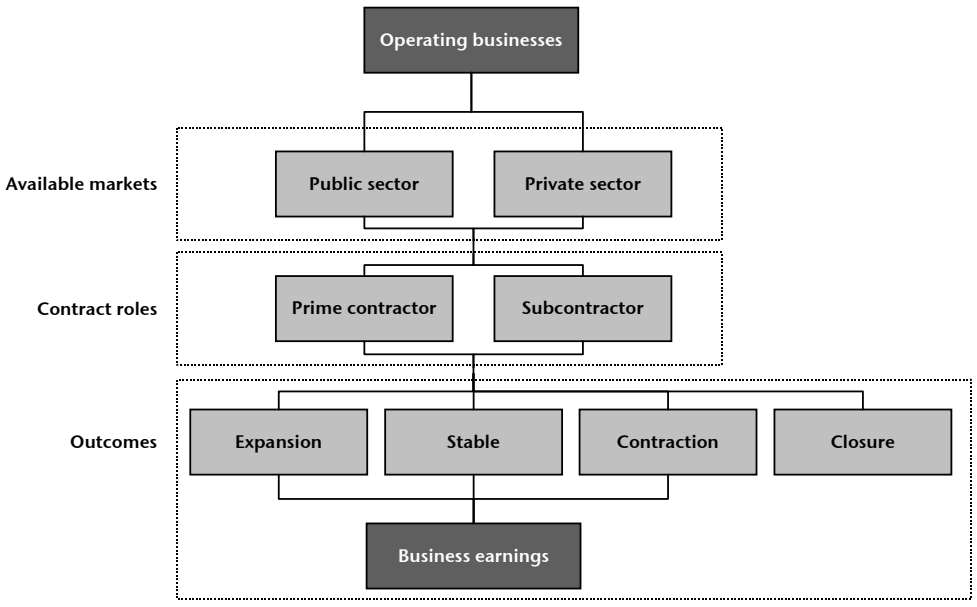
APPENDIX F.
Success of Businesses in the Construction and Engineering Industries

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:

- Participation in public versus private sector markets;
- Participation as prime contractors and subcontracts;
- Sizes of contracts bid on and performed;
- 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 Oklahoma. Figure F-1 provides a framework for the analysis.

Figure F-1.
Business success



Source: BBC Research & Consulting.

BBC begins this section by examining data collected from interviews with Oklahoma businesses as part of the study team's availability analysis. Firms were asked whether they had bid on and won public sector and private sector work in the Oklahoma transportation contracting industry. The study team also asked business owners and managers whether they had worked as prime contractors, as subcontractors, or as both. Size of projects firms bid on or performed is also examined

BBC then turns to federal data for Oklahoma and the nation concerning business closures, expansion and contraction. Using federal data and information collected from the availability interviews, BBC concludes this appendix with an analysis of business earnings.

Markets and Contract Roles

As part of the disparity study, availability interviews were performed by telephone with transportation construction and engineering firms in Oklahoma. The study team conducted interviews with local businesses in late 2009 and early 2010. Results provide information on public and private sector work, prime and subcontracts, and past bidding success. Data on largest contracts received were also examined. Firm owners and managers were also asked about potential difficulties in the marketplace. Appendix C describes the interview methodology in detail. (Annual revenue data are examined at the end of Appendix F.)

Results examined from the availability interviews pertain to businesses with Oklahoma locations reporting that they work within the local transportation construction industry.[1]

The following charts present data for MBEs, WBEs and majority-owned firms:

- Because of the relatively small number of firms for specific minority groups, BBC reports results from the availability interviews in aggregate for minority-owned firms ("MBE," whether or not they are certified as such).

- Responses for white women-owned firms are shown as "WBE." (Results for minority women-owned firms are reported under MBE.)

- "Majority-owned firms" are all firms not owned or controlled by minorities or women.

[1] Firms must have reported that they work or provides materials related to construction, maintenance or design of roads and highways. Only businesses or tribally-owned organizations are examined.

Public versus private sector work. BBC examined whether minority- and women-owned firms involved in transportation work were less likely to work in the private sector than the public sector.

The study team separately examined responses for firms in construction subindustries (including supply and trucking specializations) and firms in engineering and professional services subindustries (including engineering firms and related businesses). Results indicate whether a firm had pursued government or private sector work.[2]

BBC also examined whether a firm had bid on or been awarded any part of a project in the private sector.[3]

Construction firms. The pie charts in Figure F-2 portray the relative share of all firms competing for government and private sector prime contracts and subcontracts based on responses from firms in the availability interviews.

- Of 135 the transportation construction industry firms that reported bidding on public sector prime contracts in the past five years, 73 percent are majority-owned, 12 percent are MBEs and 16 percent are WBEs. The share of firms bidding as primes that are MBE/WBEs is about the same for private sector work.

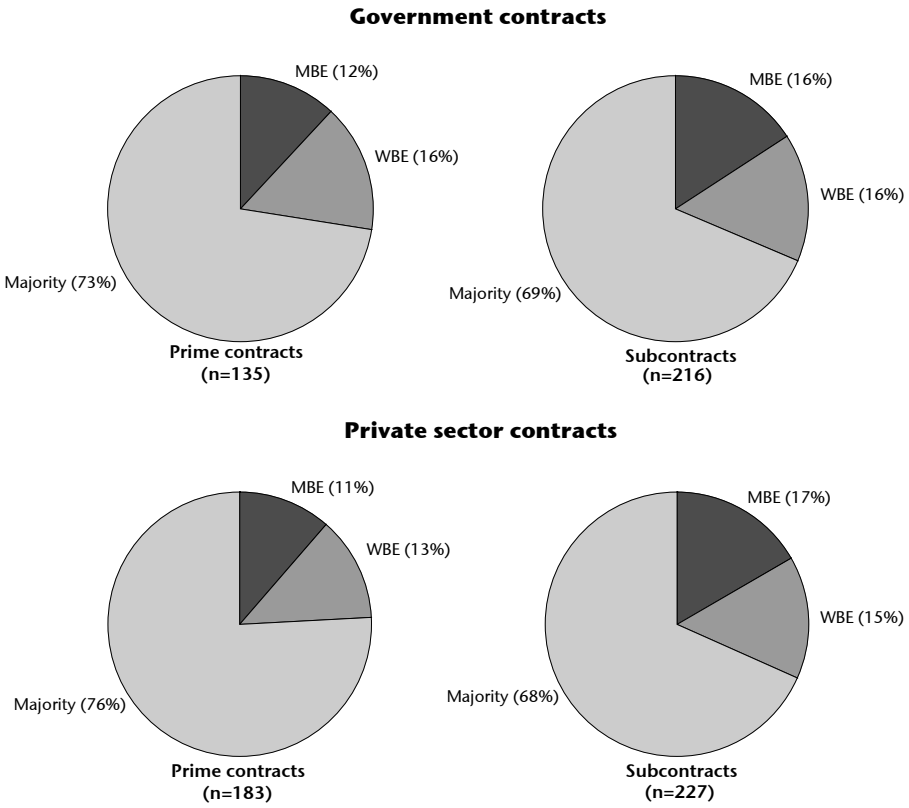
- Among 216 respondents competing for public sector subcontracts (or work as suppliers or truckers), 69 percent of the firms are majority-owned, 16 percent are MBEs and 16 percent are WBEs. As shown in the Figure 2 subcontract charts, there is little difference in results for public sector and private sector work.

The telephone interview results for firms in the transportation construction industry indicate little difference in any public versus private sector specialization between MBE/WBEs and majority-owned firms.

[2] A firm was deemed to have performed or bid on public sector work if it answered "yes" to either of the following questions: (a) "Next, I have a few questions about your company's role in construction, maintenance or design work related to roads and highways. During the past five years, has your company submitted [a bid || qualifications || a proposal] or a price quote to any part of a state or local government project in Oklahoma?" and (b) "During the past five years, has your company received an award for work [as a prime contractor or as a subcontractor || as a prime consultant or as a subconsultant] to any part of a state or local government project in Oklahoma?"

[3] A firm was deemed to have performed or bid on private sector work if it answered "yes" to either of the following questions: (a) "Again thinking about construction, maintenance or design work related to roads and highways during the past five years, has your company submitted [a bid || qualifications, a proposal] or a price quote for any part of a private sector contract in Oklahoma?" and (b) "During the past five years, has your company received an award for work as a [prime contractor or as a subcontractor] [prime consultant or as a subconsultant] for any part of a private sector contract in Oklahoma?"

Figure F-2.
MBE and WBE share of transportation construction industry firms bidding on different types of work in Oklahoma in the past 5 years



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

Source: BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Firms competing for public sector work in Oklahoma were also asked if they had been awarded any public sector contracts (including both prime contracts and subcontracts or supply/trucking work). When asked to consider the past five years, three-quarters of MBE/WBE construction firms bidding on public sector work reported that they had been successful in obtaining some work. This percentage was about the same for majority-owned construction firms bidding in the public sector (78%).

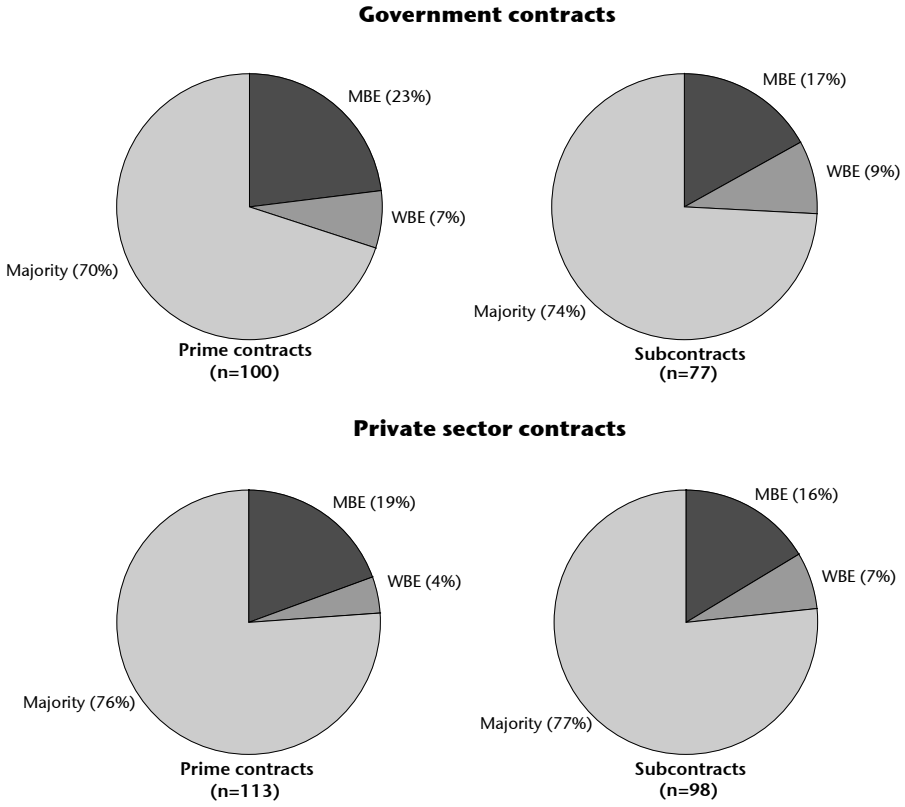
About three-quarters of MBE/WBEs that reporting bidding on private sector work indicated that they had received such work. However, among transportation construction firms bidding on private sector work, relatively more majority-owned firms (86%) had received private sector prime contractors or subcontracts.

