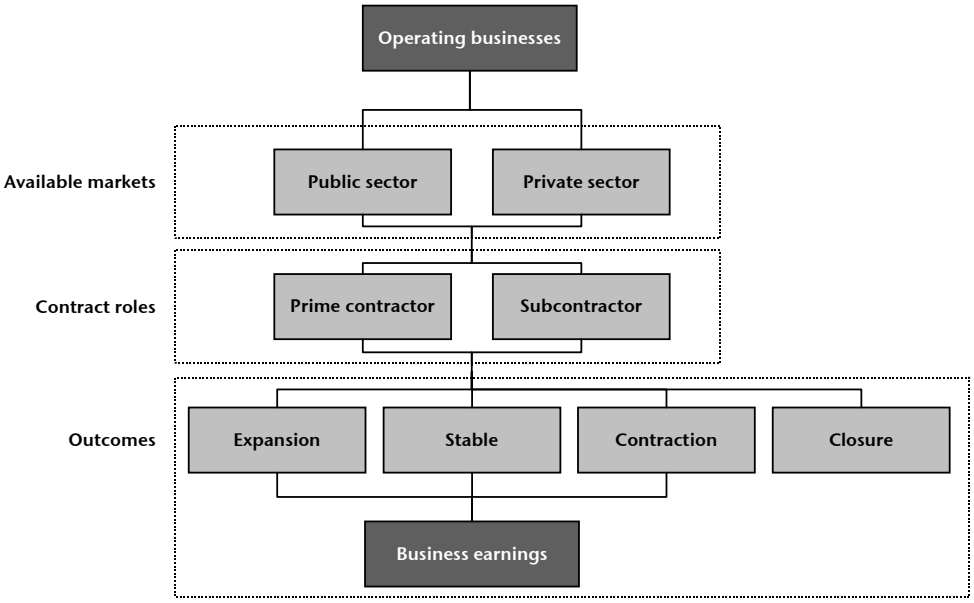
APPENDIX G.
Success of Businesses in the Construction and Engineering Industries

BBC also examined the relative success of MBE/WBEs once they are operating, assessing whether business outcomes for minority- and women-owned construction and engineering firms differ from those of majority-owned firms. BBC researched outcomes for MBE/WBEs and majority-owned businesses in terms of:

- Businesses discontinuing operations;
- Businesses expanding or contracting;
- Business receipts and earnings; and
- Size distribution of gross revenue.

This analysis examines whether some of the patterns of disparities in outcomes for minority- and women-owned businesses found by Congress in the U.S. are also found in Southern California. Figure G-1 provides a framework for the analysis. BBC begins this section by examining federal data sources on businesses in San Diego County, Southern California, California and the nation. The section concludes with an analysis of the differences in market opportunities and success for MBE/WBEs from BBC's Availability Survey.

Figure G-1.
Business success



Source: BBC Research & Consulting.

Businesses Discontinuing Operations

The relative number of business failures among minority firms in California has been cited as an indicator of unfavorable business conditions that minority business owners face in the state. Although available data limit the following analysis to California as a whole, not Southern California, they are examined here because Southern California comprises 57 percent of the businesses in the state.[1]

Rates of business closures in California. In 2006, the Discrimination Research Center (DRC) released a report analyzing the effects of Proposition 209 on DBE survival and utilization. Voter passage of Proposition 209 was one of the factors that led to elimination of race- and gender-conscious project goals for state-funded contracts as well as local agencies' contracts that were not subject to the Federal DBE Program. The DRC report argues that Proposition 209 led to a sharp decrease in the utilization of DBE firms and in the DBE share of overall contract dollars, resulting in the closure of many of these firms.[2]

DRC's study tracked DBEs that were in business throughout California in 1996 to assess the net effect of Proposition 209.

- Of the 3,269 construction firms registered with Caltrans as DBEs in 1996, 1,005 remained in operation in 2006, a survival rate of 32 percent.

- The survival rate among African American-owned construction firms registered as DBE's in 1996 was the lowest of all groups at 27 percent.

However, the implications of these statistics are unclear. The report points out that it does not provide a comparable statistic for the number of non-DBE firms that have closed, so one cannot determine whether DBEs were more likely to close than other firms.

BBC further explored possible data sources that might indicate whether MBEs were more likely to close than other firms. Using data on firms first surveyed in the 1997 Survey of Minority- and Women-Owned Business Enterprises conducted by the U.S. Census Bureau, the U.S. Small Business Administration (SBA) reported on employer firm survival rates for minority-owned businesses between 1997 and 2001 across sectors of the economy ("employer firms" are firms with paid employees other than the business owner and family members).[3] The SBA report examined patterns in each state.

Figure G-2 on the following page shows that 34 percent of African American-owned firms in California in 1997 had closed by 2001, a rate higher than other groups. These findings are consistent with the DRC study of DBEs in California. Firms owned by Native Americans may have lower rates of closure than other firms in California. Rates for Hispanic American- and Asian American-owned firms in California are similar to the rate for all firms. The patterns for California are consistent with the United States as a whole for each group of firms except for those owned by Native Americans.

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[1] BBC Research & Consulting from 2002 Survey of Business Owners, part of the U.S. Census Bureau's 2002 Economic Census.

[2] Discrimination Research Center. 2006. Free to Compete?: Measuring the Impact of Proposition 209 on Minority Business Enterprises. Berkeley: 20-21.

[3] Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington D.C.

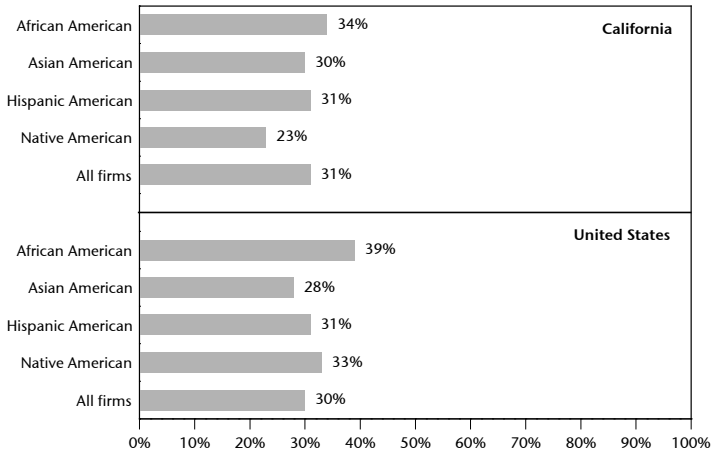
Figure G-2.
Rates of firm closure 1997-2001, California and the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



Rates of business closures for construction firms. The data shown in Figure G-3 compare national rates of closure for construction firms to national rates of closure for all firms. The higher closure rate for African American-owned firms was also present when only examining construction firms. Closure rates also appeared to be higher for construction firms owned by Native Americans or Asian Americans. No statistics were available from this data source for engineering firms.

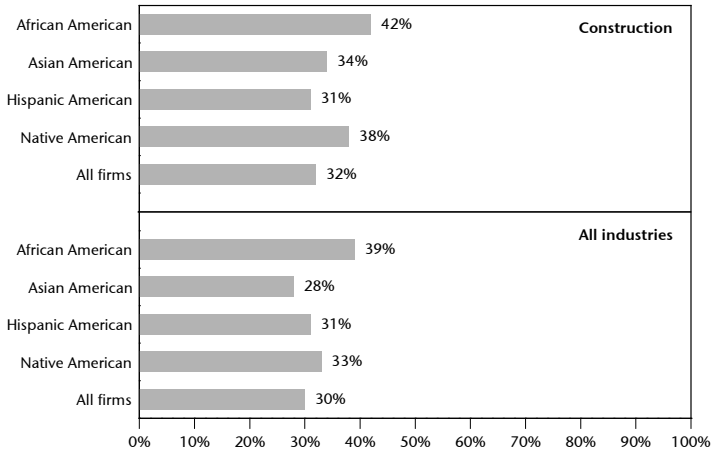
Figure G-3.
Rates of firm closure 1997-2001, construction and all industries in the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



Successful versus unsuccessful closures. Not all firm closures can be interpreted as a "failure" of the business. Reasons that a firm may close "successfully" include owner retirement or the emergence of a more profitable business alternative.

To date, the 1992 Characteristics of Business Owners Survey (CBO) is the only dataset released by the Census Bureau that classifies firm closures into successful and unsuccessful subsets.[4] The 1992 CBO survey, administered in 1996, asked owners of businesses that had closed between 1992 and 1995 the question, "Which item below describes the status of this business at the time the decision was made to cease operations?" Only the responses "successful" and "unsuccessful" were permitted. A firm reported to be unsuccessful at time of closure is understood to be a firm failure. Figure G-4

[4] CBO data from the 1997 and 2002 Economic Censuses do not include statistics on successful and unsuccessful closure. To date, the 1992 CBO is the only U.S. Census dataset that does.

shows comparative data for the proportion of firms in the U.S. closing between 1992 and 1995 that failed.[5]

According to the CBO, closed African American-owned construction firms were the most likely to report "unsuccessful" when asked about the status of the business when it closed. About 82 percent of the African Americans who had owned and closed construction firms reported an unsuccessful business (77% for all African American business owners who had closed businesses). Only 58 percent of non-minority men who had owned construction businesses said that their business was unsuccessful at time of closing, a substantial disparity. The differences in status of a construction firm at closing were also large between other minorities (Asian Americans and Native Americans) and non-minority men.

Differences in the successful versus unsuccessful closing of construction firms were only somewhat narrower for other groups:

- About 71 percent of Hispanic Americans who had owned and closed construction businesses reported the business to be unsuccessful at time of closing, a substantial difference from the results for non-minority men.
- About 66 percent of women who had owned and closed construction firms reported the business to be unsuccessful, compared to 58 percent for non-minority men.

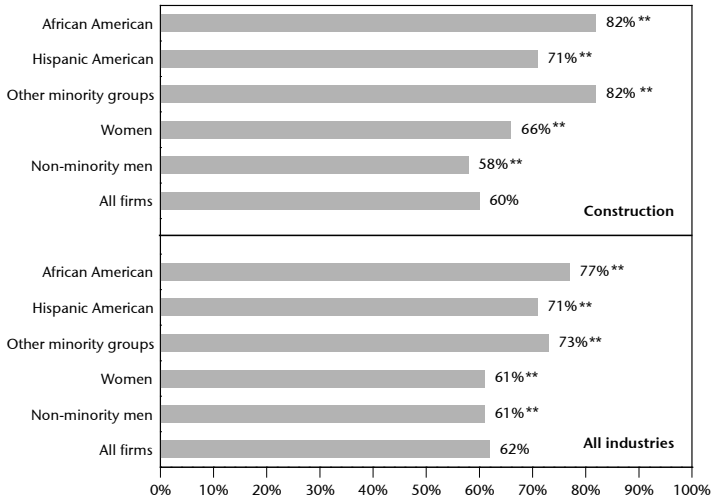
Figure G-4.
Comparative "failure" rates for firms that closed between 1992 and 1995, construction and all industries in the U.S.

Note:

** Denotes that the difference between the indicated proportion and the corresponding proportion for all firms is significant at the 95% confidence level.

Source:

U.S. Census Bureau, 1992 Characteristics of Business Owners Survey (CBO).



Results are similar when comparing successful versus unsuccessful status of closed firms for all sectors combined. Although this analysis is national in scope, these results suggest that higher overall closure rates for minority-owned firms in California may indicate higher rates of actual business failure.

[5] All CBO data should be interpreted with caution due to the fact that firms that did not respond to the survey cannot be assumed to have the same characteristics of ones that did. This report does not include CBO data on firm closure because firms not responding to the survey were found to be much more likely to have closed than ones that did. Holmes, Thomas J. and James Schmitz. 1996. "Nonresponse Bias and Business Turnover Rates: The Case of the Characteristics of Business Owners Survey." *Journal of Business & Economic Statistics*. 14(2): 231-241.

This study includes CBO data on firm success because there is no compelling reason to believe that closed firms responding to the survey would have reported different rates of success/failure than those closed firms that did not respond to the survey. Headd, Brian. U.S. Small Business Administration, Office of Advocacy. 2000. *Business Success: Factors leading to surviving and closing successfully*. Washington D.C.: 12.

Reasons for differences in failure rates. Several researchers have offered explanations for higher rates of successful closure among non-DBE firms and higher rates of failure among DBE firms:

- Minority business failure is largely due to barriers in access to capital. A regression analysis identifies initial capitalization as the most significant factor in determining firm viability. Because African American-owned businesses secure smaller amounts of debt equity in the form of loans, they are more inclined to fail. Difficulty in accessing capital is found to be particularly acute for minority firms in the construction industry.[6]

- Prior work experience in a family member's business and prior work experience in a similar business are found to be strong determinants of business viability. Because African American business owners are much less likely to have family business experience and/or similar business experience, their firms are less likely to survive.[7]

- Level of education is found to be a strong determinant in business survival. Level of education explains a significant portion of the gap in firm closure rates between African Americans and non-minority firms.[8]

- Non-minority business owners have the opportunity to pursue a much wider array of business activities, which increases their likelihood of closing successful businesses to pursue more profitable business alternatives. Minority business owners, especially those who do not speak English, have greatly limited employment options and are less likely to close a successful business.[9]

- The possession of greater initial capital and the generally higher levels of education among Asian Americans determine the high rate of survival of Asian American-owned firms compared to other minority-owned firms.[10]

Summary. Available data suggest that closure rates for African American-owned firms in California are higher than other firms. Based on national results for the construction industry, and DRC statistics on differential rates of DBE closures, African American-owned construction firms in California are likely to have had higher rates of closure than other construction firms in California. Although data are not available for just businesses located in Southern California, the statewide results are pertinent as Southern California accounts for 57 percent of total businesses in the state.

National data indicate that African Americans who owned and closed construction firms are much more likely to have done so because the firm was unsuccessful. Reasons why business failure rates are higher for African American-owned construction firms have been analyzed at the national level.

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[6] Bates, Timothy and Caren Grown. 1991. "Commercial Lending Practices and the Development of Black-Owned Construction Companies." Center for Economic Studies, U.S. Census Bureau.

[7] Robb, A. and Fairlie, R. 2005. "Why are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital." University of California, Santa Cruz.

[8] Ibid. 24.

[9] Bates, Timothy. 2002. "Analysis of Young Small Firms That Have Closed: Delineating Successful from Unsuccessful Closures." Center for Economic Studies, U.S. Census Bureau.

[10] Bates, Timothy. 1993. "Determinants of Survival and Profitability Among Asian Immigrant-Owned Small Businesses." Center for Economic Studies, U.S. Census Bureau.

Comparative Rates of Expansion and Contraction

Comparative rates of expansion and contraction of MBE and non-MBE firms are also useful indicators of the relative success of minority-owned businesses. As with rates of business closures, data are available for California but not smaller areas within the state.

Expansion. The SBA's 2005 study of minority business dynamics from 1997-2001 also examined rates of expansion and contraction for minority-owned firms in California that had paid employees at the starting time period for the analysis ("employer firms").

