

## APPENDIX H.

# Success of Businesses in the Oregon Construction and Engineering Industries

Keen Independent examined the success of minority- and women-owned business enterprises (MBE/WBEs) in the Oregon construction and engineering industries. Keen Independent assessed whether business outcomes for MBEs and WBEs differ from those of non-Hispanic white male-owned businesses (i.e., majority-owned businesses).<sup>1</sup> Chapter 5 includes a summary of results.

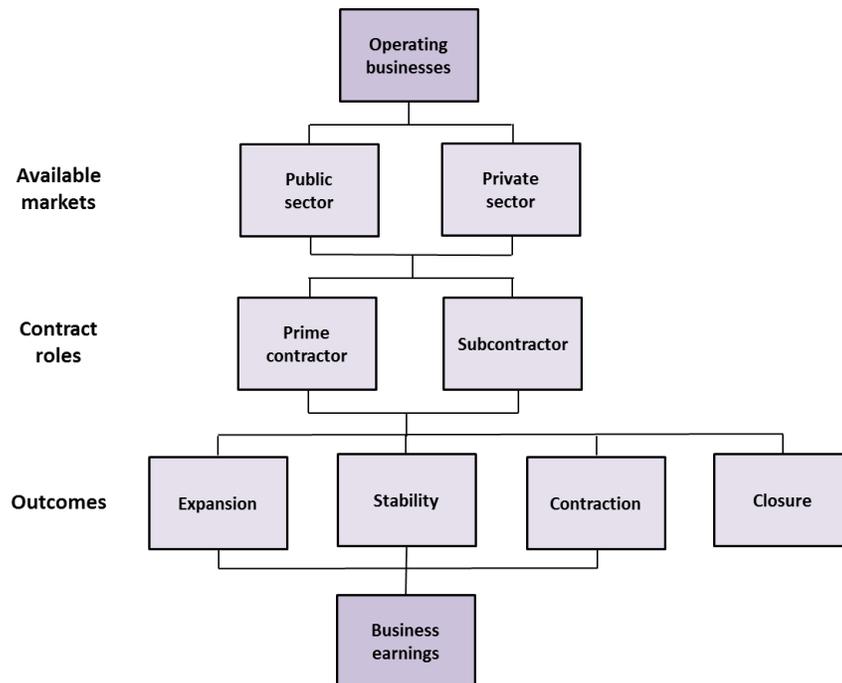
Keen Independent researched outcomes for MBE/WBEs and majority-owned businesses in terms of:

- A. Participation in public and private sector markets, including contractor roles and sizes of contracts bid on and performed;
- B. Business closures, expansions and contractions;
- C. Business receipts and earnings; and
- D. Potential barriers to starting or expanding businesses.

Figure H-1 provides a framework for Keen Independent’s analyses.

Figure H-1.  
Business  
outcomes

Source:  
Keen Independent  
Research



<sup>1</sup> Keen Independent uses the terms “MBEs” and “WBEs” to refer to businesses that are owned and controlled by minorities or women (definitions listed in Appendix A), regardless of whether they are certified or meet the revenue and net worth requirements for DBE certification, and regardless of whether they are certified as MBEs or WBEs.

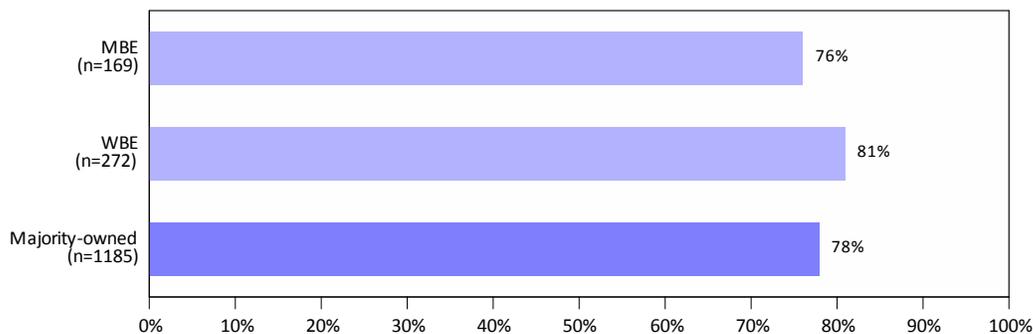
## A. Participation in Public and Private Sector Markets

Keen Independent used information collected as part of the availability analysis to examine whether transportation-related construction and engineering businesses bid on public sector and private sector work, and the extent to which firms work as prime contractors and subcontractors.

**Bidding on public sector projects.** In the availability surveys, firms that reported they performed transportation-related work were asked whether they had bid on or worked on any part of a state or local government project within Oregon in the past five years.<sup>2</sup> As shown in Figure H-2, most MBEs, WBEs and majority-owned firms (76-81%) reported they had bid on or worked on public sector projects. (In each of the following graphs, the number of firms in each group responding to a particular question in the availability survey is shown in parentheses.)

Figure H-2.

Percent of transportation-related businesses that reported bidding or working on a state or local government project in Oregon in the past five years (any part of a project)



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

Source: Keen Independent Research from 2015 Availability Surveys.

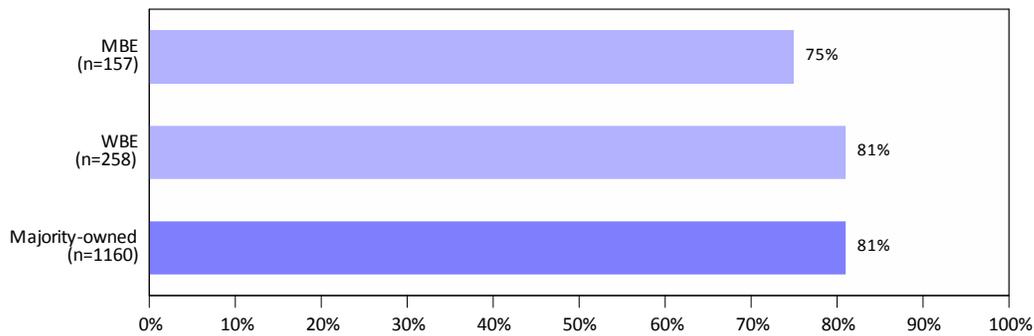
**Bidding on private sector projects.** Keen Independent also asked businesses involved in transportation work if they had bid on or worked on private sector work in Oregon in the past five years (any part of a project).<sup>3</sup> Again, most MBEs, WBEs and majority-owned firms reported that they had bid on private sector projects.

---

<sup>2</sup> Keen Independent deemed a business to have performed or bid on public sector work if it answered "yes" to either of the following questions in availability interviews: (a) "During the past five years, has your company submitted a bid or a price quote for any part of a contract for a state or local government agency in Oregon?"; or (b) "During the past five years, has your company worked on any part of a contract for a state or local government agency in Oregon?"

<sup>3</sup> Keen Independent deemed a business to have performed or bid on private sector work if it answered "yes" to either of the following questions in availability interviews: (a) "During the past five years, has your company submitted a bid or a price quote for any part of a contract for a private sector project in Oregon?"; or (b) "During the past five years, has your company worked on any part of a contract for a private sector project in Oregon?"

Figure H-3.  
Percent of transportation-related businesses that reported bidding or working on a private sector project in Oregon in the past five years (any part of a project)



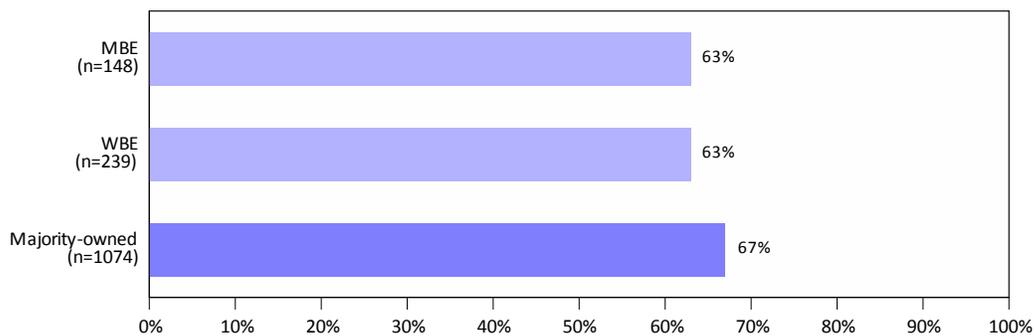
Note: "WBE" represents white women-owned firms, "MBE" represents minority-owned firms and "Majority-owned" represents non-Hispanic white male-owned firms.

Source: Keen Independent Research from 2015 Availability Surveys.

The above results indicate that most transportation-related firms in Oregon pursue both public and private sector work. As discussed in Chapter 5, the study team also conducted in-depth, personal interviews with businesses and trade associations in Oregon. Interviewees confirmed that companies performing transportation contracts in Oregon can perform both public and private sector work depending on type of work and market opportunities.

**Bidding as a prime contractor.** The study team also asked firms involved in transportation-related work whether they had bid as a prime contractor or prime consultant within Oregon in the past five years. Two-thirds of majority-owned firms reported bidding as a prime contractor, as presented in Figure H-4. A similar percentage of MBEs (63%) and WBEs (63%) said that they had bid as prime contractors or prime consultants.

Figure H-4.  
Percent of businesses that reported bidding or working as a prime contractor or prime consultant on a project in Oregon in the past five years



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

Source: Keen Independent Research from 2015 Availability Surveys.

