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**RACE, SEX, AND BUSINESS ENTERPRISE: EVIDENCE
FROM THE STATE OF WASHINGTON**

Prepared for the Washington State Department of Transportation

by

NERA Economic Consulting

FINAL REPORT—October 20, 2005

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Jon Wainwright, Vice President, NERA

I. INTRODUCTION

The Washington State Department of Transportation (WSDOT) commissioned NERA Economic Consulting to perform this study in compliance with United States Department of Transportation (USDOT) regulations.

WSDOT is charged with providing a safe, efficient, and effective statewide transportation system, and as such is responsible for the planning, construction, and maintenance of an extensive transportation network throughout Washington State. This network includes over 7,000 miles of highways and roads, 34 tunnels, 43 rest areas, 97,500 acres of roadside lands and associated drainage structures, 10 ferry routes, 20 ferry terminals, one ferry repair facility, and 16 emergency airports.¹ Between 2005 and 2011, WSDOT expects to spend almost \$2.6 billion for the highway improvement, highway preservation, and ferry construction projects necessary to carry out its transportation mission.²

Each federal fiscal year, the Federal Highway Administration (FHWA) and the other modal agencies of USDOT provide significant levels of federal funding to WSDOT to support its construction and preservation activities. Between FFY 2002 and FFY 2004, for example, WSDOT received almost \$1.8 billion from the FHWA. As a recipient of such funds, WSDOT is required to comply with the regulations pertaining to the USDOT's Disadvantaged Business Enterprise (DBE) Program. The primary concern of the DBE Program is to create a level playing field for the utilization of businesses owned by socially and economically disadvantaged persons, including members of certain minority groups and women, on contracts that are funded in part or in whole by USDOT.

In 1999, USDOT adopted a comprehensive revision of the DBE Program.³ WSDOT must set an overall, annual aspirational percentage goal for DBE participation on its USDOT-assisted contracts that are narrowly tailored to WSDOT's particular circumstances

¹ Washington State Department of Transportation and Washington State Transportation Commission. February 2002. *Washington's Transportation Plan, 2003-2022*. pp. 1, 11-12.

² Washington State Department of Transportation. February 2005. *Measures, Markers and Mileposts: The Gray Notebook for the Quarter Ending December 31, 2004*. p. 22.

³ 49 Code of Federal Regulations (CFR), part 26.

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and based on demonstrable evidence of availability—*i.e.* the percentage of relevant businesses owned by minorities and/or women in WSDOT’s geographic market area.⁴

The process for determining availability is twofold.⁵ First, WSDOT must make a determination of the baseline percentage of firms in its relevant market area that are or could become certified as DBEs. Second, WSDOT must consider other relevant information and make a determination about whether, and if so by how much, the baseline figure should be adjusted upward or downward in order to set an overall goal that is consistent with what would be expected in a market that is race- and sex- neutral, *i.e.*, DBE availability “but for” discrimination.⁶ This two-step method requires WSDOT to set a DBE goal that prevents under-utilization of DBEs and over-utilization of DBEs to the exclusion of non-DBEs. Under the regulations, if an agency exceeds its overall goal for two consecutive years through the use of contract-specific DBE participation goals, it must proportionately reduce its use of contract-specific goals in the following year.⁷

For this study, NERA used minority-owned and women-owned business (MWBE) availability as a proxy for DBE availability. The MWBE and DBE populations have a very high degree of correlation and overlap. There are two differences worth noting, however.

First, to be certified as a DBE under Part 26 a business owner’s personal net worth, excluding equity in the owner’s primary residence and in the business seeking certification, cannot exceed \$750,000.⁸ Hence, not all MWBEs are eligible for certification as DBEs. In practice, however, very few households—especially minority households—have net worth levels in excess of \$750,000, especially when home equity and business equity are excluded from the measure.⁹ Second, it is possible for businesses owned by non-minority males, such

⁴ 49 CFR § 26.45.

⁵ *Id.*

⁶ *Ibid.*

⁷ 49 C.F.R. § 26.51(f).

⁸ 49 CFR § 26.67.

⁹ According to the Federal Reserve’s *1993 National Survey of Small Business Finances*, about 6 percent of White-male-owned small businesses, 2.6 percent of White-female-owned small businesses, and 3 percent of non-White-owned small businesses have business equity in excess of \$750,000. Further, Census Bureau data show that the median net worth of Black and Hispanic households is much less
(continued...)

as businesses owned by disabled persons, to become certified DBEs if they can establish that they meet the regulatory criteria to be considered socially and economically disadvantaged.¹⁰ Hence, not all DBEs are necessarily MWBEs. In practice, however, since so few MWBEs have net worth levels in excess of \$750,000 and a substantial number of businesses owned by socially and economically disadvantaged non-minority males could potentially seek DBE certification NERA's method may understate DBE availability to a small degree.¹¹

NERA's approach to availability measurement reflects USDOT's compliance advice. According to the USDOT's guidance, "... if you have data about the number of minority and women-owned businesses (regardless of whether they are certified as DBEs) in your market area, or DBEs in your market area that are in other recipients' Directories but not yours, you can supplement your Directory data with this information. *Doing so may provide a more complete picture of the availability of firms to work on your contracts than the data in your Directory alone.*"¹²

The remainder of this report is organized as follows. Section II describes the assembly of the contract and subcontracting database and how the definition of the relevant

(...continued)

than the median for White households. Very few Black or Hispanic households have net worth above even \$500,000. Only 0.2 percent of Black households and 0.5 percent of Hispanic households have a net worth greater than \$500,000—compared to a figure of 4 percent for White households. Overall, the median net worth for White households is approximately seven times higher than that of Black or Hispanic households. (See U.S. Census Bureau, "Percent Distribution of Household Net Worth, by Amount of Net Worth and Selected Characteristics: 1995," INTERNET: <http://www.census.gov/hhes/www/wealth/1995/wlth95-4.html> and U.S. Census Bureau, "Median Value of Assets for Households, by Type of Asset Owned and Selected Characteristics: 1995," INTERNET: <http://www.census.gov/hhes/www/wealth/1995/wlth95-1.html>). More recent Federal Reserve Board data also document that the net worth of White households is much greater than that of Black or Hispanic households. The Federal Reserve's *1998 Survey of Consumer Finances* found that the median net worth of non-minority households was \$94,900 and the mean net worth was \$334,400. For minority households, the median net worth was \$16,400 and the mean net worth was \$101,700 (See Kennickell, Arthur B., Starr-McCluer, Martha, and Surette, Brian J., "Recent Changes in U.S. Family Finances: Results from the 1998 Survey of Consumer Finances," Federal Reserve Bulletin, January 2000).

¹⁰ 49 CFR § 26.67 and Appendix E.

¹¹ For ease of exposition, we shall use the term DBE throughout the remainder of the report.

¹² See INTERNET: <http://osdbu.dot.gov/business/dbe/hottips.cfm> (emphasis added). This information was released as official guidance by USDOT. See 49 CFR §26.9.

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markets. Section III describes the methods employed to estimate baseline DBE availability and Section IV presents a summary of these methods and the principal results of the availability analysis (step 1). Section V describes the compelling interest evidence considered concerning a possible Step 2 adjustment of the baseline availability figures. At WSDOT's request, we report estimates of DBE availability for contract, subcontract, and supplier opportunities in construction and architectural/engineering design and other professional construction-related consulting.

II. DEFINING THE RELEVANT MARKETS

The first step in estimating DBE availability is to define the relevant markets for WSDOT's federally-assisted contracting. Markets have a product and a geographic dimension, both of which were considered in constructing our estimates of DBE availability.¹³ Once the appropriate markets have been defined, we can estimate the number of businesses present in those markets as well as the number that are owned by minorities or women. Finally, WSDOT contract expenditure data are used to develop dollar-based weights for each relevant industry and county. These weights are combined and then used to calculate overall weighted average DBE availability for the State of Washington and each of its six highway regions.

A. Preparing the master contract/subcontract database

In order to identify the product and geographic markets relevant to WSDOT, we assembled a master database of WSDOT's contracting and subcontracting activity awarded between Federal Fiscal Year (FFY) 1999 and FFY 2003. This section describes the types of federally-assisted WSDOT projects that are included in this master contract/subcontract database: (1) Construction and (2) Architectural/Engineering Design and Other Construction-Related Consulting Services. We use FFY98-FFY03 data from both categories to identify the industries in WSDOT's product market and the counties in its geographic market.

1. Construction

NERA worked with WSDOT construction staff to identify all federally-assisted construction contracts awarded from October 1998 through September 2003 and extracted a profile on each of them from WSDOT's Construction Contract Information System (CCIS). A total of 624 such construction contracts were awarded during that period with a value of more than \$1.52 billion. For each contract, our profile included the unique contract

¹³ See, for example, Areeda, Phillip, and Louis Kaplow, *Antitrust Analysis: Problems, Text, Cases*, Boston: Little, Brown and Company, 4th Edition, 1988.

identification number, unique business identification number, business name, business address, award date, contract award amount and federal assistance participation percentage.

WSDOT has wisely also collected and retained information on the first-tier subcontractors and suppliers for each CCIS contract, including their unique business identification number, business name, business address and contract award amount. In most instances, the CCIS file also indicated each firm's DBE status, including race and sex.

Next, we cross-referenced the businesses in the CCIS file with the State Business Records Database—a file of all active businesses registered with the Department of Revenue—in order to obtain a primary Standard Industrial Classification (SIC) code for each firm.¹⁴ SIC codes for the relatively small number of firms that could not be matched in this manner were identified through manual lookups in Dun & Bradstreet and ABI-Inform.

2. Architectural/Engineering Design and Other Construction-Related Consulting Services

We also worked with WSDOT Consultant Services Section (CSS) staff to identify all federally-assisted contracts for architectural/engineering design and related professional consulting services (hereafter, "Consulting") awarded between October 1998 and September 2003. We obtained data for 89 such contracts executed during that period with an aggregate value of more than \$107 million. As with the construction contracts, we received data including the unique contract identifier, unique business identifier, business name, business address, contract approval date, contract award amount and federal funds participation percentage.

As with construction projects, WSDOT has wisely collected and retained first-tier subcontractor and supplier data for consulting projects. The first-tier sub-consultant data we obtained included the unique business identifier, business name, business address, contract award date, contract award amount and DBE status.

¹⁴ We assigned or confirmed each firm's type of work using four-digit SIC codes, which are the most detailed level available in the SIC system.

Next, we assigned and/or confirmed SIC codes for each consultant and sub-consultant in this database, using the sources identified above as well as descriptions in the CSS data concerning the type of work being performed.

B. Product Market Definition

Based on the SIC codes assigned to each contractor and subcontractor in the master database, we estimated product market weights according to the proportion of total contract and subcontract dollars attributable to each SIC code. These weights show the relative importance, in dollars, of the activity represented in each SIC code.

In Construction, we identified 97 distinct SIC codes within the 624 contracts we studied. Of these 97 SIC codes, however, 26 account for 99 percent of the total dollars spent. For this study, we take these 26 SIC codes to represent WSDOT's Construction product market.

In Consulting, we identified 21 distinct SIC codes within the 89 contracts we studied. Of these 21 SIC codes, however, 6 account for 99 percent of the total dollars spent. For this study, we take these 6 SIC codes to represent WSDOT's Consulting product market.

Although numerous industries play a role in WSDOT's contracting activities, it is clear that contracting opportunities are not distributed evenly among them. The distribution of contract expenditures is, in fact, highly skewed. Overall (Table 1), four industries account for two-thirds of total contract and subcontract spending by WSDOT during the study period. In Construction (Table 2), a single industry—highway and street construction—accounts for almost 42 percent of all contracting expenditures, and the top five industries account for almost 75 percent. Concentration is even more prevalent in Consulting (Table 3), where a single industry— Engineering Services—accounts for over 93 percent of all contracting expenditures.

C. Geographic Market Definition

We turn next to a determination of the geographic dimension of WSDOT's contracting markets. We used the master contract/subcontract database, as described above in Section II.A, to obtain the zip codes for each contractor and subcontractor in the database. We then disaggregated the database by state, highway region, county, and Metropolitan Statistical Area (MSA) and calculated the percentage of WSDOT contract dollars awarded to businesses in different geographic areas. Table 4 presents the results of these calculations.

Businesses located in Washington State account for the vast majority of WSDOT's contracting expenditures, regardless of category. As shown in Table 4, WSDOT awarded 93.7 percent of its construction dollars during the study period to contractors with businesses located in Washington.¹⁵ For consulting contracts, the figure was 92.4 percent,¹⁶ and the combined figure is 93.6%. Based on these results, we will define WSDOT's geographic market to be the State of Washington for purposes of estimated availability.