Figure G-5 compares the percentage of firms that increased their total employment between 1997 and 2001. About one-third of all firms expanded according to the SBA study. However, only 26 percent of African American-owned firms expanded over this period. Relatively more Hispanic American-owned firms expanded over this period compared with all firms in California. The percentage of Native American-owned firms in California that expanded was considerably above the percentage for all firms. The likelihood of expansion was about the same for California Asian American-owned firms as all California firms.

Results for African American-, Asian American- and Hispanic American-owned firms in California are consistent with what was found for the United States for 1997 to 2001.

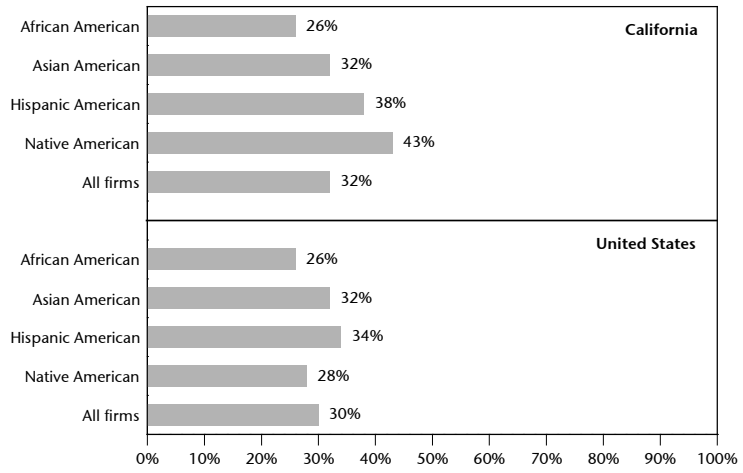
Figure G-5.
Percentage of firms that expanded employment 1997-2001, California and the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



The results above are for all firms, not just construction firms. The 2005 SBA study did not report expansion rates for construction firms in California, only for construction firms in the nation.

Figure G-6 examines the percentage of construction firms that expanded and the share of all firms that expanded for the United States. The construction industry showed differences in expansion rates for all groups. As with all firms for the nation, African American-owned construction firms were less likely to have expanded between 1997 and 2001 than all construction firms. Rates of expansion for construction were similar to rates for all industries for each group except for Hispanic American-owned firms, which showed higher rates of expansion in the construction industry. This suggests that differences in overall rates of expansion between minority-owned firms and all firms in California may also be true for the California construction industry.

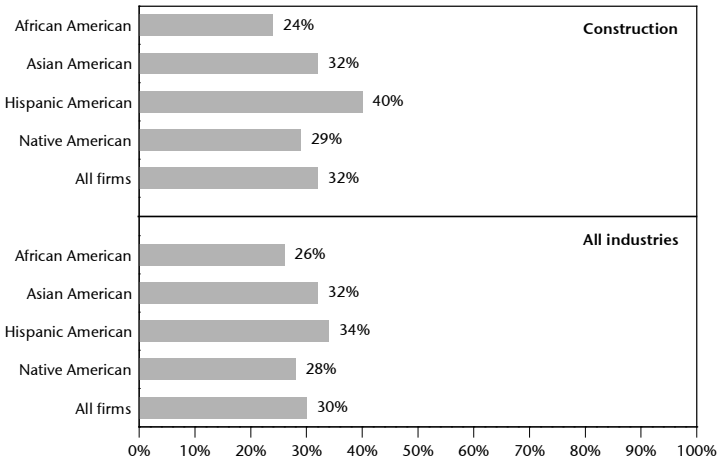
Figure G-6.
Percentage of firms that expanded employment 1997-2001, construction and all industries in the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



Contraction. Figure G-7 examines the percentage of firms that reduced their employment between 1997 and 2001. As with the analysis of expanding firms, these data track activity of employer firms beginning in 1997. African American- and Hispanic American-owned firms were less likely to have contracted than all firms, both in California and in the nation. Alternatively, Asian American- and Native American-owned firms were no more likely to have contracted than all firms, in both California and the United States.

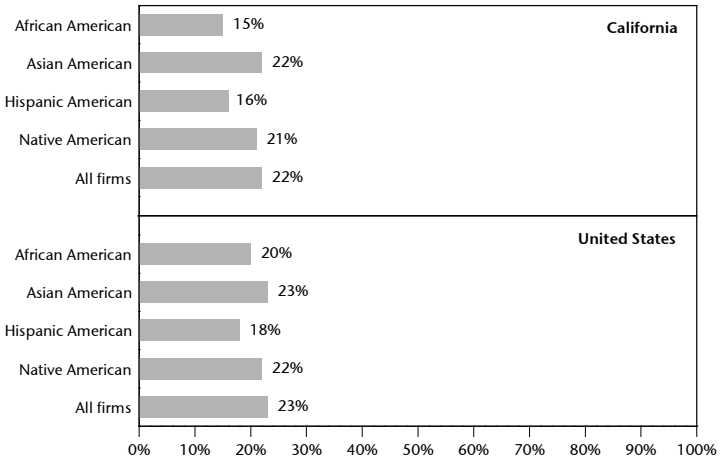
Figure G-7.
Percentage of firms that contracted employment 1997-2001, California and the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



The above results pertain to all firms in California. As with expansion, the SBA study did not report results for contraction in the California construction industry. Asian-American- and Hispanic American-owned construction firms had lower rates of contraction than all construction firms in the United States. Figure G-8 shows these results. Alternatively, African American- and Native American-owned construction firms were no more likely to have contracted than were all construction firms across the nation.

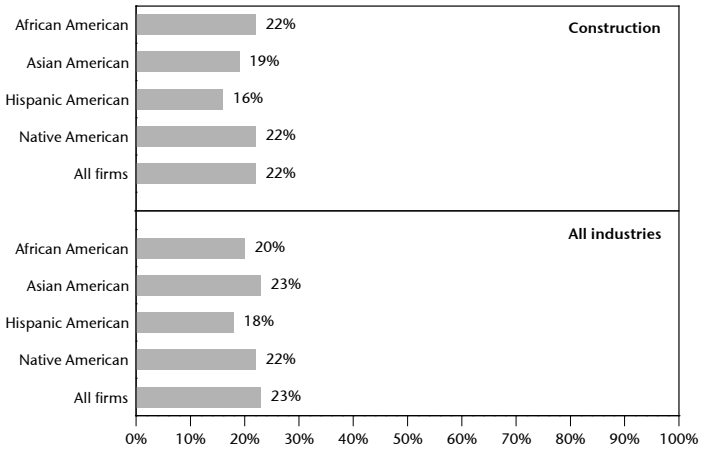
Figure G-8.
Percentage of firms that contracted employment 1997-2001, construction firms and all industries in the U.S.

Note:

Data refers only to employer firms. Sample sizes not reported, but statistics are consistent with SBA data quality guidelines.

Source:

Lowrey, Ying. 2005. "Dynamics of Minority-Owned Employer Establishments, 1997-2001." U.S. Small Business Administration Office of Advocacy. Washington, D.C.



Summary. Between 1997 and 2001, the SBA study found that 32 percent of California employer firms had expanded employment, 22 percent had contracted employment and 31 percent had closed.

- African American-owned firms were less likely to expand or contract (and more likely to close) than other firms.
- Asian American-owned firms were as likely to expand or contract compared with all firms in California.
- Hispanic American- and Native American-owned firms were more likely to expand and less likely to contract than all firms in the state.

Other than African American-owned firms, minority-owned employer firms fared as well or generally better than all firms in California by these measures of business performance.

Business Earnings/Receipts

Annual receipts and business earnings are also an indicator of the size and success of a business.

Business receipts from 2002 survey of business owners. BBC examined receipts for firms across all industries in San Diego County, Southern California and the U.S. using data from the 2002 Survey of Business Owners (SBO), conducted by the U.S. Census Bureau. BBC also analyzed receipts for the construction industry (data for just the engineering industry were not available).

All firms. Figure G-9 presents the mean annual receipts for 2002 for employer and non-employer firms, by race/ethnicity and gender. Figure G-10 presents the mean annual receipts for 2002 for firms with paid employees only ("employer firms").[11, 12]

[11] For some counties included in Southern California, SBO data are withheld from the public either to protect confidentially of individual companies or because data do not meet publication standards. No data were available for any Native American-owned firms in San Bernardino County, Native American employer firms in Ventura County or African American employer firms in Riverside County and San Bernardino County. The results presented in Figures G-9 and G-10 do not include figures for these groups.

[12] For county level data, the 2002 SBO only provided figures for each minority group and one figure for all firms, including publicly-traded companies and companies not classifiable by race or gender. From these data, figures for firms owned by non-Hispanic whites and men could not be produced.

Figure G-9.
Mean annual receipts (thousands) for all firms, by race/ethnicity and gender of owners, 2002

Note:

Includes both employer and non-employer firms.

Source:

2002 Survey of Business Owners, part of the U.S. Census Bureau's 2002 Economic Census.

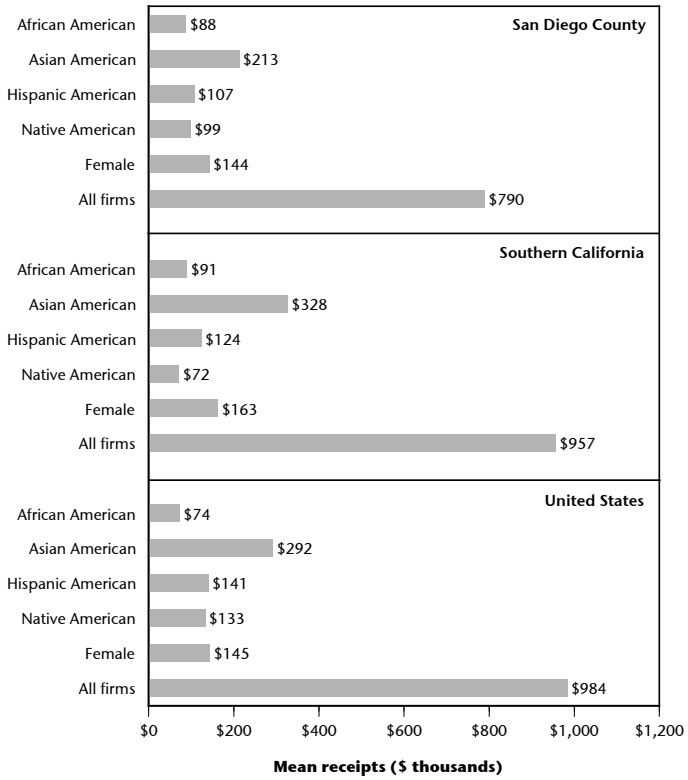


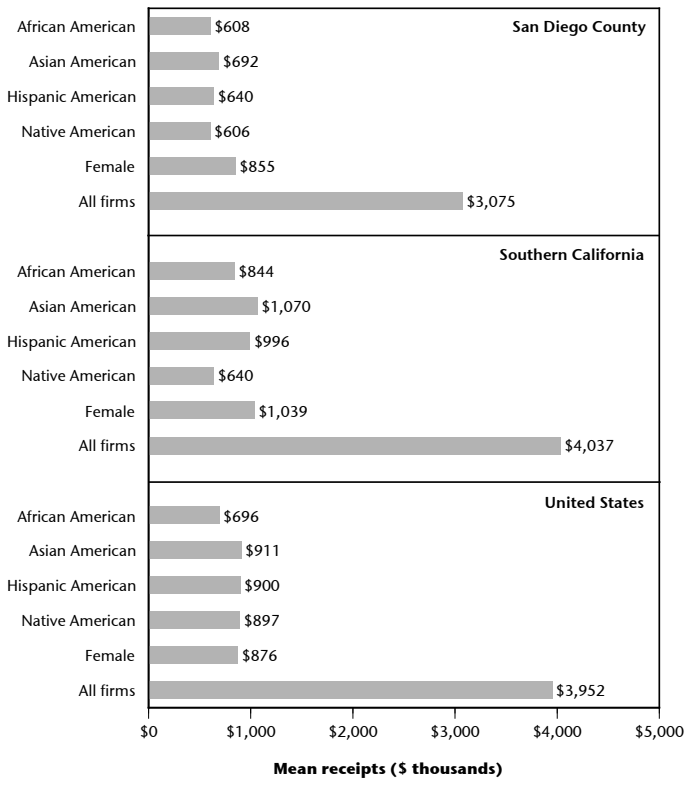
Figure G-10.
Mean annual receipts (thousands) for all firms with paid employees, by race/ethnicity and gender of owners, 2002

Note:

Includes only employer firms.

Source:

2002 Survey of Business Owners, part of the U.S. Census Bureau's 2002 Economic Census.



The SBO data for firms across all industries indicate that the average receipts for minority-owned businesses were much lower than those for all firms, with some minority groups fairing worse than others.

In San Diego County and Southern California, among employer and non-employer firms, businesses with African American and Native American owners had the lowest average receipts. For example, receipts for African American-owned firms in San Diego County averaged $88,000 in 2002 and the average for Native American-owned firms was $99,000 in that year (including both employer and non-employer firms). For all firms in San Diego County, 2002 receipts averaged $790,000. Firms owned by Asian Americans had the highest average receipts among minority-owned firms ($213,000) but were still far below the averages for all firms.

When only considering employer firms, differences in average receipts are also seen (see Figure G-10).

Construction industry. The study also analyzed SBO data for firms in the construction industry. Since data for construction firms specific to San Diego County and Southern California were not available, receipts for the construction industry are analyzed at the state and national level.

The results for the California and United States construction industries are presented in Figure G-11 and G-12. Figure G-11 presents the mean annual receipts for 2002 for employer and non-employer firms, by race/ethnicity and gender. Figure G-12 presents the mean annual receipts for 2002 for firms with paid employees only ("employer firms"). The SBO data used in this analysis includes incorporated and unincorporated firms, but not publicly-traded companies.[13]

[13] Since the 2002 SBO public access data presents figures for race and ethnicity separately, race/ethnicity groups could not be defined along the guidelines presented in Appendix J. Figures G-11 and G-12 present data first for each race regardless of Hispanic origin and then for both Hispanics and non-Hispanics regardless of race. There is also a third gender category for firms owned jointly by men and women.

Figure G-11.
Mean annual receipts (thousands) for construction firms, by race/ethnicity and gender of owners, 2002

Note:

Includes both employer and non-employer firms.