Availability survey results also indicate that firms working as prime contractors often also function as subcontractors (and vice versa). In-depth interviews with business owners confirmed that result.

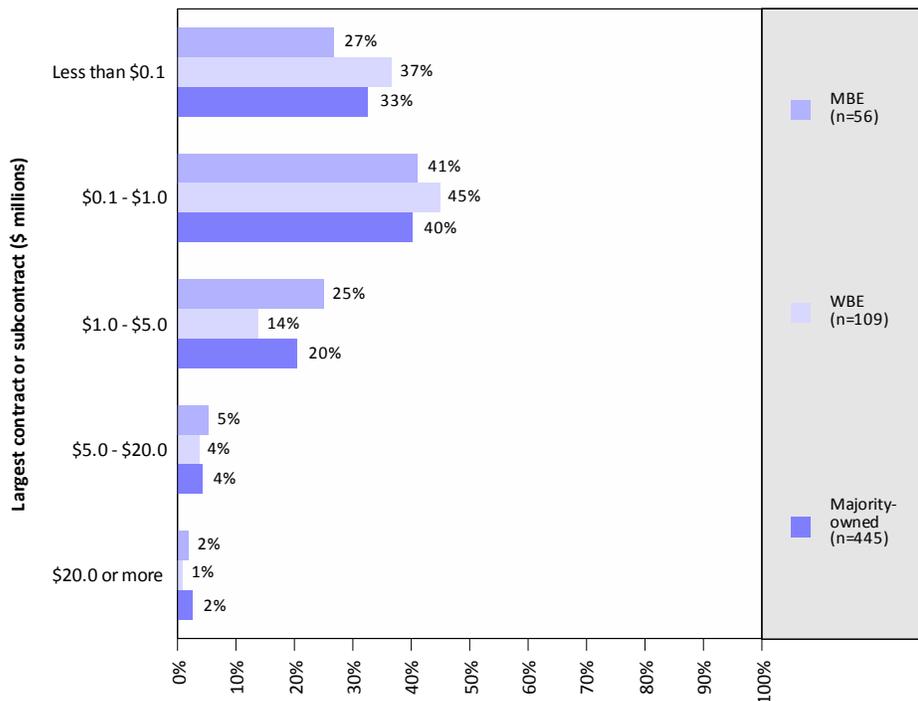
**Largest road-, highway- or bridge-related contract in Oregon in the past five years.** As part of the availability interviews, the study team asked businesses to identify the largest road-, highway- or bridge-related contract or subcontract they were awarded in Oregon in the past five years.

**Construction.** Figure H-5 examines transportation construction firms’ responses to the question concerning the largest contract they had been awarded. Most MBE, WBE and majority-owned construction companies either indicated their largest contracts or subcontracts were less than \$100,000 or were from \$100,000 to \$1 million. For example, 27 percent of MBE construction firms reported that their largest contract was less than \$100,000.

There were a few MBEs, WBEs and majority-owned construction firms represented indicating that they had won contracts or subcontracts of \$20 million or more.

Construction firms that received contracts of \$1 million or more accounted for 32 percent of MBEs, and 26 percent of majority-owned firms, but only 19 percent of WBEs. From these data, there was no indication that relatively fewer MBEs were winning large contracts compared with majority-owned construction firms. The data indicate that relatively few WBE construction firms won large contracts.

Figure H-5.  
Largest road-, highway- or bridge-related contract or subcontract that businesses received in Oregon in the past five years, construction



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

Total may not add to 100 due to rounding.

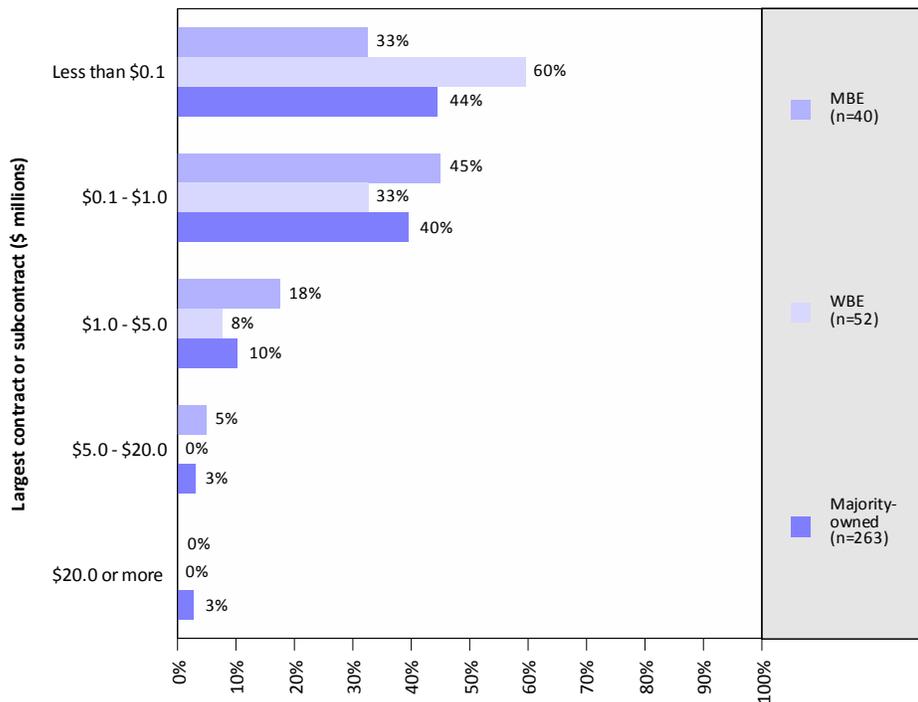
Source: Keen Independent Research from 2015 Availability Surveys.

**Engineering.** Figure H-6 examines the largest road-, highway- or bridge-related contracts that majority-, minority- and women-owned engineering-related businesses were awarded in Oregon in the past five years based on availability interview responses.

For most engineering businesses, the largest road-, highway- or bridge-related contract or subcontract received was less than \$1 million. About 23 percent of minority-owned engineering-related companies reported that the largest contract they had been awarded in the past five years was worth \$1 million or more compared with 16 percent of majority-owned businesses. Relatively fewer WBE engineering-related businesses (8%) indicated that they had been awarded a contract of \$1 million or more.

Majority-owned firms were the only engineering firms surveyed that reported they had received contracts of \$20 million or more.

**Figure H-6.**  
Largest road-, highway- or bridge-related contract or subcontract that businesses received in Oregon in the past five years, engineering



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

Total may not add to 100 due to rounding.

Source: Keen Independent Research from 2015 Availability Surveys.

## B. Relative Bid Capacity

Some legal cases regarding race- and gender-conscious contracting programs have considered the importance of the “relative capacity” of businesses included in an availability analysis.<sup>4</sup> One approach to account for differing capacities among different types of businesses is to examine relatively small contracts, a technique noted in *Rothe Development Corp. v. U.S. Department of Defense*. In addition to examining size of contracts, Keen Independent directly measured bid capacity in its availability analysis.<sup>5</sup>

Through this analysis, Keen Independent was able to distinguish firms based on the largest contracts or subcontracts they had performed or bid on (i.e., “bid capacity” as used in this study). Although additional measures of capacity might be theoretically possible, the bid capacity concept can be articulated and quantified for individual firms for specific time periods.

**Measurement of bid capacity.** The availability analysis produced a database of more than 900 businesses potentially available for ODOT work. “Relative capacity” for a business is measured as the largest contract or subcontract that the business performed or reported that they had bid on within the five years preceding when Keen Independent interviewed it.

Subindustries such as paving and general road construction tend to involve relatively large projects. Other subindustries, such as surveying, typically involve smaller projects. Figure H-7 reports the median relative bid capacity among Oregon transportation-related businesses in 26 subindustries. Results categorized companies according to their primary line of business (e.g., results for a firm that primarily performs excavation that also does trucking and hauling are included under excavation, grading and drainage).<sup>6</sup>

---

<sup>4</sup> For example, see 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).

<sup>5</sup> See Appendix D for details about the availability interview process.

<sup>6</sup> Only subindustries with a minimum of three respondents in the availability interviews were analyzed.

Figure H-7.  
Median relative capacity by subindustry

Subindustry	Median bid capacity
<b>Construction</b>	
Bridge and elevated highway construction	\$2 million up to \$5 million
General road construction and widening	\$1 million up to \$2 million
Asphalt and concrete paving	\$500,000 up to \$1 million
Painting for road or bridge projects	\$500,000 up to \$1 million
Other concrete work	\$500,000 up to \$1 million
Wrecking and demolition	\$500,000 up to \$1 million
Underground utilities	\$500,000 up to \$1 million
Concrete flatwork	\$500,000
Excavation, site prep, grading and drainage	\$100,000 up to \$500,000
Drilling and foundations	\$100,000 up to \$500,000
Electrical work including lighting and signals	\$100,000 up to \$500,000
Temporary traffic control	\$100,000 up to \$500,000
Striping or pavement marking	\$100,000 up to \$500,000
Guardrails, fencing or signs	\$100,000 up to \$500,000
Landscaping including erosion control	\$100,000 up to \$500,000
Pavement surface treatment	\$100,000 up to \$500,000
Concrete pumping	\$100,000 up to \$500,000
Concrete cutting	\$100,000 up to \$500,000
Structural steel work	\$100,000
Trucking and hauling	Less than \$100,000
<b>Engineering-related</b>	
Construction management	\$500,000 up to \$1 million
Engineering	\$100,000 up to \$500,000
Transportation planning	\$100,000 up to \$500,000
Environmental consulting	\$100,000 up to \$500,000
Inspection and testing	\$100,000 up to \$500,000
Surveying and mapping	Less than \$100,000

Source: Keen Independent Research from 2015 Availability Surveys.