Engineering firms. 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 from BBC's availability interviews.

- As shown in Figure F-3, MBE/WBEs comprise 30 percent of engineering industry firms competing for public sector prime consulting contracts and 23 percent of the firms competing for private sector prime contracts. MBE/WBE engineering firms are more likely than majority-owned firms to have competed for public sector prime construction contracts.

- When examining engineering firms competing for subcontracts, about one-quarter are MBE/WBEs for public sector and 23 percent are MBE/WBE for private sector work. This is relatively lower than the proportion of MBE/WBEs that had bid on construction subcontracts.

Figure F-3.
MBE and WBE share of transportation engineering industry firms proposing on different types of work in Oklahoma in the past five years



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

Source: BBC Research & Consulting from 2009 and 2010 Availability Interviews.

As with construction firms, transportation engineering firms competing for public sector and private sector work were asked if they had received any such work in the past five years. Among MBE/WBEs competing for public sector work, 78 percent indicated that they had received some such work. However, 85 percent of majority-owned firms bidding on public sector work had received some work.

There was little difference between MBE/WBEs and majority-owned engineering firms' success in receiving at least some private sector work — more than 90 percent of all firms bidding on such work had received at least some private sector prime contracts or subcontracts.

Bidding as prime contractors and subcontractors/suppliers. Figures F-4 through F-7 indicate that MBE/WBE construction firms are somewhat less likely to bid as a prime contractor than majority-owned firms. MBE/WBE engineering firms were more likely to bid as prime consultants than majority-owned firms. The following analysis, also drawn from availability interview data, further explores these questions.

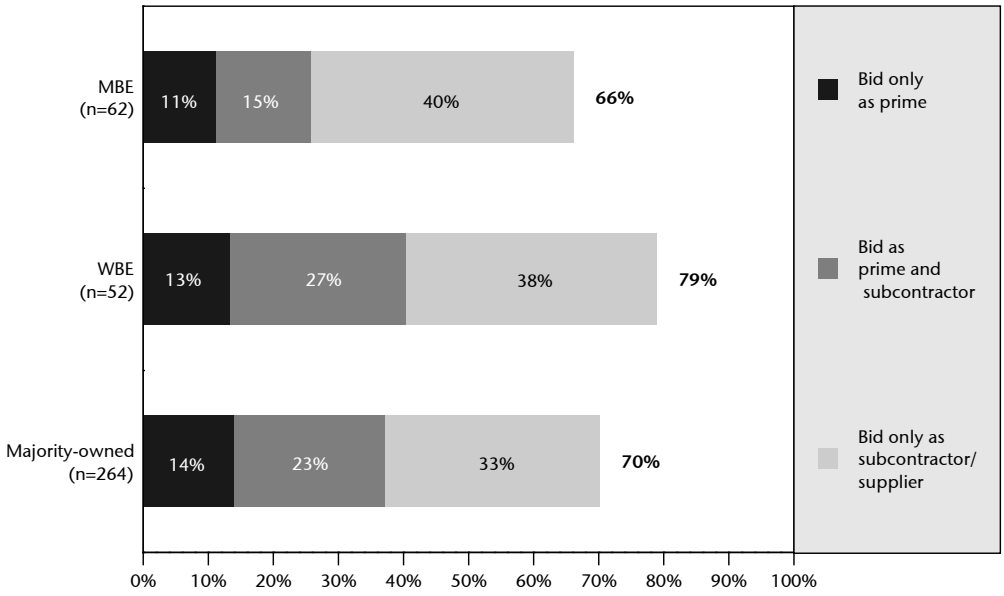
Construction firms. Figure F-4 examines the share of Oklahoma construction firms in the availability analysis that reported bidding on public sector work as a prime contractor or as a subcontractor, including the share that had bid on both prime and sub work.

- Approximately 66 percent of minority-owned transportation construction firms reported bidding on government work as a prime or a subcontractor, supplier or trucker in the past five years (including submitting price quotes). This is relatively lower than the proportion of both WBEs and majority-owned firms that reported bidding on such work. About 26 percent had bid as a prime contractor (including those that had bid as both a prime and a sub). About 40 percent had bid only as a subcontractor.

- WBEs were more likely to have bid on public sector construction work than both MBEs and majority-owned firms. WBEs (30%) were more likely to bid as a prime contractor than MBEs.

- Majority-owned firms (37%) were more likely to bid as on public sector prime construction contracts than MBEs. They were less likely than both MBEs and WBEs to bid only as a subcontractor on such work.

Figure F-4.
Percent of transportation construction 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.

Source: BBC Research & Consulting from the 2009 and 2010 Availability Interviews.

Telephone interviewers also asked firm owners and managers if the firm had bid as a prime or subcontractor on a private sector transportation project in the past five years.

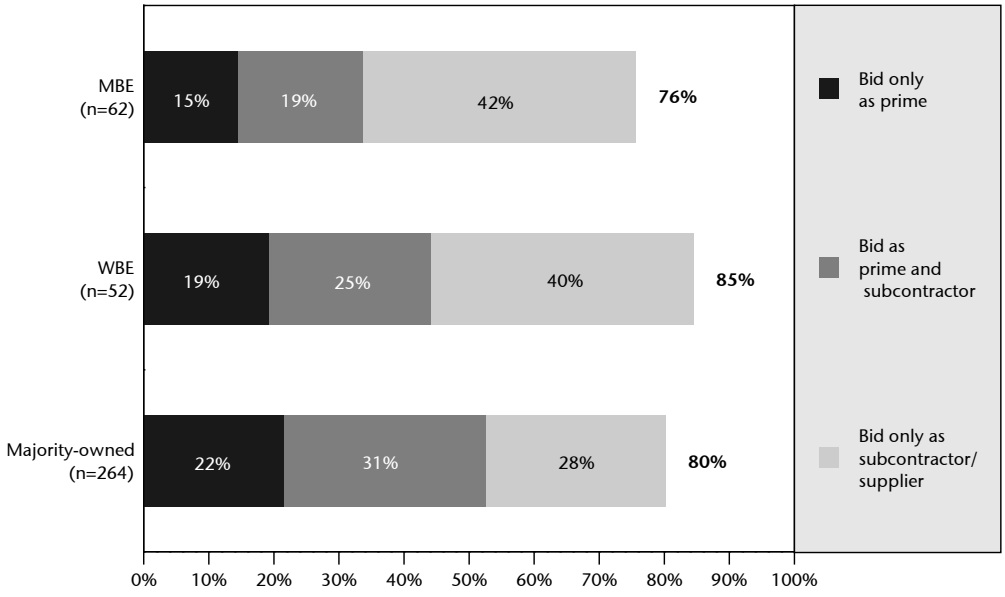
- About 34 percent of MBEs had bid as a prime on private sector work, considerably less than what was found for both WBEs and majority-owned construction firms. More than 40 percent of MBEs had bid only as a subconsultant.

- Relatively more WBEs (44%) than MBEs had bid on prime contracts. WBEs were less likely than MBE construction firms to have bid only as a subcontractor or supplier.

- Among majority-owned transportation construction firms, 53 percent had bid as a prime on a private sector project within the past five years. Considerably fewer majority-owned firms (28%) than MBE/WBEs had bid only as a subconsultant.

For both public and private sector work, MBE/WBE transportation construction firms were more likely than majority-owned firms to have bid only as subcontractors or supplier, and less likely than majority-owned firms to have bid as primes.

Figure F-5.
Percent of transportation construction 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.

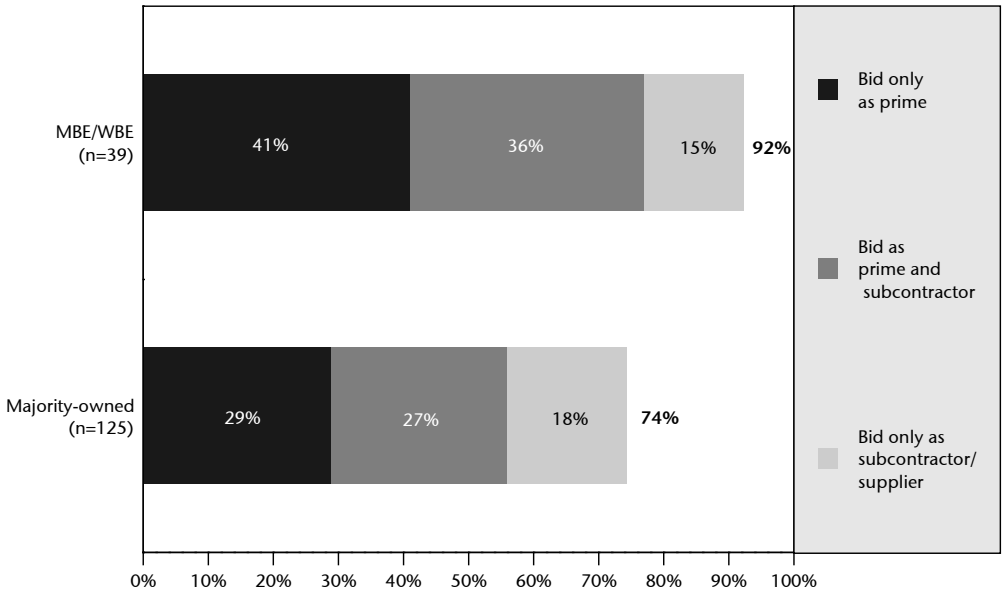
Source: BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Engineering firms. Figures F-6 and F-7 examine prime versus subcontracting bidding for engineering firms using data from the availability interviews. Responses of MBEs and WBEs were combined due to the relatively small number of respondents (28 MBEs and 11 WBEs).

- As shown in Figure F-6, 56 percent of majority-owned engineering firms reported that they had bid or proposed on a public sector prime contract in the past five years. About 18 percent had bid only as a subconsultant.

- Relatively more MBE/WBEs engineering firms (77%) had bid as a prime consultant on public sector contracts than majority-owned firms. Fewer had bid only as a subconsultant.

Figure F-6.
Percent of 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.

Source: BBC Research & Consulting from the 2009 and 2010 Availability Interviews.