Source:

2002 Survey of Business Owners, part of the U.S. Census Bureau's 2002 Economic Census.

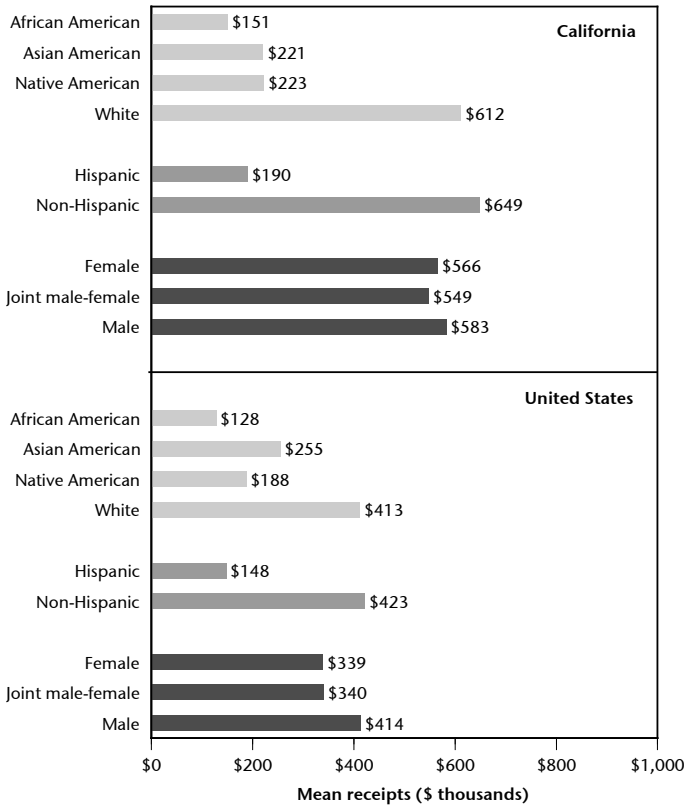


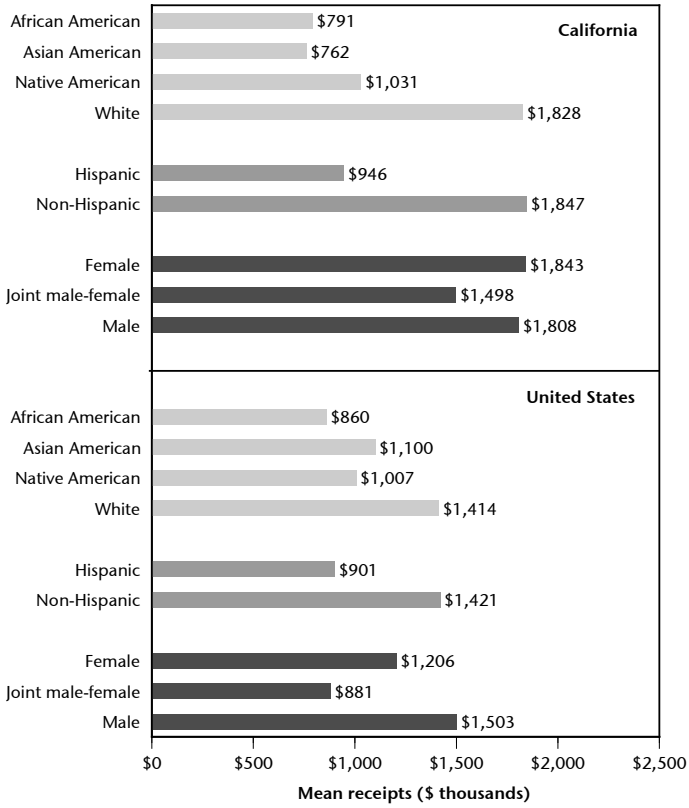
Figure G-12.
Mean annual receipts (thousands) for construction firms with paid employees, by race/ethnicity and gender of owners, 2002

Note:

Includes only employer firms.

Source:

2002 Survey of Business Owners, part of the U.S. Census Bureau's 2002 Economic Census.



The SBO data indicate that average 2002 receipts for minority-owned construction firms in California were considerably lower than for white and non-Hispanic firms. The percent difference is greatest when including non-employer firms.

- African American-owned firms' average receipts were about one-quarter the average for white-owned firms.

- Asian American- and Native American-owned firms had 36 percent of the average receipts of white-owned firms.

- Hispanic-owned firms had about 30 percent of the average receipts of non-Hispanic white-owned construction companies.

The patterns between minority and white or non-Hispanic construction firms are similar in California and the United States, although the disparities are larger in California. A recent SBA study found similar differences when examining firms in all industries across the U.S.[14]

These results for the California construction industry suggest that the differences in the 2002 mean receipts seen for all firms in Southern California and San Diego County may also be present for the local construction industry.

Receipts for female-owned construction firms were about the same as male-owned firms in California in 2002.

Summary. Results from the 2002 SBO indicate:

- Lower average receipts for African American-, Asian American-, Hispanic American-, Native American- and women-owned firms than all firms in San Diego County, Southern California and the United States.

- Low average receipts for African American-, Asian American-, Hispanic American- and Native American-owned construction firms compared to non-minority owned construction firms in California and the nation.

- Greater disparity in receipts between minority and non-minority construction businesses in California than in the nation.

[14] Lowrey, Ying. 2007. *Minorities in Business: A Demographic Review of Minority Business Ownership*. Office of Economic Research, Office of Advocacy, U.S. Small Business Administration.

Business earnings for self-employed individuals in construction and engineering. Academic researchers and policymakers have argued that self-employment is an effective means for disadvantaged workers to escape discrimination in the marketplace and advance economically.[15] In order to assess the relative business success of self-employed minorities and women in the construction and engineering industries, BBC evaluated earnings using the Public Use Micro-Sample (PUMS) data from the 2000 U.S. Census and the 2007 American Community Survey (ACS). For each sample, BBC examined incorporated and unincorporated business owners between ages 16 and 65 who reported positive business earnings. Since the 2000 Census reports earnings for the previous year, figures presented here are for 1999. The ACS is conducted continually throughout the year and reports earnings for one year prior to the date the survey is recorded, thus the figures presented from these data are for a 12-month time period between 2006 and 2007.

Construction. Figure G-13 gives 1999 earnings for construction business owners in San Diego County, Southern California and the United States. Due to small sample sizes in San Diego County, four categories are presented: minority- and non-minority-owned businesses and female- and male-owned businesses. Results for Subcontinent Asian Americans are not reported for Southern California analysis due to the small sample size.

In San Diego County, minority business owner earnings were less than three-quarters the earnings for non-Hispanic whites in 1999. Women who owned construction businesses averaged about 57 percent of the average earnings of men in the same year. These differences are statistically significant.

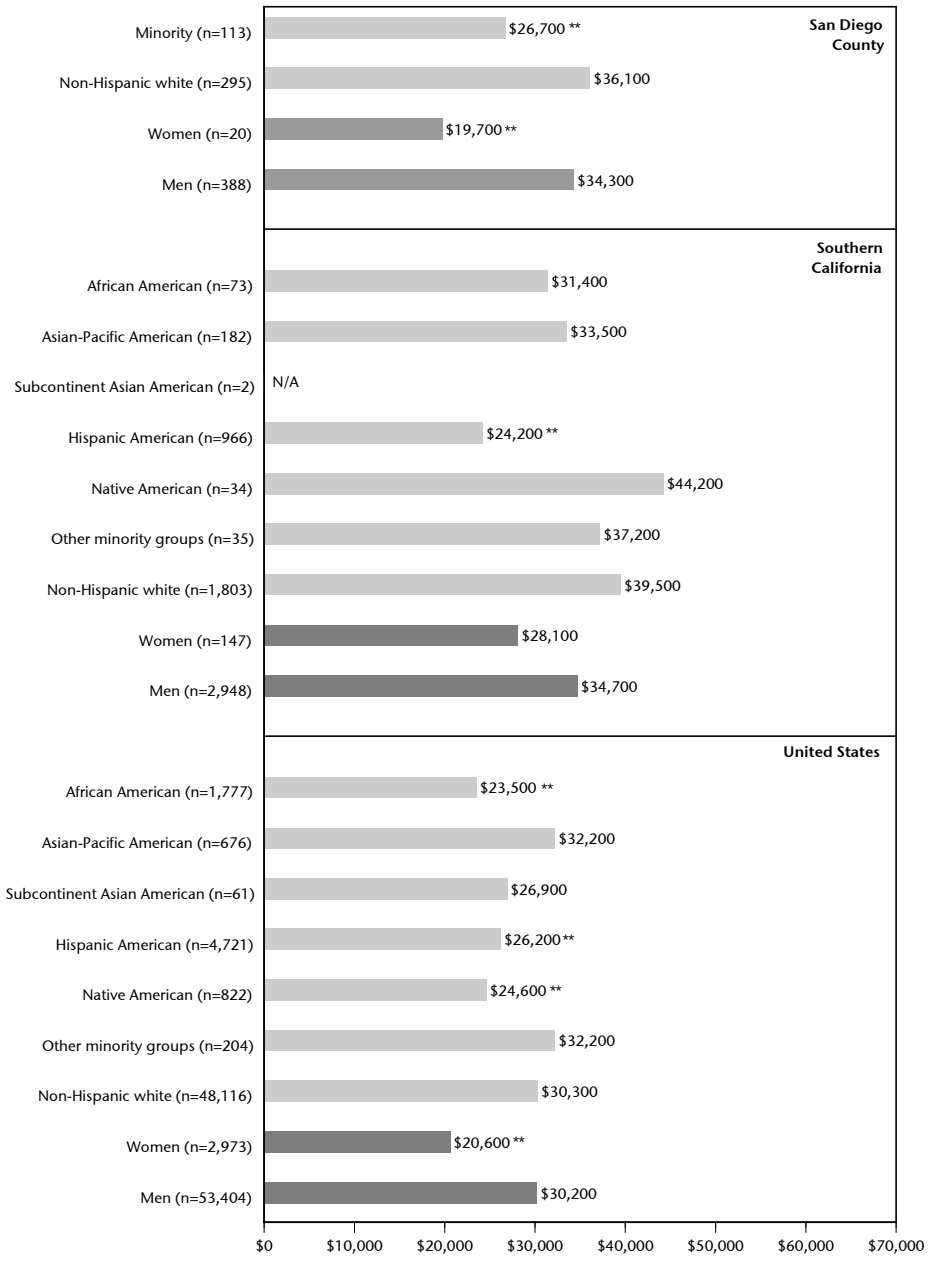
In Southern California, African American, Asian-Pacific American and Hispanic American construction business owners had substantially lower earnings than non-Hispanic white business owners; however, the differences are only statistically significant for Hispanic Americans. Hispanic American business owners' earnings averaged about 60 percent of those of non-Hispanic white owners. Female construction business owners in Southern California earned less than male construction business owners, although the difference is not statistically significant.

Figure G-14 presents findings based on 2006-2007 earnings. Due to small sample sizes in San Diego and Southern California, individual groups were combined for the analyses. In San Diego County, the "minority or female" owner category includes all minority owners and women owners and was compared to non-Hispanic white males. In Southern California, the figure for "all other minority groups" includes African Americans, Native American and "other minorities." (There were no Subcontinent Asian Americans business owners in the 2007 ACS sample of engineering workers in the Southern California.)

The 2006-2007 data show a statistically significant difference in earnings for "minority or female" business owners in San Diego County. The figures for Southern California indicate that Asian-Pacific American and Hispanic construction business owner earnings were substantially less than earnings for non-Hispanic whites, also a statistically significant difference. While earnings for "all other minority groups" were also lower than non-Hispanic whites, the difference is not statistically significant. However, earnings for women business owners in Southern California surpassed those for men in the construction industry in 2006-2007 (this difference is not statistically significant).

[15] Fairlie, Robert. 2001. "Earnings Growth Among Disadvantaged Business Owner." *Final Report to the Office of Advocacy, U.S. Small Business Administration.*

Figure G-13. Mean annual business owner earnings in the construction industry, 1999



Note:

The sample universe is business owners between ages 16 and 65 who reported positive earnings.

** Denotes statistical significance at the 95% confidence level.

Sample size too small for Subcontinent Asian American-owned firms in Southern California for purposes of this analysis.

Source:

BBC Research & Consulting from 2000 U.S. Census 5% Public Use Micro-sample data.

Figure G-14. Mean annual business owner earnings in the construction industry, 2006-2007

Note:

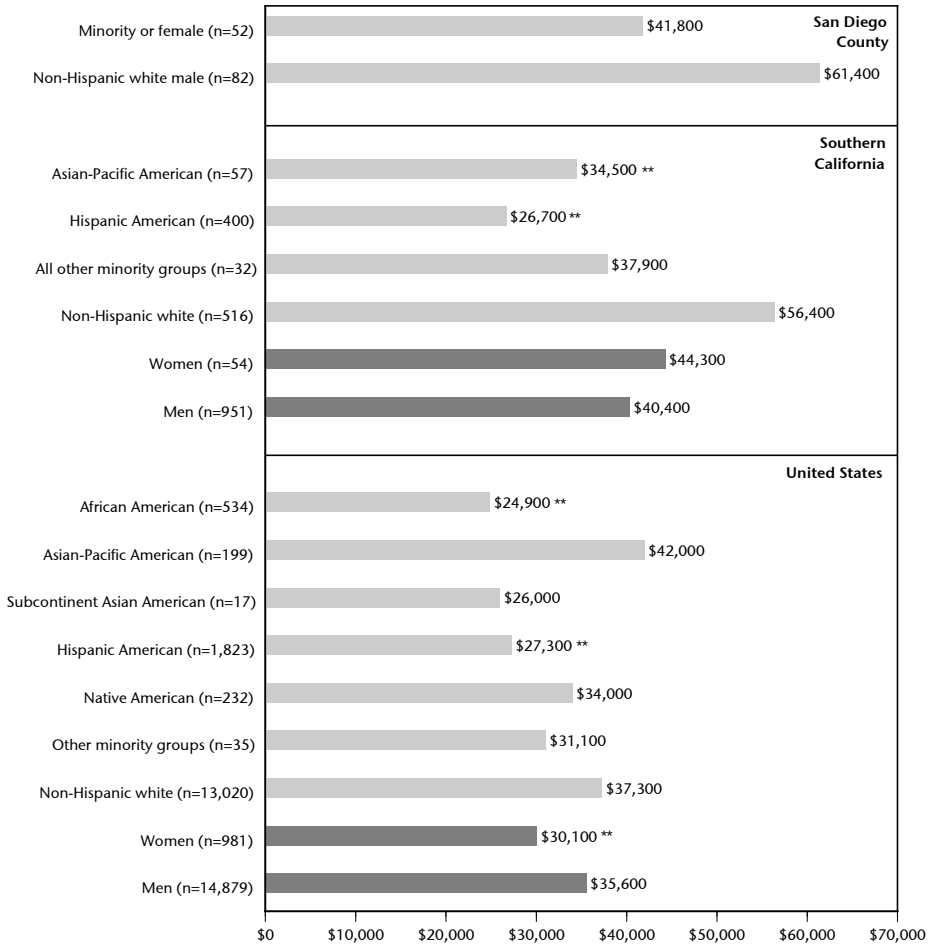
The sample universe is business owners between ages 16 and 65 who reported positive earnings.

** Denotes statistical significance at the 95% confidence level.

In Southern California, "All other minority groups" includes African American, Subcontinent Asian American, Native American and other minority groups. Sample sizes for these race/ethnicity groups were too small in Southern California for purposes of this analysis.

Source:

BBC Research & Consulting from 2007 ACS Public Use Micro-sample data.



Engineering. The study team also analyzed business earnings in engineering in San Diego County, Southern California and United States in 1999 and 2006-2007. The results are presented in figures G-15 and G-16. As sample sizes for San Diego County and Southern California are small, BBC combined groups for the analysis.

Figure G-15 shows that for engineering firms in San Diego County, "minority or female" business owners' earnings were, on average, lower than non-Hispanic white male business owners' earnings—a statistically significant difference. In Southern California, as well as the United States, minority engineering business owners earned less than non-Hispanic white owners and female owners earned less than their male counterparts in 1999. However, the disparities are only statistically significant for females.