Within the State of Washington, there is still considerable county-to-county variation in WSDOT's contract spending. Table 5 shows, for example, that businesses located in King, Kitsap, Snohomish and Pierce Counties (greater Seattle) account for relatively more construction contract and subcontract dollars than do businesses located elsewhere in the State, and that consulting work, in particular, is centered strongly around King County.¹⁷

¹⁵ After Washington, the most important states in terms of contract dollars were Oregon (4.1 percent), Idaho (0.8 percent), California (0.7 percent), and Utah (0.3 percent).

¹⁶ After Washington, the most important states in terms of contract dollars were California (5.2 percent), Virginia (1.2 percent), and Illinois (0.5 percent).

¹⁷ No contractors or subcontractors were located in the Washington counties of Adams, Ferry, Garfield, or San Juan.

III. IDENTIFYING BUSINESSES IN THE RELEVANT MARKETS

The DBE availability percentage (unweighted) is defined as the number of DBEs divided by the total number of businesses in the counties and industries relevant to WSDOT's contracting activities.¹⁸ Determining the total number of businesses in the relevant markets is more straightforward than determining the number of minority- or women-owned businesses in those markets. The latter task has three main parts: (1) identify all listed DBEs in the relevant market; (2) verify the ownership status of listed DBEs; and (3) estimate the number of unlisted DBEs in the relevant market. This section describes, in turn, how both tasks were accomplished.

A. Estimate the Total Number of Businesses in the Market

We used Dun & Bradstreet's *MarketPlace* database to determine the total number of businesses operating in the relevant geographic and product markets (these markets were discussed in the previous section). *MarketPlace* is a comprehensive database of U. S. businesses. This database, which contains over 13 million records, is updated continuously, and Dun & Bradstreet issues a revised version each quarter. For this study, we used data for the second quarter of 2004. Each record in *MarketPlace* represents a business and includes the company name, address, telephone number, primary four-digit SIC code, secondary SIC code(s) (if any), business type, DUNS Number (a unique number assigned to each business by Dun & Bradstreet) and other descriptive information. Dun & Bradstreet gathers and verifies information from many different sources. These sources include annual management interviews, payment experiences, bank account information, filings for suits, liens, judgments and bankruptcies, news items, the U. S. Postal Service, utility and telephone service, business registrations, corporate charters, Uniform Commercial Code filings, and records of the Small Business Administration and other governmental agencies.

We used the *MarketPlace* database to identify the total number of businesses in each four-digit SIC code to which we had assigned a product market weight.¹⁹ Table 6

¹⁸ To yield a percentage, the resulting figure is multiplied by 100.

¹⁹ These weights are described above in Section II.B.

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shows the number of businesses identified in each SIC code, along with the associated industry weight (all contracting combined). Comparable data for construction and consulting appear in Tables 7 and 8, respectively. The industry weights that are listed are the same as those appearing above in Tables 1-3, respectively.

B. Identify Listed DBEs

As extensive as it is, *MarketPlace* itself does not adequately identify all businesses owned by minorities or women. Although many such businesses *are* correctly identified in *MarketPlace*, experience has demonstrated that many more are missed. For this reason, several additional steps were required to identify the appropriate percentage of DBEs in the relevant market.

First, NERA completed an intensive regional search for information on minority-owned and woman-owned businesses in Washington State and surrounding areas. Beyond the information already in *MarketPlace*, NERA collected lists of DBEs from WSDOT as well as other public and private entities in and surrounding the State of Washington. Specifically, directories were included from:²⁰ Washington State Department of Transportation, Washington State Office of Minority & Women's Business Enterprise, Associated General Contractors of Washington, Business Research Services National Directory of Minority-Owned Businesses, Business Research Services National Directory of Women-Owned Businesses, CalTrans, the City Olympia, the City of Portland Sheltered Market Program, the City of Seattle Boost Program, the City of Seattle Vendor & Contractor Registration list, the City of Spokane, the City of Tacoma, the City of Vancouver, the Contractor Development & Competitiveness Center of the Urban League of Metropolitan Seattle, Diversity Information Resources, the federal government's Central Contractor Registration database, the Idaho Transportation Department, King County, the

²⁰ We also obtained information from certain entities that was duplicative of either Dun & Bradstreet or one or more of the other sources listed above. These entities include the City of Olympia, the City of Portland Sheltered Market Program, the City of Spokane, the City of Vancouver, King County, the Kroger Company, Nordstrom's Department Stores, Pepsico, the Port of Portland, the Port of Seattle, the Port of Tacoma, Qwest Communications, Raytheon, Sound Transit Diversity Programs, the Tacoma Housing Authority, Thurston County, the U.S. Army Corps of Engineers, the University of Washington, Washington Mutual, W.W. Grainger Co., and the Xerox Corporation.

Montana Department of Transportation, National Association of Women Business Owners-Inland Northwest Chapter, National Association of Women in Construction (Puget Sound, Spokane, Tri-Cities, and Yakima Valley Chapters), the National Center for American Indian Economic Development, the Nevada Department of Transportation, the Northwest Native American Business Development Center, the Oregon Office of Minority, Women and Emerging Small Business, the Port of Portland, the Port of Seattle, the Port of Tacoma, the Seattle Monorail Project, Sound Transit Diversity Programs, the South Puget Sound Hispanic Chamber of Commerce, the Tabor 100 (Northwest Association of African-American Businesses), the Tacoma Housing Authority, Thurston County, the U.S. Army Corps of Engineers, the University of Washington, the Washington State Hispanic Chamber of Commerce, Women Business Owners of Puget Sound, and the Women’s Business Enterprise National Council.²¹

We will refer to the DBE businesses identified in this manner as “listed” DBEs. Tables 9-11 provide the total number of listed DBEs by SIC code—overall, and for construction and consulting, respectively.²²

If the listed DBEs identified in the three previous tables are *all* in fact DBEs and are the *only* DBEs among all the businesses identified in Tables 6-8, then an estimate of “listed” DBE availability would be calculated as shown in Tables 12-14. The availability figure in these tables is simply the number of listed DBEs (taken from Tables 9-11, respectively) divided by the total number of businesses in the relevant market (taken from

²¹ A number of organizations we contacted declined to participate in this study or were otherwise unresponsive to our (or WSDOT’s) repeated requests. These include: Bank of America Supplier Diversity Program, the Black Chamber of Commerce Pacific Northwest Chapter, the Boise Cascade Corp Supplier Diversity Program., CH2M Hill, Chevron/Texaco Supplier Diversity Program., the City of Bellevue, Coca Cola Enterprises Supplier Diversity Program, the Community Capital Development SMWBE list, Conoco/Phillips Supplier Diversity Program, Georgia-Pacific Supplier Diversity Program, Howard S. Wright Construction Supplier Diversity Program, Microsoft Supplier Diversity Program, the National Association of Minority Contractors, the National Association of Women in Construction, Takoma Chapter, the National Minority Business Council, Nike Supplier Diversity Program, Nordstrom Department Stores Supplier Diversity Program, the Northwest Minority Business Council, the Oregon Association of Minority Entrepreneurs, Safeco Insurance Company Supplier Diversity Program, Seattle Mariners Supplier Diversity Program, the Seattle/Washington State Minority Business Development Center, Starbucks Supplier Diversity Program, the Boeing Company Supplier Diversity Program, W.W. Grainger Co. Supplier Diversity Program, and the Wells Fargo Supplier Diversity Program.

²² The industry weights appearing in Tables 9-11 are identical to those in Tables 6-8, respectively.

Tables 6-8, respectively).²³ However, as we shall see below neither of these two conditions is true.

For two reasons, the percentages in the three previous tables are not suitable as availability measures. First, it is likely that some proportion of the DBEs listed in the tables are not actually minority-owned or woman-owned. Second, it is likely that there are additional “unlisted” DBEs among all the businesses included in Tables 6-8. Such businesses do not appear in any of the directories we gathered and are therefore not included as DBEs in Tables 9-11. Additional steps are required to test these two conditions and to arrive at a more accurate representation of DBE availability in the State of Washington. We discuss these steps in Sections III.C and III.D below.

C. Verify Listed DBEs and Estimate Unlisted DBEs

It is likely that information on DBEs from *MarketPlace* and other DBE directories is not all correct. Phenomena such as ownership changes, associate or mentor status, recording errors, or even outright misrepresentation could lead to businesses being listed as DBEs in a particular directory even though they are actually owned by white males. Other things equal, this type of error would cause our availability estimate to be biased upward from the “true” availability number.

The second likelihood that must be addressed is that not all DBE businesses are necessarily listed—either in *MarketPlace* or in any of the other directories we collected. Such phenomena as geographic relocation, ownership changes, directory compilation errors, and limitations in DBE outreach could all lead to DBEs being unlisted. Other things equal, this type of error would cause our availability estimate to be biased downward from the “true” availability number.

In our experience, we have found that both types of bias are not uncommon. For this study, we attempted to correct for the effect of these biases using statistical sampling procedures. We surveyed a large stratified random sample of 1,501 relevant businesses by

²³ The industry weights appearing in Tables 6-8 are identical to those in Tables 9-11. The “average availability” figure appearing at the bottom of each table is unweighted. That is, neither product market weights nor geographic weights have been applied. These weights are applied below.

telephone and measured how often they were misclassified (or unclassified) by race and/or sex.²⁴

Strata were defined according to SIC code groups and listed DBE status.²⁵ The survey was conducted by telephone during February and March 2005. Up to ten attempts were made to reach each business and speak with an appropriate respondent. Attempts were scheduled for a mix of day and evening, weekdays and weekends, and appointments were scheduled for callbacks when necessary. Of the 1,501 firms in our sample, 600 were listed DBEs and 901 were unclassified by race or sex. However, 331 establishments were excluded as “unable to contact.” These resulted primarily from wrong phone numbers and phone numbers that had been disconnected or were no longer in service. Of the remaining 1,170 firms, 470 were listed DBEs and the remaining 700 establishments were unclassified.

The first part of the survey tested whether our sample of listed DBEs was correctly classified by race and/or sex. The second part of the survey tested whether the unclassified firms could all be properly classified as non-DBEs. Both elements of the survey are described in more detail below.

1. Survey of Listed DBEs

We selected a stratified random sample of 600 listed DBEs to verify the race and gender status of their owner(s). Of these, 130 (14.4%) were excluded as “unable to contact.” Of the 470 remaining establishments, we obtained complete interviews from 353, for a response rate of 75.1 percent.

²⁴ A very similar methodology has been employed by the Federal Reserve Board to deal with similar problems in designing and implementing the National Surveys of Small Business Finances for 1993 and 1998. See Catherine Haggerty, Karen Grigorian, Rachel Harter and John D. Wolken. “The 1998 Survey of Small Business Finances: Sampling and Level of Effort Associated with Gaining Cooperation from Minority-Owned Business,” *Proceedings of the Second International Conference on Establishment Surveys*, Buffalo, N.Y., June 17-21, 2000.

²⁵ Five separate SIC strata were created according to industry weight. SIC codes with larger weights were sampled with higher probability. Together, these five strata account for more than 95 percent of all WSDOT contracting dollars. A sixth stratum was added to capture all remaining SIC codes. All six strata were then split according to listed DBE status to create a total of 12 strata. Generally, listed DBEs were sampled at a higher rate than unclassified establishments.

Of the 353 establishments interviewed, 75 (21.2%) were owned by White males. The amount of misclassification was substantial in every SIC stratum, and was highest in stratum 1 (SIC 16), as shown in Table 15. Misclassification was substantial as well in all Highway Regions, in the North Central Region in particular, as shown in Table 16. Misclassification varied by putative race and sex as well, and was highest among apparent White female firms, as shown in Table 17.²⁶

The race and gender status of the listed DBEs responding to the survey was changed, if necessary, according to the survey results. For example, if a business originally listed as a White female DBE was actually owned by a White male, then that business was counted as a White male for purposes of calculating DBE availability. But what about the remaining putative White female-owned establishments that we did not interview? For these businesses, we must estimate their DBE status since we did not directly obtain it (because we did not interview them). We base our estimates on the amount of misclassification we observed among the White female-owned firms that we succeeded in interviewing. In this example, our interviews show that 62.2 percent of these firms are actually White female-owned, 30.6 percent are actually White male-owned, and 8.2 percent are actually minority-owned. Therefore, we assign each of the remaining putative White female firms a 62.2 percent probability of actually being White female-owned, a 30.6 percent probability of actually being White male-owned, and an 8.2 percent probability of being minority-owned. We repeated this procedure within each sample stratum and for all putative race and sex categories.

2. Survey of Unclassified Businesses

In a manner exactly analogous to our survey of listed DBEs, in the second part of our survey we examined unclassified businesses, *i.e.* any business that was not originally identified as a DBE, either in *MarketPlace* or in one or more of the other directories collected for this study.