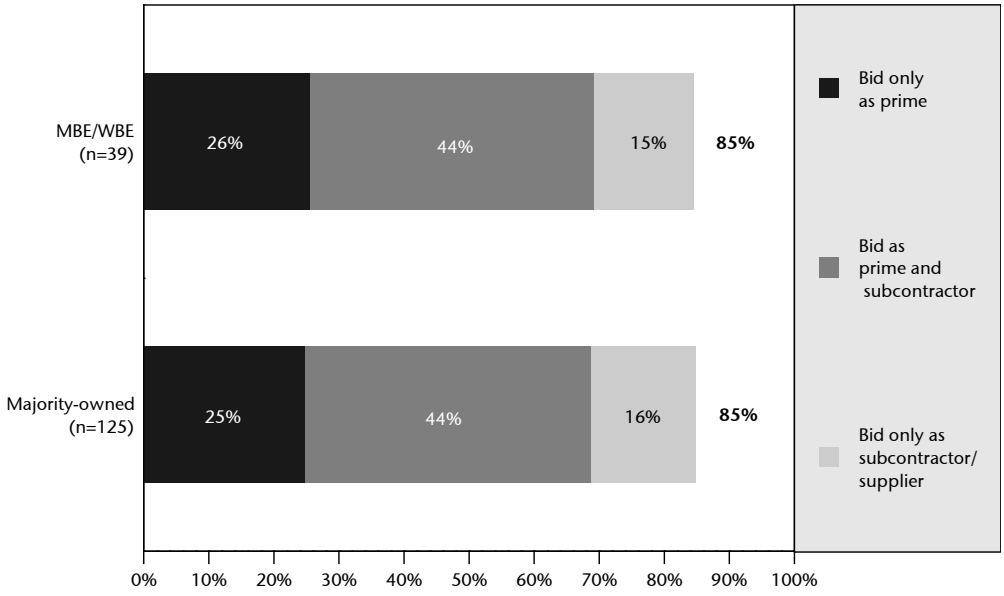
Figure F-7 includes results for transportation engineering firms bidding on private sector work.

- More than two-thirds of majority-owned firms had bid or proposed on private sector work as a prime consultant. Only 16 percent of majority-owned engineering firms had bid only as a subconsultant on private sector work.

- Results for MBE/WBE engineering firms bidding on private engineering work were similar to those for majority-owned firms.

Among transportation engineering firms, there is little evidence from the availability interviews that MBE/WBEs in Oklahoma are less likely than majority-owned firms to have bid or proposed as a prime consultant. In addition, relatively few MBE/WBEs or majority-owned transportation engineering firms bid solely as a subconsultant on public or private sector work.

Figure F-7.
Percent of 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.

Source: BBC Research & Consulting from the 2009 and 2010 Availability Interviews.

Largest transportation-related contract. As part of the availability interviews, the study team asked firms to identify the largest transportation-related contract the company was awarded in Oklahoma in the past five years. MBEs and WBEs have been combined for both construction and engineering firms due to the relatively small number of respondents.

Construction firms. Among construction firms in the availability interviews, 42 percent of majority-owned construction firms had received a prime contract or subcontract of $0.5 million or more, considerably more than the relative number of MBE/WBEs (25%) firms that had received work of this size. As illustrated in Figure F-8, the largest transportation-related contract for MBE/WBEs tended to be smaller than for majority-owned construction firms.

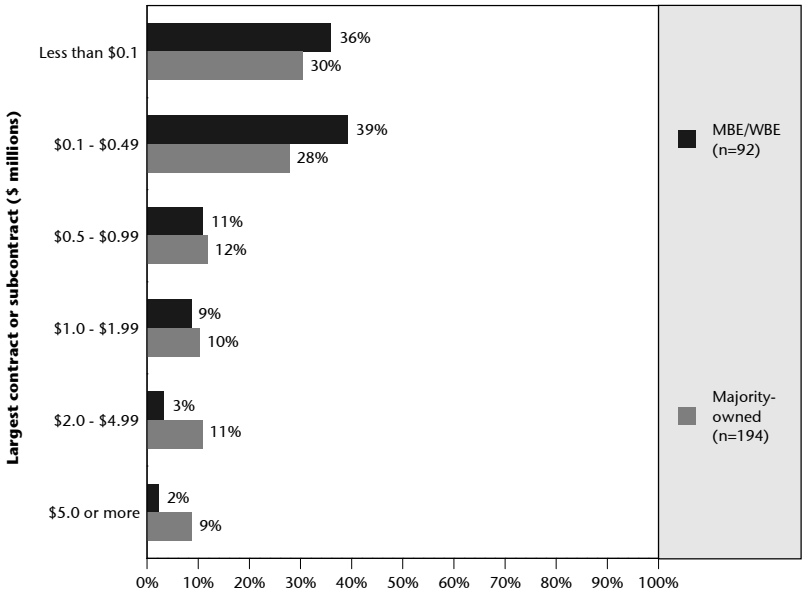
Figure F-8.
Largest transportation-related contract or subcontract that the company was awarded in Oklahoma in the past 5 years, transportation construction firms

Note:

WBE is white women-owned firms.

Source:

BBC Research & Consulting from 2009 and 2010 Availability Interviews.

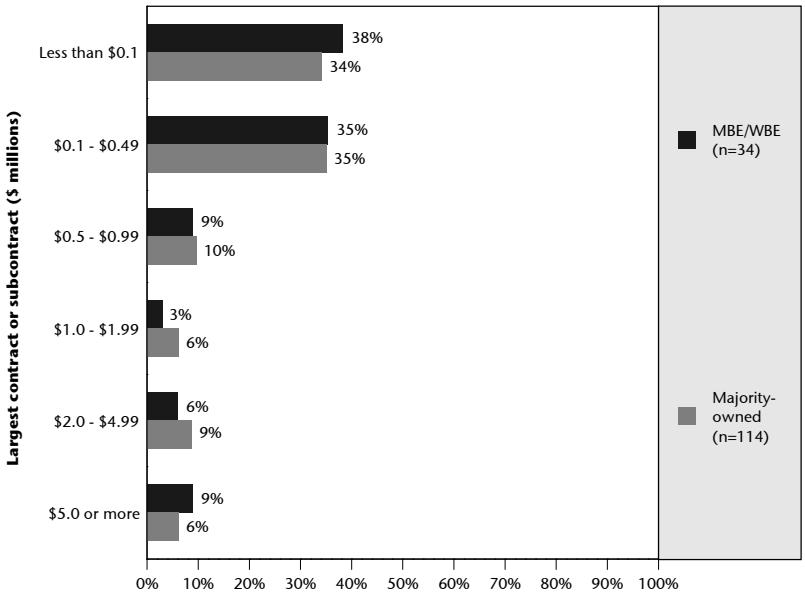


Engineering firms. Among engineering firms in the availability interviews, 31 percent of majority-owned firms had received a prime contract or subcontract of $0.5 million or more, relatively more than the number of MBE/WBEs (27%) firms that had received work of this size. MBE/WBEs did receive relatively more contracts of $5 million or more than majority-owned firms. Figure F-9 shows that results for contracts under $0.5 million were similar for MBE/WBEs and majority-owned firms.

Figure F-9.
Largest transportation-related contract or subcontract that the company was awarded in Oklahoma in the past 5 years, transportation engineering firms

Note:
WBE is white women-owned firms.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

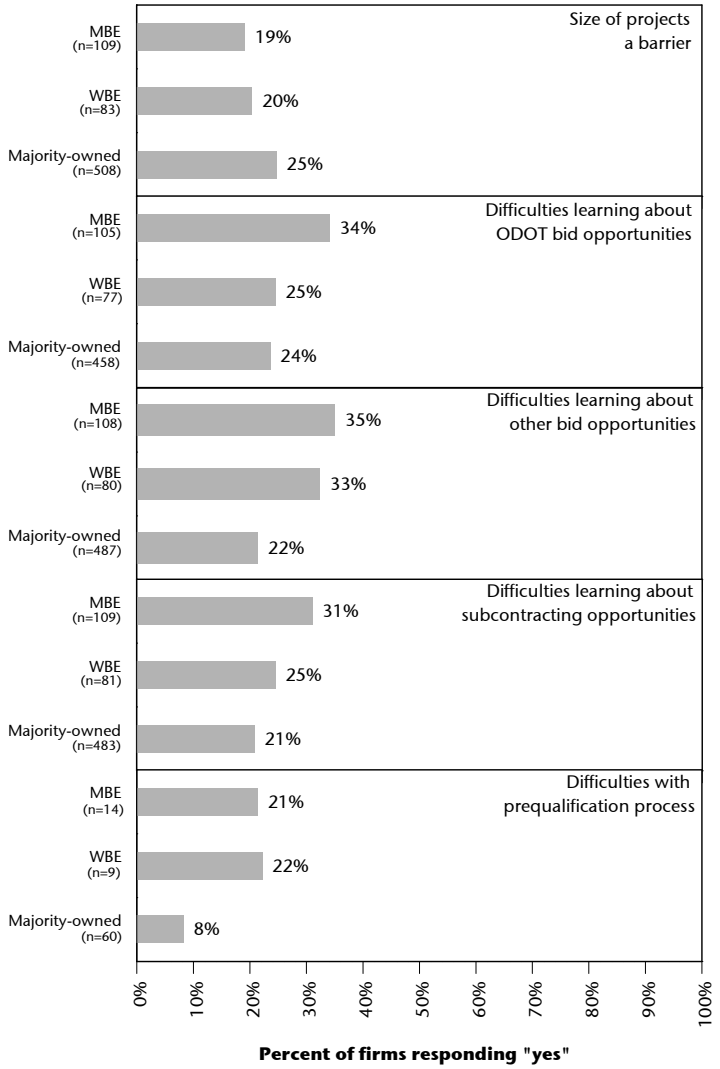


Results concerning potential barriers in the local marketplace. The study team asked firm owners and managers responding to the availability interviews if they had experienced barriers or difficulties associated with starting or expanding a business. BBC asked if:

- The size of projects had presented a barrier to bidding;
- The firm had experienced difficulties learning about bid opportunities with ODOT;
- The firm had experienced difficulties learning about bid opportunities with local governments or private companies;
- The firm had experienced difficulties learning about subcontracting opportunities in Oklahoma; and
- The prequalification process for ODOT work had presented difficulties for the firm.

Figure F-12 summarizes responses to these questions. Responses for construction and engineering firms have been combined.

Figure F-12.
Responses to 2010 availability interview questions with transportation construction and engineering firms



Note: "WBE" represents white women-owned firms, "MBE" represents minority-owned firms and "Majority-owned" represents non-Hispanic white male-owned firms.

Source: BBC Research & Consulting.

As shown in Figure F-12, MBEs and WBEs were less likely than majority-owned firms to report that the size of projects had been a barrier to bidding. MBEs and WBEs were more likely than majority-owned firms to report difficulties learning about:

- ODOT bid opportunities
- Other bid opportunities; and
- Subcontracting opportunities.

Minority- and white female-owned firms appeared to be more likely than majority-owned firms to report difficulties with the prequalification process, but the number of respondents for this question was small.

BBC also asked questions related to access to capital, bonding and insurance; Appendix G reports results.

Summary of public versus private sector and prime versus subcontracting analyses. The availability interviews revealed some similarities and some differences between MBE/WBEs and majority-owned firms related to public versus private sector work:

- The telephone interview results for firms in the transportation construction industry found no indication that MBE/WBEs are less likely to have pursued work in the private sector than the public sector. MBE/WBEs that had bid on public and private sector work were also about as successful in obtaining work as majority-owned firms.

- The telephone interviews indicate that majority-owned firms were more successful in obtaining public sector PTE work compared to MBE/WBEs.

- Relatively more MBE/WBE engineering firms reported pursuing prime contracts in the public sector than found for majority-owned engineering firms. MBE/WBE and majority-owned firms were nearly equally likely to have bid or proposed on private sector prime contracts. There is some evidence that MBE/WBE engineering firms bidding on public sector prime contracts or subcontracts were not as successful in obtaining at least some public sector work as majority-owned firms.

