.
Percentage of workers in the professional services
industry who were self-employed, 2000 and 2006-2008

Portland MSA	2000	2006-08	Sample size	
			2000	2006-08
Race/ethnicity				
Minority	9.2 %	4.3 % **	61	39
Non-Hispanic white	17.6	13.6	472	425
Gender				
Female	11.6 %	10.9 %	147	126
Male	18.7	13.4	386	338
All individuals	16.7 %	12.7 %	533	464
Oregon				
Race/ethnicity				
Minority	10.7 %	8.4 % **	77	50
Non-Hispanic white	19.4	17.8	676	568
Gender				
Female	10.2 % **	14.4 %	208	175
Male	21.8	18.0	545	443
All individuals	18.5 %	17.0 %	753	618
United States				
Race/ethnicity				
Minority	7.8 % **	7.4 % **	9,401	8,559
Non-Hispanic white	14.2	13.4	48,823	40,921
Gender				
Female	7.5 % **	7.7 % **	15,191	13,009
Male	15.1	13.9	43,033	36,471
All individuals	13.2 %	12.3 %	58,221	49,480

Note: "Minority" includes African Americans, Hispanic Americans, Asian-Pacific Americans, Subcontinent Asian Americans, Native Americans and other minority groups. Sample sizes for these race/ethnicity groups were too small to analyze individually. The data presented in this table include all workers in the professional services industry.

** Denotes that the difference in proportions between the minority and non-Hispanic white group (or female and male groups) for the given Census/ACS year is statistically significant at the 95% confidence level.

"NA" denotes cases where percentages are not shown due to small sample size (i.e., less than 25 observations).

Source: BBC Research & Consulting from 1980 and 2000 U.S. Census 5% sample and 2006-2008 ACS Public Use Microdata samples. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

Potential causes of differences in business ownership rates. Researchers have examined whether there are disparities in business ownership rates after consideration of other personal characteristics such as education and age. A number of studies have found that disparities in business ownership still exist when accounting for such neutral factors:

- Some studies have found that access to financial capital is a strong determinant of business ownership. Researchers have consistently found a positive relationship between start-up capital and business formation, expansion and survival.³ One study found that housing appreciation measured at the MSA level is a positive determinant of becoming self-employed.⁴ Unexplained differences still exist, however, when controlling for these factors.⁵
- Education has a positive effect on the probability of business ownership in most industries. However, findings from multiple studies indicate that minorities are still less likely to own a business than non-minority counterparts with the same levels of education.⁶
- Intergenerational links affect one's likelihood of self-employment. One study found that experience working for a self-employed family member increases the likelihood of business ownership for minority groups.⁷
- Time since immigration and assimilation into American society are important determinants of self-employment, but unexplained differences in minority-business ownership still exist when accounting for these factors.⁸

³ See Lofstrom, Magnus and Chunbei Wang. 2006. *Hispanic Self-Employment: A Dynamic Analysis of Business Ownership*. Working paper, Forschungsinstitut zur Zukunft der Arbeit (Institute for the Study of Labor).; and Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses*. Russell Sage Foundation.

⁴ Fairlie, Robert W. and Harry A. Krashinsky. 2006. Liquidity Constraints, Household Wealth and Entrepreneurship Revisited.

⁵ Lofstrom, Magnus and Chunbei Wang. 2006. *Hispanic Self-Employment: A Dynamic Analysis of Business Ownership*. Working paper, Forschungsinstitut zur Zukunft der Arbeit (Institute for the Study of Labor).

⁶ See Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations*. The Journal of Human Resources, Volume 31, Issue 4, 757-793; and Butler, John Sibley and Cedric Herring. 1991. *Ethnicity and Entrepreneurship in America: Toward an Explanation of Racial and Ethnic Group Variations in Self-Employment*. Sociological Perspectives. 79-94.

⁷ See Fairlie, Robert W. and Alicia M. Robb. 2006. *Race, Families and Business Success: A Comparison of African-American-, Asian-, and White-Owned Businesses*. Russell Sage Foundation; and Fairlie, Robert W. and Alicia M. Robb. 2006. Why are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital. Forthcoming Journal of Labor Economics.