²⁶ By “putative,” we mean the race and sex that we initially assigned to each firm based on the information provided by Dun & Bradstreet or by our master M/W/DBE directory.

We selected a stratified random sample of 901 unclassified businesses to verify the race and gender status of their owner(s). Of these, 201 (22.3%) were excluded as “unable to contact.” Of the 700 remaining establishments, we obtained 519 complete interviews, for a response rate of 74.1 percent.

Of the 519 establishments interviewed, 460 (88.6%) were owned by White males, 33 (6.4%) by White females, and 26 (5.0%) by minorities. A similar phenomenon was observed within each stratum (Table 18) as well as within each highway district (Table 19).

As with the survey of listed DBEs, the race and gender status of unclassified businesses was changed, if necessary, according to the survey results. For example, if an interviewed business that was originally unclassified indicated that they were actually owned by a White male, then that business was counted as a White male for purposes of the DBE availability calculation. If they indicated they were White female-owned, they were counted as White female, and so on. For unclassified businesses that were not interviewed, we assigned probability values (probability actually White male-owned, probability actually White female-owned, probability actually Black-owned, etc.) based on the interview responses. We again carried out the probability assignment procedure within each stratum.

Clearly, the large majority of unclassified businesses (almost 89 percent overall) are White male-owned. Nevertheless, more than 11 percent were *not* White male-owned. Of the latter, the largest group was owned by White females, with descending size shares accounted for by Asians, Native Americans, Hispanics, and Blacks, respectively. Table 7C shows the actual survey results by race and sex.

IV. ESTIMATING BASELINE DBE AVAILABILITY

All the steps necessary to calculate overall weighted average DBE availability are now complete. We briefly summarize each step below. Table 21 details the results from each step for all WSDOT federally-assisted contracting activity. Tables 22-23 repeat the process for construction and architectural/engineering design contracts.

Identify the relevant geographic market. Determine the states and counties where prime contractors and subcontractors are located based on WSDOT's contract expenditure data. Identify the geographic areas that account for the majority of WSDOT's contract and subcontract activity.

Identify the relevant product market and associated industry weights. Determine which SIC codes best represent contracting and subcontracting opportunities on WSDOT projects with federal participation, based on expenditure data for WSDOT's construction and architectural/engineering design contracts and subcontracts. Next, calculate the dollar value attributable to each SIC code as a percentage distribution. The resulting percentage figures are used to calculate industry-weighted DBE availability. In contrast to an unweighted figure, the industry-weighted DBE availability figure gives greater weight to DBE availability from those industries where WSDOT spends more contract dollars, and lesser weight to availability in those industries where fewer dollars are spent.

Count all businesses in the relevant geographic and product market. Determine the total number of businesses in each relevant SIC code, state, and county from Dun & Bradstreet's *MarketPlace*. This determination was made overall as well as separately for construction and consulting.

Identify "listed" DBE businesses in relevant markets. Some DBEs were directly identified in Dun & Bradstreet's *MarketPlace* or in WSDOT's DBE directory. Other businesses in *MarketPlace* were identified as DBEs by cross-referencing name and address information from numerous regional directories of minority- and women-owned firms collected for this study. This determination was made overall as well as separately for construction and consulting.

Verify ownership status of listed DBEs. To correct for race and sex misclassification, conduct interviews with listed DBEs to verify ownership status. Calculate the percentage of listed DBEs that are actually owned by White males. Separate calculations were made by SIC code grouping and by race and sex.

Verify ownership status of unclassified firms. To correct for race and sex misclassification, conduct interviews with businesses that were not listed as DBEs in order to determine their ownership status. Calculate the percentage of unclassified businesses that are actually DBEs and non-DBEs. Separate calculations were made by SIC code grouping and by race and sex.

Table 21 shows a total of 40,449 businesses operating in the 27 SIC codes within WSDOT's geographic market (*see* Table 6). Of these, 13.02 percent were listed DBEs. With industry weights, the percentage shrinks to 9.72 percent. This decrease occurs primarily because the proportion of listed DBEs in certain industries is less than the overall average. In particular, the proportion of listed DBEs in SIC 1611, at 8.95 percent, is substantially lower than the overall average of 13.02 percent. Our misclassification survey found that approximately 21 percent of listed DBEs were not actually DBEs (*see* tables 15-17). Our survey also found that approximately 11 percent of unclassified firms were actually DBEs (*see* tables 18 & 19). Combining the results of these two surveys and applying them as probability weights to the baseline business population yields an unweighted DBE availability of 28.21 percent, which then falls significantly to the final overall baseline availability figure of 18.77 percent once industry weights are applied. Tables 22-23 provide similar derivations for construction and consulting, respectively.

The final results of our baseline DBE availability analysis for WSDOT are shown in Table 24. Overall, DBE availability for WSDOT contracts is estimated to be 18.77 percent. Availability for construction contracts is estimated to be 19.59 percent. Availability for consulting contracts is estimated to be 14.88 percent. Availability results are also presented by highway regions and by the race and sex of business ownership.

V. DBE PARTICIPATION IN WSDOT CONTRACTING AND SUBCONTRACTING, FFY 1999-2003

Using the databases of WSDOT contracting and subcontracting activity described above in Section II.A.1 and II.A.2, we calculated the fraction of all contracts, subcontracts, contract dollars and subcontract dollars received by DBEs. Tables 25-36 below provide this information from several important perspectives: (1) federally-funded versus non-federally-funded, (2) prime contract gross amount versus prime contract amount net of subcontracted amounts, (3) prime contract dollars versus prime contract and first-tier subcontract dollars combined. Tables 25-30 cover WSDOT construction projects and Tables 31-36 cover WSDOT consulting projects. Results are presented for White males, White females, Blacks, Asians, Native Americans, all MBEs combined, and all DBEs combined.

An examination of the results in Tables 25-36 shows that: (1) the DBE share of contracts is greater than the DBE share of contract dollars, (2) DBE participation in subcontracting is greater than DBE participation in prime contracting, and (3) in Construction, DBE participation is much higher on federally-funded projects than on non-federally-funded projects.

The amount of DBE participation that could be expected in the absence of race- or sex-conscious goals can be estimated based on the amount of DBE participation of projects without DBE goals. As a proxy for this, we consider DBE participation on non-federally-funded contracts and subcontracts, as shown in Tables 30 and 36. Table 30 shows that DBE participation on non-federally-funded construction contracts and subcontracts during the review period was 2.97 percent. For consulting, the figure is 10.66 percent (Table 36).

VI. DISPARITIES IN MBE BUSINESS FORMATION AND BUSINESS OWNER EARNINGS

In this Study, we examine qualitative and quantitative evidence relevant to establishing whether expected DBE availability in WSDOT's construction and consulting contracting markets would, absent business-related discrimination, be substantially and significantly higher or lower than the levels shown above in Table 24. The baseline availability figures calculated in the previous section represent the percentage of businesses in WSDOT's construction and consulting markets that are owned by minorities and/or women. These availability figures will be artificially low if discrimination has led minorities and women to be more reluctant to start businesses or if it has contributed to the businesses they start being less profitable and therefore more likely to fail.

For this reason, 49 CFR §26.45 requires recipients of federal funds to consider whether an adjustment to the baseline DBE availability figures such as those reported in Table 9 would be necessary in order to approximate the amount of DBE availability that would be expected in a race-neutral marketplace, that is, "but for" discrimination. This is referred to in the regulations as the step 2 adjustment.²⁷ Specifically, recipients must examine the volume of work DBEs have performed for them in the past as well as findings from any relevant disparity studies conducted within the recipient's jurisdiction. Recipients must also consider "evidence from related fields that affect the opportunities for DBEs to form, grow and compete" to the extent available.²⁸

In keeping with these requirements, this final section of the Study summarizes evidence relevant to whether an adjustment is warranted and, if so, what size adjustment would be narrowly tailored to that evidence. First, we review the microeconomic and microeconometric literature on self-employment and entrepreneurship.

Secondly, we present statistical evidence of disparities in business formation and business owner earnings, based on entrepreneur microdata from the 2000 Decennial Census and from the 1979-2002 Current Population Surveys. The presence of statistically

²⁷ 49 CFR § 26.45(d).

²⁸ 49 CFR § 26.45(d)(2).

significant business formation and earnings disparities is consistent with present discrimination in the WSDOT marketplace and/or the present effects of past discrimination in the WSDOT marketplace. This evidence of business formation disparities forms the basis for quantifying the amount of upward or downward adjustment from Step 1 availability that would be consistent with a race-neutral marketplace.

Finally, in order to shed light on how much of WSDOT's annual DBE goal is susceptible to fulfillment by race-neutral measures alone, we examine the past volume of construction and consulting work performed for WSDOT and its prime contractors by DBEs, comparing utilization differences on federally-funded versus non-federally funded projects as well as differences on projects with DBE goals versus projects without DBE goals. NERA's estimates of DBE availability from the previous section (*See* Table 24) are substantially higher than average DBE utilization levels achieved by WSDOT between FFY 1999 and FFY 2003.²⁹

A. Review of Relevant Literature

We examine here disparities in business formation and earnings principally in the private sector, where contracting and procurement activity is generally *not* subject to MWBE requirements. Statistical examination of disparities in the private sector economy surrounding the State of Washington is important for at least three reasons. First, to the extent that discriminatory practices by contractors, suppliers, insurers, lenders, customers, and others limit the ability of DBEs to compete, those practices are likely to be felt in the larger private sector as well as in the public sector. Second, examining the utilization of DBEs in the private sector provides an indicator of the extent to which DBEs are used in the absence of affirmative action efforts, since few firms in the private sector make such efforts. Third, the Supreme Court in *Croson* acknowledged that state and local governments have a constitutional duty not to contribute to the perpetuation of racial or ethnic discrimination in the private sector of the local economy.

²⁹ *See* Tables 25-36.

After years of comparative neglect, research on the economics of entrepreneurship—especially upon self-employment—is beginning to expand.³⁰ In the U.S. for example, minorities start businesses at much lower rates than non-Hispanic whites. These disparities persist even when factors such as geography, industry, occupation, age, education and assets are held constant.³¹

One possible impediment to entrepreneurship among minorities is lack of capital.³² The key test shows that, all else remaining equal, people with greater family assets are more likely to switch to self-employment from employment. This asset variable enters probit equations significantly and with a quadratic form. Indeed, the probability of self-employment depends positively upon whether the individual ever received an inheritance or gift.³³

Further, house prices through the impact on equity withdrawal play a powerful role in affecting the supply of small new firms.³⁴ Again this is suggestive of capital constraints.. Transfers of firms within families will also help to preserve the status quo and work against

³⁰ Blanchflower [8]. Microeconomic work includes Fuchs [30], Borjas and Bronars [17], Evans and Jovanovic [22], Evans and Leighton [23], Fairlie [24], Fairlie and Meyer [11, 26], Reardon [48], Wainwright for the United States [54], Rees and Shah [49], Pickles and O'Farrell [46], Blanchflower and Oswald [11, 12, 13], Meager [43], Taylor [53], Robson for the UK [50, 51], DeWit and van Winden for the Netherlands [21], Alba-Ramirez for Spain [2], Bernhardt [6], Schuetze [52], Arai [3], Lentz and Laband [40], and Kuhn and Schuetze] for Canada [38, Laferrere and McEntee for France [39], Blanchflower and Meyer [10] and Kidd for Australia [36], and Foti and Vivarelli for Italy [29]. There are also several theoretical papers including Kihlstrom and Laffonte [36], Kanbur [35], Coate and Tennyson [19], and Holmes and Schmitz [31], plus a few papers that draw comparisons across countries *i.e.* Schuetze for Canada and the U.S. [52], Blanchflower and Meyer for Australia and the U.S. [10], Alba-Ramirez for Spain and the United States [2], and Acs and Evans for many countries [1].

³¹ Public Use Microdata Samples (PUMS) data from the 1990 Census, Wainwright [54].

³² In work based on U.S. micro data at the level of the individual, Evans and Leighton [23], and Evans and Jovanovic [22] have argued formally that entrepreneurs face liquidity constraints. The authors use the National Longitudinal Survey of Young Men for 1966-1981, and the Current Population Surveys for 1968-1987.

³³ Blanchflower and Oswald [12]. This emerges from British data, the National Child Development Study; a birth cohort of children born in March 1958 who have been followed for the whole of their lives. They also find that, when directly questioned in interview surveys, potential entrepreneurs say that raising capital is their principal problem. Additionally, Blanchflower and Oswald find that the self-employed report higher levels of job and life satisfaction than employees, and that psychological test scores play only a small role in explaining entry into self-employment. Work by Holtz-Eakin, Joulfaian and Rosen drew similar conclusions using different methods on U.S. data [32, 33].