- Relatively more MBE/WBEs than majority-owned firms indicated difficulty in learning of bid opportunities, including subcontracting opportunities and opportunities with ODOT.

BBC identified some differences in bidding as primes versus subcontractors/suppliers between MBE/WBE and majority-owned construction firms, but not for engineering firms:

- For both public and private sector work, MBE transportation construction firms were more likely than majority-owned firms to have only bid as subcontractors or supplier, and less likely than majority-owned firms to have bid as primes. Only for private sector work were WBEs less likely than majority-owned construction firms to have bid as prime contractors.

- Among transportation engineering firms, there is no evidence from the availability interviews that MBE/WBEs in Oklahoma are less likely than majority-owned firms to have bid or proposed as a prime consultant. In addition, relatively few MBE/WBEs or majority-owned transportation engineering firms bid solely as a subconsultant on public or private sector work.

Among available construction firms, relatively more majority-owned firms than MBE/WBEs had received contracts or subcontracts of at least $0.5 million in size. There was little difference in largest contract size for MBE/WBE and majority-owned transportation engineering firms.

Businesses Closures, Expansions and Contractions

Having examined different markets for work, Appendix F now turns to different outcomes for businesses: closures, expansion and contraction. BBC used U.S. Small Business Administration (SBA) analyses to examine outcomes for minority- and women-owned firms in Oklahoma and the nation. The SBA analyses pertain to minority-owned firms, by group, in comparison with all firms.

Business closure. High rates of business failures may reflect adverse business conditions faced by minority business owners.

Rates of business closures in Oklahoma. BBC 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).[4,5] The SBA report examined patterns in each state.

Figure F-13 shows that 42 percent of Native American-owned firms in Oklahoma in 1997 had closed by 2001, a rate higher than other groups. Hispanic American- and African American-owned firms also had above-average closure rates during this time, while closure rates for Asian American-owned firms were close to the average. Firm closure rates for Hispanic- and Native American-owned firms appear to be higher in Oklahoma than in the nation as a whole.

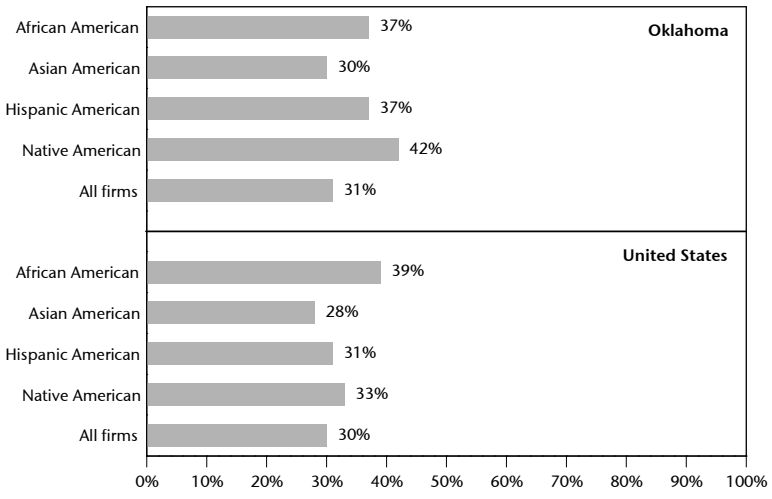
Figure F-13.
Rates of firm closure 1997-2001, Oklahoma and the U.S.

Note:

Data refer only to employer firms. As sample sizes are not reported, statistical significance of these results cannot be determined; however, 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 F-14 compare national rates of closure for construction firms to national rates of closure for all firms. The higher closure rate for Native American- and African American-owned firms was also present when only examining construction firms. Closure rates also appeared to be above average for construction firms owned by Asian Americans.

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

[5] Results from the 2007 SBO will be available by the end of 2010.

No statistics were available from this data source for engineering firms. The SBA analysis by industry is not available for Oklahoma.

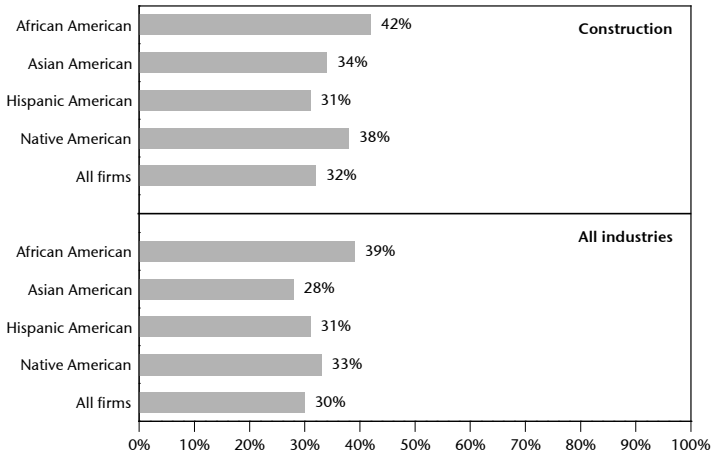
Figure F-14.
Rates of firm closure 1997-2001, construction and all industries in the U.S.

Note:

Data refer only to employer firms. As sample sizes are not reported, statistical significance of these results cannot be determined; however, 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.[6] The 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 F-15 shows comparative data for the proportion of firms in the U.S. closing between 1992 and 1995 that failed.[7]

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 or business status (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.

[6] 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.

[7] 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 overall firm closure rates 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.

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.

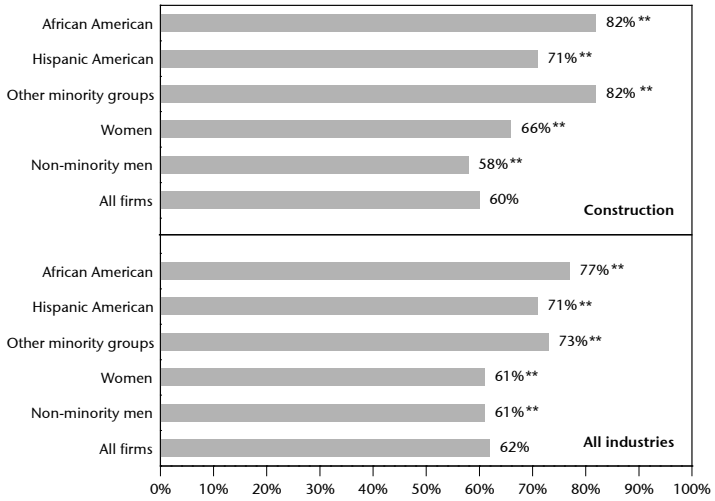
Figure F-15.
Comparative "failure" rates for firms that closed between 1992 and 1995, construction and all industries in the U.S.

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, 1996 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 Oklahoma may indicate higher rates of actual business failure.

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

- Minority business failure is largely due to barriers in access to capital. Regression analysis has identified 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.[8]
- 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.[9]

[8] 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.

[9] 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.

- 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.[10]

- 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.[11]

- 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.[12]

Summary. Available data suggest that closure rates for African American-, Native American- and Hispanic American-owned firms in Oklahoma are higher than other firms. Based on national results for the construction industry, African American- and Native American-owned construction firms in Oklahoma are likely to have had higher rates of closure than other construction firms.

National data indicate that African Americans who owned and closed construction firms are more likely to have done so because the firm was unsuccessful, compared to all firms. Several studies have examined why business failure rates are higher for African American-owned construction at the national level.

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, only some of the data available for the nation are also available at the state level.

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 Oklahoma that had paid employees at the starting time period for the analysis ("employer firms").

Figure F-16 compares the percentage of firms that increased their total employment between 1997 and 2001. Slightly less than one-third of all Oklahoma firms expanded according to the SBA study. Expansion rates for minority-owned businesses were similar to — and in some cases greater than — the average for all firms, with rates greatest for Hispanic American-owned firms and least for Native American-owned firms. Although for most groups the pattern in Oklahoma reflects the picture in the nation as a whole, this was not true for African American-owned firms: expansion rates for African American-owned businesses in Oklahoma were higher than average while the percentage of African American-owned firms that expanded nationally was the lowest of all groups examined. However, the

[10] Ibid. 24.

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

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

2009 SBA study of business dynamics found that a similar percentage of African American-owned firms expanded during 2002-2003 compared to firms owned by other race and ethnicity groups.[13]

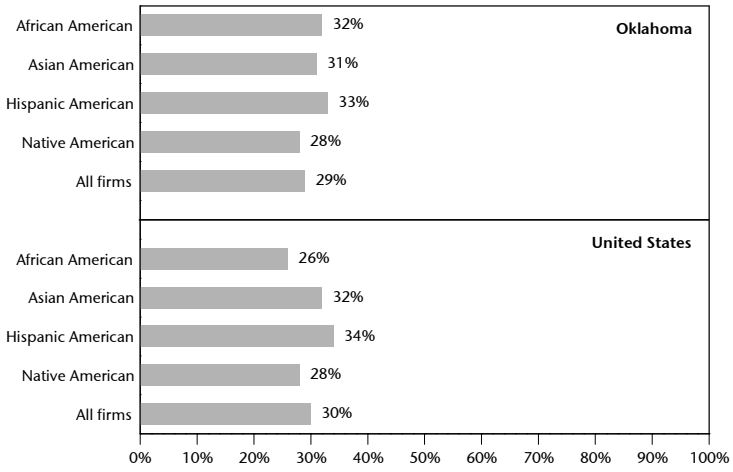
Figure F-16.
Percentage of firms that expanded employment 1997-2001, Oklahoma and the U.S.

Note:

Data refer 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 separately report expansion rates for construction firms in Oklahoma.

Figure F-17 shows expansion rates for construction firms and firms in all industries in the United States. Nationally, the patterns seen in the construction industry are similar to those seen for all industries. African American-owned construction firms were less likely to have expanded between 1997 and 2001. Native American-owned firms also had below-average expansion rates in both construction and in all industries, although the difference with all firms was smaller. In contrast, a greater share of Hispanic American-owned construction firms expanded during this period compared to all firms. Hispanic American-owned firms in all industries were also more likely to have expanded during this period.

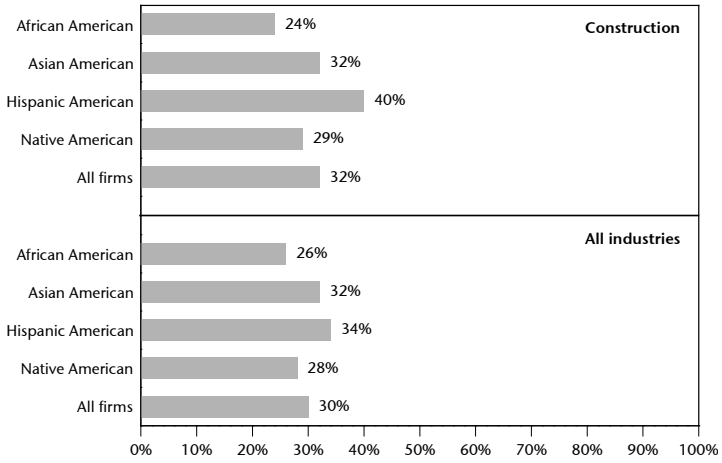
Figure F-17.
Percentage of firms that expanded employment 1997-2001, construction and all industries in the U.S.