Results for 2006-2007, shown in Figure G-16, are consistent with the disparities in engineering business earnings observed in 1999. Again, the disparity is only statistically significant for female business owners. (Due to the small sample size of business owners in the engineering industry in San Diego County, figures for San Diego County in 2006-2007 are not reported.)

Figure G-15.
Mean annual business owner earnings for engineering firms, 1999

Note:

The sample universe is business owners between ages 16 and 65 who reported positive earnings.

The data presented in this table include all business owners in the engineering industry. The study team was unable to restrict the population to the specific occupations defined in Appendix J due to small sample sizes.

** Denotes statistical significance at the 95% confidence level.

Source:

BBC Research & Consulting from 2000 U.S. Census 5% Public Use Micro-sample data.

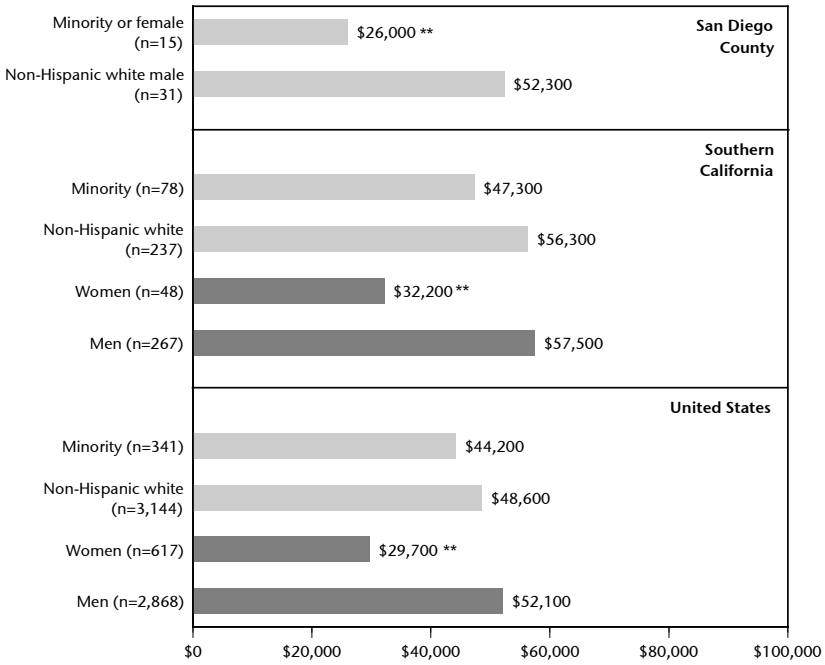


Figure G-16.
Mean annual business owner earnings for engineering firms, 2006-2007

Note:

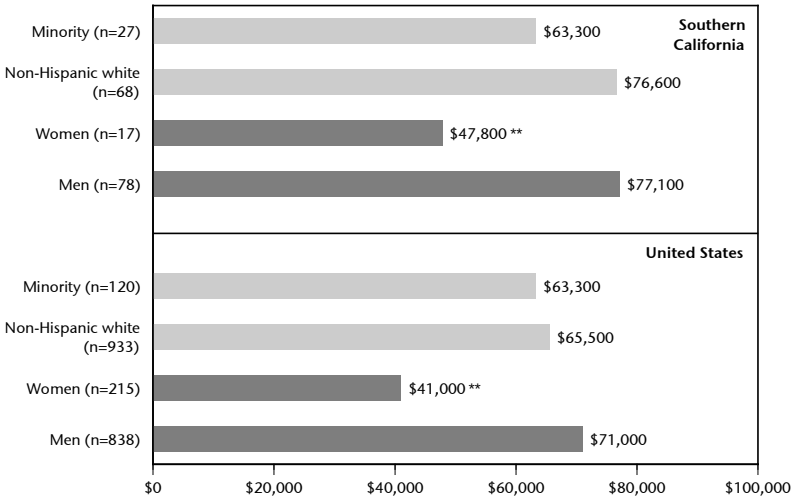
The sample universe is business owners between ages 16 and 65 who reported positive earnings.

The data presented in this table include all business owners in the engineering industry. The study team was unable to restrict the population to the specific occupations defined in Appendix J due to small sample sizes.

** Denotes statistical significance at the 95% confidence level.

Source:

BBC Research & Consulting from 2007 ACS Public Use Micro-sample data.



Regression analysis of business earnings. Differences in business owner earnings may be at least partially accounted for by race/ethnicity- and gender-neutral factors such as age, marital status or educational attainment. BBC therefore applied regression analysis to the 2000 and 2007 PUMS data to examine whether disparities in business earnings for 1999 and 2006-2007 remained after controlling for certain neutral factors. Consistent with past court-reviewed research, BBC applied an ordinary least squares (OLS) regression to create models for Southern California. The OLS model of construction and engineering business owner earnings in Southern California included 3,410 observations for 1999 and 1,100 observations for 2006-2007.

Consistent with model specifications that have been reviewed by the courts, the dependent variable in this model is the natural logarithm of business earnings. Business owners reporting zero or negative business earnings were excluded, as were observations where the Census Bureau had imputed the value of business earnings. Apart from variables indicating the race, ethnicity and gender of the business owner, the model also used available measures from the PUMS data considered likely to affect earnings potential, including age, age-squared, marital status, ability to speak English well, disability condition and educational attainment. This model is very similar to models reviewed by the courts.[16]

Results for the Southern California construction and engineering industries. In line with previous studies reviewed by the courts,[17] BBC developed an OLS model for the combined construction and engineering industries. Figure G-17 on the next page shows the results of this OLS model for 1999 earnings. The model indicates that several neutral factors were statistically significant in predicting the 1999 earnings of business owners in the Southern California combined construction and engineering industries:

- Older business owners had greater earnings, but this marginal effect declined for the oldest individuals;
- Business owners who are married tended to have greater business earnings;
- Owners who had the ability to speak English well, on average, had greater earnings; and
- Business owners with less than a high school degree tended to have lower business earnings (compared to business owners with just a high school degree).

[16] See, for example, *Northern Contracting, Inc. v. Illinois*, 2005 WL 2230195 at *21, N. 32 (N.D. Ill. Sept. 8, 2005), aff'd 473 F.3d 715 (7th Cir. 2007); *Sherbrooke Turf, Inc. v. Minn. DOT*, 345 F.3d 964 (8th Cir. 2003), *cert. denied*, 541 U.S. 1041 (2004).

[17] For example, National Economic Research Associates, Inc. 2000. *Disadvantaged Business Enterprise Availability Study*. Prepared for the Minnesota Department of Transportation; and National Economic Research Associates, Inc. 2004. *Disadvantaged Business Enterprise Availability Study*. Prepared for the Illinois Department of Transportation.

After accounting for neutral factors, there are statistically significant disparities for Hispanic American and female business owners. There is also a disparity for African Americans business owners, although this difference is not statistically significant, which may be due to small sample size.

Figure G-17.
Southern California combined construction and engineering business owner earnings model, 1999

Variable	Coefficient	t-statistic
Constant	7.215	18.98 **
Age	0.114	6.54 **
Age-squared	-0.001	-6.70 **
Married	0.419	8.72 **
Speaks English well	0.253	3.59 **
Disabled	0.044	0.82
Less than high school	-0.262	-3.92 **
Some college	0.042	0.74
Four-year degree	0.120	1.34
Advanced degree	0.364	3.44 **
African American	-0.159	-1.08
Asian-Pacific American	-0.088	-1.05
Subcontinent Asian American	0.099	0.34
Hispanic American	-0.261	-4.33 **
Native American	-0.013	-0.04
Other minority group	0.265	1.26
Female	-0.451	-4.51 **

Note: ** Denotes statistical significance at the 95% confidence level.
Source: BBC Research & Consulting based on analysis of 2000 Census Public Use Microdata Sample.

Figure G-18 shows the results of the combined engineering and construction model using 2006-2007 earnings. The results indicate statistically significant disparities in earnings received for Hispanic American business owners, while the disparity for African American business owners continued to not be statistically significant (possibly due to the small sample size). While the disparity in business earnings for female construction business owners remained in 2006-2007, the difference is no longer statistically significant.

Figure G-18.
Southern California combined construction and engineering business owner earnings model, 2006-2007

Variable	Coefficient	t-statistic
Constant	7.666	12.15 **
Age	0.106	3.60 **
Age-squared	-0.001	-3.64 **
Married	0.294	3.31 **
Speaks English well	0.383	4.09 **
Disabled	-1.422	-6.23 **
Less than high school	-0.205	-2.11 **
Some college	-0.034	-0.26
Four-year degree	0.208	1.50
Advanced degree	0.524	2.78 **
African American	-0.355	-1.27
Asian-Pacific American	-0.202	-1.60
Subcontinent Asian American	N/A	N/A
Hispanic American	-0.358	-2.44 **
Native American	0.152	0.61
Other minority group	0.228	0.50
Female	-0.132	-0.86

Note: ** Denotes statistical significance at the 95% confidence level.
There were no Subcontinent Asian Americans business owners in the 2007 ACS sample of engineering workers in the Southern California.

Source: BBC Research & Consulting based on analysis of 2007 ACS Public Use Microdata Sample.

Results specific to the Southern California construction industry. As the influences on business owner earnings might differ between construction firms and engineering firms, BBC developed separate models for construction and engineering earnings in 1999. Due to the small sample size for construction and engineering business owners in California in the 2007 ACS, BBC did not develop construction- and engineering-only models for 2006-2007 earnings.

Figure G-19 presents the results of the OLS model of business owner earnings specific to the Southern California construction industry in 1999.

Figure G-19.
Southern California construction business owner earnings model, 1999

Variable	Coefficient	t-statistic
Constant	7.449	18.94 **
Age	0.103	5.68 **
Age-squared	-0.001	-5.80 **
Married	0.446	8.91 **
Speaks English well	0.229	3.21 **
Disabled	0.061	1.09
Less than high school	-0.262	-3.88 **
Some college	0.042	0.73
Four-year degree	-0.003	-0.03
Advanced degree	0.246	1.68 *
African American	-0.177	-1.14
Asian-Pacific American	-0.074	-0.81
Subcontinent Asian American	0.557	2.34 **
Hispanic American	-0.280	-4.46 **
Native American	-0.027	-0.08
Other minority group	0.204	0.88
Female	-0.437	-3.72 **

Note: ** Denotes statistical significance at the 95% confidence level.
Source: BBC Research & Consulting, based on analysis of 2000 Census Public Use Microdata Sample.

The construction-only model of business owner earnings for 1999 shows very similar influences from neutral factors as observed in the 1999 combined construction and engineering model. After controlling for these influences, model results indicate significant disparities in earnings for Hispanic American and female business owners in the construction industry. African American, Asian-Pacific American and Native American business owners also have lower earnings, but the differences are not statistically significant. Model results also show that construction business owners in the Subcontinent Asian group are likely to earn more than similarly situated non-Hispanic white male owners.

Results specific to the engineering industry. Figure G-20 presents the results of the OLS regression model of business owner earnings for California engineering firms in 1999.

Figure G-20.
Southern California engineering business owner earnings model, 1999

Variable	Coefficient	t-statistic
Constant	3.887	2.50 **
Age	0.238	3.76 **
Age-squared	-0.003	-3.87 **
Married	0.124	0.78
Speaks English well	1.557	3.27 **
Disabled	-0.131	-0.62
Less than high school	0.664	1.68 *
Some college	-0.351	-1.05
Four-year degree	-0.054	-0.18
Advanced degree	0.103	0.33
African American	0.156	0.48
Asian-Pacific American	-0.198	-0.91
Subcontinent Asian American	-0.287	-0.81
Hispanic American	-0.065	-0.28
Native American	0.283	1.56
Other minority group	0.451	1.02
Female	-0.619	-3.40 **

Note: *,** Denote statistical significance at the 90% and 95% confidence levels, respectively.
Source: BBC Research & Consulting based on analysis of 2000 Census Public Use Microdata Sample.

The engineering business owner earnings model for 1999 indicates that women business owners in Southern California experience significant earnings disparities after accounting for neutral factors.

Results from the Availability Survey

The study team's Availability Survey provides information on firm revenue, size of contracts and past bidding success. This analysis includes results from the 2006 survey conducted for the 2007 Caltrans Study and the 2008-2009 survey.

Gross revenue of transportation construction, engineering, and material and equipment firms. Firms responding to the Availability Survey were asked to identify the size range for their gross revenue for the prior year. A second question asked for gross revenue across all California locations for multi-location firms.

Figure G-21 examines the distribution of MBEs, WBEs and majority-owned transportation construction industry firms by revenue class. Relatively more MBEs than majority-owned construction firms in California had revenues less than $1 million (a difference that is statistically significant). Almost 70 percent of minority-owned firms reported gross revenue of less than $1 million for 2005. Only 44 percent of majority-owned construction firms had revenues of less than $1 million.

Figure G-21 also shows that relatively few minority- and women-owned firms in the transportation construction industry in California reach annual revenue of more than $5 million per year. More than 25 percent of majority-owned firms reach this revenue threshold compared with 10 percent of MBEs and 15 percent of WBEs in the transportation construction industry.

Figure G-21. Distribution of firms by gross revenue net size class, transportation construction industry

Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.

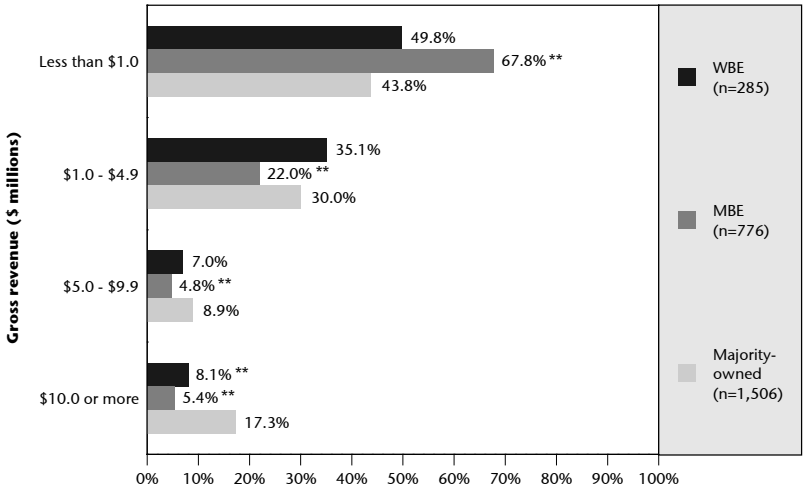


Figure G-22 provides greater detail on transportation construction industry firms that report gross revenue of $5 million or more in 2005. About 9 percent of Subcontinent Asian- and Asian-Pacific American-owned firms and 15 percent of WBEs reached this revenue level, more than other MBE groups but still short of the proportion of majority-owned firms (26%). Approximately 7 percent of African American-owned transportation construction industry firms reached this revenue level.