⁸ See Fairlie, Robert W. and Bruce D. Meyer. 1996. *Ethnic and Racial Self-Employment Differences and Possible Explanations*. The Journal of Human Resources, Volume 31, Issue 4, 757-793; and Butler, John Sibley and Cedric Herring. 1991. *Ethnicity and Entrepreneurship in America: Toward an Explanation of Racial and Ethnic Group Variations in Self-Employment*. Sociological Perspectives. 79-94.

Race, ethnicity and gender can affect opportunities for business ownership, even when accounting for other personal characteristics such as education, age and familial ties. To further examine this topic, BBC developed multivariate statistical models to explore patterns of business ownership in the Portland MSA. These models estimate the effect of race/ethnicity and gender on the probability of self-employment while controlling for other potentially influential factors.

Business Ownership Regression Analysis

An extensive body of literature examines whether race- and gender-neutral factors such as access to financial capital, education, age, and family characteristics (e.g., marital status) help explain differences in business ownership. This subject has also been examined in other disparity analyses. Prior studies in Minnesota⁹ and Illinois¹⁰ have conducted econometric analyses investigating whether disparities in business ownership among race/ethnicity and gender groups in the combined construction and engineering industry remain after controlling for other personal characteristics. These studies have incorporated probit econometric models using PUMS data from the 2000 Census and have been among materials submitted to courts in subsequent litigation concerning state implementation of the Federal DBE Program.

BBC used similar probit regression models to predict business ownership from multiple independent or “explanatory” variables.¹¹ Independent variables include:

- Personal characteristics potentially linked to the likelihood of business ownership (age, age-squared, marital status, number of children and elderly people in the household, English-speaking ability and disability status);
- Indicators of educational attainment;
- Measures and indicators related to personal financial resources and constraints (home ownership, home value, monthly mortgage payment, dividend and interest income and additional household income from a spouse or unmarried partner); and
- Variables representing the race/ethnicity and gender of the individual.

⁹ National Economic Research Associates, Inc. 2000. *Disadvantaged Business Enterprise Availability Study*. Prepared for the Minnesota Department of Transportation.

¹⁰ National Economic Research Associates, Inc. 2004. *Disadvantaged Business Enterprise Availability Study*. Prepared for the Illinois Department of Transportation.

¹¹ Probit models estimate the effects of multiple independent or “predictor” variables in terms of a single, dichotomous dependent or “outcome” variable — in this case, business ownership. The dependent variable is binary, coded as “1” for individuals in a particular industry who are self-employed; “0” for individuals who are not self-employed. The model enables estimation of the probability that a worker in a given estimation sample is self-employed. The study team excluded observations where the Census Bureau had imputed values for the dependent variable, business ownership.

BBC developed three models using PUMS data from the 2000 Census and 2006-2008 ACS:

- A probit regression model for the Portland MSA construction industry in 2000 that included 2,963 observations;
- A probit regression model for the Portland MSA construction industry in 2006-2008 that included 2,105 observations; and
- A probit regression model for the Oregon and Washington professional services industry in 2000 that included 2,261 observations.

The professional services model differs slightly in form from the two construction models as it examines a larger geographic area. Due to the small sample size for professional services in the Portland MSA, BBC developed a model using observations from Oregon and Washington. All professional services workers from these two states are included in the model, and any Portland effects are estimated by including MSA-level control variables. (BBC used a similar approach when analyzing SSBF data on business credit in Appendix G.) The MSA-level variables included an indicator variable for Portland workers as well as “interaction” terms for minorities and women living in the Portland MSA.

Results specific to the Portland construction industry. BBC developed probit regression models of business ownership in the Portland MSA construction industry for 2000 and 2006-2008.

Portland construction industry in 2000. Figure F-3 presents the coefficients and t-statistics for the 2000 probit model for individuals working in the Portland construction industry.

The model indicates that several neutral factors are important in predicting the probability of business ownership in this industry:

- Older individuals are more likely to be business owners;
- More children living in the household increases the likelihood of being self-employed;
- Owning a more expensive home is associated with greater probability of business ownership;
- Greater interest and dividend income and greater income from a spouse or partner both increase workers’ likelihood of owning a business; and
- Speaking English well increases the probability of self-employment in construction.