Note:

Data refer 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.



[13] Lowrey, Ying. 2009. "Dynamics of Employer Establishments, 2002-2003." U.S. Small Business Administration Office of Advocacy. Washington D.C.

Contraction. Figure F-18 examines the percentage of firms that reduced their employment between 1997 and 2001. As with the analysis of expanding firms, these data track the activity of firms that had paid employees in 1997. In Oklahoma, minority-owned firms were less likely to have contracted during 1997-2001 than all firms. Among minority groups, African American-owned firms were the least likely to have contracted, followed by Native American-owned firms. Nationally, minority-owned firms were no more likely to have contracted than all firms.

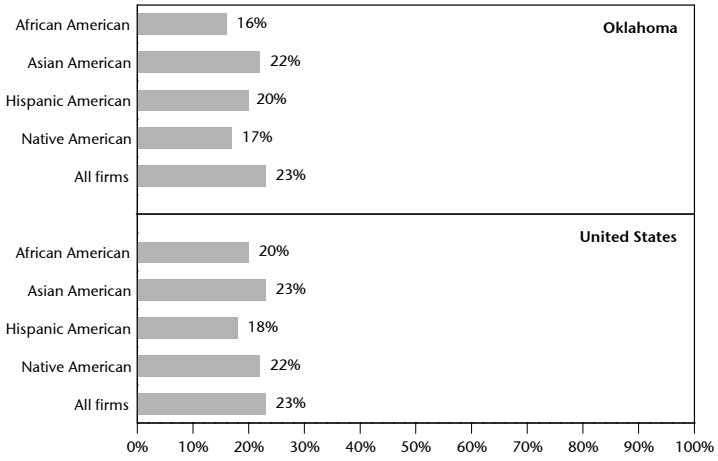
Figure F-18.
Percentage of firms that contracted employment 1997-2001, Oklahoma and the U.S.

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 in Figure F-18 for Oklahoma are for all industries. As with expansion, the SBA study did not report results for contraction in the Oklahoma construction industry. However, Figure F-19 shows rates of contraction for construction at the national level. Nationally, Asian American- and Hispanic American-owned construction firms had lower rates of contraction than all construction firms in the United States, while African American- and Native American-owned construction firms were no more likely to have contracted than were all construction firms across the nation.

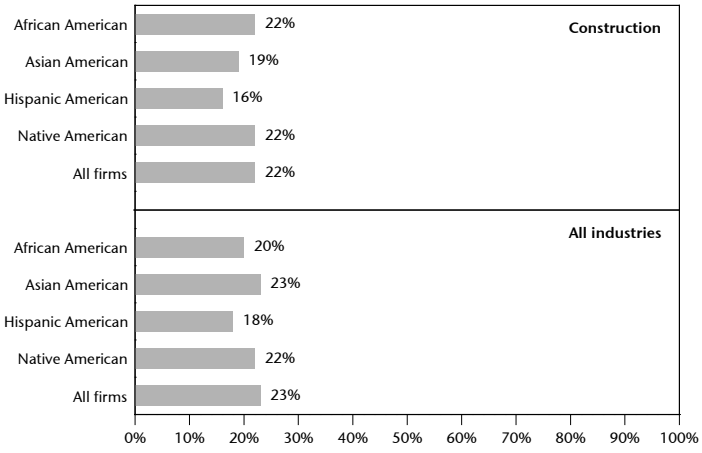
Figure F-19.
Percentage of firms that contracted employment 1997-2001, construction firms and all industries in the U.S.

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 29 percent of Oklahoma employer firms had expanded employment, 23 percent had contracted employment, and 32 percent had closed. In Oklahoma:

- Among the groups examined, Native American-owned firms were the most likely to close, but were no more likely to expand or contract than all firms.
- African American- and Hispanic American-owned businesses were more likely to close than all firms. However, these firms were less likely to contract and more likely to expand than all firms.
- Asian American-owned firms were no more likely to close or contract than all firms and were close to the average in terms of the percentage that expanded during this period.

In terms of expansion and contraction, minority firms from most groups fared as well or generally better than all firms in Oklahoma. However, with the exception of Asian American-owned businesses, minority-owned firms were more likely to close than all firms in Oklahoma.

Business Earnings/Receipts

Annual receipts and business earnings are also important indicators of the success of businesses. The study team examined:

- Business receipts data published by the U.S. Census Bureau;
- Data on business earnings for business owners from the 2000 Census of Population and the 2008 American Community Survey; and
- Annual revenue data for transportation construction and engineering firms in Oklahoma collected as part of the availability interviews.

Business receipts from 2002 survey of business owners. BBC examined receipts for firms across all industries in Oklahoma 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 the engineering industry were not available). The SBO separately reports business receipts for employer firms (those with paid employees apart from the business owner and family members) and for all firms. (The SBO data used in this analysis include incorporated and unincorporated firms but not publicly-traded companies or other firms not classifiable by race/ethnicity and gender)

All firms. Figure F-20 presents the mean annual receipts in 2002 for employer and non-employer firms, by race/ethnicity and gender. Figure F-21 presents the mean annual receipts in 2002 for firms with paid employees only.

The SBO data for firms across all industries indicate that the average receipts for minority- and women-owned businesses were lower than the average for all firms, with some minority groups faring worse than others. Disparities in minority- and women-owned business receipts compared to all firms in Oklahoma are generally consistent with those seen at the national level, although average receipts for all firms were lower in Oklahoma.

In Oklahoma, businesses with African American owners had the lowest average receipts. Receipts for African American-owned firms in Oklahoma averaged $62,000 in 2002, less than 20 percent of the average for all firms. Compared to other minority groups, Hispanic American-owned firms had the highest average receipts in 2002, still less than two-thirds the average for all firms.

Figure F-21 shows mean annual earnings in 2002 for employer firms in Oklahoma and the nation. Minority- and female-owned employer firms also had lower business receipts on average than all employer firms, both in Oklahoma and nationally.

A recent SBA study found similar differences when examining firms in all industries across the U.S.[14]

Figure F-20.
Mean annual receipts (thousands) for all firms, by race/ethnicity and gender of owners, 2002

Note:

Includes employer and non-employer firms. Does not include publicly-traded companies or other firms not classifiable by race/ethnicity and gender.

Source:

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

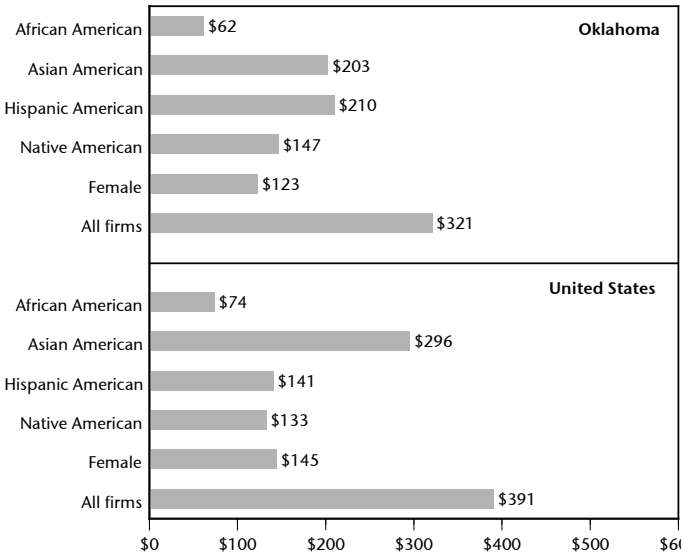


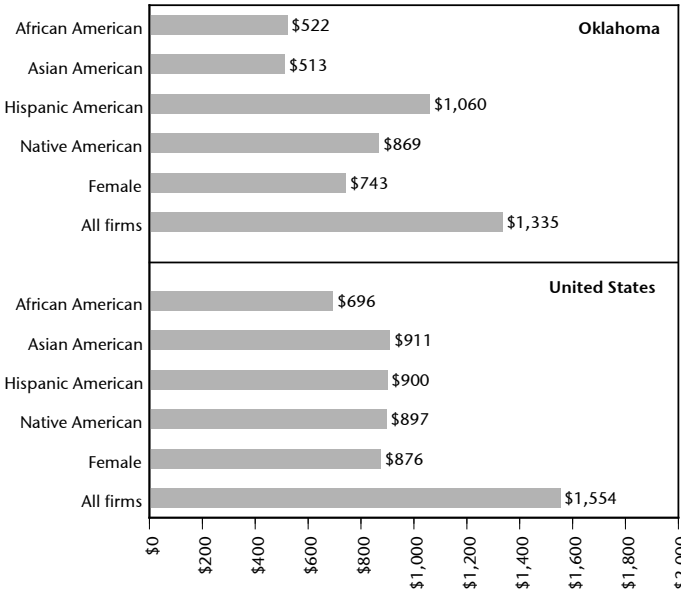
Figure F-21.
Mean annual receipts (thousands) for all firms with paid employees, by race/ethnicity and gender of owners, 2002

Note:

Includes employer and non-employer firms. Does not include publicly-traded companies or other firms not classifiable by race/ethnicity and gender.

Source:

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



[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.

Construction industry. The study team analyzed SBO data for firms in the construction industry. Receipts for the construction industry are analyzed at the state and national level.

Results for the Oklahoma and U.S. construction industries are presented in Figure F-22 and F-23. Figure F-22 presents the mean annual receipts in 2002 for employer and non-employer firms, by race/ethnicity and gender. Figure F-23 presents the mean annual receipts in 2002 for firms with paid employees only.

Figure F-22.
Mean annual receipts (thousands) for construction firms, by race/ethnicity and gender of owners, 2002

Note:

Includes employer and non-employer firms. Does not include publicly-traded companies or other firms not classifiable by race/ethnicity and gender.