**Comparison of MBE/WBE and majority-owned bid capacity for transportation construction.**

Keen Independent examined whether there were differences in the size of the largest contracts for MBEs, WBEs and majority-owned firms within the same subindustries.

- First, the study team determined for each company whether its largest contract or subcontract (awarded or bid on) was higher than the median for its primary line of business. For example, if the median bid capacity category for a subindustry was \$1-2 million, and a firm’s largest contract was more than \$2 million, it was classified as having “above median bid capacity.”

- Keen Independent then calculated the percentage of MBEs, WBEs and majority-owned firms that had above-median bid capacity for their subindustry. Figure H-8 reports results for construction subindustries and engineering-related subindustries.

For about one-in-three MBE construction businesses, the largest contract bid on or awarded was higher than the median for its subindustry. (This also means that for two-thirds of MBE construction businesses, the largest contract was in the same or lower size category as the median for their primary line of business.)

Relatively more minority-owned construction businesses (45%) than majority-owned companies (36%) reported largest contracts that were above the median for their subindustry.

About 34 percent of WBEs reported largest contracts that were above the median for their subindustry.

**Figure H-8.**  
Proportion of firms with above-median bid capacity by ownership

Source:  
Keen Independent Research from 2015  
Availability Surveys.

Firm	Construction	Engineering	Construction and engineering
MBE	45 %	38 %	42 %
WBE	34	28	32
Majority-owned	36	32	35

**Engineering.** Figure H-8 also shows the percentage of engineering businesses that reported relative capacities that exceeded the median for their subindustries.

- For 38 percent of MBE engineering businesses, the largest contract bid on or received was higher than the median size category for their subindustry.
- 28 percent of WBEs had above-median bid capacity.
- 32 percent of majority-owned engineering businesses had above-median bid capacity.

**Summary.** The right-hand column of Figure H-8 shows the percentage of all construction and engineering-related firms that had above-median bid capacity for their subindustry. Again, after controlling for subindustry, a higher percentage of MBEs (42%) than majority-owned firms (32%) bid on or received contracts that were above the median. There is no evidence that bid capacity for MBEs in the Oregon transportation contracting industry is depressed after controlling for subindustry. There was only a small difference in the bid capacity for WBEs and majority-owned firms.

**Summary of markets, contracting roles and bid capacity.** Availability interview results show that most firms in the transportation contracting industry pursue both public and private sector work. Most firms also bid as prime contractors and as subcontractors. Compared with majority-owned companies, relatively few WBEs have been awarded contracts or subcontracts of \$1 million or more in size. Relatively more MBEs than majority-owned firms received contracts exceeding \$1 million.

Analysis of bid capacity compared the largest contracts and subcontracts bid on or received for MBEs, WBEs and majority-owned firms in the same subindustries. Relatively more MBEs have bid

on or been awarded contracts that were “large” for a subindustry compared with majority-owned firms (for construction and engineering industries separately and combined). There was no indication that bid capacity for minority-owned firms was lower than for majority-owned companies after controlling for primary line of business for the firm. Differences in results for WBEs compared with majority-owned firms were small for both construction and engineering.

### **C. Business Closures, Expansions and Contractions**

A 2010 Small Business Administration (SBA) report investigated business dynamics for the 2002 through 2006 time period for minority-owned and white-owned businesses. By matching data from business owners who responded to the 2002 U.S. Census Bureau Survey of Business Owners (SBO) to data from the Census Bureau’s 1989-2006 Business Information Tracking Series, the SBA reported on business closures, expansions and contractions between 2002 and 2006 across different sectors of the economy.<sup>7, 8</sup> The SBA also examined differences by gender.<sup>9</sup>

**Business closures.** High rates of business closures may reflect adverse business conditions for minority business owners.

**Overall rates of business closure in Oregon.** The 2010 SBA report analyzed business closure rates between 2002 and 2006 for minority- and white-owned firms in Oregon. Figure H-9 presents those data for African American-, Asian American- and Hispanic American-owned businesses as well as for non-Hispanic white-owned businesses.

- About 40 percent of African American-owned businesses that were operating in Oregon in 2002 had closed by the end of 2006, a higher rate than for white-owned businesses (29%).
- Hispanic American-owned businesses (37%) also had closure rates higher than white-owned businesses.
- Closure rates for Asian American-owned businesses (30%) were similar to white-owned firms.
- About 35 percent of female-owned firms closed compared with 27 percent of male-owned firms.

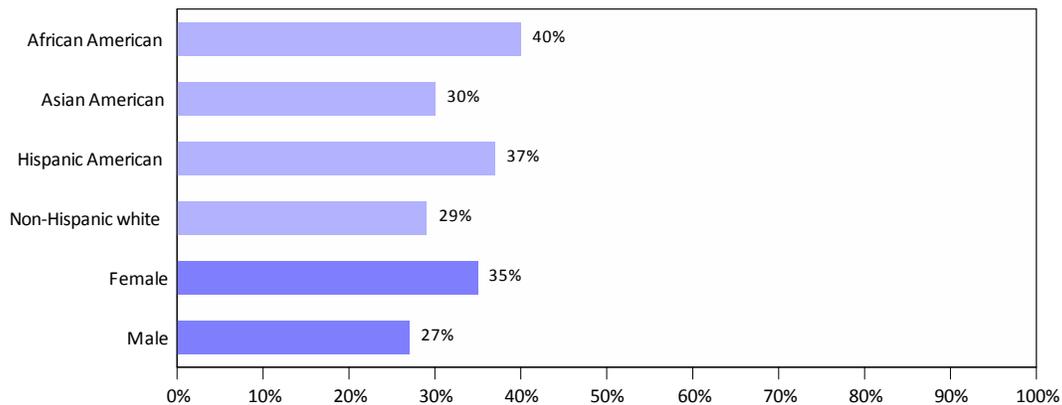
---

<sup>7</sup> Lowrey, Y. (2010). “Race/Ethnicity and Establishment Dynamics, 2002-2006.” U.S. Small Business Administration Office of Advocacy. Washington D.C.

<sup>8</sup> Businesses classifiable by race/ethnicity exclude publicly-traded companies. Keen Independent did not categorize racial groups by ethnicity. As a result, some Hispanic Americans may also be included in statistics for African Americans, Asian Americans and whites.

<sup>9</sup> Lowrey, Y. (2010). “Gender and Establishment Dynamics, 2002-2006.” U.S. Small Business Administration Office of Advocacy. Washington D.C.

**Figure H-9.**  
**Rates of business closure in Oregon, 2002 through 2006**



Note: Data refer only to non-publicly held businesses only. As sample sizes are not reported, statistical significance of these results cannot be determined; however, statistics are consistent with SBA data quality guidelines.

Here, Oregon refers only to businesses in the state of Oregon, and not those businesses from Clark County, Washington, and Skamania County, Washington.

Source: Lowrey, Ying. 2010. "Race/Ethnicity and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.; Lowrey, Ying. 2010. "Gender and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.

**Rates of business closures by industry.** Data for the construction and professional services industries were not available by state. The SBA analysis only reported industry-specific results for the nation as a whole. Based on national results, 43 percent of African American-owned construction businesses that were operating in 2002 had closed by 2006; this was higher than the rate for white-owned construction companies. Among professional, scientific and technical services firms, comparatively more African American-owned businesses closed than white-owned firms.

Hispanic American-owned businesses and Asian American-owned construction businesses that were operating in 2002 were also more likely than white-owned companies to have closed by 2006. This was also found in the professional, scientific and technical services industry.

One-third of women-owned construction firms in the United States in 2002 had closed by 2006, a greater percentage than male-owned firms (30%). There was a similar difference nationally for female-owned professional, scientific and technical services firms (33% closure rate for female-owned and 28% closure rate for male-owned firms).

**Unsuccessful closures.** Not all business closures can be interpreted as "unsuccessful closures." Businesses may close when an owner retires or a more profitable business opportunity emerges, both of which represent "successful closures." The 1992 Characteristics of Business Owners (CBO) Survey is one of the few Census Bureau sources to classify business closures into successful and unsuccessful subsets.<sup>10</sup> The 1992 CBO combines data from the 1992 Economic Census and a survey of business owners conducted in 1996. The survey portion of the 1992 CBO asked owners of businesses that had closed between 1992 and 1995, "Which item below describes the status of this business at the time

<sup>10</sup> CBO data from the 1997 and 2002 Economic Censuses do not include statistics on successful and unsuccessful business closures. To date, the 1992 CBO is the only U.S. Census dataset that includes such statistics.

the decision was made to cease operations?” Only the responses “successful” and “unsuccessful” were permitted. A firm that reported being unsuccessful at the time of closure was understood to have failed.

Keen Independent examined CBO data on the proportion of businesses that closed due to failure between 1992 and 1995 in construction; professional, scientific, and technical services; and all industries.<sup>11, 12</sup> According to CBO data, African American-owned businesses were the most likely to report being “unsuccessful” at the time their businesses closed. About 77 percent of African American-owned businesses in all industries reported an unsuccessful business closure between 1992 and 1995, compared with only 61 percent of non-Hispanic white male-owned businesses. Unsuccessful closure rates were also relatively high for Hispanic American-owned businesses (71%) and for businesses owned by “other minority groups” (73%). The rate of unsuccessful closures for women-owned businesses (61%) was similar to that of non-Hispanic white male-owned businesses.