Figure G-22. Percentage of transportation construction industry firms with $5 million or more gross revenues for all California locations

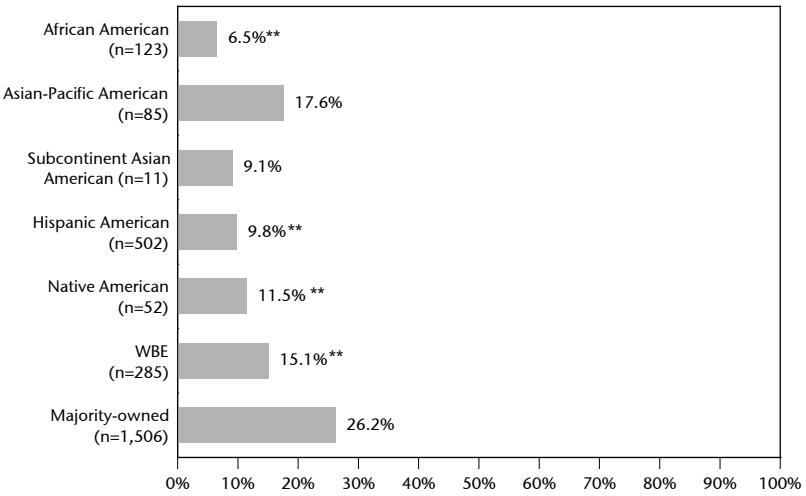
Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



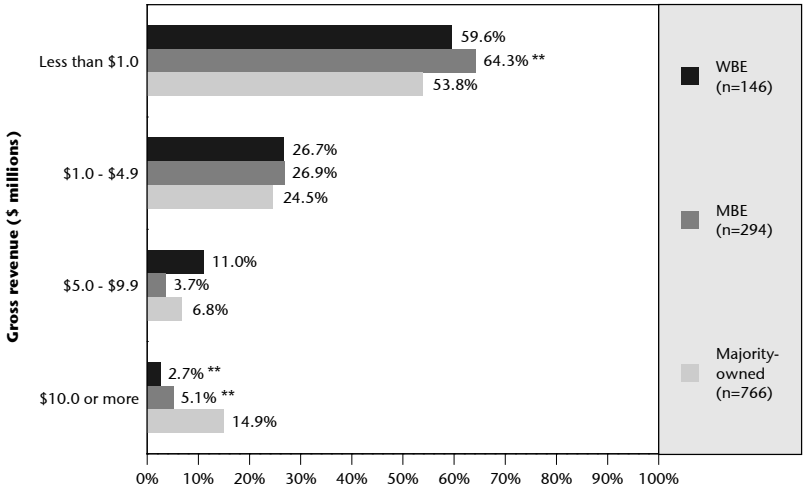
Transportation engineering industry firms interviewed in the Availability Survey were also asked to identify gross revenue across all California locations. Findings are similar to those for transportation construction industry firms (see Figure G-23):

- MBEs and WBEs were disproportionately represented in the lowest revenue size classes (though the difference for WBEs is not statistically significant).
- About 22 percent of majority-owned firms reported gross revenue of $5 million or more, a larger proportion than found for MBEs (9%) and WBEs (14%).

Figure G-23.
Gross revenue of company for all California locations, transportation engineering industry

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

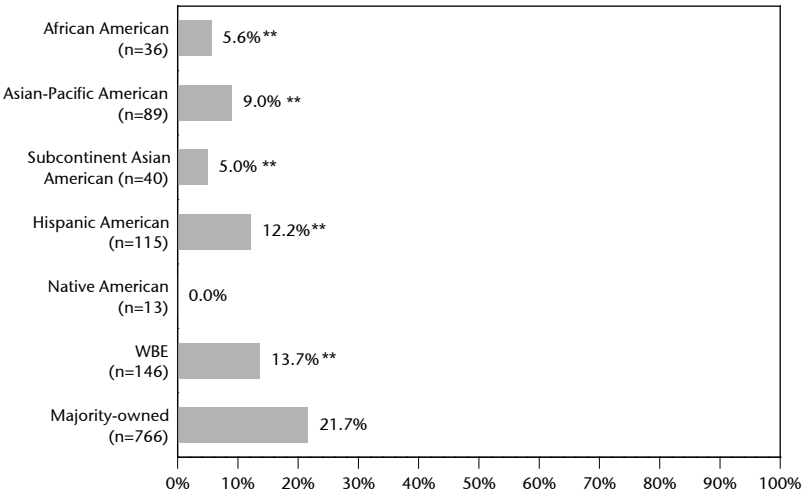


Approximately 14 percent of WBEs and 12 percent of Hispanic American-owned transportation engineering firms had revenue of $5 million or more (compared with 22% of majority-owned firms). About 6 percent of African American-owned firms reported this level of revenue (see Figure G-24).

Figure G-24.
Percentage of transportation engineering industry firms with $5 million or more in gross revenues for all California locations

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



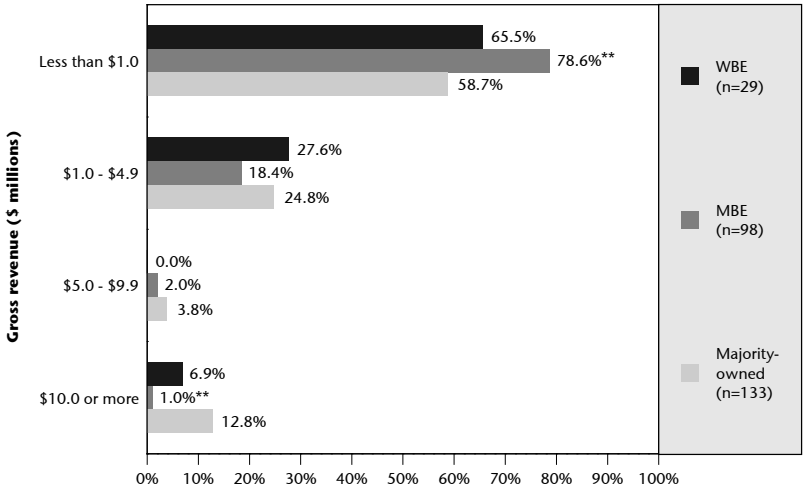
Transportation material and equipment industry firms interviewed in the Availability Survey were also asked to identify gross revenue across all California locations. Findings are similar to those for transportation construction industry and transportation engineering industry firms (see Figure G-25):

- MBEs and WBEs were disproportionately represented in the lowest revenue size classes (though the difference for WBEs is not statistically significant).
- About 17 percent of majority-owned firms reported gross revenue of $5 million or more, a larger proportion than found for MBEs (3%) and WBEs (7%).

Figure G-25.
Gross revenue of company for all California locations, transportation material and equipment industry

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

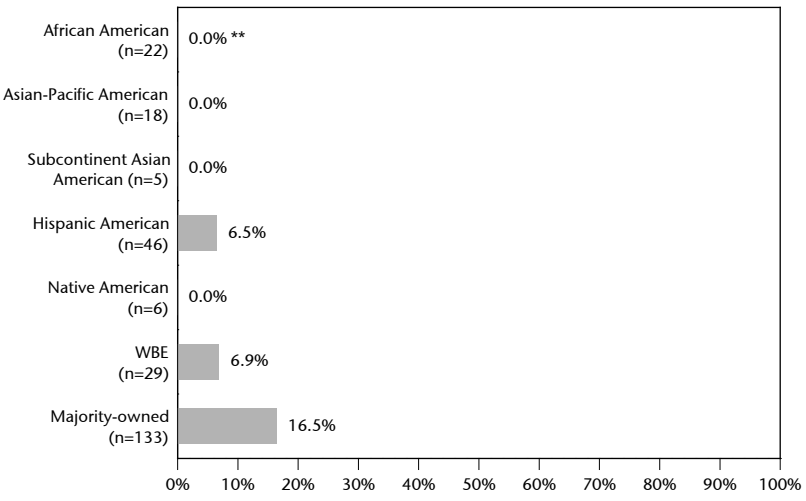


About 7 percent of Hispanic American-owned transportation material and equipment firms had revenue of $5 million or more (compared with 17% of majority-owned firms). Approximately 7 percent of WBEs in the transportation material and equipment industry reported this level of revenue (see Figure G-26).

Figure G-26.
Percentage of transportation material and equipment industry firms with $5 million or more in gross revenues for all California locations

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Largest transportation-related contract. The study team asked firms responding to the Availability Survey to identify the largest transportation-related contract the company was awarded in California in the past five years. Relatively more majority-owned construction firms have received contracts or subcontracts of at least $5 million compared with MBEs and WBEs. Fewer than 8 percent of MBEs and WBEs had received contracts or subcontracts of at least $5 million compared with 19 percent of majority-owned firms (see Figure G-27).

Figure G-27.
Largest transportation-related contract or subcontract that the company was awarded in California in the past 5 years, transportation construction firms

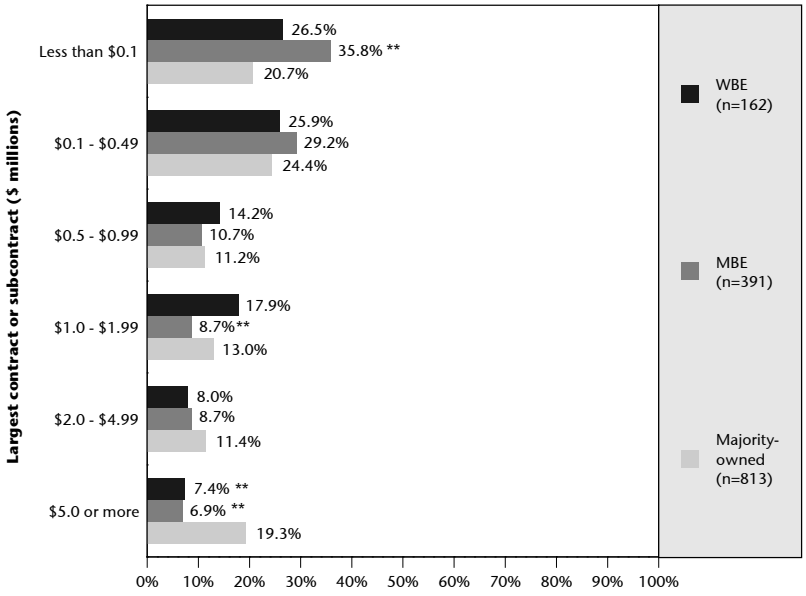
Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Among transportation engineering firms, about 11 percent of majority-owned firms and 9 percent of minority-owned firms had received contracts or subcontracts of at least $5 million. Only 4 percent of WBEs had received work of this size. Figure G-28 examines the largest contract or subcontract received by transportation engineering firms.

Figure G-28.
Largest transportation-related contract or subcontract that the company was awarded in California in the past 5 years, transportation engineering firms

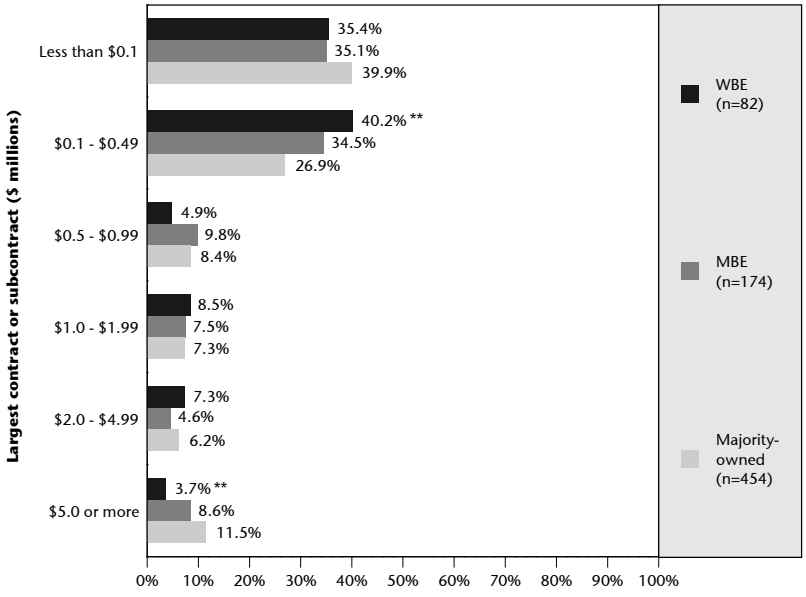
Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Among transportation material and equipment firms, about 5 percent of majority-owned firms had received contracts or subcontracts of at least $5 million. No MBEs or WBEs in the availability survey reported having received work of this size. Figure G-29 examines the largest contract or subcontract received by transportation material and equipment firms.

Figure G-29.
Largest transportation-related contract or subcontract that the company was awarded in California in the past 5 years, transportation material and equipment firms

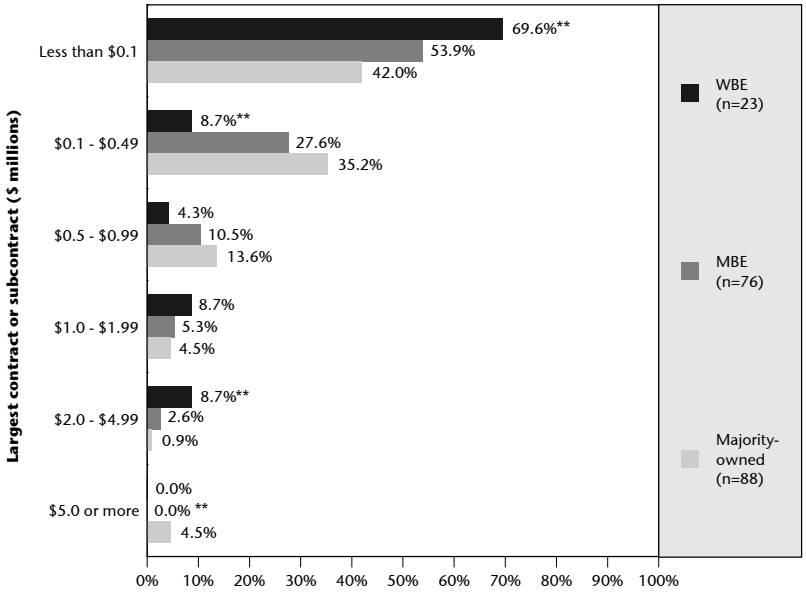
Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Past bidding on government and private sector work. The Availability Survey asked firm owners and managers whether they had submitted a bid or proposal (including submitting a price quote as a sub or supplier) on transportation-related projects in the past five years. Firms were asked about bidding as a prime or subcontractor on any part of a:

- State, city, county or local transportation agency project; and
- Private sector project.

Responses only include firms that reported being qualified and interested in future government transportation contracting work.

The study team separately examined responses for firms in construction subindustries (including supply and trucking specializations), firms in engineering and professional services subindustries (including engineering firms and related businesses) and firms in material and equipment subindustries. Results indicate the extent to which firms have pursued government and private sector work.

Transportation construction industry firms' past bidding on public sector work. Approximately 58 percent of majority-owned transportation construction industry firms reporting to be qualified and interested in future transportation construction work in the Availability Survey reported bidding on government work as a prime or a subcontractor, supplier or trucker in the past five years (including submitting price quotes). About 33 percent had bid as a prime contractor and 25 percent had only bid as a subcontractor (including submitting price quotes for supplies or for trucking).

Fewer minority- and women-owned firms reported bidding on past public sector work, as shown in Figure G-30.