Source:

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

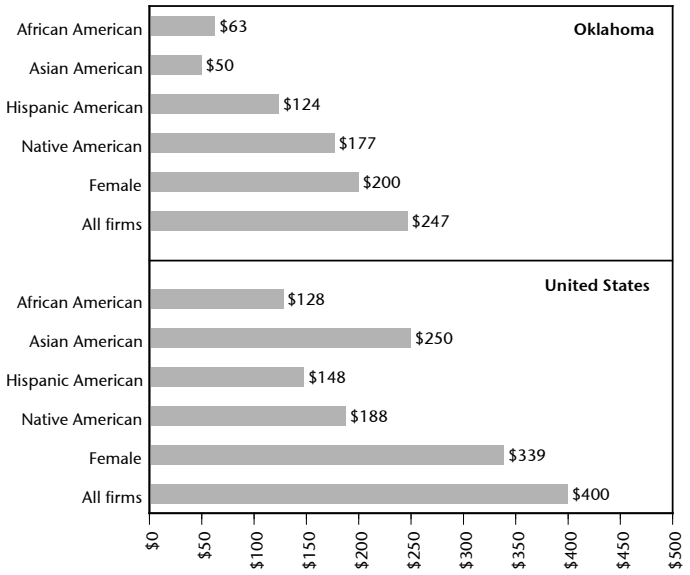


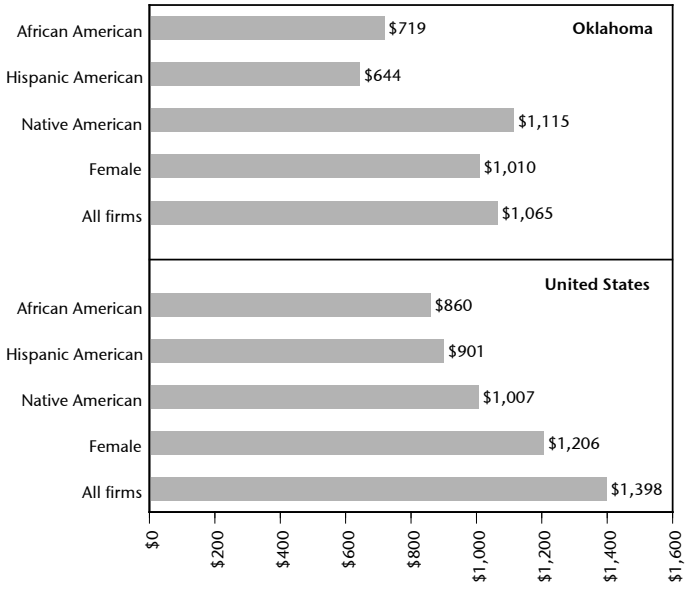
Figure F-23.
Mean annual receipts (thousands) for construction firms with paid employees, by race/ethnicity and gender of owners, 2002

Note:

Includes employer and non-employer firms. Does not include publicly-traded companies or other firms not classifiable by race/ethnicity and gender.

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- and women-owned construction firms in Oklahoma were generally lower than the average for all firms. Disparities are most evident when considering all businesses, both employer and non-employer firms. In Oklahoma:

- Average receipts for Asian American-owned construction firms were about 20 percent of the average for all firms;
- African American-owned construction firms' average receipts were about one-quarter the average for all firms;
- Native American-owned firms had the greatest average receipts among minority-owned construction firms, still just 72 percent of the average for all firms; and
- Women-owned construction firms also had lower average receipts than all firms.

When examining only employer firms in Oklahoma, mean receipts for women-owned construction businesses were similar to the average for all firms, and Native American-owned construction firms had greater-than-average receipts. However, mean receipts for African American- and Hispanic American-owned construction businesses were substantially less than the average for all Oklahoma construction firms with paid employees.

Business earnings for business owners. 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 2008 American Community Survey (ACS). For each sample, BBC examined incorporated and unincorporated business owners age 16 and over 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 during 2007-2008. Due to small sample sizes, BBC was unable to report robust statistics for engineering business owners using these data sources.

Construction business owners. Figure F-24 shows average earnings in 1999 for construction business owners in Oklahoma and the United States. In Oklahoma, mean annual earnings for non-Hispanic white construction business owners were $23,500. In contrast, minority business owners averaged earnings of $19,100. Female construction business owners in Oklahoma also earned substantially less than male construction business owners.

None of the Oklahoma results are statistically significant, possibly due to small sample sizes. However, these results are consistent with the picture at the national level, where statistically significant differences are evident.

Figure F-24.
Mean annual business owner earnings in the construction industry, 1999

Note:

The sample universe is business owners age 16 and over who reported positive earnings.

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

"Minority" includes African Americans, Hispanic Americans, Native Americans and other race groups.

Source:

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

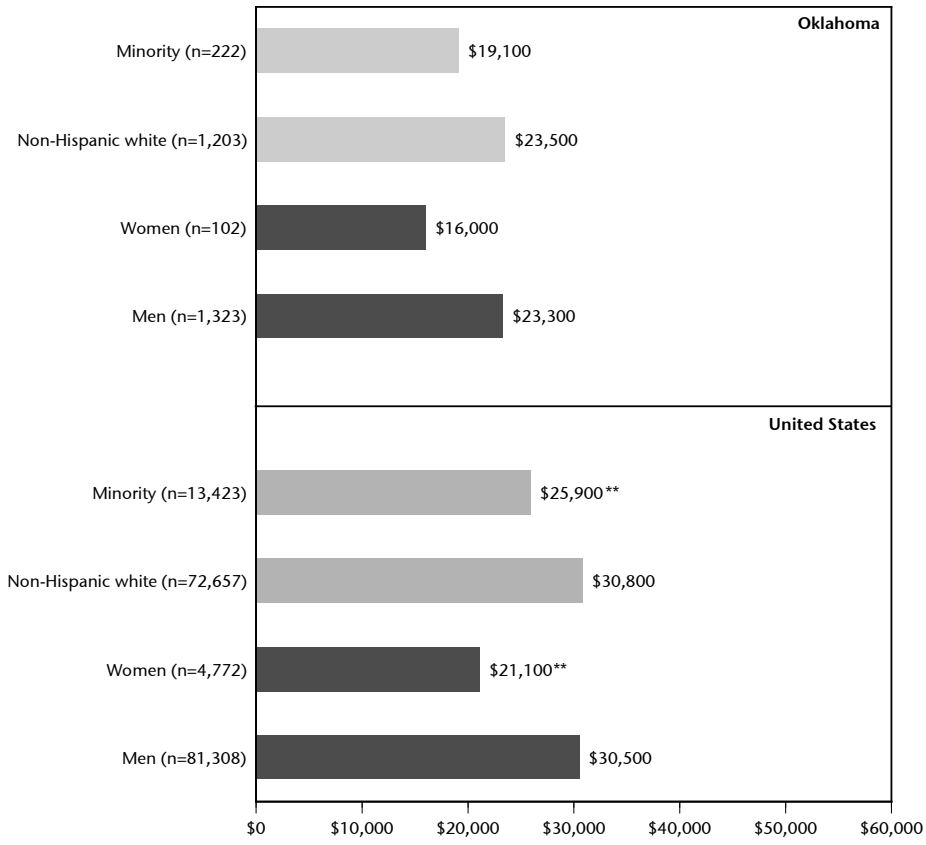


Figure F-25 presents findings based on 2007-2008 earnings. The results are consistent with data for 1999, showing that average earnings for minority and women construction business owners in Oklahoma were less than the average for non-Hispanic whites and males, respectively.

Figure F-25. Mean annual business owner earnings in the construction industry, 2007-2008

Note:

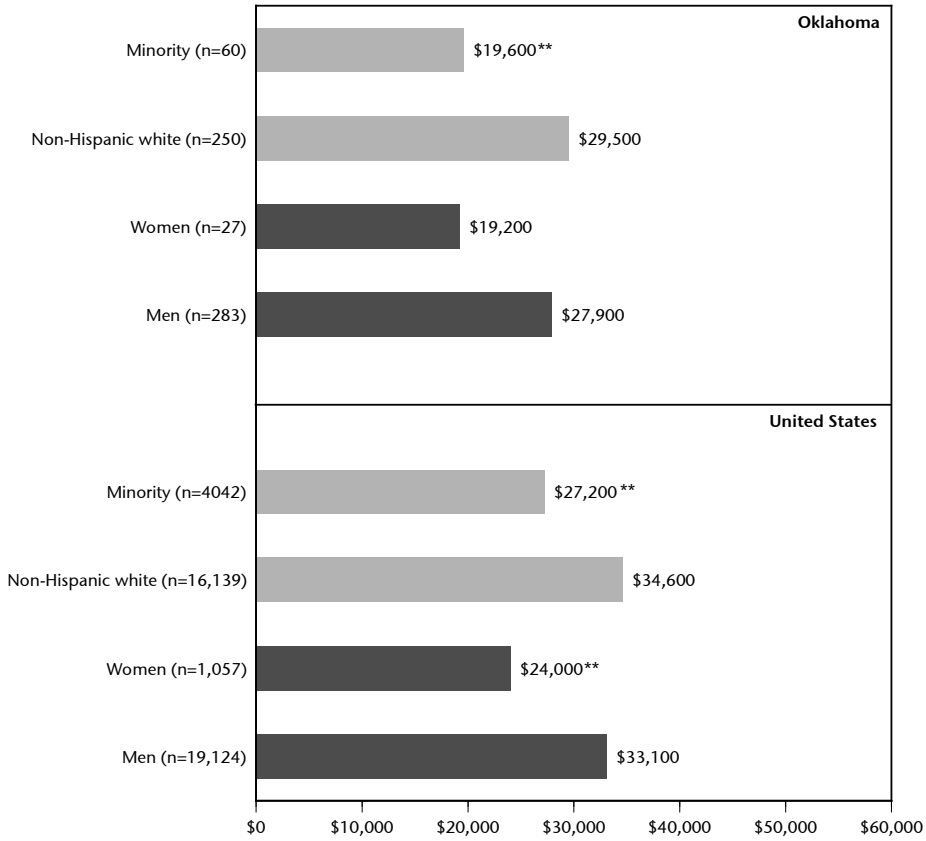
The sample universe is business owners age 16 and over who reported positive earnings.

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

"Minority" includes African Americans, Hispanic Americans, Native Americans and other race groups.

Source:

BBC Research & Consulting from 2008 ACS Public Use Micro-sample data.



Engineering business owners. Because of small sample sizes for self-employed people in the Oklahoma engineering industry, BBC examined business earnings for self-employed individuals for the West South Central (WSC) region, which includes Oklahoma, Texas, Arkansas and Louisiana. Only data for 1999 could be examined due to small sample sizes for the 2008 ACS data.

Figure F-26 compares results for minorities and non-Hispanic whites and for female and male engineering business owners. Non-Hispanic white engineering business owners in the WSC region had mean annual earnings of approximately $50,200 in 1999. This compares to about $44,500 for minority owners during the same year. Female engineering business owners in the WSC region also earned substantially less ($32,200) compared to male owners ($52,300).

Figure F-26. Mean annual business owner earnings in the engineering industry, 1999

Note:

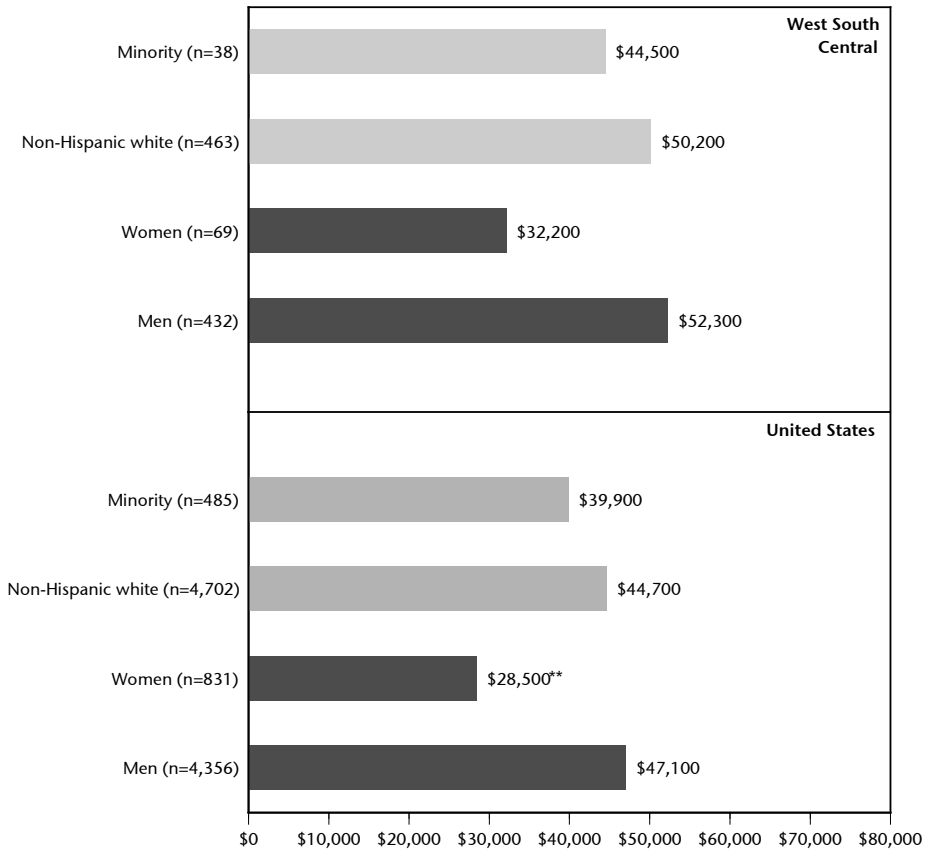
The sample universe is business owners age 16 and over who reported positive earnings.