Even after controlling for neutral factors in the 2000 data, statistically significant disparities in rates of business ownership remain for women working in the Portland construction industry.

Figure F-3.
Portland construction industry business ownership model, 2000

Variable	Coefficient	t-statistic
Constant	-2.6058	-6.85 **
Age	0.0380	2.47 **
Age-squared	-0.0002	-1.08
Married	-0.0861	-1.13
Disabled	-0.1434	-1.39
Number of children in household	0.0834	3.02 **
Number of people over 65 in household	-0.0512	-0.51
Owns home	0.1240	1.37
Home value (\$000s)	0.0005	1.90 *
Monthly mortgage payment (\$000s)	0.0221	0.37
Interest and dividend income (\$000s)	0.0049	1.73 *
Income of spouse or partner (\$000s)	0.0029	2.36 **
Speaks English well	0.5196	2.38 **
Less than high school education	0.0087	0.09
Some college	0.0634	0.94
Four-year degree	-0.0209	-0.20
Advanced degree	0.1426	0.77
African American	-0.3402	-1.30
Asian-Pacific American	-0.0478	-0.23
Hispanic American	-0.1412	-0.89
Native American	0.1425	0.63
Other minority group	-0.3292	-0.73
Female	-0.3312	-3.60 **

Note: *,** Denote statistical significance at the 90% and 95% confidence levels, respectively.

Source: BBC Research & Consulting based on analysis of 2000 Census of Population data.

The probit modeling approach allows for simulation of business ownership rates for minorities and females if they had the same probability of self-employment as similarly situated non-Hispanic whites and males, respectively. To conduct this next step in the analysis, BBC performed a probit regression predicting business ownership using only non-Hispanic white (or non-Hispanic white male) construction workers in the dataset.¹² The study team then applied the coefficients from this version of the model to the mean characteristics of minorities (or women) working in the Portland construction industry to estimate the probability of business ownership in the absence of any racial/ethnic (or gender) differences in the likelihood of self-employment.

BBC performed these calculations for only those groups with statistically significant disparities in business ownership (as shown in Figure F-3).

Figure F-4, on the next page, shows these simulated (“benchmark”) business ownership rates, comparing them to the actual, observed mean probability of business ownership for non-Hispanic white women. Similar simulation approaches have been incorporated in other disparity studies reviewed by the courts.

¹² This version of the model excludes the race/ethnicity indicator variables since the value for all of those variables would be the same.

Figure F-4.
Comparison of actual construction business ownership rates in Portland to simulated rates, 2000

Group	Self-employment rate		Disparity index (100 = parity)
	Actual	Benchmark	
White female	20.6%	28.6%	72

Note: As the benchmark figure can only be estimated for records with an observed dependent variable, comparison is made with only this subset of the sample. For this reason, actual self-employment rates may differ slightly from those in Figure F-1.

Source: BBC Research & Consulting from statistical models of 2000 Census of Population data.

Comparing actual self-employment rates of non-Hispanic white women with a benchmark based on business ownership rates of non-Hispanic white men, there were about 72 percent as many white female-owned businesses as would be expected. (To focus on the effects of gender, BBC's analysis compares actual and predicted rates for non-Hispanic white women.)

Portland construction industry in 2006-2008. Figure F-5 presents the coefficients and t-statistics from the probit model predicting business ownership in the Portland construction industry in 2006-2008.¹³

From the 2006-2008 model, it appears that many of the same neutral factors that are important in predicting business ownership in the 2000 model also have an impact in more recent years. However, only one neutral factor has a statistically significant effect on the probability of business ownership in the Portland construction industry in 2006-2008: owning a home with greater value is associated with a greater likelihood of self-employment.

After controlling for neutral factors, there was a statistically significant disparity in the rate of business ownership for female construction workers. On the other hand, Asian-Pacific Americans were significantly more likely to own businesses compared to non-Hispanic whites.

¹³ The 2006-2008 data do not include a variable indicating that an individual had a disability. Thus, the 2006-2008 model differs only slightly from the 2000 model as it does not include such a variable.