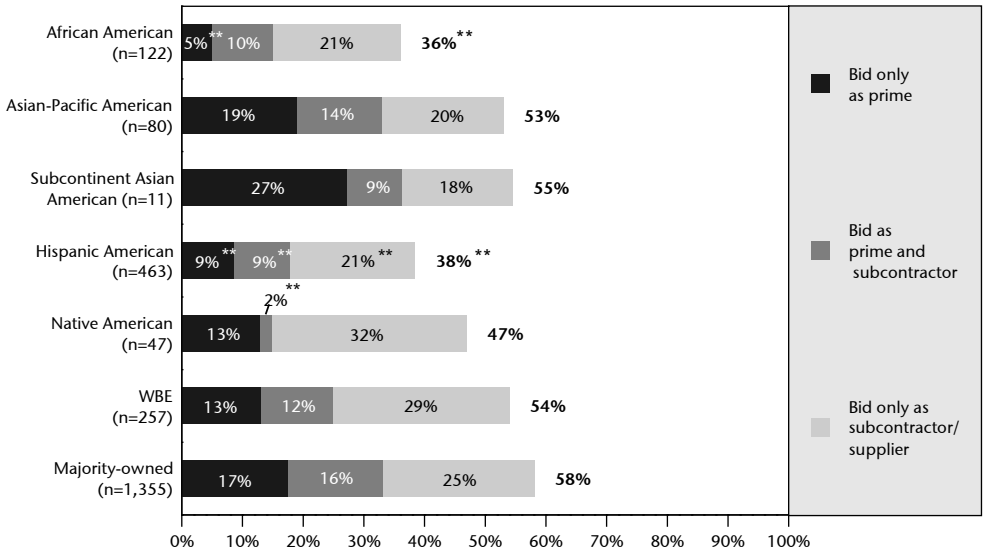
- About half of women-, Asian-Pacific American-, Subcontinent Asian American- and Native American-owned firms reported having bid on past government work.

- About 38 percent of Hispanic American- and 36 percent of African American-owned firms reported bidding on past public sector work.

Majority-owned firms were more likely to have bid on prime contracts (33% of firms) and subcontracts (41%) relative to minority-owned firms. About 33 percent of Asian Pacific American-owned firms and 36 percent of Subcontinent Asian American-owned firms had bid on a prime contract. Other groups of minority-owned firms were less likely to have bid on a government contract as a prime. No group of minority-owned firms were as likely to have bid on a government subcontract as majority-owned firms.

The proportion of women-, Subcontinent Asian- and Asian-Pacific American-owned firms bidding on past government projects was relatively close to the proportion for majority-owned firms.

Figure G-30.
Percent of available transportation construction industry firms that reported submitting a bid for any part of a government project in the past 5 years



Note: WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

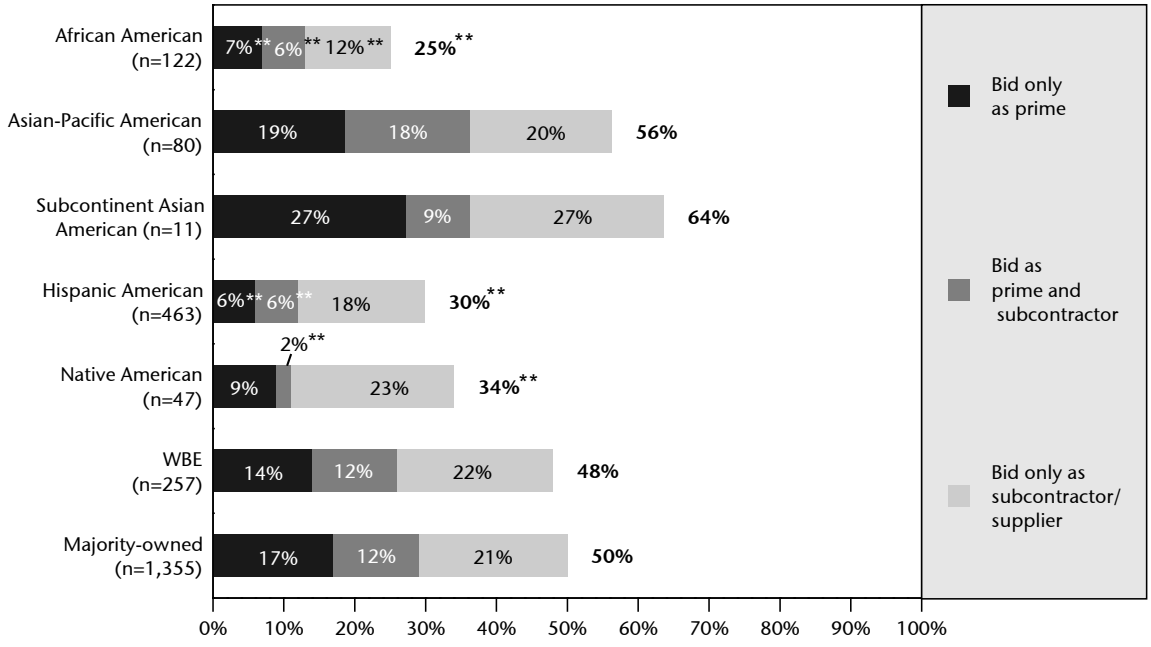
Source: BBC Research & Consulting from the 2006 and 2008 Availability Surveys.

Transportation construction industry firms' past bidding on private sector work. Telephone interviewers also asked firm owners and managers if the firm had bid on a private sector transportation project in the past five years. Except for Subcontinent Asian American- and Asian-Pacific American-owned businesses, each group of transportation industry firms was less likely to have bid on private sector work than on government work.

Asian-Pacific American- and Subcontinent Asian American-owned firms were more likely to have bid on private sector work than majority-owned firms.

Only 12 percent of African American-owned transportation construction industry businesses reported bidding on private sector work as a prime and only 19 percent indicated bidding as a subcontractor. African American-owned firms were more likely to have bid as primes or subs on government projects. Figure G-31 presents these results.

Figure G-31.
Percent of available transportation construction industry firms that reported submitting a bid for any part of a private sector project in the past 5 years



Note: WBE is white women-owned firms.
** Statistically significant difference from majority-owned firms at the 95% confidence level.

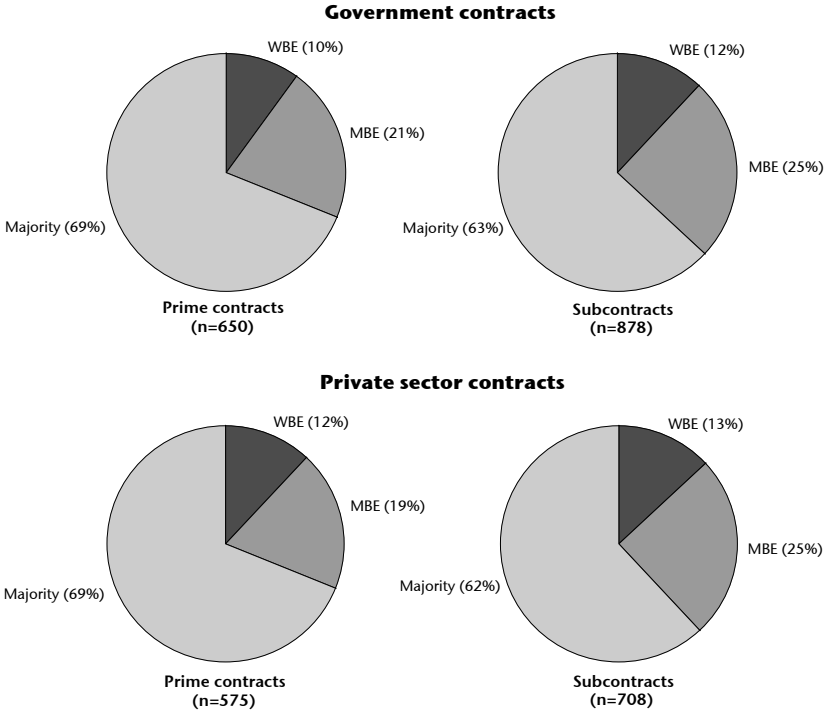
Source: BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Summary of transportation construction firm competition for government and private sector work. The pie charts in Figure G-32 examine the relative share of all firms competing for government and private sector prime contracts and subcontracts based on responses from firms in the 2006 and 2008 Availability Survey.

Of the 650 transportation construction industry firms in the Availability Survey that reported bidding on public sector prime contracts in the past five years, 69 percent are majority-owned, 21 percent are MBEs and 10 percent are WBEs. The share of firms bidding as primes that are MBE/WBEs is about the same for private sector work.

Among the 878 firms in the Availability Survey competing for public sector subcontracts, 63 percent of the firms are majority-owned. MBE/WBE share of firms bidding on this subcontract work varies little between government contracts and private sector contracts.

Figure G-32.
MBE and WBE share of transportation construction industry firms bidding on different types of work in California in the past 5 years



Note: WBE is white women-owned firms.
Total may not add to 100 percent due to rounding.

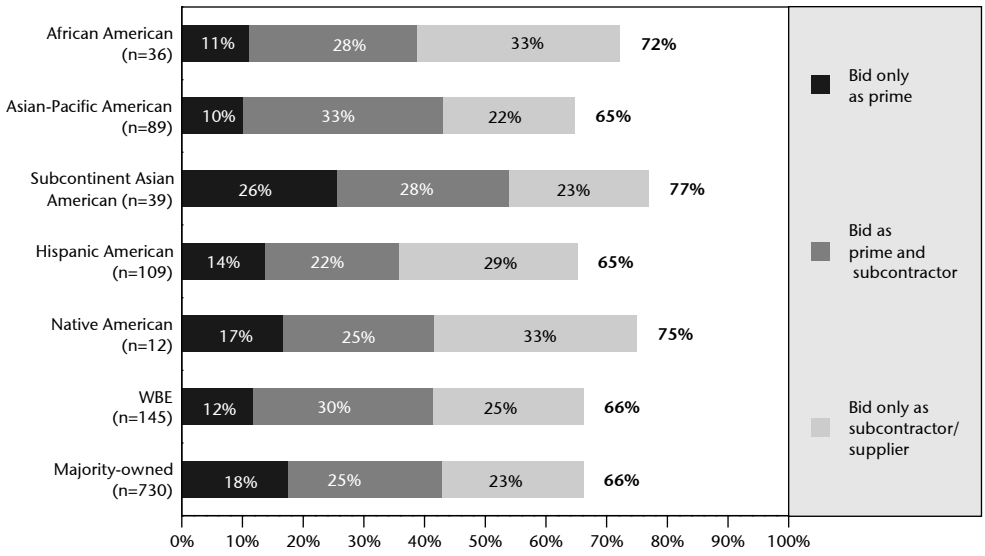
Source: BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Transportation engineering industry firms' past bidding on government work. Transportation engineering industry firms are more likely to have bid on past government projects as a prime consultant or subcontractor than transportation construction industry firms. As shown in Figure G-33, among majority-owned firms, 66 percent had submitted proposals as a prime or subcontractor on public sector projects in the past five years. About the same share of African American-, Hispanic American- and Asian-Pacific American-owned transportation engineering industry firms had proposed as a prime or subcontractor on past government projects.

Results for WBEs were similar to majority-owned firms, except that WBEs were more likely to have bid as subcontractors (54% compared with 49% of majority-owned firms).

This pattern is evident for minority-owned firms as well, with the exception of Subcontinent Asian American-owned firms. Most groups of firms were about as likely to have proposed on past government projects as majority-owned firms, but a greater proportion attempted to participate as a subcontractor.

Figure G-33.
Percent of available transportation engineering industry firms that reported submitting a bid for any part of a government project in the past 5 years



Note: WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

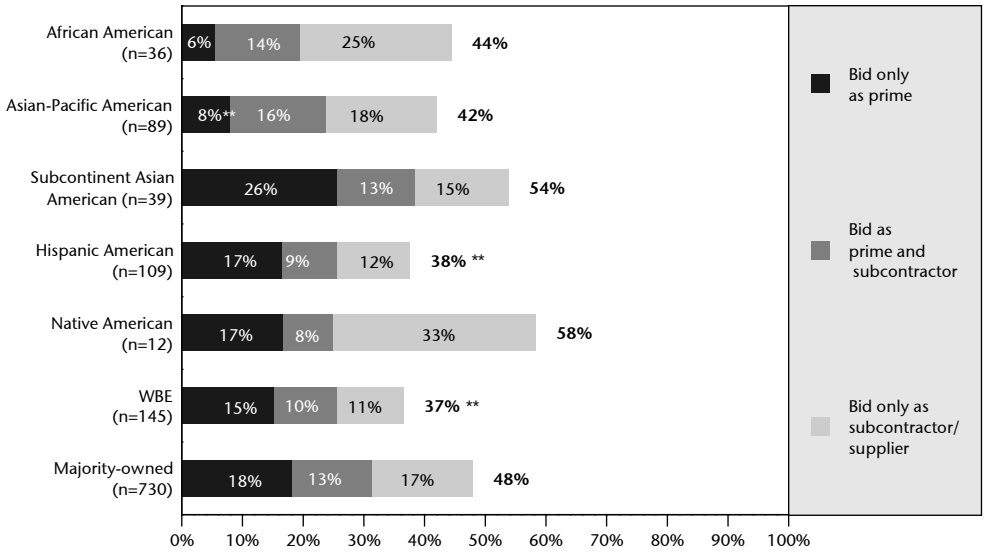
Source: BBC Research & Consulting from the 2006 and 2008 Availability Surveys.

Transportation engineering industry firms' past bidding on private sector work. One-half of majority-owned transportation engineering industry firms had proposed as prime or subcontractors on private sector work in the past five years. This was higher than MBEs and WBEs, except for Native American- and Subcontinent Asian American-owned firms:

- For most groups, MBEs were somewhat less likely than majority-owned firms to have bid as prime contractors.
- WBEs and Hispanic American-owned firms were less likely to bid as subcontractors than majority-owned firms (21% versus 30%);
- Fewer MBEs and WBEs had competed for private sector prime contracts compared with majority-owned firms (with the exception of firms owned by Subcontinent Asian Americans).

Figure G-34 examines this information.

Figure G-34.
Percent of available transportation engineering industry firms that reported submitting a bid for any part of a private sector project in the past 5 years



Note: WBE is white women-owned firms.
** Statistically significant difference from majority-owned firms at the 95% confidence level.