In the construction industry, minority- and women-owned businesses were more likely to report unsuccessful business closures than non-Hispanic white male-owned businesses (58%). Those trends were similar in the professional services industry with one exception — women-owned businesses (52%) were less likely to report unsuccessful closures than non-Hispanic white male-owned businesses (59%).

**Reasons for differences in unsuccessful closure rates.** Several researchers have offered explanations for higher rates of unsuccessful closures among minority- and women-owned businesses compared with non-Hispanic white-owned businesses:

- Unsuccessful business failures of minority-owned businesses are largely due to barriers in access to capital.<sup>13</sup> Regression analyses have identified initial capitalization as a significant factor in determining firm viability. Because minority-owned businesses secure smaller amounts of debt equity in the form of loans, they may be more liable to fail. Difficulty in accessing capital is found to be particularly acute for minority-owned businesses in the construction industry.<sup>14</sup>

---

<sup>11</sup> All CBO data should be interpreted with caution, as businesses that did not respond to the survey cannot be assumed to have the same characteristics of ones that did. Holmes, T. J., & Schmitz, J. (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 report did not include CBO data on overall business closure rates because businesses not responding to the survey were found to be much more likely to have closed than ones that did.

<sup>12</sup> This study includes CBO data on firm success because there is no compelling reason to believe that closed businesses responding to the survey would have reported different rates of success/failure than those closed businesses that did not respond to the survey. Headd, B. (2000). “Business Success: Factors leading to surviving and closing successfully.” U.S. Small Business Administration, Office of Advocacy, 12.

<sup>13</sup> Access to capital is discussed in greater detail in Appendix G.

<sup>14</sup> Bates, T., & Grown, C. (1991). “Commercial Lending Practices and the Development of Black-Owned Construction Companies.” Center for Economic Studies, U.S. Census Bureau.

- Prior work experience in a family member’s business or similar experiences are found to be strong determinants of business viability. Because minority business owners are much less likely to have such experience, their businesses are less likely to survive.<sup>15</sup> Similar research has been conducted for women-owned businesses and found similar gender-based gaps in the likelihood of business survival.<sup>16</sup>
- Level of education is found to be a strong determinant of business survival. Educational attainment explains a substantial portion of the gap in business closure rates between African American-owned and non-minority-owned businesses.<sup>17</sup>
- Non-minority business owners have broader business opportunities, increasing their likelihood of closing successful businesses to pursue more profitable business alternatives. Minority business owners, especially those who do not speak English, have limited employment options and are less likely to close a successful business.<sup>18</sup>
- Possession of greater initial capital and generally higher levels of education among Asian Americans are related to the relatively high rate of survival of Asian American-owned businesses compared to other minority-owned businesses.<sup>19</sup>

**Expansions and contractions.** Comparing rates of expansion and contraction between minority-owned and white-owned businesses is also useful in assessing the success of minority-owned businesses. As with closure data, only some of the data on expansions and contractions that were available for the nation were also available at the state level.

**Expansions.** The 2010 SBA study of minority business dynamics from 2002 through 2006 examined the number of non-publicly-held Oregon businesses that expanded and contracted between 2002 and 2006. Figure H-11 presents the percentage of all Oregon businesses that increased their total employment between 2002 and 2006 with a breakdown ownership race/ethnicity and gender.

Results for Oregon from the SBA study indicate that a smaller percentage of Asian American-owned businesses (27%) expanded between 2002 and 2006 compared with non-Hispanic white-owned businesses (31%). Rates for African Americans and Hispanic Americans were equal to those of non-Hispanic whites.<sup>20</sup>

---

<sup>15</sup> Fairlie, R., & Robb, A. M. (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.

<sup>16</sup> Fairlie, R., & Robb, A. M. (2009). “Gender Differences in Business Performance: Evidence from the Characteristics of Business Owners Survey.” University of California, Santa Cruz.

<sup>17</sup> *Ibid.*

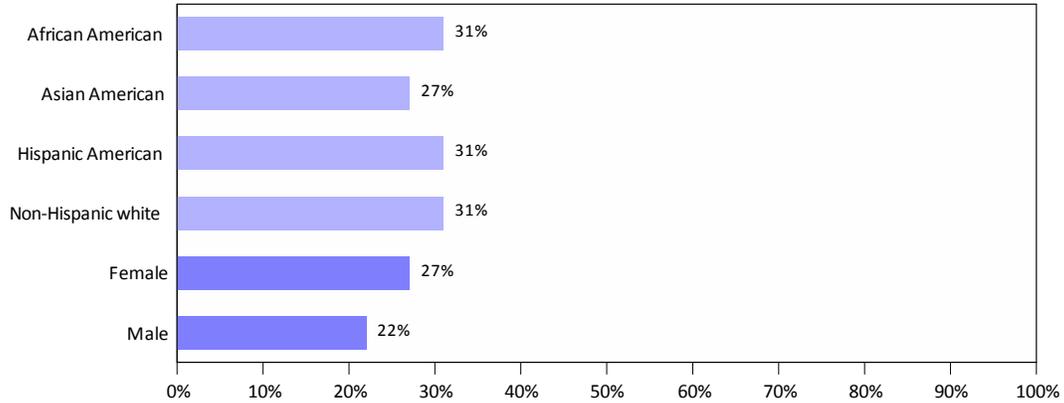
<sup>18</sup> Bates, T. (2002). “Analysis of Young Small Businesses That Have Closed: Delineating Successful from Unsuccessful Closures.” Center for Economic Studies, U.S. Census Bureau.

<sup>19</sup> Bates, T. (1993). “Determinants of Survival and Profitability Among Asian Immigrant-Owned Small Businesses.” Center for Economic Studies, U.S. Census Bureau.

<sup>20</sup> Lowrey, Y. (2010). “Race/Ethnicity and Establishment Dynamics, 2002-2006.” U.S. Small Business Administration Office of Advocacy. Washington D.C.

Women-owned firms were more likely to expand over this time period than businesses owned by men, as shown in the bottom of Figure H-10.

Figure H-10.  
Percentage of businesses in Oregon that expanded, 2002 through 2006



Note: Data refer only to non-publicly held businesses only. As sample sizes are not reported, statistical significance of these results cannot be determined; however, statistics are consistent with SBA data quality guidelines.

Here, Oregon refers only to businesses in the state of Oregon, and not those businesses from Clark County, Washington, and Skamania County, Washington.

Source: Lowrey, Ying. 2010. "Race/Ethnicity and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.; Lowrey, Ying. 2010. "Gender and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.

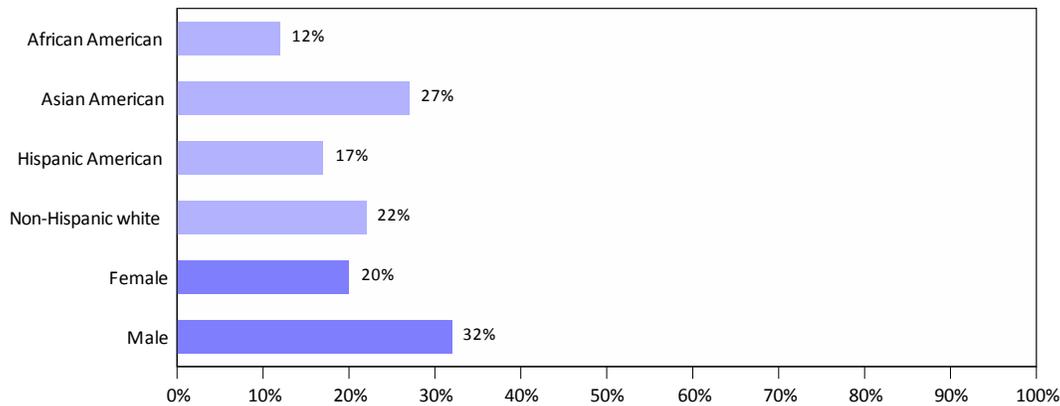
The 2010 SBA study did not report state-level results for individual industries. Nationally, African American-owned construction and professional, scientific, and technical services businesses were less likely than white-owned businesses to have expanded between 2002 and 2006. Hispanic American- and Asian American-owned companies in both construction and professional, scientific, and technical services were slightly more likely than white-owned businesses to have expanded between 2002 and 2006.

Nationally, about the same percentage of female- and male-owned construction firms expanded over this time period (29% and 30%, respectively). For the professional, scientific and technical services industry, however, female-owned firms were less likely to expand than male-owned firms (24% versus 27%).

**Contractions.** Figure H-11 shows the percentage of businesses operating in 2002 that reduced their employment (i.e., contracted) between 2002 and 2006 in Oregon. About 22 percent of white-owned firms contracted employment during this period. Rates were lower for African Americans (12%) and Hispanic Americans (17%), and higher for Asian Americans (27%).

Female-owned businesses were less likely to contract than male-owned businesses in Oregon over this time period.

**Figure H-11.**  
Percentage of businesses in Oregon that contracted, 2002 through 2006



Note: Data refer only to non-publicly held businesses only. As sample sizes are not reported, statistical significance of these results cannot be determined; however, statistics are consistent with SBA data quality guidelines.