³⁴ Black, Meza, and Jeffreys [7]; Cowling and Mitchell [20].

the interests of Blacks in particular who do not have as strong a history of business ownership as indigenous whites. Analogously, because the offspring of self-employed fathers are more likely than others to become self-employed the historically low rates of self-employment among Blacks and Latinos may contribute to their low contemporary rates.³⁵

Nationally, the self-employment rate of Black males is one third of that of White males and has remained roughly constant since 1910. Neither trends in demographic factors, including the Great Migration and the racial convergence in education levels, nor an initial lack of business experience, nor the lack of traditions in business enterprise among blacks that resulted from slavery can explain a substantial part of the current racial gap in self-employment”.³⁶ A considerable part of the explanation of the differences between the Black and White self-employment rate can be attributed to discrimination.³⁷ There is strong evidence that racial differences in levels of financial capital have significant effects upon racial patterns in business failure rates.³⁸ Further, the black exit rate from self-employment is twice as high as that of whites.³⁹

B. Race and Sex Disparities in Earnings

In this section we examine earnings to determine whether minority and female entrepreneurs earn less from their businesses than do their White male counterparts. Other things equal, if minority and female business owners as a group cannot achieve comparable earnings from their businesses as similarly-situated non-minorities because of discrimination, then failure rates for MWBEs will be higher and MWBE formation rates will be lower than would be observed in a race- and sex-neutral marketplace. Both phenomena would contribute directly to lower levels of minority and female business ownership.

³⁵ Hout and Rosen [34].

³⁶ Fairlie and Meyer (2000) ([27] p. 664)

³⁷ Robert Fairlie [24] and Wainwright [54].

³⁸ Tim Bates [5].

³⁹ Fairlie [24].

Below, we first examine earnings disparities among wage and salary employees, that is, non-business owners. It is critical to examine this segment of the labor force since a key source of new entrepreneurs in any given industry is the pool of experienced wage and salary workers in that same industry.⁴⁰ Any employment discrimination that adversely impacts the ability of minorities or women to succeed in the labor force directly shrinks the available pool of potential MWBEs. In almost every instance examined, a statistically significant adverse impact on earnings is observed in both the economy at large and in the construction and construction-related professional services sector.⁴¹

We then turn to an examination of differences in earnings among the self-employed, that is, among business owners. Here too, among the pool of minorities and women who have formed businesses despite discrimination in both employment opportunities and business opportunities, statistically significant adverse impacts are observed in the vast majority of cases both in construction and the economy as a whole.

The remainder of this section discusses the methods and data we employed and presents the specific findings we obtained.

1. Methods

We used a statistical technique known as linear regression analysis to estimate the effect of each of a set of observable characteristics, such as education and age, on an outcome variable of interest. In this case, the outcome variable of interest is earnings and we used regression to compare earnings among individuals in similar geographic and product markets at similar points in time and with similar years of education and potential labor market experience and see if any adverse race or sex differences remain. In a

⁴⁰ Blanchflower [8, 9].

⁴¹ There is a growing body of evidence that discriminatory constraints in the capital market prevent minority-owned businesses from obtaining business loans. Furthermore, even when they are able to obtain them there is evidence that these loans are not obtained on equal terms: minority-owned firms have to pay higher interest rates, other things being equal. We have written in other studies regarding racial discrimination in commercial credit and capital markets throughout the U.S. This is another form of discrimination with an obvious and direct impact on the ability of racial minorities to form businesses and to expand or grow previously formed businesses. Additionally, see the detailed discussion of this phenomenon in D. G. Blanchflower, P. B. Levine, and D. Zimmerman, “Discrimination in the market for small business credit market”, NBER Working Paper W6840, 1999.

discrimination free market place, one would not expect to observe significant differences in earnings by race or sex among such similarly situated observations.

Regression also allows us to narrowly tailor our statistical tests to the State of Washington and assess whether disparities in the State of Washington are statistically significantly different from those observed elsewhere in the nation. Starting from an economy-wide data set, we first estimate the basic model of earnings differences just described and also include an indicator variable for the State of Washington. This model appears as Specification (1) in Tables 37 through 48. Next, we estimate Specification (2), which is the same model as (1) but with the addition of indicator variables that interact race, sex, and the State of Washington. Specification (3) represents our ultimate specification, which includes all the variables from the basic model as well as any of the interaction terms from Specification (2) that were statistically significant.⁴²

Any negative and statistically significant differences by race or sex that remain in Specification (3) after holding all of these other factors constant—time, age, education, geography, and industry—are consistent with what would be observed in a market suffering from business-related discrimination.

2. Data

The analyses undertaken in this report require individual-level data (*i.e.* “microdata”) with relevant information on business ownership status and other key socioeconomic characteristics. Two primary sources of such data are available.

The first is the Five Percent Public Use Microdata Samples (PUMS) from the 2000 decennial census. The 2000 PUMS contains observations representing five percent of all U.S. housing units and the persons in them (approximately 14 million records). Released in late 2003, the PUMS provides the full range of population and housing information collected in the 2000 census. Business ownership status is identified in the PUMS through the “class of worker” variable, which distinguishes the unincorporated and incorporated self-employed from others in the labor force. The presence of the class of worker variable

⁴² If none of these terms is significant then Specification (3) reduces to Specification (1).

allows us to construct a detailed cross-sectional sample of individual business owners and their associated earnings.

The second source of data is the Current Population Survey (CPS). The CPS has been conducted monthly by the Census Bureau and the Bureau of Labor Statistics for over 40 years, and is a primary source of official government statistics on employment and unemployment. Currently, about 56,500 households are scientifically selected for the CPS on the basis of area of residence in order to represent the nation as a whole, individual states and the largest metropolitan areas. In addition to information on employment status, the CPS collects information on age, sex, race, marital status, educational attainment, earnings, occupation, industry, and other characteristics. These statistics serve to update the information collected every 10 years through the decennial census.⁴³

3. Findings: Race and Sex Disparities in Wage and Salary Earnings

Tables 37 through 42 report results from our regression analyses of annual earnings among wage and salary workers. Tables 37 through 39 focus on the economy as a whole and Tables 40 through 42 on construction and construction-related professional services. Tables 37 and 40 are derived from the 2000 PUMS, Tables 38 and 41 are derived from the 1979–1991 CPS, and Tables 39 and 42 are derived from the 1992–2002 CPS. The numbers shown in each of these six tables indicate the percentage difference between the average wages of a given race/sex group and comparable White males.

⁴³ Since 1979, about a quarter of the households in each monthly CPS survey have been asked to provide additional information, including usual weekly earnings and weekly hours of work. These households are said to be in “Outgoing Rotation Groups” (ORG) because of the way the CPS rotates households for interviews. Each household selected for the survey is interviewed once a month for four consecutive months, not interviewed for eight months, and interviewed again once a month for four more months. The households in the ORG are those that are in either the fourth or the eighth survey. The ORG files of the CPS include individual data for about 30,000 individuals each month, or over 350,000 per year. Data in which the State of Washington is identifiable are available in a comparable form from 1986 through 2002. Data from the ORG files are used below in addition to the PUMS to examine earnings disparities among wage and salary workers. The ORG files however, do not contain data on the earnings of the self-employed. Annual earnings, whether from wages or self-employment are available from the March CPS, however, also known as the Annual Demographic File. This latter file also contains the basic monthly demographic and labor force data. In the March CPS, data on employment, earnings, and income refer to the preceding year, although demographic data refer to the time of the survey. The March surveys are therefore included for the years 1987-2003. Because the information
(continued...)

a. Specification (1) - the Basic Model

For example, in Table 37 Specification (1) the estimated percentage difference in annual wages between Blacks (both sexes) and White males in 2000 was -30.4 percent. That is, average annual wages among Blacks were 30.4 percent lower than for White males who were otherwise similar in terms of geographic location, industry, age, and education. The number in parentheses below each percentage difference is the t-statistic, which indicates whether the estimated percentage difference is statistically significant or not. In Tables 37 through 42, a t-statistic of 1.99 or larger indicates statistical significance at a 95 percent confidence level or better.⁴⁴ In the example just used, the t-statistic of 197.61 indicates that the result is statistically significant.

Specification (1) in Tables 37-39 shows negative and statistically significant wage disparities for Blacks, Hispanics, Asians, Native Americans, persons reporting in multiple race categories, and White women consistent with the presence of discrimination in these markets. Observed disparities are large as well, ranging from a low of -16.7 percent for Hispanics in Table 38 to a high of -35.7 percent for White women in Table 37.

Specification (1) in Tables 40 through 42 shows similar results when the basic analysis is restricted to the construction and construction-related professional services sector. In this sector, large, negative, and statistically significant wage disparities are observed for all minority groups and for white women. For Blacks, the large wage disparities observed in the construction sector are similar to those observed economy-wide. Large wage disparities in construction are also observed for Hispanics, Asians, and Native Americans; however, the differences are smaller than those observed in the economy as a whole. For White women, large disparities are observed both economy-wide and in construction—however, disparities in construction are larger.

(...continued)

relates to the preceding year, the earnings data relate to the years 1986-2002. The sample consists of any individual who reports positive self-employment earnings in the year preceding the interview.

⁴⁴ From a two-tailed test.

Specification (1) in, respectively, Tables 38 and 39 and Tables 41 and 42 describes changes in observed wage disparities over time. For the economy as a whole, as well as for the construction sector, disparities for Blacks became slightly smaller between 1979–1991 (Tables 38 and 41) and 1992–2002 (Table 39 and 42), but remain large (average wages more than 20 percent below comparable White males). For Hispanics, wage disparities increased substantially during the same period and average wages remain 14-20 percent lower than for comparable White males in construction and elsewhere. For White women, wage disparities grew substantially smaller between the two periods, both in construction and in the economy as a whole, although they remain large (average wages 18-25 percent below comparable White males).⁴⁵

Finally, the indicator variable for the State of Washington is positive and statistically significant in the 2000 PUMS data, although this is not the case in the CPS data. The PUMS data indicate that residents of the State of Washington enjoy, on average, a modest wage advantage over their similarly situated counterparts elsewhere in the nation. Unfortunately, the observed wage advantages fail to offset the much larger wage disadvantages observed for minorities and women throughout the nation and the State of Washington.

b. Specifications (2) and (3) - the Full Model Including Washington-Specific Interaction Terms

Next, we turn to Specifications (2) and (3) in Tables 37 through 42. In each of these Tables, Specification (2) is the basic regression model enhanced by the addition of a set of interaction terms that test whether minorities and women in the State of Washington differ significantly from those elsewhere in the U.S. economy. Specification (2) in Table 37, for example, shows once again the -30.5 percent wage difference that estimates the direct effect of being Black in 2000, as well as a statistically significant 10.3 percent wage increment in that year that captures the indirect effect of residing in the State of Washington and being Black. Therefore, the net wage disparity for Blacks in the State of Washington is approximately -20.2 percent (-30.5 percent plus 10.3 percent).

⁴⁵ It is not possible to perform a similar comparison for Asians or Native Americans, as they were not
(continued...)

Specification (3) simply repeats Specification (2), dropping any Washington interaction terms that are not statistically significant. In Table 39, for example, the only interaction terms included in the final specification were for Blacks and Asians. The net result of Specification (3) in Tables 37, 38 and 39 is evidence of large, negative and statistically significant wage disparities for all minority groups and for White women. The same result holds in Construction and Consulting (Tables 40, 41, and 42).

Clearly, prime age minorities and women earn substantially and significantly less from their labors than their White male counterparts. Such disparities are symptoms of discrimination in the labor force that, in addition to its direct effect on workers, reduce the future availability of DBEs by stifling opportunities for minorities and women to progress through precisely those internal labor markets and occupational hierarchies that are most likely to lead to entrepreneurial opportunities in the first place. These disparities reflect more than mere “societal discrimination” because they demonstrate the relationship between discrimination in the job market and reduced entrepreneurial opportunities for minorities and women. Other things equal, these reduced entrepreneurial opportunities in turn lead to lower DBE availability levels than would be observed in a race- and sex-neutral marketplace.

4. Findings: Race and Sex Disparities in Business Owner Earnings

We turn next to the analysis of race and sex disparities in business owner earnings. Tables 43 through 48 report results from regression analyses of earnings from self-employment. Tables 43 through 45 focus on the economy as a whole and Tables 46 through 48 on construction and construction-related professional services. Tables 43 and 46 are derived from the 2000 PUMS, Tables 44 and 47 are derived from the 1979–1991 CPS, and Tables 45 and 48 are derived from the 1992–2002 CPS. The numbers shown in each of these six tables indicate the percentage difference between the average annual self-employment earnings of a given race/sex group and comparable White males.