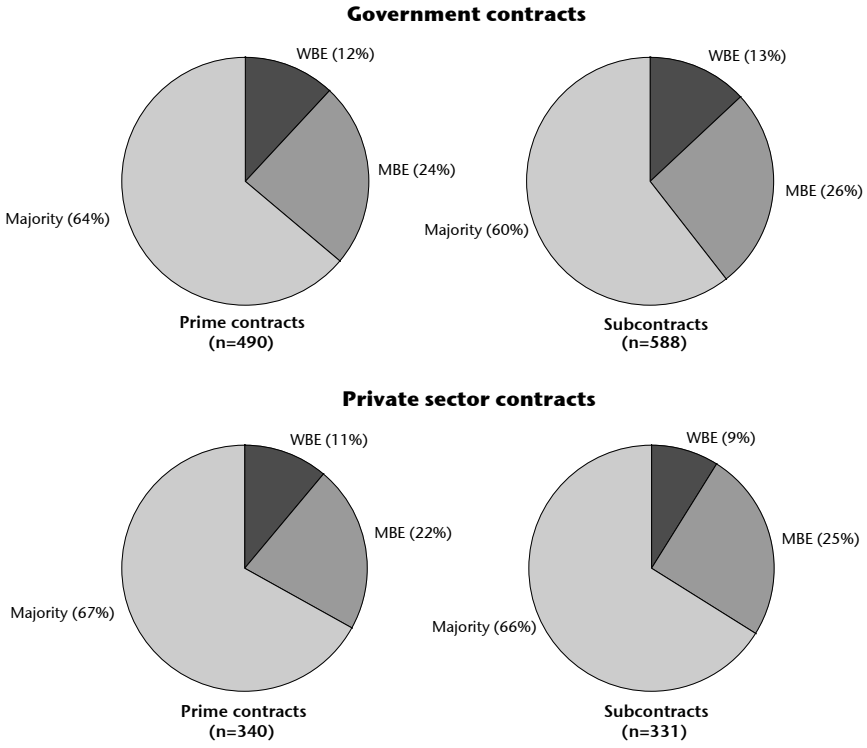
Source: BBC Research & Consulting from the 2006 and 2008 Availability Surveys.

Summary of transportation engineering firm competition for government and private sector work. As with transportation construction firms, the study team analyzed the relative share of engineering industry firms competing for public and private sector prime contracts and subcontracts. These results are based on counts of firms reporting that they compete for each type of work in the Availability Survey.

As shown in Figure G-35, MBE/WBEs comprise a larger share of transportation engineering industry firms competing for public sector prime contracting work than firms competing for private sector prime contracting work (36% for the public sector versus 33% in the private sector).

MBE/WBEs comprised 40 percent of firms pursing government subcontracts, more than MBE/WBE representation among firms seeking subcontracts in the private sector (34%).

Figure G-35.
MBE and WBE share of transportation engineering industry firms proposing on different types of work in California in the past five years

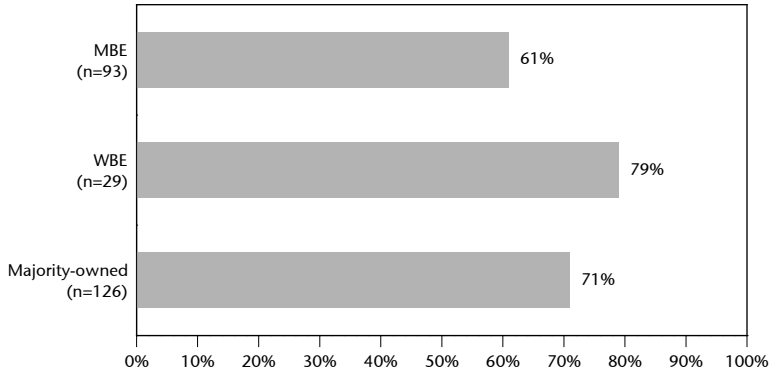


Note: WBE is white women-owned firms.
Total may not add to 100 percent due to rounding.

Source: BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Transportation material and equipment industry firms' past bidding on government work. Transportation material and equipment industry firms are more likely to have bid on past public sector projects as a prime consultant or subcontractor than transportation construction industry firms. As shown in Figure G-36, among majority-owned firms, 71 percent had submitted proposals or bids to government agencies in the past five years. Only 61 percent of minority-owned transportation engineering industry firms had proposed as a prime or subcontractor on past government projects. Results for WBEs were similar to majority owned firms.

Figure G-36.
Percent of available transportation material and equipment industry firms that reported submitting a bid for any part of a government project in the past *5* years

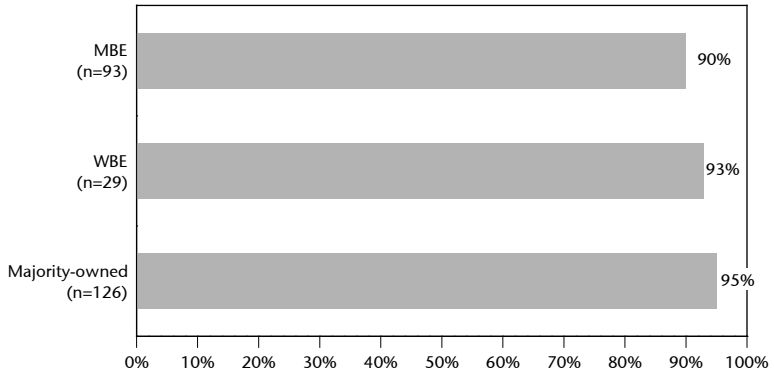


Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Transportation material and equipment industry firms' past bidding on private sector work. Nearly all of majority-owned transportation material and equipment industry firms had submitted bids or price quotes for private sector work in the past five years. Figure G-37 presents this information.

Figure G-37.
Percent of available transportation material and equipment industry firms that reported submitting a bid for any part of a private sector project in the past *5* years



Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

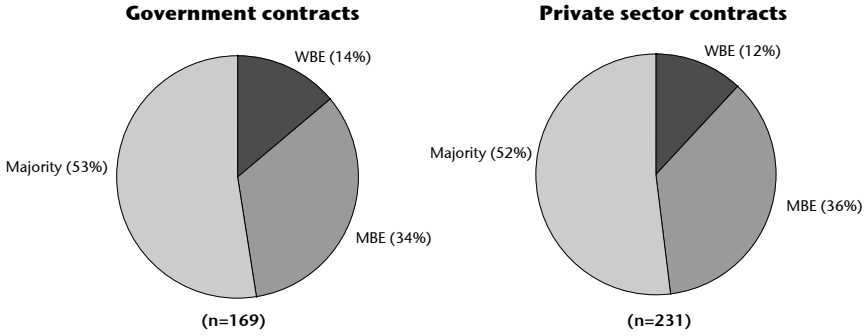
Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Summary of transportation material and equipment firm competition for government and private sector work. As with transportation construction and engineering firms, the study team analyzed the relative share of material and equipment industry firms competing for public or private sector contracts. These results are based on counts of firms reporting that they compete for each type of work in the Availability Survey.

As shown in Figure G-38, the share of MBE/WBE transportation material and equipment industry firms competing for public sector work is similar to the share competing for private sector work (48% for both sectors).

MBE/WBEs represented a higher proportion of firms in the transportation material and equipment industry than for either transportation construction or engineering.

Figure G-38.
MBE and WBE share of transportation material and equipment industry firms proposing on different types of work in California in the past five years



Note: WBE is white women-owned firms.
Total may not add to 100 percent due to rounding.

Source: BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Relative success of firms in pursuing government and private sector work. Only a portion of the firms reporting bidding on different types of work were successful in obtaining that work. For example, 78 percent of majority-owned transportation construction industry firms that indicated bidding on government work reported being awarded some part of a public sector contract in the past five years. A similar share of majority-owned transportation construction firms that pursued private sector work were successful in receiving that work (80% of bidders obtained a contract or subcontract).

These statistics for overall "bidding success rates" combine firms bidding as prime contractors, subcontractors, suppliers and truckers (and combines awards by type). Figures G-39 and G-40 compare success rates of minority-, women- and majority-owned firms in the transportation construction industry when pursuing government and private sector work. Figures G-41 and G-42 examine results for the transportation engineering industry. Bid success rates for the transportation material and equipment industry are presented in Figures G-43 and G-44.

Government transportation construction work. Figure G-39 examines the bidding success rates of transportation construction industry firms pursuing any part of a government contract. As shown, more than 70 percent of Asian-Pacific American- and Hispanic American-owned firms that reported bidding or submitting price quotes on government work (as primes, subs, suppliers, truckers) were successful in obtaining at least one contract or subcontract over the prior five years.

While only 50 percent of Subcontinent Asian American-owned firms that bid on government work were successful in obtaining such work, this is based on a relatively small number of responses (only 6 firms). WBEs had a lower success rate than majority-owned firms when pursuing government work.

Figure G-39.
Success rate of transportation construction firms bidding on government work

Note:

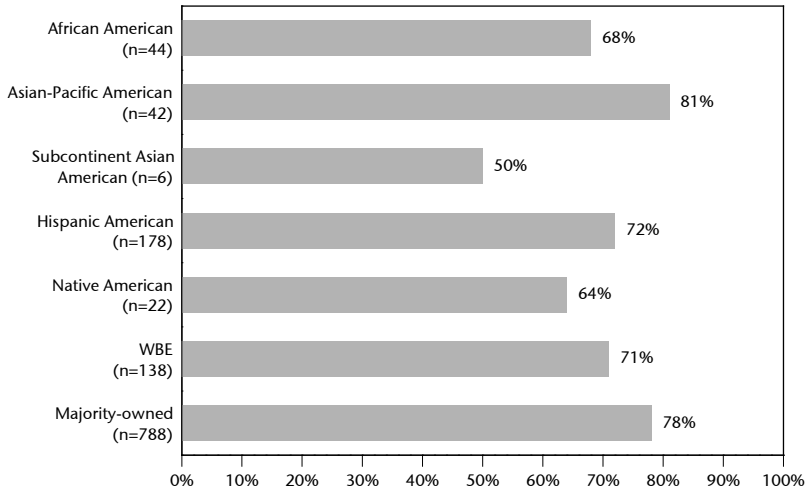
Success rate is the percentage of firms bidding on work in the past five years that received contracts or subcontract.

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Private sector transportation construction work. When bidding on private sector work, 80 percent of majority-owned transportation construction industry firms were successful in receiving some work from this sector. The success rate of WBEs was similar.

Some MBE race/ethnicity groups pursuing private sector work were not as successful as majority-owned firms based on the survey responses:

- Only 60 percent of Asian-Pacific American-owned transportation construction industry firms seeking bidding on private sector work had received contracts or subcontracts, a large disparity. (This result is statistically significant.)

- About 72 percent of Hispanic American-owned firms bidding on private sector work had obtained contracts or subcontracts.

These findings are summarized in Figure G-40.

Figure G-40. Success rate of transportation construction firms bidding on private sector work

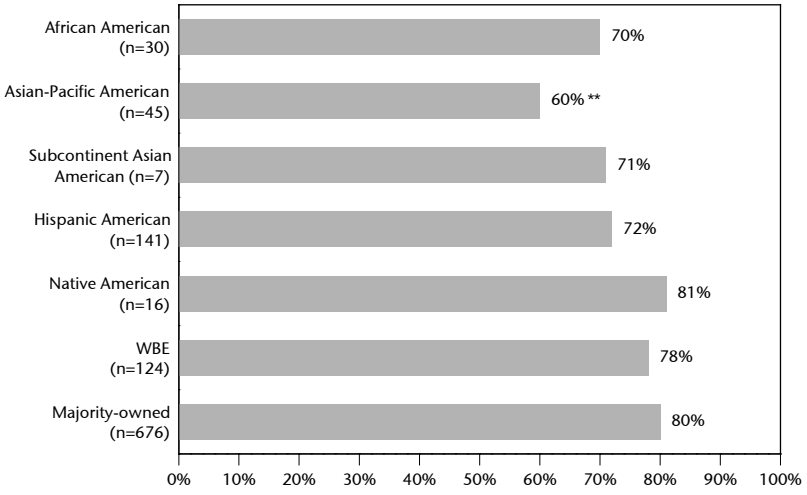
Note:

WBE is white women-owned firms.

** Statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.



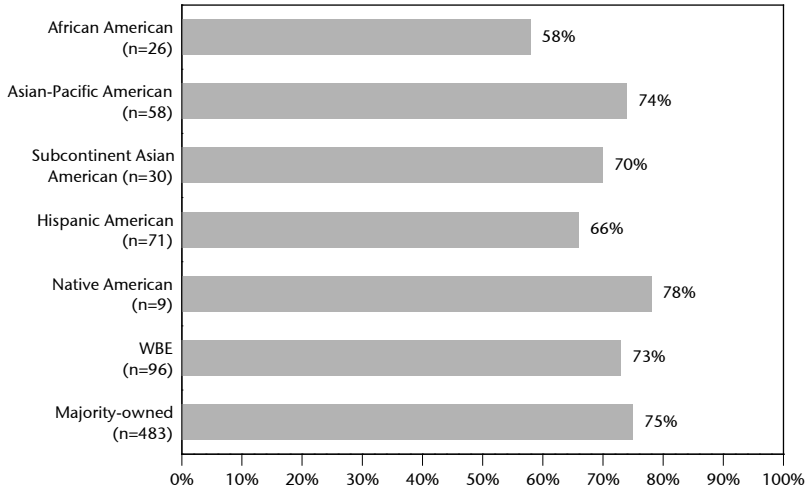
Government transportation engineering work. The study team performed similar analyses for transportation engineering industry firms responding to the Availability Survey. Figure G-41 examines the success rate of transportation engineering industry firms in obtaining government work as prime consultants or subcontractors.

About 75 percent of majority-owned firms seeking government prime contracts or subcontracts were successful in obtaining some government work over the past five years. Asian-Pacific American-, Native American-owned firms and WBEs had a similar rate of success pursuing government engineering work (74%, 78% and 73% respectively). African-American-owned firms were less successful than all other groups in winning government work (58%).

Figure G-41.
Success rate of transportation engineering firms bidding on government work

Note:
WBE is white women-owned firms.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Private sector transportation engineering work. More than three-quarters of majority-owned transportation engineering industry firms that had bid on any private sector work (including subcontracts) were successful in receiving some work from this sector.

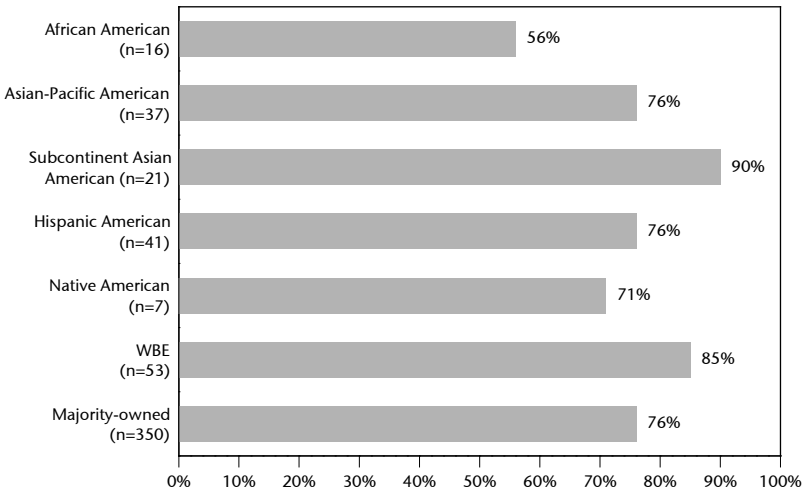
Relatively fewer African American-owned transportation engineering industry firms were successful when seeking this work (56%). This is a large disparity, but is not statistically significant and is based on a relatively small number of African American-owned firms that had sought private sector work (16 firms).

As shown in Figure G-42, other minority-owned firms and WBEs that had proposed on private sector work had similar success rates as majority-owned firms. More Subcontinent Asian American-owned firms reported successfully bidding on private contracts than other MBEs, WBEs or majority owned firms.