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

"Minority" includes African Americans, Hispanic Americans, Native Americans and other race groups.

Source:

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



Regression analysis of business earnings for construction in Oklahoma and WSC. 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 PUMS data to examine whether disparities in business earnings for 1999 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 Oklahoma and the West South Central Census Division (referred to in the following discussion as the WSC region). Due to small sample sizes, BBC did not develop a model using 2008 ACS data.

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 after other recent disparity studies.[15]

[15] 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.

Figure F-27 shows the results of this OLS model for 1999 earnings. The model indicates that several neutral factors are statistically significant in predicting the 1999 earnings of business owners in the Oklahoma construction industry:

- Older business owners had greater earnings, but this marginal effect declined for the oldest individuals;
- Business owners who were married tended to have greater business earnings;
- Owners who spoke English well, on average, had greater earnings;
- 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; and
- Business owners with some college (but no degree) tended to have lower earnings, compared to business owners with just a high school degree.

Even when taking into account neutral factors, there are statistically significant disparities in business owner earnings in the Oklahoma construction industry in 1999.

Figure F-27.
Oklahoma construction business owner earnings model, 1999

Variable	Coefficient	t-statistic
Constant	6.913	14.33 **
Age	0.095	5.41 **
Age-squared	-0.001	-5.54 **
Married	0.290	3.31 **
Speaks English well	0.606	1.81 *
Disabled	0.059	0.49
Less than high school	-0.238	-2.18 **
Some college	-0.296	-2.77 **
Four-year degree	-0.116	-0.54
Advanced degree	-0.463	-1.18
African American	-0.190	-0.58
Hispanic American	0.660	3.47 **
Native American	-0.040	-0.34
Other minority group	0.212	0.43
Female	-0.575	-3.43 **

Note: ** Denotes statistical significance at the 95% confidence level.
* Denotes statistical significance at the 90% confidence level.
Source: BBC Research & Consulting based on analysis of 2000 Census Public Use Microdata Sample.

The following differences were statistically significant after accounting for neutral factors.

- Hispanic American construction business owners tended, on average, to earn more than similarly situated non-Hispanic white owners; and

- Female construction business owners tended, on average, to earn less than male construction business owners.

The model also indicates that business earnings were lower for African Americans compared to non-Hispanic whites, on average, after taking other factors into account. However, this result is not statistically significant.

The Oklahoma construction industry model includes 927 observations. BBC also developed a model for the wider WSC region, with additional variables to represent business owners in Oklahoma. This model includes 7,137 observations. Figure F-28 shows the results of the construction model for 1999 earnings in the WSC region.

Figure F-28.
WSC region construction business owner earnings model, 1999

Variable	Coefficient	t-statistic	
Constant	7.541	40.76	**
Age	0.083	10.43	**
Age-squared	-0.001	-10.99	**
Married	0.314	8.07	**
Speaks English well	0.331	4.04	**
Disabled	-0.078	-1.59	
Less than high school	-0.122	-2.77	**
Some college	-0.026	-0.63	
Four-year degree	0.165	2.13	**
Advanced degree	0.289	2.09	**
In Oklahoma	-0.226	-4.09	**
African American	-0.350	-3.45	**
African American in Oklahoma	0.167	0.49	
Hispanic American	-0.023	-0.49	**
Hispanic American in Oklahoma	0.614	3.35	**
Native American	-0.198	-1.63	
Native American in Oklahoma	0.158	0.92	
Other minority group	0.117	0.86	
Other minority group in Oklahoma	0.113	0.23	
Female	-0.361	-4.38	**
Female in Oklahoma	-0.256	-1.35	

Note: ** Denotes statistical significance at the 95% confidence level.
* Denotes statistical significance at the 90% confidence level.
Source: BBC Research & Consulting based on analysis of 2000 ACS Public Use Microdata Sample.

Most of the neutral factors that were statistically significant in the Oklahoma construction model are also statistically significant in this model. However, in the WSC model, business owners with some college but no degree no longer tended to have lower earnings, compared to business owners with just a high school degree.

The following are statistically significant results for the WSC model but not the Oklahoma model:

- Business owners with a four-year or advanced degree had higher earnings on average than those with only a high school education; and

- Business owners in Oklahoma tended to have lower earnings than owners in other states within the WSC region.

After controlling for neutral factors, disparities are still evident at the WSC region level.

- African American and Hispanic American construction business owners in the WSC region earned less on average than non-Hispanic whites; and

- Female construction business owners in the WSC region earned less on average than male owners.

There was also evidence indicating that one group faired differently in Oklahoma. Hispanic American business owners in Oklahoma had significantly higher earnings, on average, than Hispanic American owners elsewhere in the WSC region. Results for African American, Native American and female construction business owners indicate that they did not fair significantly differently in Oklahoma compared to elsewhere in the WSC region.

Regression analysis of business earnings for engineering. To examine the relationship between race/gender and neutral factors in business earnings in the engineering industry, BBC developed a separate model for engineering using 2000 Census data. This model includes engineering business owners in the WSC, with additional variables representing engineering business owners in Oklahoma. The model is based on 387 observations. (Due to small sample sizes BBC did not develop a separate model for just Oklahoma using these data.)

Figure F-28 presents the results of the OLS model of business owner earnings specific to the WSC region engineering industry in 1999.

Figure F-28.
WSC region engineering business owner earnings model, 1999

Variable	Coefficient	t-statistic
Constant	9.879	12.08 **
Age	0.098	3.02 **
Age-squared	-0.001	-3.15 **
Married	0.218	1.18
Speaks English well	-2.018	-9.27 **
Disabled	-0.246	-0.81
Less than high school	0.006	0.02
Some college	-0.442	-1.80 *
Four-year degree	-0.182	-0.74
Advanced degree	-0.106	-0.39
In Oklahoma	0.775	3.91 **
African American	0.200	0.58
Hispanic American	0.346	1.33
Native American	-2.327	-4.53 **
Native American in Oklahoma	-1.785	-3.31 **
Other minority group	0.544	1.34
Female	-0.637	-2.42 **

Note: ** Denotes statistical significance at the 95% confidence level.
* Denotes statistical significance at the 90% confidence level.
Due to small sample sizes, variables representing African Americans, Hispanic Americans, other minorities and females in Oklahoma were dropped from the model.

Source: BBC Research & Consulting, based on analysis of 2000 Census Public Use Microdata Sample.

The engineering-only model of business owner earnings for 1999 shows similar influences from neutral factors as observed in the 1999 WSC construction model. However, there are some differences in statistically significant variables.

- There was no significant difference in earnings between engineering business owners who were married and those who were not;
- Individuals with some college (but no degree) tended to have lower earnings on average than individuals with just a high school education; and
- In contrast to construction business owners, engineering business owners in Oklahoma had higher earnings on average than owners elsewhere in the WSC region.

After controlling for neutral factors, model results indicate statistically significant disparities in earnings at the WSC region level.

- Native American engineering business owners earned less on average than non-Hispanic white engineering business owners in the WSC region; and
- Female engineering business owners earned less on average than male engineering business owners in the WSC region.

Furthermore, results indicate that Native American engineering business owners earned even less in Oklahoma compared to Native Americans elsewhere in the WSC region.

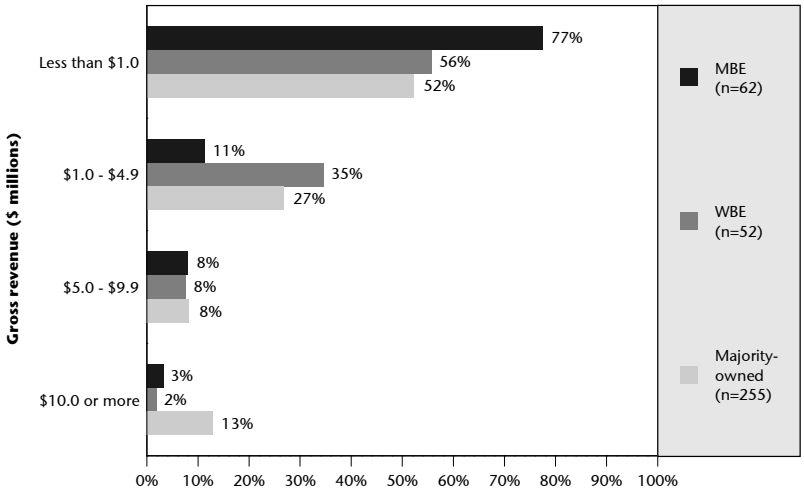
Gross revenue of transportation construction and engineering firms from availability interviews. Respondents were asked to identify the size range for their gross revenue for the prior year. A second question asked for gross revenue across all Oklahoma locations for multi-location firms.

Construction firms. Figure F-29 examines the distribution of MBEs, WBEs and majority-owned transportation construction industry firms by revenue class. Relatively more MBE/WBEs than majority-owned construction firms in Oklahoma had annual revenue of less than $1 million. Nearly 80 percent of MBE firms reported gross revenue of less than $1 million for 2009. Only 52 percent of majority-owned construction firms had revenues of less than $1 million. A larger share of majority-owned firms also reported gross revenue of $5 million or greater than MBE/WBEs.