Figure F-5.
Portland construction industry business ownership model, 2006-2008

Variable	Coefficient	t-statistic
Constant	-2.3961	-5.18 **
Age	0.0351	1.79
Age-squared	-0.0002	-0.78
Married	-0.0046	-0.05
Number of children in household	0.0390	1.23
Number of people over 65 in household	0.1033	1.07
Owns home	0.0299	0.21
Home value (\$000s)	0.0008	3.49 **
Monthly mortgage payment (\$000s)	0.0803	1.46
Interest and dividend income (\$000s)	0.0052	1.05
Income of spouse or partner (\$000s)	0.0000	-0.02
Speaks English well	0.2959	1.45
Less than high school education	-0.1110	-0.76
Some college	-0.0748	-0.85
Four-year degree	-0.0697	-0.48
Advanced degree	0.0233	0.11
African American	-0.4397	-1.51
Asian-Pacific American	0.5794	2.87 **
Hispanic American	-0.2800	-1.77
Native American	-0.1855	-0.61
Female	-0.2781	-2.76 *

Note: **, * Denote statistical significance at the 90% and 95% confidence levels, respectively.

Source: BBC Research & Consulting based on analysis of 20006-2008 ACS data.

The study team used the same approach from the previous section to simulate business ownership rates for minorities and females in 2006-2008 if they had the same probability of self-employment as similarly situated non-Hispanic whites and non-Hispanic white males, respectively. Figure F-6 shows actual and simulated (“benchmark”) business ownership rates for Asian-Pacific Americans and white women.

Figure F-6.
Comparison of actual construction business ownership rates in Portland to simulated rates, 2006-2008

Group	Self-employment rate		Disparity index (100 = parity)
	Actual	Benchmark	
Asian-Pacific American	46.2%	27.2%	170
White female	18.9%	27.5%	69

Note: As the benchmark figure can only be estimated for records with an observed dependent variable, comparison is made with only this subset of the sample. For this reason, actual self-employment rates may differ slightly from those in Figure F-1.

Source: BBC Research & Consulting from statistical models of 2006-2008 ACS data.

In 2006-2008, Asian-Pacific Americans had a self-employment rate of about 46 percent, substantially greater than the predicted rate of 27 percent from the study team's simulation. This translates into a disparity index of 170, which suggests that substantially fewer Asian-Pacific Americans would be business owners if they had the same self-employment rate as similarly situated non-Hispanic whites.

For women, results for 2006-2008 were similar to 2000. Based on the simulation, about 28 percent of white women would own businesses in the construction industry if gender did not have an impact on self-employment. However, their actual self-employment rate was only 19 percent in 2006-2008 (a disparity index of 69).

Results specific to the Oregon and Washington professional services industry. Factors associated with self-employment may differ between the construction and professional services industries. Therefore, BBC developed a separate business ownership model for the professional services industry. Due to small sample sizes for the Portland MSA, the study team combined 2000 Census data for Oregon and Washington. The model included an indicator variable for Portland and interaction terms for minorities and women in the MSA.

Figure F-7 presents results from the 2000 professional services model for Oregon and Washington.

The following neutral factors are statistically significant in predicting business ownership for the professional services industry in Oregon and Washington in 2000:

- Older individuals are more likely to be business owners, but this marginal effect declines for the oldest individuals;
- Higher home values (for homeowners) are associated with a greater likelihood of business ownership;
- Larger mortgage payments are associated with lower rates of self-employment; and
- Having a four-year or advanced degree increases the likelihood of owning a business.

After accounting for neutral factors, the professional services model indicates statistically significant disparities in the business ownership rates for other race minorities and women working in the industry.

The variables representing African Americans and the interaction term for African Americans in the Portland MSA were not included in the model because not a single African American worker in the 2000 Oregon and Washington professional services industry sample owned a business.

The indicator variable for the Portland MSA and the interaction terms for minority- and female-workers are not statistically significant. This result suggests that the probabilities of business ownership for minorities and females (and non-minorities) within the Portland MSA are not significantly different from the larger geographic region of Oregon and Washington.¹⁴

¹⁴ Where sample sizes were very small, interaction terms for minority groups have been excluded from the model.