Here, Oregon refers only to businesses in the state of Oregon, and not those businesses from Clark County, Washington, and Skamania County, Washington.

Source: Lowrey, Ying. 2010. "Race/Ethnicity and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.; Lowrey, Ying. 2010. "Gender and Establishment Dynamics, 2002-2006." U.S. Small Business Administration Office of Advocacy. Washington D.C.

The SBA study did not report state-specific results relating to contractions in individual industries. Based on national data, a slightly smaller percentage of African American-, Hispanic American- and Asian American-owned construction and professional, scientific and technical services businesses contracted between 2002 and 2006 compared to white-owned businesses. A slightly higher percentage of female-owned construction firms and a slightly lower percentage of female-owned professional, scientific and technical services firms contracted compared with male-owned firms.

**Summary of business closure, expansion and contraction.** The following conclusions can be made based on U.S. Small Business Administration analyses for 2002 to 2006 for Oregon:

- African American-owned businesses were more likely than white-owned businesses to close; African American-owned businesses were also less likely to contract than white-owned businesses.
- Asian American-owned businesses were more likely to contract than white-owned businesses.
- Closure rates for Hispanic American-owned businesses were higher than that of white-owned firms for those years. Contraction rates were lower for Hispanic American business owners.

## D. Business Receipts and Earnings

Annual business receipts and earnings for business owners are also indicators of the success of businesses. Keen Independent used several different data sources, including:

- Business receipts data from the U.S. Census Bureau 2012 Survey of Business Owners;
- Business earnings data for business owners from the 2000 Census and 2007-2012 American Community Survey (ACS); and
- Annual revenue data for Oregon market area transportation construction and engineering businesses that the study team collected as part of 2015 availability surveys.

**Business receipts.** Keen Independent examined receipts for construction and professional, scientific and technical services businesses in Oregon using data from the 2012 Survey of Business Owners (SBO), conducted by the U.S. Census Bureau. The 2012 SBO reports business receipts separately for “employer” firms (i.e., those with paid employees other than the business owner and family members) and for all businesses.<sup>21</sup>

Figure H-12 presents mean annual receipts in 2012 (in thousands) for construction and professional, scientific and technical services businesses. The first column of results for “all firms” pertains to employer firms and non-employer businesses combined. The second column presents results for professional, scientific and technical services firms in Oregon, including both employers and non-employers. The final two columns provide mean receipts for employer firms. (Note that SBO did not report results for African American- and American Indian-owned construction firms in Oregon.)

Figure H-12.  
Mean annual receipts (thousands) for Oregon, 2012

	All firms		Employer firms	
	Construction	Professional, scientific and technical services	Construction	Professional, scientific and technical services
African American	N/A	\$75	N/A	\$710
Asian American	\$411	\$193	\$1,656	\$1,211
Hispanic American	\$229	\$96	\$595	\$608
American Indian and Alaska Native	N/A	\$86	N/A	\$649
Non-Hispanic white	\$514	\$175	\$1,355	\$691
Female	\$308	\$80	\$876	\$427
Male	\$536	\$230	\$1,582	\$834

Notes: Does not include publicly-traded companies or other businesses not classifiable by race/ethnicity and gender. As sample sizes are not reported, statistical significance of these results cannot be determined.

Here, Oregon refers only to businesses in the state of Oregon, and not those businesses from Clark County, Washington, and Skamania County, Washington.

Source: 2012 Survey of Business Owners, part of the U.S. Census Bureau’s 2012 Economic Census.

<sup>21</sup> Includes incorporated and unincorporated businesses, but not publicly-traded or other businesses not classifiable by race/ethnicity and gender.

**Construction.** In the Oregon construction industry, average 2012 receipts for minority-owned businesses were lower than the average for non-Hispanic white-owned businesses (\$514,000). Results for all businesses (i.e., employer and non-employer businesses combined) indicate that:

- Average receipts of Asian American-owned construction businesses (\$411,000) were about four-fifths of the average of non-Hispanic white-owned construction businesses in Oregon;
- Hispanic-owned construction businesses (\$229,000) had average revenue that was less than one-half of the average for non-Hispanic white-owned businesses;
- Average receipts for women-owned construction businesses in Oregon (\$308,000) were 57 percent of the average for male-owned businesses (\$536,000).

Average receipts were higher for businesses with paid employees (the third and fourth columns of results in Figure H-12). Non-Hispanic white-owned construction employer businesses had average receipts of \$1.4 million. Minority-owned construction firms with paid employees had lower receipts:

- Average receipts of Asian American-owned construction employer businesses (\$1.7 million) were about 22 percent higher than that of non-Hispanic white-owned construction employer businesses in Oregon.
- Hispanic-American owned construction employer businesses (\$0.6 million) exhibited revenues that were roughly 44 percent of the average of non-Hispanic white-owned employer businesses.
- Average receipts for women-owned construction employer businesses (\$0.9 million) were 55 percent of the average of male-owned employer businesses (\$1.6 million).

**Professional, scientific, and technical services.** In the Oregon professional, scientific, and technical services industry, African American-, Hispanic-, and American Indian and Alaska Native-owned businesses had lower average receipts than non-Hispanic white-owned businesses.

As shown in Figure H-12, results for all businesses (i.e., employer and non-employer businesses combined) in the professional, scientific, and technical services industry indicate that:

- Average receipts of African American-owned businesses (\$75,000) were 43 percent that of non-Hispanic white-owned businesses (\$175,000);
- Average receipts of Asian American-owned businesses (\$193,000) were 10 percent higher than for non-Hispanic white-owned businesses;
- Average receipts of Hispanic American-owned companies (\$96,000) were 55 percent that of non-Hispanic white-owned businesses;
- Average receipts of American Indian and Alaska Native-owned companies (\$86,000) were 49 percent that of non-Hispanic white-owned businesses; and
- Average receipts of women-owned businesses in the Oregon professional, scientific, and technical services industry (\$80,000) were 35 percent that of male-owned businesses (\$230,000).

Examination of businesses with paid employees in professional, scientific, and technical services showed little to no disparity for minority-owned firms compared to non-Hispanic white-owned firms. African American-owned firms (\$710,000) had receipts about 3 percent higher than those of non-Hispanic white owned firms (\$691,000). Asian American-owned firms (\$1,211,000) had receipts 75 percent higher than those of non-Hispanic white owned firms. Hispanic-owned firms (\$608,000) still had receipts lower than those of non-Hispanic white-owned firms, however, the disparity was less than that of all firms (88%). Women-owned businesses (\$427,000) had receipts just 51 percent of those of male-owned businesses (\$834,000).

**Business earnings.** Keen Independent also examined U.S. Census data regarding earnings of business owners in Oregon. Data sources were the Public Use Microdata Series (PUMS) data from the 2000 U.S. Census of Population and the 2007-2012 American Community Survey (ACS). Keen Independent analyzed earnings of incorporated and unincorporated business owners age 16 and older who reported positive business earnings. Results are presented for the Oregon construction industry and the Oregon engineering industry.

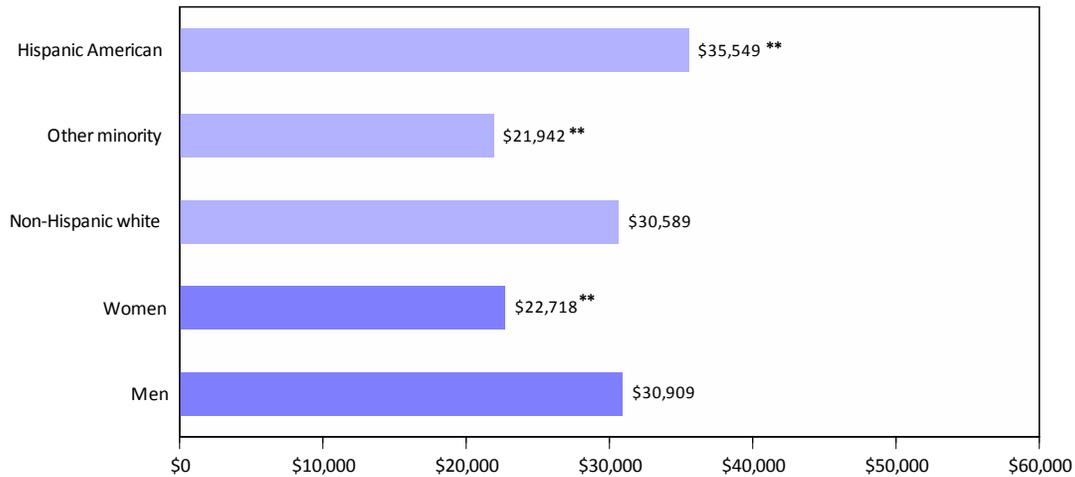
**Construction business owner earnings, 1999.** The 2000 Census of Population asked business owners about their business earnings in the previous year (1999). Figure H-13 shows average earnings in that year for business owners in the construction industry in Oregon. Due to small sample sizes for individual racial/ethnic groups, Keen Independent examined Hispanic Americans separately but grouped all other minorities into a single “other minority” category.

The top three bars of Figure H-13 present results for Hispanic Americans, other minorities and non-Hispanic whites. Results indicated that:

- On average, Hispanic American construction business owners in Oregon earned more (\$35,549) than non-Hispanic white construction business owners (\$30,589). This difference was statistically significant at the 95 percent confidence level.
- Other minority business owners earned significantly less (\$21,942) than non-Hispanic white business owners, and that difference was also statistically significant at the 95 percent confidence level.