(...continued)

identified separately in the CPS prior to 1992 and instead were classified together as “Other Race.”

a. Specification (1) - the Basic Model

Specification (1) in Tables 43 through 45 shows negative and statistically significant and large wage disparities for Blacks, Hispanics, Asians, Native Americans, persons of mixed race, and White women consistent with the presence of discrimination in these markets. The measured difference for Blacks ranges between 30 percent and 59 percent; for Hispanics, from 19 percent to 39 percent; for Asians, from 4 percent to 22 percent; and for Native Americans, from 38 percent to 51 percent. The largest business owner earnings disparities, however, are observed for White women: between 44 percent and almost 73 percent.

Specification (1) in Tables 46 through 48 shows similar results for the construction and construction-related professional services sector. Large negative earnings disparities are observed in every case—in particular for Blacks and White Females. Most of instances these differences are also statistically significant.

Specification (1) in, respectively, Tables 44 and 45 and Tables 47 and 48 describes changes in observed business owner earnings disparities over time. For the economy as a whole as well as for the construction sector, large disparities for Blacks increased between 1979–1991 (Tables 44 and 47) and 1992–2002 (Table 45 and 48). For Blacks and Hispanics, in the economy as a whole, the large earnings disparities observed in the 1979–1991 period grew even larger from 1992–2002. In the construction sector, disparities for both groups remained large but were smaller in 1992–2002 than in 1979–1991. For White women, while disparities have lessened somewhat in the economy as a whole, in the construction sector disparities remain among the largest observed (between 50 percent and 85 percent lower than White males).

Finally, with respect to Specification (1), the indicator variable for the State of Washington is insignificantly different from zero 4 of 6 times in Tables 43–48. In the two cases in which it is statistically significant, it is negative. This indicates that residents of the State of Washington enjoy no apparent earnings advantage over similarly situated entrepreneurs elsewhere in the nation, and might in fact be at somewhat of an earnings disadvantage.

b. Specifications (2) and (3) - the Full Model Including Washington-Specific Interaction Terms

Next we turn to Specifications (2) and (3) in Tables 43 through 48. Specification (2) is the basic regression model enhanced by a set of interaction terms to test whether minorities and women in the State of Washington differ significantly from persons elsewhere in the U.S. economy. Specification (3) drops any Washington interaction terms that are not statistically significant.

For the economy as a whole (Tables 43 through 45), none of the Washington interaction terms is statistically significant, indicating that estimates for Washington are similar to results from elsewhere in the nation. The final results for these three tables therefore are compiled in Specification (1). The same is true in Tables 46 and 48, though not Table 47, where the final results are as in Specification (3).

As was the case for wage and salary earners, prime age minority and female entrepreneurs earn substantially and significantly less from their efforts than similarly situated White male entrepreneurs. These disparities are a symptom of discrimination in commercial markets that directly and adversely affects DBEs. Other things equal, if minorities and women cannot earn remuneration from their entrepreneurial efforts comparable to that of White males, growth rates will slow, business failure rates will increase, and as demonstrated in the next section, business formation rates will decrease. Combined, these phenomena result in lower DBE availability levels than would be observed in a race- and sex-neutral marketplace.

C. Race and Sex Disparities in Business Formation

Finally, we turn to the analysis of race and sex disparities in business formation.⁴⁶ In this section, we compare self-employment rates by race and sex to determine whether minorities or women are as likely to enter the ranks of entrepreneurs as similarly-situated White males. We find that they are not as likely to do so and that minority business

⁴⁶ We use the phrases “business formation rates” and “self-employment rates” interchangeably in this Study.

formation rates would likely be substantially and significantly higher if markets operated in a race- and sex-neutral manner.

Discrimination in the labor market, symptoms of which are evidenced in Section B.3 above, might cause wage and salary workers to turn to self-employment in hopes of encountering less discrimination from customers and suppliers than from employers and co-workers. Other things equal, and assuming minority and female workers did not believe that discrimination pervaded commercial markets as well, this would lead minority and female business formation rates to be higher than would otherwise be expected.

On the other hand, discrimination in the labor market prevents minorities and women from acquiring the very skills, experience, and positions that are often observed among those who leave the ranks of the wage and salary earners to start their own businesses. Many construction contracting concerns have been formed by men who were once employed as foreman for other contractors, fewer by those who were employed instead as laborers. Similarly, discrimination in commercial capital and credit markets, as well as asset and wealth distribution, prevents minorities and women from acquiring the financial credit and capital that are so often prerequisite to starting or expanding a business. Other things equal, these phenomena would lead minority and female business formation rates to be lower than otherwise would be expected.

Further, discrimination by commercial customers and suppliers against DBEs, symptoms of which are evidenced in Section B.4 above and elsewhere, operates to increase input prices and lower output prices for DBEs. This discrimination leads to higher rates of failure for some minority and women firms, lower rates of profitability and growth for others, and prevents some minorities and women from ever starting businesses.⁴⁷ All of these phenomena, other things equal, would contribute directly to lower observed rates of minority and female self-employment.

⁴⁷ See also the materials cited at fn. 41 *supra*.

1. Methods and Data

To see if minorities or White women are as likely to be business owners as are comparable White males, we use a statistical technique known as Probit regression. Probit regression is used to determine the relationship between a categorical variable—one that can be characterized in terms of a yes or no response as opposed to a continuous number—and a set of characteristics that are related to the outcome of the categorical variable. Probit regression produces estimates of the extent to which each characteristic is positively or negatively related to the likelihood that the categorical variable will be a yes or no. For example, Probit regression is used by statisticians to estimate the likelihood that an individual participates in the labor force, retires this year, or contracts a particular disease—these are all variables that can be categorized by a response of yes (for example, she is in the labor force) or no (for example, she is not in the labor force)—and the extent to which certain factors are positively or negatively related to the likelihood (for example, the more education she has, the more likely that she is in the labor force). Probit regression is one of several techniques that can be used to examine qualitative outcomes. Generally, other techniques such as Logit regression yield similar results.⁴⁸ In the present case, Probit regression is used to examine the relationship between the choice to own a business (yes or no) the other demographic and socioeconomic characteristics in our basic model. The underlying data for this section is once again the 2000 PUMS, the 1979-1991 CPS, and the 1992-2002 CPS.

2. Findings: Race and Sex Disparities in Business Formation

As a point of reference for what follows, Tables 49 and 50 provide a summary of business ownership rates in 2000 by race and sex. A striking feature of both tables is how much higher business ownership rates in the United States are for White males than for any other group. Table 49, for example, shows almost an 8 percentage point difference between the overall self-employment rate of Blacks and White Males in the State of Washington

⁴⁸ For a detailed discussion, see G.S. Maddala, *Limited Dependent and Qualitative Variables in Econometrics*, Cambridge University Press, 1983. Probit analysis is performed here using the “dprobit” command in the statistical program STATA.

(13.3 - 5.7 = 7.6), and Table 50 shows more than a 16 point difference in the construction sector self-employment rate for this group. Results such as this are observed whether we consider the country as a whole or only the State of Washington, it is apparent in the construction sector as well as in the economy as a whole, and it is evident for all minority groups and for White women.

There is no doubt that part of the group differences shown in Tables 49 and 50 are associated with differences in the distribution of individual characteristics and preferences between minorities, women, and White males. It is well known that personal earnings tend to increase with age, for example. It is also true that the propensity toward self-employment increases with age.⁴⁹ Since most minority populations in the U.S. have a lower median age than the non-Hispanic white population, we must examine whether the disparities in business ownership evidenced in Tables 49 and 50 are largely—or even entirely—due to differences in the age distribution of minorities compared to non-minorities or other factors such as education, geographic location, or industry preferences.

The remainder of this section presents a series of regression analyses designed to address whether large, negative and statistically significant race and sex disparities are found among otherwise similarly-situated individuals. Tables 51 through 56 report results from regression analyses of the decision to start a business. Tables 51 through 53 focus on the economy as a whole and Tables 54 through 56 focus on construction and construction-related professional services. As in previous sections, the first in each triad of Tables is derived from the 2000 PUMS, the second from the 1979–1991 CPS, and the third from the 1992–2002 CPS. The numbers shown in each of these tables indicate the percentage point difference between the probability of self-employment for a given race/sex group and for comparable White males.

a. Specification (1) - the Basic Model

Specification (1) in Tables 51 through 53 shows negative, statistically significant and large business formation disparities for Blacks, Hispanics, Asians, Native Americans,

⁴⁹ Wainwright [54] p. 86.

persons of mixed race, and White women consistent with the presence of discrimination in these markets.

Specification (1) in Tables 54 through 56 shows similar large, negative, and statistically significant business formation disparities for every group in the construction and construction-related professional services sector.

Once again, Specification (1) in, respectively, Tables 52 and 53 and Tables 55 and 56 describes changes in observed business owner earnings disparities over time. For the economy as a whole as well as for the construction sector, disparities for Blacks and Hispanics have actually worsened in recent years, while those for Asians and Native Americans have changed only little. In the construction sector, disparities for White women have lessened substantially in the construction sector, although they remain large. Disparities for White women in the economy as a whole, in contrast, did not change much between the two periods.

Lastly, with respect to Specification (1), results on the indicator variable for the State of Washington indicate a positive self-employment effect relative to the rest of the nation in the 2000 PUMS data.

b. Specifications (2) and (3) - the Full Model Including Washington-Specific Interaction Terms

Several of the Washington interaction terms included in Specification (2) were significant. The final results are in Specification (3) for Tables 51-54, and in Specification (1) for Tables 55-56. To summarize for the economy-wide results (Tables 51-53):

- The remaining difference for Blacks ranges between 1.6 and 4.7 percentage points (approximately 30-35 percent lower than the corresponding White male business formation rate).⁵⁰

⁵⁰ Because the overall White male self-employment rate is 13.6 percent (Table 49), the rate for comparable Blacks is approximately 30–35 percent lower than expected (i.e. $3.7 \div 13.6 \approx 0.27$; $4.8 \div 13.6 \approx 0.35$).

- For Hispanics, from 2.8 to 6.3 percentage points (approximately 21-46 percent lower than the White male business formation rate).
- For Asians, from -0.5 to +0.4 percentage points (approximately 4 percent lower to 3 percent higher than the White male business formation rate).
- For Native Americans, from 3.0 to 3.3 percentage points (approximately 22-24 percent lower than the White male business formation rate).
- For White women, from 0.2 to 1.3 percentage points (approximately 1-10 percent lower than the White male business formation rate).

To summarize for the construction sector results (Tables 54-56):

- For Blacks, the remaining difference ranges between 8.5 to 19.9 percentage points (approximately 34-80 percent lower than the corresponding White male business formation rate).
- For Hispanics, from 6.5 to 9.1 percentage points (approximately 26-36 percent lower than the White male business formation rate).
- For Asians, from 5.6 to 7.5 percentage points (approximately 22-30 percent lower than the White male business formation rate).
- For Native Americans, from 7.6 to 8.9 percentage points (approximately 30-36 percent lower than the White male business formation rate).
- For White women, from 4.8 to 9.9 percentage points (approximately 19-40 percent lower than the White male business formation rate).

c. Conclusions

This section has demonstrated that observed DBE availability levels in the State of Washington are substantially and statistically significantly lower than those that would be observed if commercial markets operated in a race- and sex-neutral manner. This suggests that minorities and women are substantially and significantly less likely to own their own businesses as the result of discrimination than would be expected based upon their observable characteristics including age, education, geographic location, and industry.

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These groups also suffer substantial and significant earnings disadvantages relative to comparable White males whether they work as employees or as entrepreneurs.

D. Estimates of Adjusted DBE Availability

The Probit regression results for the Washington construction and architecture/engineering sector from Table 54 are combined with weighted average self-employment rates by race and sex from the 2000 PUMS (Table 50) to determine the expected difference between baseline availability and expected availability in a race-neutral marketplace. These figures appear in column (2) of Table 57.

Overall, the self-employment rate for minorities and women is 14.4 percent. According to the regression specification underlying Table 57, that rate would be 20.7 percent, or 43.8 percent higher, in a race and sex neutral marketplace. Put differently, the disparity ratio of the actual compared to the potential business formation rate is 0.70. Disparity ratios are large and statistically significant for all groups examined. The largest disparity observed is for Blacks (0.22), followed in descending order by that for Hispanics (0.58), Native Americans (0.64), Asians (0.71), Multiple races (0.77), and White females (0.78).

Given the large disparities observed throughout Table 57, adjusted baseline estimates of DBE availability may be warranted to account for the continuing effects of discrimination, as directed by 49 CFR § 26.45(d)(1)(ii). It is important to note, however, that even the unadjusted baseline DBE availability figure is substantially higher than the average level of DBE utilization that WSDOT has achieved in recent fiscal years.⁵¹ Finally, Table 58 summarizes our estimates of baseline DBE availability and adjusted DBE availability for construction and consulting, separately as well as combined.

⁵¹ See Section V, above.