Figure F-7.
Oregon and Washington professional services
industry business ownership model, 2000

Variable	Coefficient	t-statistic
Constant	-4.5167	-8.29 **
Age	0.1110	4.53 **
Age-squared	-0.0009	-3.20 **
Married	-0.1246	-1.23
Disabled	0.0039	0.03
Number of children in household	-0.0554	-1.39
Number of people over 65 in household	0.1829	1.64
Owns home	0.0955	0.72
Home value (\$000s)	0.0015	4.73 **
Monthly mortgage payment (\$000s)	-0.1386	-2.06 **
Interest and dividend income (\$000s)	0.0012	0.42
Income of spouse or partner (\$000s)	-0.0010	-0.82
Less than high school education	-0.0615	-0.13
Some college	0.0480	0.25
Four-year degree	0.4204	2.27 **
Advanced degree	0.3249	1.65 *
Asian-Pacific American	-0.2731	-1.25
Hispanic American	-0.0111	-0.03
Native American	-0.0655	-0.22
Other minority group	-0.7529	-1.78 *
Female	-0.3116	-2.79 **
Asian-Pacific American in Portland MSA	-0.0928	-0.23
Hispanic American in Portland MSA	0.2805	0.47
Native American in Portland MSA	0.9419	1.54
Other minority group in Portland MSA	0.5457	0.68
Female in Portland MSA	0.0526	0.26
Portland MSA	0.1428	1.40

Note: Results pertain to construction –related professional services industry.
 *,** Denote statistical significance at the 90% and 95% confidence levels, respectively.
 The variable representing African Americans and the interaction term representing African Americans in the Portland MSA were dropped from the model as they predicted failure perfectly.

Source: BBC Research & Consulting based on analysis of 2000 Census of Population data.

BBC used the same approach from previous sections to simulate the business ownership rate for minorities and white women in the Oregon and Washington professional services industry if they had the same probability of business ownership as similarly situated non-Hispanic whites and non-Hispanic white males. Figure F-8 shows simulated self-employment rate in comparison to the actual, observed mean probability of business ownership for other race minorities and white women.

Figure F-8.
Comparison of actual professional services business ownership rates in Oregon and Washington to simulated rates, 2000

Group	Self-employment rate		Disparity index (100 = parity)
	Actual	Benchmark	
Other minority group	9.4%	19.3%	49
White female	8.0%	13.3%	60

Note: Results pertain to professional services industry.
 As the benchmark figure can only be estimated for records with an observed dependent variable, comparison is made with only this subset of the sample. For these reason, actual self-employment rates may differ slightly from those in Figure F-2.

Source: BBC Research & Consulting from statistical models of 2000 Census of Population data.

Less than half as many other race minorities own businesses in the Oregon and Washington professional services industry as one would expect based on the model. Other race minorities had an actual self-employment rate of approximately 9 percent and a benchmark business ownership rate of about 19 percent.

The simulation indicates that white women working in the industry own professional services firms at 60 percent of the rate observed for similarly situated white men. In the Oregon and Washington professional services industry, only about 8 percent of non-Hispanic white women were business owners in 2000. White women had a benchmark business ownership rate of about 13 percent. Consistent with other research, the statistical modeling indicates that gender may affect rates of business ownership even after controlling for neutral factors.

Summary of Business Ownership in the Construction and Professional Services Industries

In 2006-2008, disparities in business ownership were present in the Portland construction industry:

- The business ownership rate for African Americans was less than one-half that of non-Hispanic whites (a statistically significant difference).
- Compared to all other race/ethnicity groups, Hispanic Americans had the lowest self-employment rate, about 9 percent (also a statistically significant difference from the non-Hispanic white rate).
- Lower business ownership rates also existed for Native Americans compared to non-Hispanic whites and for women compared to men, although these differences are not statistically significant.

Disparities were also found in the Portland professional services industry in 2006-2008:

- Fewer minorities than non-Hispanic whites owned businesses in the Portland construction –related professional services industry (a statistically significant difference).
- Women also had a lower self-employment rate than men in this industry, but the difference is not statistically significant.

BBC used probit regression models to investigate the presence of race/ethnicity and gender disparities in business ownership in Portland after accounting for the effects of neutral factors. Even while controlling for neutral personal characteristics, statistically significant disparities in business ownership rates were found in the construction industry for women in 2000 and 2006-2008. BBC also identified statistically significant disparities in ownership rates for other race minorities and women in the construction-related professional services industry in Oregon and Washington.