Figure G-42.
Success rate of transportation engineering firms bidding on private sector work

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



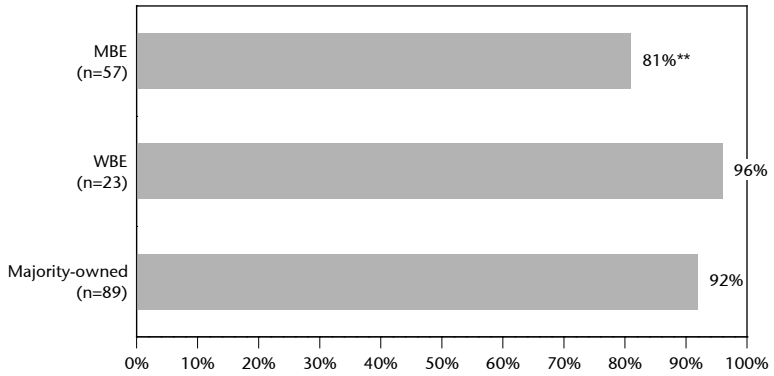
Government transportation material and equipment work. The study team performed similar analyses for transportation material and equipment industry firms responding to the Availability Survey. Figure G-43 examines the success rate of transportation material and equipment industry firms in obtaining government work as prime consultants or subcontractors.

About 92 percent of majority-owned firms seeking government contracts were successful in obtaining some government work in the five years prior to being surveyed. WBEs had similar rates of success pursuing government material and equipment work (96%), while MBEs reported a slightly lower rate (81%).

Figure G-43.
Success rate of transportation material and equipment firms bidding on government work

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



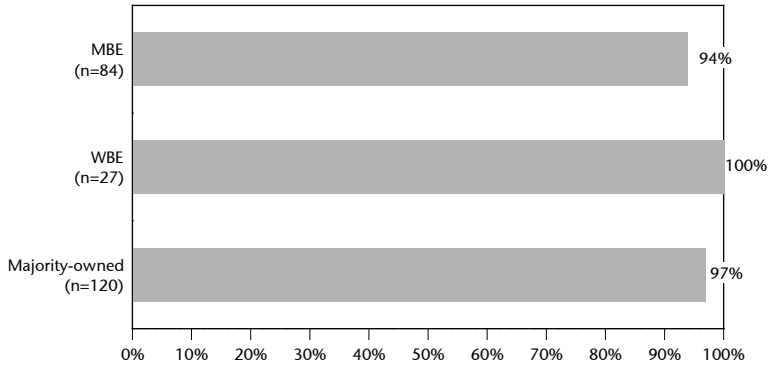
Private sector transportation material and equipment work. More than 90 percent of majority-owned transportation engineering industry firms that had bid on any private sector work (including subcontracts) were successful in receiving some work from this sector. MBEs and WBEs reported similar success in securing private sector work.

These findings are presented in Figure G-44.

Figure G-44.
Success rate of transportation material and equipment firms bidding on private sector work

Note:
WBE is white women-owned firms.
** Statistically significant at the 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.



Summary. Certain groups of minority- and women-owned firms appear to have different market opportunities and business outcomes compared with majority-owned firms. Major findings include:

- A low share of Hispanic American- and African American-owned firms in the transportation construction industry have bid on government and private sector work.
- Across all transportation contracting subindustries (construction, engineering and material and equipment) relatively few MBE/WBEs have been awarded large contracts or subcontracts (contracts or subcontracts of $5 million or more).
- In the transportation contracting industry, African American-, Asian-Pacific American-, Subcontinent Asian American-, Hispanic American-, Native American- and white women-owned businesses have lower annual revenue than majority-owned firms.

Bid capacity. Some recent legal cases regarding race-conscious programs have considered the issue of the "relative capacity" of firms included in the availability analysis.[18] One approach to controlling for differing relative capacity is to examine relatively small contracts, a technique noted in *Rothe*. In addition to examining small contracts, BBC directly measured bid capacity in the availability analysis.

Measurement of bid capacity. "Bid capacity" for a firm is measured as the largest transportation-related contract or subcontract the firm bid on or performed in California within the five years preceding when BBC interviewed the firm. BBC uses bid capacity as one factor in determining whether a firm would be available to bid on specific prime contracts and subcontracts.

Assessment of possible disparities in bid capacity of MBE/WBEs and majority-owned firms. The study team asked firms responding to the Availability Survey to identify the largest transportation-related contract the company was awarded in California in the past five years. Relatively more majority-owned construction firms have received contracts or subcontracts of at least $5 million compared with MBEs and WBEs (see Figures G-27, G-28 and G-29 for more detailed information by subindustry).

The survey effort produced a database of 2,053 potentially available firms.[19] The following analysis of bid capacity relies on the results of the Availability Survey.

One of the factors that affect bid capacity is the industry specialization of construction and engineering firms. Some industry segments, such as construction of water, sewer and utility lines, involve larger projects. Other segments, such as landscape architecture and surveying and mapmaking, involve smaller scale assignments. One way of controlling for variation in bid capacities in different sub-industries is to assess whether or not a firm has a bid capacity above or below the median level for firms in that sub-industry. BBC can then test whether minority- and women-owned firms bid on larger or smaller contracts or subcontracts compared with other firms in their sub-industry.

[18] See, for example, the decision of the United States Court of appeals for the Federal Circuit in *Rothe Development Corp. v. U.S. Department of Defense, 545 F.3d 1023 (Fed. Cir. 2008).*

[19] See Appendix D for further description of the survey sample and process.

Figure G-45 indicates the median bid capacity among Southern California-based establishments in each of the 32 industry segments within the construction, engineering and material and equipment subindustries. Note that the survey questions regarding the largest project that firms had bid on or been awarded captured data in dollar ranges rather than specific dollar amounts.

Figure G-45.
Median bid capacity by industry segment

Industry segment	Median bid capacity
Asphalt/paving mixtures	More than $20 million
Building construction	$2 million to $5 million
Cleaning and janitorial services	$100,000 or less
Communications equipment	Over $100,000 to $500,000
Concrete and related products	Over $1 million to $2 million
Construction management	Over $1 million to $2 million
Electrical work	Over $100,000 to $500,000
Elevator installation and repair	Over $100,000 to $500,000
Engineering	Over $100,000 to $500,000
Environmental and transportation planning	Over $100,000 to $500,000
Excavation	Over $100,000 to $500,000
Heavy construction	Over $500,000 to $1 million
Heavy construction equipment rental	Over $500,000 to $1 million
Industrial equipment and machinery	Over $100,000 to $500,000
Industrial hydraulic equipment	$100,000
Landscape architecture	$100,000 or less
Other building construction	Over $500,000 to $1 million
Other construction materials	Over $100,000 to $500,000
Other construction services	Over $500,000 to $1 million
Other heavy construction	$500,000
Petroleum products	$2 million to $5 million
Security services	Over $100,000 to $500,000
Security systems services	Over $100,000 to $500,000
Soundproofing	Over $500,000 to $1 million
Structural steel	Over $100,000 to $500,000
Surveying and mapmaking	Over $100,000 to $500,000
Testing services	Over $100,000 to $500,000
Transportation signaling	Over $1 million to $2 million
Trucking	Over $100,000 to $500,000
Vehicle body repair	$100,000 or less
Water, sewer, and utility lines	Over $1 million to $2 million
Wrecking and demolition	Over $100,000 to $500,000

Source: BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Firms with bid capacities above the median for their industry segments are counted as available for larger Airport projects than most of the firms in their line of business (as well counted as available for smaller assignments). Thus, these firms figure more prominently in the availability analysis than firms with smaller bid capacities. An initial question is whether or not minority and women-owned firms are as likely as majority owned firms to have above-median bid capacity for their industry segment. Figure G-46 compares the proportions of firms with above-median bid capacity by ownership.

Figure G-46.
Proportion of firms with above-median bid capacity by ownership

Note:
WBE is white women-owned firms.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

	Proportion with above-median bid capacity		
Firm ownership	Construction	Engineering	Goods and Services
African American	37.2%	39.1%	33.3%
Asian-Pacific American	33.3%	30.5%	26.7%
Subcontinent Asian American	11.1%	42.3%	66.7%
Hispanic American	30.0%	36.2%	31.4%
Native American	29.2%	12.5%	50.0%
Female	36.0%	58.1%	27.1%
Majority-owned	43.5%	38.5%	36.0%
All firms	**39.8%**	**37.1%**	**32.8%**

Construction. The results shown in Figure G-46 indicate that, in aggregate, relatively fewer minority and women-owned construction firms have above-median bid capacity for their subindustry compared with firms owned by non-Hispanic, white males.

Engineering. For the engineering industry, the proportion of firms with above-median bid capacity is similar for Subcontinent Asian American-, African American- and Hispanic American-owned firms as for majority-owned firms. A greater number of WBEs reported above-median bid capacity than majority firms and fewer Asian-Pacific American- and Native American-owned firms reported an above-median bid capacity.

Material and Equipment. The proportion of firms in material and equipment with above-median bid capacity was similar for majority- and African American-owned firms. A lower proportion of Asian-Pacific American-, Native American-, Hispanic American- and women-owned firms reported above-median bid capacity.

BBC then considered whether neutral factors account for differences among groups in the probability of having above-median bid capacity and if there are statistically significant disparities in bid capacity after accounting for neutral factors.

There are a number of variables from the Availability Survey that may be correlated with bid capacity. Annual revenues, number of employees and, potentially, whether or not a firm has multiple establishments in California, are examples. However, the direction of causation for these variables is unclear. Do firms have greater bid capacity because they have more employees, or do they have more employees because they bid on and win larger assignments?

After considering the array of variables from the Availability Survey, the study team determined that the neutral factor that might best explain differences in bid capacity (within a subindustry) while being truly exogenous to that capacity was age of the firm. Theoretically, the longer firms are in business, the larger the contract or subcontract they might pursue.

To test this hypothesis, the study team conducted separate logistic regression analyses for the construction, engineering, and material and equipment industries to determine whether or not bid capacity could be at least partly explained by the age of the firm and whether or not minority- and women-owned firms differ from majority-owned firms of similar ages (after controlling for subindustry).

Bid capacity results for the Southern California construction industry. Results for the Southern California construction industry are shown in Figure G-47. The logistic regression model indicates:

- The age of the firm is a significant predictor of having above-median bid capacity;
- Hispanic-owned firms in the construction industry are significantly less likely to have an above-median bid capacity; and
- Any remaining negative differences in the likelihood of having above-median bid capacity for minority and women-owned firms were not statistically significant.

Figure G-47.
Southern California construction industry bid capacity model

Note:

WBE is white women-owned firms.

**Significant at 95% confidence level.

Source:

BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Variable	Coefficient	Wald-statistic
Constant	-0.78	42.02 **
Age of firm	0.02	25.23 **
African American	-0.15	0.22
Asian Pacific American	-0.10	0.10
Subcontinent Asian American	-1.57	2.15
Hispanic American	-0.42	5.39 **
Native American	-0.46	0.99
Female	-0.15	0.43

Bid capacity results for the Southern California engineering industry. Results for the Southern California engineering industry are shown in Figure G-48, below. The logistic regression model for this industry indicates:

- The age of the firm is a significant predictor of having above-average bid capacity for engineering as well as construction;
- Any remaining negative differences in the likelihood of having above-average bid capacity for minority-owned firms were not statistically significant; and
- Engineering firms owned by women are significantly more likely to have above-average bid capacity than other firms in their sub-industries.

Figure G-48.
Southern California engineering industry bid capacity model

Variable	Coefficient	Wald-statistic
Constant	-1.21	56.56 **
Age of firm	0.03	22.80 **
African American	0.41	0.85
Asian Pacific American	-0.16	0.26
Subcontinent Asian American	0.39	0.90
Hispanic American	-0.01	0.00
Native American	-1.21	1.25
Female	0.97	6.23 **

Note:
WBE is white women-owned firms.
**Significant at 95% confidence level.

Source:
BBC Research & Consulting from 2006 and 2008 Availability Surveys.

Bid capacity results for the California material and equipment industry. The study team also performed a logistic regression for the material and equipment industry. This regression showed no statistically significant evidence of discrimination. This result may have occurred due to the small sample size (212 firms were included in the regression).

Summary of Business Success in the Transportation Contracting Industries

Results from the analyses conducted in Appendix G include the following:

- Data from the U.S. Bureau of the Census 2002 Survey of Business Owners indicate that 2002 receipts were lower for African American-, Asian American-, Hispanic American-, Native American- and women-owned firms compared with all firms in Southern California.

- Analysis of the 2000 U.S. Census of Population shows that construction business owner earnings for African Americans, Asian-Pacific Americans and Hispanic Americans were lower than earnings for non-Hispanic whites in Southern California. Female owners earned less than men who owned construction businesses. U.S. Bureau of the Census data for 2007 reveal similar disparities for minorities. However, earnings for female construction business owners were higher than men in that year.

- Similar analyses for the owners of engineering firms in Southern California found lower earnings for minority and female business owners than non-Hispanic white male business owners (data from the 2000 Census of Population and the 2007 American Community Survey are consistent).

- Regression analyses using 2000 U.S. Bureau of the Census data for Southern California show statistically significant disparities for Hispanic American and female business owners in the construction industry. The regression analysis suggests the possibility of disparities for African American, Asian-Pacific American and Native American business owners, but these results were not statistically significant (perhaps due to small sample sizes in some cases).

- Regression analyses for Southern California engineering business owners indicate evidence of disparities for female business owners. Earnings of Native American business owners exceeded non-Hispanic whites after controlling for other factors.

- Analysis of revenue data collected as part of BBC's availability interviews in Southern California indicated the following:

  - Lower annual revenue for African American-,Asian-Pacific American-, Subcontinent Asian American-, Hispanic American-, Native American- and women-owned firms compared with majority-owned construction firms;

  - Lower annual revenue for African American-,Asian-Pacific American-, Subcontinent Asian American-, Hispanic American-, Native American- and women-owned firms compared with majority-owned engineering and related firms; and

  - Lower annual revenue for minority- and women-owned material and equipment firms compared with majority-owned firms.

- Data from the availability interviews also suggest that:

- African American-, Hispanic American- and Native American-owned construction firms were considerably less likely to have bid on any part of a government contract (within the previous 5 years).

- Among construction firms that had attempted to obtain public sector work, firms owned by African Americans, Subcontinent Asian Americans, Hispanic Americans, Native Americans and women were less likely to have been successful in receiving a contract or subcontract than majority-owned firms. Disparities were also found for African American- and Hispanic-owned engineering firms. None of these disparities were statistically significant.

- The availability interviews collected data on the largest contract or subcontract a firm had performed or bid on the previous five years. This statistic is referred to as "bid capacity" in this report. Results for Southern California include the following:

  - MBE/WBEs were less likely than majority-owned firms to have received large contracts or subcontracts.

  - When BBC conducted regression analyses to further explore these differences, firm specialization and age were important in explaining whether a firm had "high bid capacity."

  - Hispanic American-owned construction firms appeared to be less likely to have above-median bid capacity than other firms after controlling for firm specialization and age (statistically significant difference).

  - Women-owned engineering firms appeared to have higher bid capacity after controlling for other factors. There were no statistically significant disparities for minority-owned engineering firms.