VII. TABLES

Table 1. Product Market for All WSDOT Contracts

SIC Code	SIC Description	Percentage	Cumulative Percentage
1611	Highway and Street Construction	39.207	39.207
1622	Bridge, Tunnel, and Elevated Highway	15.220	54.426
8711	Engineering Services	6.528	60.954
1629	Heavy Construction, n.e.c.	5.383	66.337
1771	Concrete Work	5.342	71.679
1731	Electrical Work	4.829	76.508
1794	Excavation Work	3.687	80.195
1541	Industrial Buildings and Warehouses	2.642	82.837
1721	Painting	2.179	85.016
1542	Nonresidential Construction, n.e.c.	1.888	86.904
4213	Trucking, Except Local	1.738	88.642
1751	Carpentry Work	1.597	90.240
2951	Paving Mixtures and Blocks	1.586	91.826
1442	Construction Sand and Gravel	1.299	93.125
1791	Structural Steel Erection	1.141	94.265
1623	Water, Sewer, and Utility Lines	1.130	95.395
0782	Lawn and Garden Services	0.904	96.299
1799	Special Trade Contractors, n.e.c.	0.834	97.133
7389	Business Services, n.e.c.	0.606	97.738
1795	Wrecking and Demolition Work	0.448	98.187
7353	Heavy Construction Equipment Rental and Leasing	0.356	98.542
4212	Local Trucking Without Storage	0.342	98.884
1711	Plumbing, Heating, and Air Conditioning	0.275	99.159
1781	Water Well Drilling	0.248	99.406
4959	Sanitary Services, n.e.c.	0.226	99.633
8743	Public Relations Services	0.191	99.823
8713	Surveying Services	0.177	100.000
	TOTAL (\$)	1,605,950,845	

Table 2. Product Market for WSDOT Construction Contracts

SIC Code	SIC Description	Percentage	Cumulative Percentage
1611	Highway and Street Construction	41.867	41.867
1622	Bridge, Tunnel, and Elevated Highway	16.252	58.120
1629	Heavy Construction, n.e.c.	5.748	63.867
1771	Concrete Work	5.705	69.572
1731	Electrical Work	5.157	74.729
1794	Excavation Work	3.937	78.667
1541	Industrial Buildings and Warehouses	2.821	81.488
1721	Painting	2.327	83.814
1542	Nonresidential Construction, n.e.c.	2.016	85.831
4213	Trucking, Except Local	1.856	87.687
1751	Carpentry Work	1.706	89.393
2951	Paving Mixtures and Blocks	1.694	91.086
1442	Construction Sand and Gravel	1.388	92.474
1791	Structural Steel Erection	1.218	93.692
1623	Water, Sewer, and Utility Lines	1.207	94.898
0782	Lawn and Garden Services	0.965	95.863
1799	Special Trade Contractors, n.e.c.	0.890	96.753
7389	Business Services, n.e.c.	0.647	97.400
1795	Wrecking and Demolition Work	0.479	97.879
8711	Engineering Services	0.419	98.298
7353	Heavy Construction Equipment Rental and Leasing	0.380	98.677
4212	Local Trucking Without Storage	0.365	99.042
1711	Plumbing, Heating, and Air Conditioning	0.292	99.335
1781	Water Well Drilling	0.264	99.599
4959	Sanitary Services, n.e.c.	0.241	99.841
8713	Surveying Services	0.159	100.000
	TOTAL (\$)	1,503,894,094	

Table 3. Product Market for WSDOT Consulting Contracts

SIC Code	SIC Description	Percentage	Cumulative Percentage
8711	Engineering Services	93.163	93.163
8743	Public Relations Services	2.896	96.060
8741	Management Services	2.308	98.368
8748	Business Consulting, n.e.c.	0.863	99.231
8713	Surveying Services	0.415	99.647
8742	Management Consulting Services	0.353	100.000
	TOTAL (\$)	105,766,945	

Table 4. Distribution of WSDOT Contract Dollars by Category

Location	Construction (%)	Consulting (%)	Combined (%)
Inside Washington	93.7%	92.4%	93.6%
Outside Washington	6.3%	7.6%	6.4%
Metropolitan	89.1%	99.0%	89.7%
Non-Metropolitan	10.9%	1.0%	10.3%
Northwest Region	44.4%	87.6%	47.2%
Olympic Region	24.6%	3.1%	23.2%
Eastern Region	11.9%	0.6%	11.1%
South Central Region	7.0%	<0.1%	6.5%
North Central Region	3.1%	1.0%	3.0%
Southwest Region	2.8%	0.1%	2.7%
Outside WA	6.2%	7.6%	6.3%
Seattle-Bellevue-Everett, WA	41.1%	87.3%	44.2%
Bremerton, WA	14.4%	<0.1%	13.5%
Spokane, WA	11.3%	0.6%	10.6%
Tacoma, WA	6.5%	1.6%	6.1%
Yakima, WA	3.9%	<0.1%	3.7%
Portland-Vancouver, OR-WA	3.5%	0.2%	3.3%
Richland-Kennewick-Pasco, WA	2.0%	0.0%	1.8%
Bellingham, WA	1.9%	0.3%	1.8%
Eugene-Springfield, OR	1.4%	0.1%	1.3%
Olympia, WA	1.2%	1.4%	1.2%
Salem, OR	0.6%	0.0%	0.5%
San Diego, CA	0.0%	2.9%	0.3%
San Jose, CA	0.3%	0.0%	0.3%
San Francisco, CA	0.0%	1.4%	0.1%
All other metropolitan areas combined	<1.0%	3.1%	1.0%
Non-metropolitan areas	10.9%	1.0%	10.3%

Source: NERA calculations from WSDOT master contract/subcontract database.

Table 5. County Distribution of WSDOT Contract Dollars

County	State	Construction (%)	Consulting (%)	Combined (%)
Asotin	WA	1.03		0.98
Benton	WA	1.12		1.04
Chelan	WA	1.72	1.09	1.67
Clallam	WA	1.11		1.03
Clark	WA	1.87	0.14	1.77
Columbia	WA	0.01		0.01
Cowlitz	WA	0.56		0.52
Douglas	WA	0.36		0.33
Franklin	WA	0.95		0.90
Grant	WA	1.11		1.07
Grays Harbor	WA	1.36		1.26
Island	WA	0.25		0.23
Jefferson	WA	0.00		0.00
King	WA	30.83	92.04	34.77
Kitsap	WA	15.50	0.08	14.38
Kittitas	WA	0.08		0.08
Klickitat	WA	0.20		0.19
Lewis	WA	0.38		0.35
Lincoln	WA	0.02		0.02
Mason	WA	0.23		0.21
Okanogan	WA	0.15		0.14
Pacific	WA	0.00		0.00
Pend Oreille	WA	0.05		0.05
Pierce	WA	6.85	1.70	6.56
Skagit	WA	1.27		1.18
Skamania	WA	0.00		0.00
Snohomish	WA	12.84	2.45	12.27
Spokane	WA	11.93	0.63	11.23
Stevens	WA	0.63		0.59
Thurston	WA	1.29	1.56	1.30

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County	State	Construction (%)	Consulting (%)	Combined (%)
Wahkiakum	WA	0.00		0.00
Walla Walla	WA	0.02		0.02
Whatcom	WA	2.07	0.30	1.94
Whitman	WA	0.01		0.01
Yakima	WA	4.22	0.01	3.91
TOTAL		100.0	100.0	100.0

Source: NERA calculations from WSDOT contracts databases.

Table 6. Total Businesses and Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	726	39.21	39.21
1622	Bridge, Tunnel, and Elevated Highway	36	15.22	54.43
8711	Engineering Services	2696	6.53	60.95
1629	Heavy Construction, n.e.c.	561	5.38	66.34
1771	Concrete Work	1071	5.34	71.68
1731	Electrical Work	2136	4.83	76.51
1794	Excavation Work	1383	3.69	80.20
1541	Industrial Buildings and Warehouses	302	2.64	82.84
1721	Painting	2375	2.18	85.02
1542	Nonresidential Construction, n.e.c.	1890	1.89	86.90
4213	Trucking, Except Local	1136	1.74	88.64
1751	Carpentry Work	1709	1.60	90.24
2951	Paving Mixtures and Blocks	34	1.59	91.83
1442	Construction Sand and Gravel	71	1.30	93.12
1791	Structural Steel Erection	150	1.14	94.27
1623	Water, Sewer, and Utility Lines	370	1.13	95.40
782	Lawn and Garden Services	2544	0.90	96.30
1799	Special Trade Contractors, n.e.c.	2634	0.83	97.13
7389	Business Services, n.e.c.	12197	0.61	97.74
1795	Wrecking and Demolition Work	68	0.45	98.19
7353	Heavy Construction Equipment Rental and Leasing	190	0.36	98.54
4212	Local Trucking Without Storage	2542	0.34	98.88
1711	Plumbing, Heating, and Air Conditioning	2579	0.27	99.16
1781	Water Well Drilling	179	0.25	99.41
4959	Sanitary Services, n.e.c.	128	0.23	99.63
8743	Public Relations Services	446	0.19	99.82
8713	Surveying Services	296	0.18	100.00
	TOTAL	40449		

Table 7. Construction Businesses and Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	726	41.87	41.87
1622	Bridge, Tunnel, and Elevated Highway	36	16.25	58.12
1629	Heavy Construction, n.e.c.	561	5.75	63.87
1771	Concrete Work	1071	5.70	69.57
1731	Electrical Work	2136	5.16	74.73
1794	Excavation Work	1383	3.94	78.67
1541	Industrial Buildings and Warehouses	302	2.82	81.49
1721	Painting	2375	2.33	83.81
1542	Nonresidential Construction, n.e.c.	1890	2.02	85.83
4213	Trucking, Except Local	1136	1.86	87.69
1751	Carpentry Work	1709	1.71	89.39
2951	Paving Mixtures and Blocks	34	1.69	91.09
1442	Construction Sand and Gravel	71	1.39	92.47
1791	Structural Steel Erection	150	1.22	93.69
1623	Water, Sewer, and Utility Lines	370	1.21	94.90
782	Lawn and Garden Services	2544	0.96	95.86
1799	Special Trade Contractors, n.e.c.	2634	0.89	96.75
7389	Business Services, n.e.c.	12197	0.65	97.40
1795	Wrecking and Demolition Work	68	0.48	97.88
8711	Engineering Services	2696	0.42	98.30
7353	Heavy Construction Equipment Rental and Leasing	190	0.38	98.68
4212	Local Trucking Without Storage	2542	0.37	99.04
1711	Plumbing, Heating, and Air Conditioning	2579	0.29	99.33
1781	Water Well Drilling	179	0.26	99.60
4959	Sanitary Services, n.e.c.	128	0.24	99.84
8713	Surveying Services	296	0.16	100.00
	TOTAL	40003		

Table 8. Consulting Businesses and Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
8711	Engineering Services	2696	93.16	93.16
8743	Public Relations Services	446	2.90	96.06
8741	Management Services	1032	2.31	98.37
8748	Business Consulting, n.e.c.	5001	0.86	99.23
8713	Surveying Services	296	0.42	99.65
8742	Management Consulting Services	5180	0.35	100.00
	TOTAL	14651		

Table 9. Listed DBEs and Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	65	39.21	39.21
1622	Bridge, Tunnel, and Elevated Highway	5	15.22	54.43
8711	Engineering Services	247	6.53	60.95
1629	Heavy Construction, n.e.c.	44	5.38	66.34
1771	Concrete Work	83	5.34	71.68
1731	Electrical Work	177	4.83	76.51
1794	Excavation Work	96	3.69	80.20
1541	Industrial Buildings and Warehouses	22	2.64	82.84
1721	Painting	241	2.18	85.02
1542	Nonresidential Construction, n.e.c.	136	1.89	86.90
4213	Trucking, Except Local	96	1.74	88.64
1751	Carpentry Work	75	1.60	90.24
2951	Paving Mixtures and Blocks	3	1.59	91.83
1442	Construction Sand and Gravel	5	1.30	93.12
1791	Structural Steel Erection	16	1.14	94.27
1623	Water, Sewer, and Utility Lines	38	1.13	95.40
782	Lawn and Garden Services	359	0.90	96.30
1799	Special Trade Contractors, n.e.c.	236	0.83	97.13
7389	Business Services, n.e.c.	2739	0.61	97.74
1795	Wrecking and Demolition Work	7	0.45	98.19
7353	Heavy Construction Equipment Rental and Leasing	13	0.36	98.54
4212	Local Trucking Without Storage	247	0.34	98.88
1711	Plumbing, Heating, and Air Conditioning	158	0.27	99.16
1781	Water Well Drilling	9	0.25	99.41
4959	Sanitary Services, n.e.c.	14	0.23	99.63
8743	Public Relations Services	117	0.19	99.82
8713	Surveying Services	20	0.18	100.00
	TOTAL	5268		