The bottom two bars of Figure H-13 compare business owner earnings for women and men who owned construction businesses in Oregon. With mean earnings of \$22,718, female construction business owners in Oregon earned considerably less than male construction business owners (\$30,909). This difference was statistically significant at the 95 percent confidence level.

**Figure H-13.**  
**Mean annual business owner earnings in the Oregon construction industry, 1999**



Note: The sample universe is business owners age 16 and over who reported positive earnings. All amounts in 1999 dollars. \*, \*\* Denote statistically significant differences from non-Hispanic whites (for minority groups) or from men (for women) at the 90% and 95% confidence level, respectively.

Source: Keen Independent Research from 2000 U.S. Census 5% sample. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

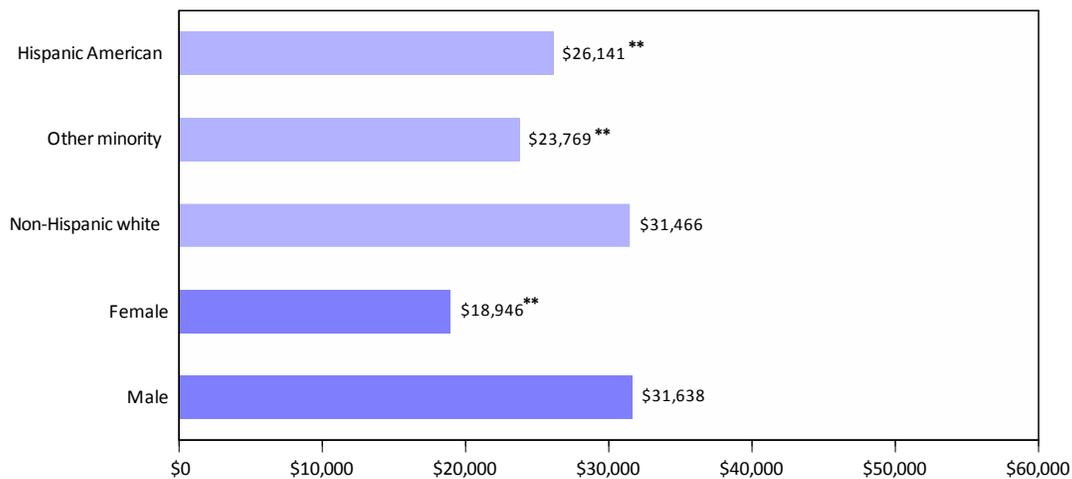
**Construction business owner earnings, 2007-2012.** The 2007-2012 ACS also reports business owner earnings. Because of the way that the U.S. Census Bureau conducts each year's ACS, earnings for business owners reported in the 2007 through 2012 sample were for the previous 12 months (2006-2012).<sup>22</sup> All dollar amounts are presented in 2012 dollars.

Figure H-14 shows earnings in 2007 through 2012 for business owners in the construction industry in Oregon. Again, due to small sample sizes for non-Hispanic minority groups, these groups were combined.

- On average, Hispanic American construction business owners in Oregon earned less in 2007-2012 (\$26,141) than non-Hispanic white construction business owners (\$31,466), a statistically significant difference at the 95 percent confidence level.
- Other minority-owned construction business owners also earned less (\$23,769) than non-Hispanic white construction business owners. This difference was significant at the 95 percent confidence level.
- Female construction business owners in Oregon earned substantially less, on average (\$18,946), than male construction business owners (\$31,638), a statistically significant difference at the 95 percent confidence level.

<sup>22</sup> For example, if a business owner completed the survey on January 1, 2009, the figures for the previous 12 months would reference January 1, 2008 to December 31, 2008. Similarly, a business owner completing the survey December 31, 2011 would reference amounts since January 1, 2011.

**Figure H-14.**  
**Mean annual business owner earnings in the Oregon construction industry, 2007-2012**



Note: The sample universe is business owners age 16 and over who reported positive earnings. All amounts in 2012 dollars.  
 \*\*, \*\* Denote statistically significant differences from non-Hispanic whites (for minority groups) or from men (for women) at the 90% and 95% confidence level, respectively.

Source: Keen Independent Research from 2007-2012 ACS. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

**Engineering business owner earnings, 1999.** Figure H-15 presents average earnings in 1999 for business owners in the engineering industry in Oregon based on the 2000 Census. Due to small sample sizes for individual groups, Keen Independent analyzed results for minority business owners combined.

- Minority engineering business owners in Oregon earned considerably less (\$15,160) than non-Hispanic whites in 1999 (\$40,268), a statistically significant difference.
- Female engineering business owners in Oregon also earned substantially less (\$25,731) than male business owners (\$42,592) in 1999 (statistically significant difference).

**Figure H-15.**  
**Mean annual business owner earnings in the Oregon engineering industry, 1999**



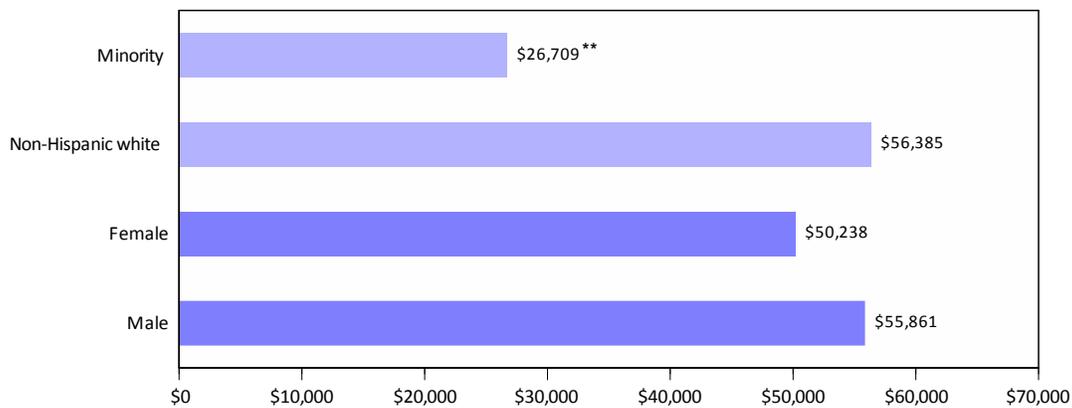
Note: The sample universe is business owners age 16 and over who reported positive earnings. All amounts in 1999 dollars.  
 \*\*, \*\* Denote statistically significant differences from non-Hispanic whites (for minority groups) or from men (for women) at the 90% and 95% confidence level, respectively.

Source: Keen Independent Research from 2000 U.S. Census 5% sample. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

**Engineering business owner earnings, 2007-2012.** As with earnings data for the construction industry, earnings for engineering business owners that were reported in the 2007-2012 ACS data were for the time period between 2007 and 2012. Again, due to small sample sizes, all minority business owners were combined into a single category. Results are for Oregon. Those results are displayed in Figure H-16.

- Minority business owners earned \$26,709, on average, which was less than one-half the earnings of non-Hispanic white business owners (about \$56,385) in Oregon.
- Average earnings for female engineering business owners (about \$50,238) were slightly lower than for male business owners (\$55,861) in Oregon. The difference is not statistically significant.

**Figure H-16.**  
**Mean annual business owner earnings in the Oregon engineering industry, 2007-2012**



Note: The sample universe is business owners age 16 and over who reported positive earnings. All amounts in 2012 dollars. \*,\*\* Denote statistically significant differences from non-Hispanic whites (for minority groups) or from men (for women) at the 90% and 95% confidence level, respectively.

Source: Keen Independent Research from 2007-2012 ACS. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

**Regression analyses of business earnings.** Differences in business earnings among different racial/ethnic and gender groups may be at least partially attributable to race- and gender-neutral factors such as age, marital status, and educational attainment. Keen Independent performed regression analyses using 2007-2012 ACS data to examine whether there were differences in business earnings between minorities and non-Hispanic whites and between women and men after statistically controlling for certain race- and gender-neutral factors.

The study team applied an ordinary least squares regression model to the data that was very similar to models reviewed by courts after other disparity studies.<sup>23</sup> The dependent variable in the model was the natural logarithm of business earnings. Business owners that reported zero or negative business earnings were excluded, as were observations for which the U.S. Census Bureau had imputed values of business earnings. Along with variables for the race, ethnicity and gender of business owners, the

<sup>23</sup> 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.

model also included variables for characteristics considered likely to affect earnings, including age, age-squared, marital status, ability to speak English well, disability condition and educational attainment.

Keen Independent created two regression models for Oregon, a model for business owner earnings in 2007 through 2012 for the construction industry that included 1,295 observations and a model for business owner earnings in 2007 through 2012 for the engineering industry that included 111 observations.

**Construction industry in Oregon, 2007 through 2012.** Figure H-17 presents the results of the regression model for 2007 through 2012 business earnings in the Oregon construction industry. The model indicated that several race- and gender-neutral factors predicted earnings of business owners in the Oregon construction industry (and were statistically significant):

- Being older was associated with higher business earnings (with additional age having less of an effect for older individuals);
- Being married was associated with higher business earnings; and
- Not being able to speak English well was associated with lower business earnings;

After accounting for race- and gender neutral factors, results for race/ethnicity and gender were as follows:

- The model suggested that there were negative effects for minorities, but none were statistically significant; and
- Being female was associated with lower business earnings, and that effect was statistically significant.