Figure F-29.
Distribution of firms by gross revenue net size class, transportation construction industry

Note:
WBE is white women-owned firms.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

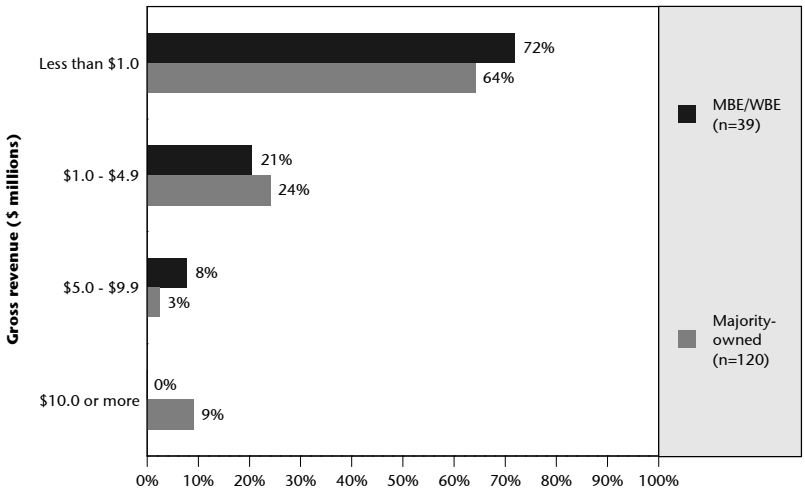


Engineering firms. Transportation engineering industry firms were also asked to identify gross revenue across all Oklahoma locations. As shown in Figure F-30, the distribution of gross revenue for MBE/WBE engineering firms was similar to majority-owned firms that reported revenue of less than $5 million. No MBE/WBEs reported to have gross revenue of $10 million or more, while 9 percent of majority-owned firms reported such revenue. Responses of MBEs and WBEs were combined due to the relatively small number of respondents (28 MBEs and 11 WBEs).

Figure F-30.
Gross revenue of company for all Oklahoma locations, transportation engineering industry

Note:
WBE is white women-owned firms.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.



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.[16] 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 Oklahoma 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 interviews to identify the largest transportation-related contract the company was awarded in Oklahoma in the past five years. The survey effort produced a database of 542 potentially available firms.[17] The following analysis of bid capacity relies on the results of the availability interviews.

One factor that affects 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 subindustries is to assess whether a firm has a bid capacity above or below the median level for firms in that subindustry. BBC can then test whether minority- and women-owned firms bid on larger or smaller contracts or subcontracts compared with other firms in their subindustries.

[16] 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).*

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

Figure F-32 indicates the median bid capacity among Oklahoma-based establishments in each of the 15 industry segments within the construction and engineering 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 F-32.
Median bid capacity by industry segment

Industry segment	Median revenue
Bridge construction and repair	$5 million
Construction supplies	$5 million to $10 million
Consulting and research	Over $100,000 to $500,000
Drainage structures and utilities	$2 million
Electrical, lighting and signals	Over $500,000 to $1 million
Engineering services	Over $500,000 to $1 million
Excavation, grading and erosion control	Over $500,000 to $1 million
Fencing, guardrail and barriers	Over $100,000 to $500,000
Highway and tunnel construction	Over $1 million to $2 million
Machinery and equipment	Over $1 million to $2 million
Other construction services	$1 million
Other construction supplies	Over $500,000 to $1 million
Surveying and mapping services	Over $100,000 to $500,000
Traffic control	$5 million to $10 million
Trucking and hauling	Over $500,000 to $1 million

Source: BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Firms with bid capacities above the median for their industry segments are counted as available for larger transportation projects than most of the firms in their line of business (as well as being 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 F-33 compares the proportions of firms with above-median bid capacity by ownership.

Figure F-33.
Proportion of firms with above-median bid capacity by ownership

Source:

BBC Research & Consulting from 2009 and 2010 Availability Interviews.

	Proportion with above-median bid capacity	
Firm ownership	Construction	Engineering
African American	20.0%	0.0%
Asian-Pacific American	-	100.0%
Subcontinent Asian American	-	100.0%
Hispanic American	20.0%	50.0%
Native American	24.3%	35.7%
Female	28.9%	20.0%
Majority-owned	41.8%	41.2%
All firms	**36.7%**	**39.9%**

Construction. The results shown in Figure F-33 indicate that, in aggregate, relatively fewer minority and women-owned construction firms have above-median bid capacity for their subindustries compared with majority-owned firms.

Engineering. Figure F-33 shows that 41 percent of majority-owned firms have an above-median bid capacity and that a relatively smaller share of WBEs is above median bid capacity. The results indicate that 100 percent of Asian-Pacific and Subcontinent Asian American firms reported an above-median bid capacity. However, this is based on a small number of observations: two for Asian-Pacific Americans and one for Subcontinent Asian American.

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 interviews that may be correlated with bid capacity. Annual revenues, number of employees and, potentially, whether a firm has multiple establishments in Oklahoma 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 interviews, the study team determined that the age of firms was the neutral factor that might best explain differences in bid capacity (within a subindustry) while being truly exogenous to that capacity. Theoretically, the longer firms are in business, the larger the contracts or subcontracts they might pursue.

To test this hypothesis, the study team conducted separate logistic regression analyses for the construction and engineering industries to determine whether 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 Oklahoma construction industry. The results for the Oklahoma construction industry are shown in Figure F-34. The results of the logistic regression indicate the following:

- The age of the firm is a significant predictor of having above-median bid capacity;
- Minority-owned firms are significantly less likely to have an above median bid capacity; and
- Women-owned firms are only marginally less likely to be above median bid capacity (p-value of 0.052).

Figure F-34.
ODOT-available construction industry bid capacity model

Variable	Coefficient	Z-Statistic
Constant	-0.63	-2.68 **
Age of firm	0.02	2.21 *
Minority	-0.78	-2.18 *
Female	-0.63	-1.95

Note:
*Significant at 95% confidence level.
**Significant at 99% confidence level.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Bid capacity results for Oklahoma engineering industry. The results for the Oklahoma engineering industry are shown in Figure F-35. The logistic regression model for the industry indicates:

- The age of the firm is a significant predictor of having above-average bid capacity for engineering as well as construction;
- MBE/WBE ownership is not a significant predictor of having above-average bid capacity for firms in the engineering industry.

Figure F-37.
ODOT-available engineering industry bid capacity model

Variable	Coefficient	Z-Statistic
Constant	-0.50	-1.80
Age of firm	0.02	2.60 **
Minority	-0.12	-0.26
Female	-0.67	-0.94

Note:
*Significant at 95% confidence level.
**Significant at 99% confidence level.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Median revenue. In addition to analyzing median bid capacity, the study team analyzed median revenue of firms available for transportation work. BBC was interested in seeing how MBE/WBE firms compare to majority-owned firms in their rates of being above median revenue for their industry sector. Figure F-38 indicates the median revenue among Oklahoma-based establishments in each of the 15 industry segments within the construction and engineering subindustries.

Figure F-38.
Median revenue by industry segment

Industry segment	Median revenue
Bridge construction and repair	$5 million
Construction supplies	$5 million to $10 million
Consulting and research	Over $100,000 to $500,000
Drainage structures and utilities	$2 million
Electrical, lighting and signals	Over $500,000 to $1 million
Engineering services	Over $500,000 to $1 million
Excavation, grading and erosion control	Over $500,000 to $1 million
Fencing, guardrail and barriers	Over $100,000 to $500,000
Highway and tunnel construction	Over $1 million to $2 million
Machinery and equipment	Over $1 million to $2 million
Other construction services	$1 million
Other construction supplies	Over $500,000 to $1 million
Surveying and mapping services	Over $100,000 to $500,000
Traffic control	$5 million to $10 million
Trucking and hauling	Over $500,000 to $1 million

Source: BBC Research & Consulting from 2009 and 2010 Availability Interviews.

As with the study team's analysis of median bid capacity, an initial question is whether or not minority and women-owned firms are as likely as majority owned firms to have above-median revenue for their industry segment. Figure F-39 compares the proportions of firms with above-median bid capacity by ownership.

Figure F-39.
Proportion of firms with above-median revenue by ownership

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

	Proportion with above-median revenue	
Firm ownership	Construction	Engineering
African American	0.0%	0.0%
Asian-Pacific American	-	50.0%
Subcontinent Asian American	-	100.0%
Hispanic American	28.6%	40.0%
Native American	22.4%	29.4%
Female	42.3%	27.3%
Majority-owned	39.6%	39.2%
All firms	**36.9%**	**37.1%**

Construction. Figure F-39 shows that, in aggregate, relatively fewer minority and women-owned construction firms have above-median revenue for their subindustries compared with majority-owned.

Engineering. Results are similar to those for median bid capacity. As indicated by Figure F-39, 39 percent of majority-owned firms have an above-median revenue, and a relatively smaller share of WBEs have an above-median revenue. The results indicate that 50 percent of Asian-Pacific and 100 percent of Subcontinent Asian American-owned firms reported above-median revenue. However, this is based on a small number of observations, 2 for Asian-Pacific Americans and 1 for Subcontinent Asian American.

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

The study team determined that the age of firms was the neutral factor that might best explain differences in revenue (within a subindustry) while being truly exogenous to that capacity. Theoretically, the longer firms are in business, the greater their revenue should be.

To test this hypothesis, the study team conducted separate logistic regression analyses for the construction and engineering industries to determine whether or not revenue 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).

Revenue results for the Oklahoma construction industry. The results for the Oklahoma construction industry are shown in Figure F-40. The logistic regression model for the industry indicates:

- Age of the firm is a significant determinant in a firm being above median revenue; and
- MBE ownership is a significant determinant of a firm being above median revenue.

Figure F-40.
Oklahoma construction industry revenue model

Variable	Coefficient	Z-Statistic
Constant	-0.84	-3.74 **
Age of firm	0.02	2.30 *
Minority	-0.83	-2.44 *
Female	0.15	0.50

Note:
*Significant at 95% confidence level.
**Significant at 99% confidence level.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Revenue results for the Oklahoma engineering industry. The results for the Oklahoma engineering industry are shown in Figure F-41. The logistic regression model for the industry indicates:

- Age of the firm is a significant determinant in a firm being above median revenue; and
- MBE/WBE ownership does not have a significant impact on above median revenue in the engineering subindustry.

Figure F-41.
Oklahoma engineering industry revenue model

Variable	Coefficient	Z-Statistic
Constant	-1.65	-5.01 **
Age of firm	0.05	4.48 **
Minority	-0.15	-0.31
Female	-0.07	-0.10

Note:
*Significant at 95% confidence level.
**Significant at 99% confidence level.

Source:
BBC Research & Consulting from 2009 and 2010 Availability Interviews.

Summary of analysis of business receipts and earnings. BBC examined a number of different data sources for business receipts and earnings for construction and engineering firms.

- Analysis of 2002 data on business receipts show relatively low mean receipts for minority- and women-owned construction firms.
- Regression analyses using Census data for business owner earnings indicate that there are statistically significant disparities in earnings in the WSC region for some groups, even after taking several neutral factors into account. In construction:
  - African American, Native American and Hispanic American business owners tended to earn less than non-Hispanic white business owners; and
  - Female business owners tended to earn less than male business owners.
- Regression analyses for engineering for the WSC region show that:
  - Native American business owners earned less on average than non-Hispanic white business owners; and
  - Female business owners earned less on average than male business owners.
- Considering the transportation construction industry overall, relatively few MBE/WBEs had annual revenue of $1 million or more. Compared with majority-owned firms, relatively few MBE/WBE engineering firms had revenue of $10 million or more.
- The availability interviews indicate that the share of majority-owned firms that reported gross revenue of $10 million or more for 2009 was substantially greater than the share of MBE/WBEs for both construction and engineering firms. No MBE/WBE engineering firms reported revenue of $10 million of more for 2009.