Table 10. Listed Construction DBEs & Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	65	41.87	41.87
1622	Bridge, Tunnel, and Elevated Highway	5	16.25	58.12
1629	Heavy Construction, n.e.c.	44	5.75	63.87
1771	Concrete Work	83	5.70	69.57
1731	Electrical Work	177	5.16	74.73
1794	Excavation Work	96	3.94	78.67
1541	Industrial Buildings and Warehouses	22	2.82	81.49
1721	Painting	241	2.33	83.81
1542	Nonresidential Construction, n.e.c.	136	2.02	85.83
4213	Trucking, Except Local	96	1.86	87.69
1751	Carpentry Work	75	1.71	89.39
2951	Paving Mixtures and Blocks	3	1.69	91.09
1442	Construction Sand and Gravel	5	1.39	92.47
1791	Structural Steel Erection	16	1.22	93.69
1623	Water, Sewer, and Utility Lines	38	1.21	94.90
782	Lawn and Garden Services	359	0.96	95.86
1799	Special Trade Contractors, n.e.c.	236	0.89	96.75
7389	Business Services, n.e.c.	2739	0.65	97.40
1795	Wrecking and Demolition Work	7	0.48	97.88
8711	Engineering Services	247	0.42	98.30
7353	Heavy Construction Equipment Rental and Leasing	13	0.38	98.68
4212	Local Trucking Without Storage	247	0.37	99.04
1711	Plumbing, Heating, and Air Conditioning	158	0.29	99.33
1781	Water Well Drilling	9	0.26	99.60
4959	Sanitary Services, n.e.c.	14	0.24	99.84
8713	Surveying Services	20	0.16	100.00
	TOTAL	5151		

Table 11. Listed Consulting DBEs & Industry Weight, by SIC Code

SIC Code	SIC Description	Number of Establishments	Industry Weight	Industry Weight (Cumulative)
8711	Engineering Services	247	93.16	93.16
8743	Public Relations Services	117	2.90	96.06
8741	Management Services	133	2.31	98.37
8748	Business Consulting, n.e.c.	999	0.86	99.23
8713	Surveying Services	20	0.42	99.65
8742	Management Consulting Services	1094	0.35	100.00
	TOTAL	2610		

Table 12. Listed DBE Percentage & Industry Weight, by SIC Code

SIC Code	SIC Description	Percent- age	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	8.95	39.21	39.21
1622	Bridge, Tunnel, and Elevated Highway	13.89	15.22	54.43
8711	Engineering Services	9.16	6.53	60.95
1629	Heavy Construction, n.e.c.	7.84	5.38	66.34
1771	Concrete Work	7.75	5.34	71.68
1731	Electrical Work	8.29	4.83	76.51
1794	Excavation Work	6.94	3.69	80.20
1541	Industrial Buildings and Warehouses	7.28	2.64	82.84
1721	Painting	10.15	2.18	85.02
1542	Nonresidential Construction, n.e.c.	7.20	1.89	86.90
4213	Trucking, Except Local	8.45	1.74	88.64
1751	Carpentry Work	4.39	1.60	90.24
2951	Paving Mixtures and Blocks	8.82	1.59	91.83
1442	Construction Sand and Gravel	7.04	1.30	93.12
1791	Structural Steel Erection	10.67	1.14	94.27
1623	Water, Sewer, and Utility Lines	10.27	1.13	95.40
782	Lawn and Garden Services	14.11	0.90	96.30
1799	Special Trade Contractors, n.e.c.	8.96	0.83	97.13
7389	Business Services, n.e.c.	22.46	0.61	97.74
1795	Wrecking and Demolition Work	10.29	0.45	98.19
7353	Heavy Construction Equipment Rental and Leasing	6.84	0.36	98.54
4212	Local Trucking Without Storage	9.72	0.34	98.88
1711	Plumbing, Heating, and Air Conditioning	6.13	0.27	99.16
1781	Water Well Drilling	5.03	0.25	99.41
4959	Sanitary Services, n.e.c.	10.94	0.23	99.63
8743	Public Relations Services	26.23	0.19	99.82
8713	Surveying Services	6.76	0.18	100.00
	TOTAL	13.02		

Table 13. Listed Construction DBE Percentage & Industry Weight, by SIC Code

SIC Code	SIC Description	Percentage	Industry Weight	Industry Weight (Cumulative)
1611	Highway and Street Construction	8.95	41.87	41.87
1622	Bridge, Tunnel, and Elevated Highway	13.89	16.25	58.12
1629	Heavy Construction, n.e.c.	7.84	5.75	63.87
1771	Concrete Work	7.75	5.70	69.57
1731	Electrical Work	8.29	5.16	74.73
1794	Excavation Work	6.94	3.94	78.67
1541	Industrial Buildings and Warehouses	7.28	2.82	81.49
1721	Painting	10.15	2.33	83.81
1542	Nonresidential Construction, n.e.c.	7.20	2.02	85.83
4213	Trucking, Except Local	8.45	1.86	87.69
1751	Carpentry Work	4.39	1.71	89.39
2951	Paving Mixtures and Blocks	8.82	1.69	91.09
1442	Construction Sand and Gravel	7.04	1.39	92.47
1791	Structural Steel Erection	10.67	1.22	93.69
1623	Water, Sewer, and Utility Lines	10.27	1.21	94.90
782	Lawn and Garden Services	14.11	0.96	95.86
1799	Special Trade Contractors, n.e.c.	8.96	0.89	96.75
7389	Business Services, n.e.c.	22.46	0.65	97.40
1795	Wrecking and Demolition Work	10.29	0.48	97.88
8711	Engineering Services	9.16	0.42	98.30
7353	Heavy Construction Equipment Rental and Leasing	6.84	0.38	98.68
4212	Local Trucking Without Storage	9.72	0.37	99.04
1711	Plumbing, Heating, and Air Conditioning	6.13	0.29	99.33
1781	Water Well Drilling	5.03	0.26	99.60
4959	Sanitary Services, n.e.c.	10.94	0.24	99.84
8713	Surveying Services	6.76	0.16	100.00
	TOTAL	12.88		

Table 14. Listed Consulting DBE Percentage & Industry Weight, by SIC Code

SIC Code	SIC Description	Percent- age	Industry Weight	Industry Weight (Cumulative)
8711	Engineering Services	9.16	93.16	93.16
8743	Public Relations Services	26.23	2.90	96.06
8741	Management Services	12.89	2.31	98.37
8748	Business Consulting, n.e.c.	19.98	0.86	99.23
8713	Surveying Services	6.76	0.42	99.65
8742	Management Consulting Services	21.12	0.35	100.00
	TOTAL	17.81		

Table 15. Listed DBE Survey—Amount of Misclassification, by SIC Code Grouping⁵²

Listed DBE By SIC Code Grouping	Misclassification (Percentage White Male)	Percentage Actually DBE-owned	Number of Businesses Interviewed
SIC 16	26.9	73.1	67
SIC 15	21.2	78.8	52
SIC 17	18.9	81.1	53
SIC 87	19.1	80.9	89
SIC 42	24.1	75.9	54
Balance of SIC Codes	15.8	84.2	38
All SIC Codes	21.2	78.8	353

Source: NERA telephone surveys conducted in February and March 2005.

⁵² SIC 16 – Heavy Construction, SIC 15 – Building Construction, SIC 17 – Special Trades Construction, SIC 87 – Professional Engineering and Other Services, SIC 42 – Trucking and Other Transportation.

Table 16. Listed DBE Survey—Amount of Misclassification, by Highway Region

Highway Region	Misclassification (Percentage White Male)	Percentage Actually DBE- owned	Number of Businesses Interviewed
Eastern	23.3	76.7	30
North Central	33.3	66.7	15
Northwest	21.1	78.9	171
Olympic	22.7	77.3	66
South Central	13.5	86.5	37
Southwest	20.6	79.4	34
Entire Region	21.2	78.8	353

Source: See Table 15.

Table 17. Listed DBE Survey—Amount of Misclassification, by Putative DBE Type

Putative Race/Sex	Misclassification (Percentage White Male)	Misclassification (Percentage Other DBE Type)	Percentage Correctly Classified	Number of Businesses Interviewed
Black (either sex)	5.3	5.2	89.5	19
Hispanic (either sex)	15.9	9.1	75.0	44
Asian (either sex)	11.5	3.9	84.6	52
Native American (either sex)	8.2	4.0	87.8	49
Unspecified Minority (either sex)	22.2	77.8	0.0	9
White Female	30.6	8.2	62.2	180
All DBE Types	21.2	8.3	70.5	353

Source: See Table 15.

Table 18. Unclassified Businesses Survey —By SIC Code Grouping

Listed DBE By SIC Code Grouping	Percentage DBE	Percentage Actually White Male-owned	Number of Businesses Interviewed
Stratum 1	5.6	94.4	231
Stratum 2	13.3	86.7	60
Stratum 3	15.7	84.3	89
Stratum 4	7.8	92.2	64
Stratum 5	19.6	80.4	46
Stratum 6	34.5	65.5	29
All SIC Codes	11.4	88.6	519

Source: NERA telephone surveys conducted in February and March 2005.

Table 19. Unclassified Businesses Survey —By Highway Region

Highway Region	Percentage DBE	Percentage Actually White Male-owned	Number of Businesses Interviewed
Eastern	11.1	88.9	45
North Central	10.0	90.0	20
Northwest	12.6	87.4	206
Olympic	12.1	87.9	141
South Central	9.3	90.7	43
Southwest	7.8	92.2	64
Statewide	11.4	88.6	519

Source: See Table 15.

Table 20. Unclassified Businesses Survey—By Race and Sex

Verified Race/Sex	Number of Businesses Interviewed	Percentage of Total
White Male	460	88.6
White Female	33	6.4
Black	4	0.8
Hispanic	6	1.2
Asian	9	1.7
Native American	7	1.4
Statewide	519	100.0

Source: See Table 18.

Table 21. Calculation Summary—Overall

Step / Calculation	Number of Businesses	Percentage of Total
All Businesses	40,449	100.00
Listed DBEs	5,268	13.02
Listed DBEs (effective number, with industry weights)	3,931	9.72
Listed DBEs (effective number, corrected for misclassification)	3,939	9.74
Listed DBEs (effective number, corrected for misclassif.; with industry weights)	3,955	9.78
Unlisted DBEs (effective number, corrected for misclassification)	7,474	18.48
Unlisted DBEs (effective number, corrected for misclassif.; with industry weights)	4,471	11.05
All DBEs (final, unweighted)	11,412	28.21
All DBEs (final, with industry weights)	7,592	18.77

Table 22. Calculation Summary—Construction

Step / Calculation	Number of Businesses	Percentage of Total
All Businesses	40,003	100.00
Listed DBEs	5,151	12.88
Listed DBEs (effective number, with industry weights)	3,926	9.81
Listed DBEs (effective number, corrected for misclassification)	3,843	9.61
Listed DBEs (effective number, corrected for misclassif.; with industry weights)	3,801	9.50
Unlisted DBEs (effective number, corrected for misclassification)	7,448	18.62
Unlisted DBEs (effective number, corrected for misclassif.; with industry weights)	4,773	11.93
All DBEs (effective number, final, unweighted)	11,291	28.23
All DBEs (effective number, final, with industry weights)	7,838	<i>19.59</i>

Table 23. Calculation Summary—Consulting

Step / Calculation	Number of Businesses	Percentage of Total
All Businesses	14,651	100.00
Listed DBEs	2,610	17.81
Listed DBEs (effective number, with industry weights)	1,398	9.54
Listed DBEs (effective number, corrected for misclassification)	2,133	14.56
Listed DBEs (effective number, corrected for misclassif.; with industry weights)	2,136	14.58
Unlisted DBEs (effective number, corrected for misclassification)	940	6.42
Unlisted DBEs (effective number, corrected for misclassif.; with industry weights)	942	6.43
All DBEs (effective number, final, unweighted)	3,074	20.98
All DBEs (effective number, final, with industry weights)	2,181	14.88

Table 24. Estimated DBE Availability for WSDOT

Geographic Region	Overall	Construction	Consulting
Eastern	17.37	18.21	11.91
North Central	15.42	15.94	10.28
Northwest	19.95	21.21	15.55
Olympic	17.65	18.47	12.59
South Central	21.71	22.41	18.17
Southwest	16.46	16.59	15.46
White Male	81.23	80.41	85.12
White Female	11.86	12.43	9.29
Black	0.55	0.59	0.35
Hispanic	1.30	1.46	0.49
Asian	2.68	2.61	3.01
Native American	2.39	2.51	1.75
MBE	6.91	7.16	5.59
DBE	18.77	19.59	14.88
ENTIRE GEOGRAPHIC MARKET AREA	18.77	19.59	14.88

Source: (i) NERA calculations from master WSDOT contract/subcontract database; (ii) Dun & Bradstreet's *MarketPlace*; (iii) business directory information compiled by NERA; and (iv) NERA telephone surveys.