**Figure H-17.**  
Oregon construction business owner earnings model, 2007-2012

Note:

\*,\*\* Denote statistical significance at the 90% and 95% confidence level, respectively.

Source:

Keen Independent Research from 2007-2012 ACS. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

Variable	Coefficient
Constant	7.730 **
Age	0.091 **
Age-squared	-0.001 **
Married	0.339 **
Speaks English well	-0.556 **
Disabled	0.107
Less than high school	-0.225
Some college	-0.152
Four-year degree	-0.283
Advanced degree	0.163
Hispanic American	-0.070
Other minority	-0.459
Female	-0.746 **

**Engineering industry in Oregon, 2007 through 2012.** Figure H-18 presents the results of the regression model of business owner earnings in the Oregon engineering industry in 2007 through 2012. Having an advanced degree was associated with higher business earnings in the engineering industry. No other race- and gender-neutral factors were statistically significant.

After statistically controlling for race- and gender-neutral factors, Keen Independent observed that:

- Effects of race/ethnicity were negative and statistically significant for Hispanic Americans; and
- Being female was associated with lower business earnings in the Oregon engineering industry, but this difference was not statistically significant.

**Figure H-18.**  
Oregon engineering industry business owner earnings model, 2007-2012

Note:

\*,\*\* Denote statistical significance at the 90% and 95% confidence level, respectively.

Source:

Keen Independent Research from 2007-2012 ACS. The raw data extract was obtained through the IPUMS program of the MN Population Center: <http://usa.ipums.org/usa/>.

Variable	Coefficient
Constant	5.262 **
Age	0.198 **
Age-squared	-0.002 *
Married	-0.027
Disabled	-0.333
Some college	-0.623
Four-year degree	-0.850
Advanced degree	-0.427
Hispanic American	-1.978 **
Other minority	0.668
Female	-0.416

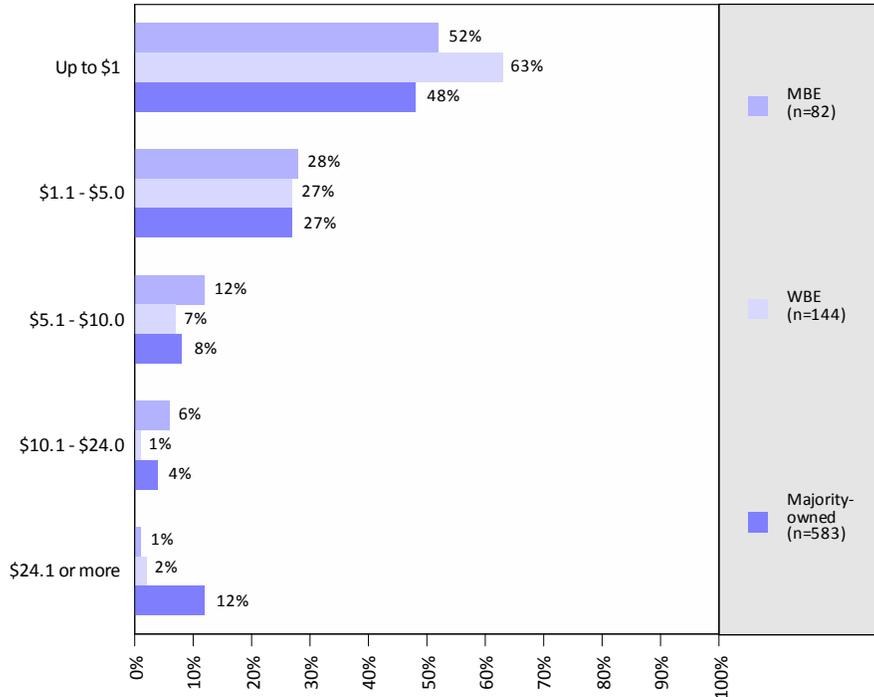
**Gross revenue of construction and engineering firms from availability interviews.** In the availability telephone interviews that Keen Independent conducted in 2015, the study team asked firm owners and managers to identify the size range of their average annual gross revenue in the previous three years.

**Construction.** Figure H-19 presents the reported annual revenue for MBEs, WBEs and majority-owned construction businesses.

- A larger percentage of WBEs (63%) than majority-owned businesses (48%) and minority-owned firms (52%) reported average revenue of less than \$1 million per year.
- Only 1 percent of MBEs and 2 percent of WBEs reported average revenue of more than \$24 million. About 12 percent of majority-owned construction firms reported revenue of this level.

As shown in Figure H-19, minority-owned businesses and white women-owned firms in the Oregon transportation construction industry are disproportionately small.

Figure H-19.  
Average annual gross revenue of company over previous three years, construction industry



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

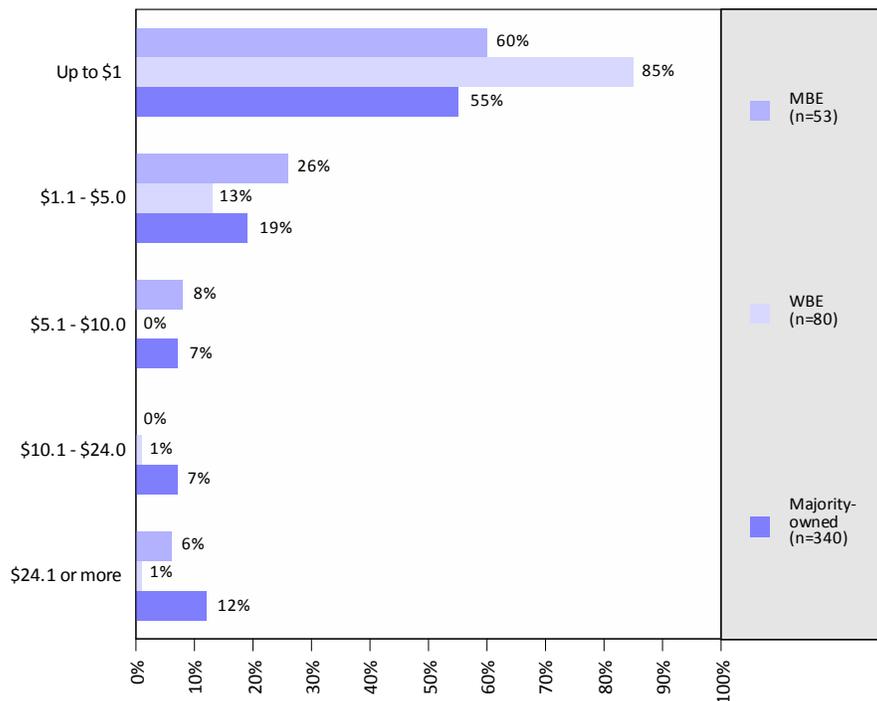
Source: Keen Independent Research from 2015 Availability Surveys.

**Engineering.** Engineering-related businesses were also asked to report average gross revenue over the previous three years. Figure H-20 presents those results.

- Most WBE engineering-related firms (85%) reported average annual income of no more than \$1 million, compared with 55 percent of majority-owned firms and 60 percent of MBEs.
- Twelve percent of majority-owned engineering-related firms reported average annual revenue of more than \$24 million. A relatively small percentage of MBE and WBE engineering-related firms reported average annual revenue of more than \$24 million (6% and 1%, respectfully).

In sum, among engineering-related firms, minority-owned businesses and white women-owned firms are disproportionately low revenue compared with majority-owned firms.

Figure H-20.  
Annual gross revenue of company over previous three years, engineering industry



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

Source: Keen Independent Research from 2015 Availability Surveys.

**Summary of analysis of business receipts and earnings.** Keen Independent examined business earnings data for the Oregon construction and engineering-related industries from the U.S. Census Bureau and the 2015 availability interviews with businesses working in the Oregon transportation contracting industry. The data from different data sets pertained to annual revenue in 1999, 2007-2012 and the three years before 2015. Across time periods and data sources, minority- and women-owned firms had lower revenue than majority-owned firms.

One of the data sets the study team examined included personal characteristics of the business owner. Regression analyses using these data indicated that female construction business owners and Hispanic American engineering firm owners had lower earnings than male and non-minority owners after controlling for other factors.

### E. Availability Survey Results Concerning Potential Barriers

As part of the availability interviews conducted with Oregon and Southwest Washington businesses, the study team asked firm owners and managers if they had experienced barriers or difficulties associated with starting or expanding a business or with obtaining work. Appendix D explains the interview process and provides the interview questions. Appendix G presents results for questions concerning access to capital, bonding and insurance.

Results for other interview questions are examined here, including whether the firm had experienced difficulties learning about:

- Bid opportunities with ODOT;
- Bid opportunities with local governments;
- Bid opportunities in the private sector;
- Subcontracting opportunities in Oregon; and
- Networking with prime contractors or customers.

**Learning about ODOT bid opportunities.** As shown in Figure H-21 on the following page, a greater percentage of minority- and women-owned firms indicated difficulties learning about bid opportunities, including ODOT opportunities, compared with majority-owned businesses. For example, the percentage of minority-owned businesses reporting that they experienced difficulties learning about ODOT bid opportunities (30%) was substantially higher than that for majority-owned firms (18%). About 24 percent of white women-owned firms indicated that they experienced difficulty learning about ODOT bid opportunities.

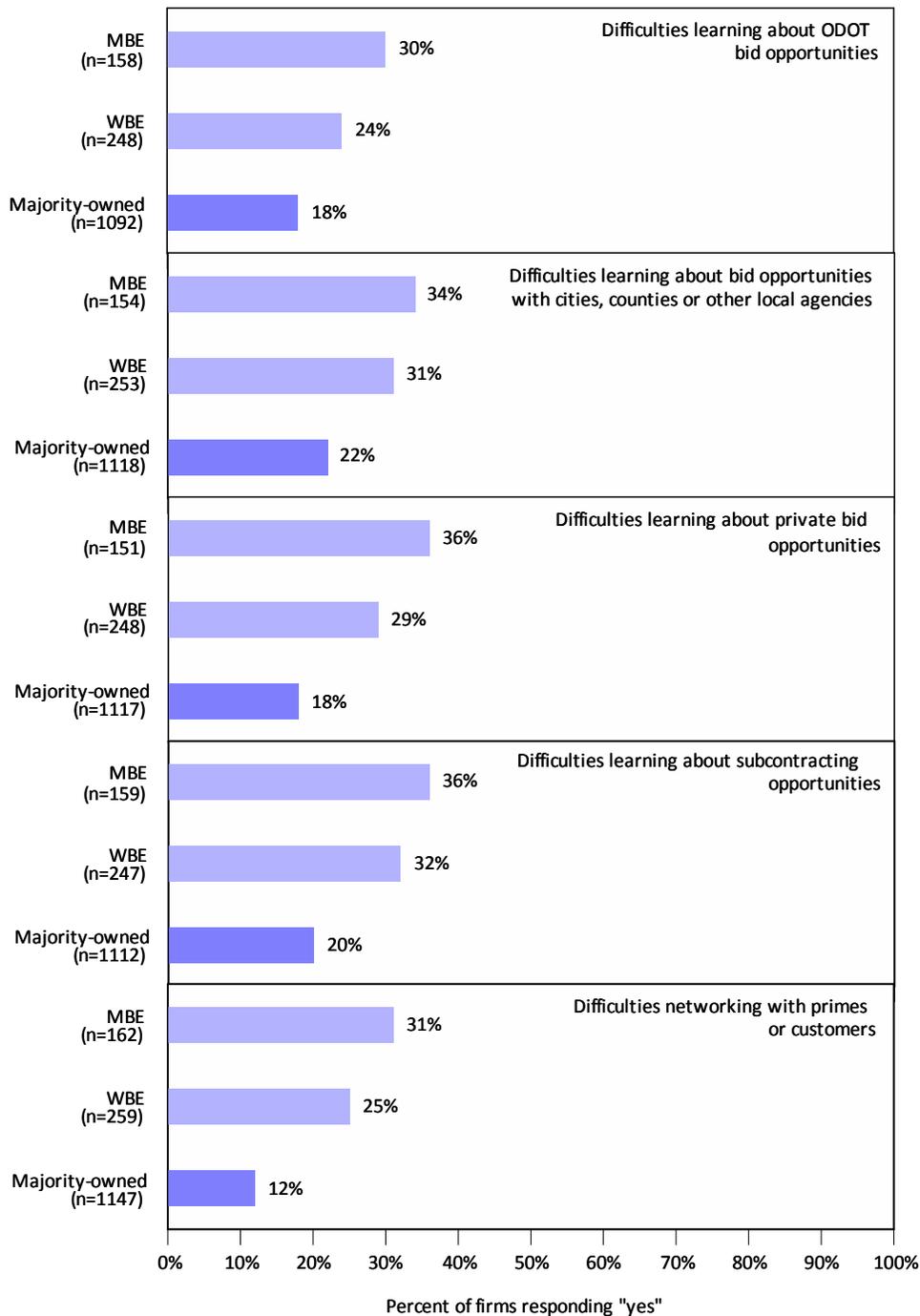
**Learning about local agency bid opportunities.** Results were similar for questions concerning learning about local government bid opportunities. Relatively more minority- and women-owned firms reported difficulties learning about local agency bid opportunities (34% and 31%, respectively) compared with 22 percent of majority-owned firms.

**Learning about private sector bid opportunities.** About 36 percent of MBEs and 29 percent of WBEs reported difficulties learning about private sector bid opportunities. Only 18 percent of majority-owned firms reported such difficulties.

**Learning about subcontracting opportunities.** MBEs and WBEs were also more likely than majority-owned firms to report difficulties learning about subcontracting opportunities. About 36 percent of minority-owned firms and 32 percent of white women-owned firms indicated such difficulties compared with 20 percent of majority-owned firms.

**Networking with prime contractors and customers.** MBEs (31%) and WBEs (25%) were more than twice as likely as majority-owned firms (12%) to report difficulties networking with prime contractors and customers. The bottom portion of Figure H-21 presents these results.

Figure H-21.  
 Responses to 2014 availability interview questions concerning learning about work,  
 MBE, WBE and majority-owned firms



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

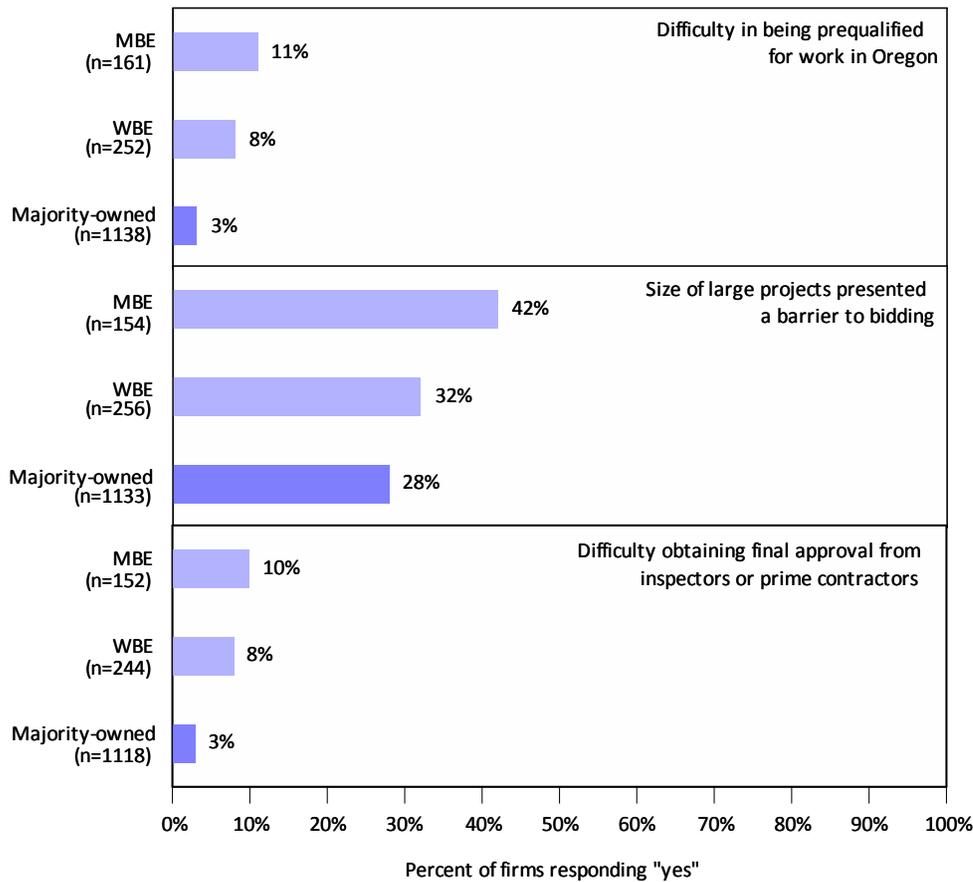
Source: Keen Independent Research from 2015 Availability Surveys.

**Prequalification for work.** As shown in Figure H-22, few majority-owned firms (3%) reported difficulties being prequalified for work in Oregon. Relatively more MBEs (11%) and WBEs (8%) reported difficulty being prequalified.

**Size of projects.** Interviewers also asked business owners and managers whether size of projects presented a barrier to bidding. About 28 percent of majority-owned firms reported that size of projects was a barrier. A greater percentage of MBEs (42%) and WBEs (32%) reported that size was a barrier to bidding. Figure H-22 shows these results.

**Obtaining final approval on work from inspectors or prime contractors.** Although few firms indicated difficulties regarding inspections or approval of work, MBEs and WBEs were more than twice as likely to report these difficulties as majority-owned firms (see Figure H-22).

Figure H-22.  
Responses to 2015 availability interview questions concerning size of projects, approval of work, and licensing and prequalification, MBE, WBE and majority-owned firms



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

Source: Keen Independent Research from 2015 Availability Surveys.

**Summary of analysis of availability interview questions concerning barriers.** The availability interviews suggest that relatively more minority- and women-owned firms report difficulties across a broad factor related to operating a business within the Oregon transportation contracting industry.

- Relatively more MBEs and WBEs have difficulty learning about bid opportunities, including those at ODOT and local agencies and in the private sector. MBEs and WBEs are also more likely to indicate difficulty learning about subcontracting opportunities from prime contractors.
- MBEs and WBEs were substantially more likely to report difficulty networking with prime contractors or customers.
- Relatively more minority- and women-owned firms than majority-owned firms reported that size of projects was a barrier to bidding.
- Only a few firms said that they had difficulties obtaining final approval of work from inspectors or prime contractors, however, relatively more MBEs and WBEs reported this as a difficulty.