Table 25. Estimated DBE Utilization on WSDOT Construction Projects—Federally-Funded Only, Prime Contracts Only, Gross Contract Amount

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	93.91	586	96.71	1,470,643,756
White Female	4.01	25	2.15	32,684,309
Black	0.64	4	0.40	6,149,632
Hispanic	0.16	1	0.02	254,988
Asian/Pacific	0.48	3	0.51	7,780,420
Native American	0.48	3	0.14	2,128,907
All MBE	1.76	11	1.07	16,313,948
All DBE	5.77	36	3.22	48,998,257
TOTAL	100.00	624	100.00	1,520,628,331

Table 26. Estimated DBE Utilization on WSDOT Construction Projects—Federally-Funded Only, Prime Contracts Only, Non-Subcontracted Dollar Amounts

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	93.91	586	96.93	934,339,651
White Female	4.01	25	1.98	19,118,874
Black	0.64	4	0.50	4,838,814
Hispanic	0.16	1	0.02	150,733
Asian/Pacific	0.48	3	0.38	3,659,171
Native American	0.48	3	0.12	1,155,349
All MBE	1.76	11	1.02	9,804,068
All DBE	5.77	36	3.00	28,922,942
TOTAL	100.00	624	100.00	963,981,488

Table 27. Estimated DBE Utilization on WSDOT Construction Projects—Federally-Funded Only, Prime and Subcontracts, First-Tier Only

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	75.88	4,266	86.31	1,312,432,008
White Female	17.32	974	8.22	124,966,639
Black	1.09	61	1.99	30,322,633
Hispanic	1.94	109	1.30	19,700,784
Asian/Pacific	1.51	85	1.33	20,239,235
Native American	3.11	175	1.51	22,934,893
All MBE	7.61	428	6.12	93,058,335
All DBE	24.62	1,384	14.32	217,743,804
TOTAL	100.00	5,622	100.00	1,520,628,328

**Table 28. Estimated DBE Utilization on WSDOT Construction
Projects—Non-Federally-Funded Only, Prime Contracts Only,
Gross Contract Amount**

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	92.86	234	99.34	1,004,227,834
White Female	3.17	8	0.12	1,202,021
Black	0.79	2	0.21	2,091,603
Hispanic	0.40	1	0.03	338,309
Asian/Pacific	0.00	0	0.00	
Native American	1.98	5	0.17	1,735,363
All MBE	3.17	8	0.41	4,165,275
All DBE	6.35	16	0.53	5,367,297
TOTAL	100.00	252	100.00	1,010,878,014

Table 29. Estimated DBE Utilization on WSDOT Construction Projects—Non-Federally-Funded Only, Prime Contracts Only, Non-Subcontracted Dollar Amounts

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	92.86	234	99.35	837,527,923
White Female	3.17	8	0.13	1,131,463
Black	0.79	2	0.18	1,512,603
Hispanic	0.40	1	0.04	321,426
Asian/Pacific	0.00	0	0.00	
Native American	1.98	5	0.18	1,529,073
All MBE	3.17	8	0.40	3,363,102
All DBE	6.35	16	0.53	4,494,565
TOTAL	100.00	252	100.00	842,982,672

**Table 30. Estimated DBE Utilization on WSDOT Construction
Projects—Non-Federally-Funded Only, Prime and Subcontracts,
First-Tier Only**

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	79.74	1,350	96.98	980,387,520
White Female	14.29	242	1.53	15,447,446
Black	0.77	13	0.33	3,325,453
Hispanic	1.77	30	0.36	3,621,541
Asian/Pacific	1.18	20	0.10	999,372
Native American	2.54	43	0.67	6,740,693
All MBE	6.14	104	1.45	14,671,032
All DBE	19.91	337	2.97	29,991,946
TOTAL	100.00	1,693	100.00	1,010,878,015

Table 31. Estimated DBE Utilization on WSDOT Consulting Projects—Federally-Funded Only, Prime Contracts Only, Gross Contract Amount

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	6.74	6	3.10	3,312,947
White Female	4.49	4	0.47	506,033
Black	0.00	0	0.00	
Hispanic	2.25	2	2.23	2,382,761
Asian/Pacific	0.00	0	0.00	
Native American	1.12	1	0.30	324,555
All MBE	3.37	3	2.53	2,707,316
All DBE	7.87	7	3.00	3,213,349
TOTAL	100.00	89	100.00	107,025,548

**Table 32. Estimated DBE Utilization on WSDOT Consulting
Projects—Federally-Funded Only, Prime Contracts Only, Non-
Subcontracted Dollar Amounts**

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	6.74	6	5.18	3,312,947
White Female	4.49	4	0.79	506,033
Black	0.00	0	0.00	
Hispanic	2.25	2	3.66	2,344,801
Asian/Pacific	0.00	0	0.00	
Native American	1.12	1	0.51	324,555
All MBE	3.37	3	4.17	2,669,356
All DBE	7.87	7	4.96	3,175,389
TOTAL	100.00	89	100.00	64,009,932

Table 33. Estimated DBE Utilization on WSDOT Consulting Projects—Federally-Funded Only, Prime and Subcontracts, First-Tier Only

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	5.34	11	3.92	4,196,987
White Female	12.62	26	6.33	6,775,918
Black	0.97	2	0.05	54,479
Hispanic	2.91	6	2.60	2,783,686
Asian/Pacific	6.80	14	1.12	1,199,543
Native American	0.97	2	0.34	358,903
All MBE	11.65	24	4.11	4,396,611
All DBE	24.27	50	10.44	11,172,529
TOTAL	100.00	206	100.00	107,025,548

**Table 34. Estimated DBE Utilization on WSDOT Consulting
Projects—Non-Federally-Funded Only, Prime Contracts Only,
Gross Contract Amount**

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	9.58	23	8.16	12,769,411
White Female	3.75	9	3.20	5,005,290
Black	0.00	0	0.00	
Hispanic	1.67	4	0.77	1,203,935
Asian/Pacific	1.67	4	0.37	581,485
Native American	0.00	0	0.00	
All MBE	3.33	8	1.14	1,785,420
All DBE	7.08	17	4.34	6,790,710
TOTAL	100.00	240	100.00	156,427,228

Table 35. Estimated DBE Utilization on WSDOT Consulting Projects—Non-Federally-Funded Only, Prime Contracts Only, Non-Subcontracted Dollar Amounts

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	9.58	23	10.28	12,660,373
White Female	3.75	9	4.03	4,958,157
Black	0.00	0	0.00	
Hispanic	1.67	4	0.97	1,196,497
Asian/Pacific	1.67	4	0.44	543,355
Native American	0.00	0	0.00	
All MBE	3.33	8	1.41	1,739,852
All DBE	7.08	17	5.44	6,698,009
TOTAL	100.00	240	100.00	123,104,599

**Table 36. Estimated DBE Utilization on WSDOT Consulting
Projects—Non-Federally-Funded Only, Prime and Subcontracts,
First-Tier Only**

Type	Contracts		Contract Dollars	
	%	N	%	\$
White Male	6.67	34	8.89	13,905,701
White Female	13.14	67	5.69	8,905,335
Black	0.98	5	0.28	439,953
Hispanic	2.75	14	1.38	2,158,310
Asian/Pacific	6.86	35	3.31	5,174,635
Native American	0.00	0	0.00	
All MBE	10.59	54	4.97	7,772,898
All DBE	23.73	121	10.66	16,678,233
TOTAL	100.00	510	100.00	156,427,229

Table 37. Annual Wage Earnings Regressions, All Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.304 (197.61)	-0.305 (197.36)	-0.305 (197.51)
Hispanic	-0.216 (139.09)	-0.217 (138.95)	-0.217 (139.06)
Asian/Pacific Islanders	-0.292 (139.06)	-0.293 (137.52)	-0.293 (137.58)
Native American	-0.327 (70.23)	-0.329 (69.08)	-0.329 (69.09)
Other Race	-0.281 (89.02)	-0.283 (88.14)	-0.283 (88.15)
White Female	-0.357 (400.16)	-0.357 (396.29)	-0.357 (400.18)
Age	0.177 (680.45)	0.177 (680.42)	0.177 (680.42)
Age ²	-0.002 (588.53)	-0.002 (588.51)	-0.002 (588.51)
Washington	0.213 (17.80)	0.197 (15.87)	0.197 (16.48)
Washington*Black		0.103 (4.62)	0.103 (4.67)
Washington*Hispanic		0.075 (5.87)	0.075 (6.06)
Washington* Asian/Pacific Islanders		0.056 (4.03)	0.056 (4.13)
Washington* Native American		0.068 (2.46)	0.068 (2.47)
Washington*Other Race		0.084 (4.12)	0.084 (4.18)
Washington*White Female		0.000 (.01)	
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	3848837	3848837	3848837
R ²	.436	.436	.436
F	18480	17816	18032

Source: NERA calculations from the 2000 Decennial Census Five Percent Public Use Microdata Samples.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 38. Annual Wage Earnings Regressions, All Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.220 (205.27)	-0.220 (204.87)	-0.220 (205.27)
Hispanic	-0.167 (122.92)	-0.167 (122.76)	-0.167 (122.81)
Other Race	-0.194 (109.06)	-0.194 (107.96)	-0.194 (109.07)
White Female	-0.238 (370.55)	-0.238 (368.36)	-0.238 (370.55)
Age	0.057 (351.86)	0.057 (351.86)	0.057 (351.86)
Age ²	-0.001 (286.2)	-0.001 (286.21)	-0.001 (286.20)
Washington	-0.061 (14.01)	-0.060 (11.82)	-0.062 (14.15)
Washington*Black		0.019 (.99)	
Washington*Hispanic		0.045 (2.13)	0.047 (2.24)
Washington*Other Race		0.006 (.44)	
Washington*White Female		-0.006 (1.07)	
Time (13 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	1868379	1868379	1868379
R ²	.504	.504	.504
F	16243	15706	16105

Source: NERA calculations from the Merged Outgoing Rotation Groups of the 1979-1991 Current Population Survey microdata samples.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 39. Annual Wage Earnings Regressions, All Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.214 (129.51)	-0.214 (129.35)	-0.214 (129.4)
Hispanic	-0.206 (118.35)	-0.206 (118.14)	-0.206 (118.38)
Asian	-0.194 (78.96)	-0.195 (78.45)	-0.195 (78.45)
Native American	-0.171 (38.05)	-0.172 (37.93)	-0.171 (38.05)
White Female	-0.178 (174.59)	-0.178 (173.5)	-0.178 (174.59)
Age	0.053 (202.35)	0.053 (202.35)	0.053 (202.35)
Age ²	-0.001 (166.92)	-0.001 (166.92)	-0.001 (166.92)
Washington	-0.070 (11.05)	-0.077 (10.21)	-0.074 (11.44)
Washington*Black		0.059 (2.16)	0.055 (2.05)
Washington*Hispanic		0.039 (1.93)	
Washington*Asian		0.050 (2.73)	0.046 (2.59)
Washington*Native American		0.068 (1.89)	
Washington*White Female		0.002 (.27)	
Time (11 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	933024	933024	933024
R ²	.467	.467	.467
F	6372	6133	6274

Source: NERA calculations from the Merged Outgoing Rotation Groups of the 1992-2002 Current Population Survey microdata samples.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) “Other Race” includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 40. Annual Wage Earnings Regressions, Construction and Related Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.334 (52.33)	-0.334 (52.26)	-0.334 (52.36)
Hispanic	-0.158 (31.74)	-0.159 (31.72)	-0.158 (31.76)
Asian/Pacific Islanders	-0.195 (17.87)	-0.197 (17.75)	-0.195 (17.89)
Native American	-0.296 (22.41)	-0.299 (22.18)	-0.296 (22.41)
Other Race	-0.216 (18.73)	-0.222 (19)	-0.222 (18.98)
White Female	-0.395 (103.90)	-0.394 (102.19)	-0.395 (103.89)
Age	0.157 (174.96)	0.157 (174.97)	0.157 (174.96)
Age ²	-0.002 (149.34)	-0.002 (149.35)	-0.002 (149.34)
Washington	0.260 (7.22)	0.251 (6.92)	0.254 (7.08)
Washington*Black		0.126 (1.35)	
Washington*Hispanic		0.060 (1.34)	
Washington* Asian/Pacific Islanders		0.057 (.84)	
Washington* Native American		0.102 (1.29)	
Washington*Other Race		0.233 (3.17)	0.231 (3.15)
Washington*White Female		-0.041 (1.45)	
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	307414	307414	307414
R ²	.268	.268	.268
F	1503	1392	1484

Source: See Table 37.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64 employed in the construction or construction-related professional services industries; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 41. Annual Wage Earnings Regressions, Construction and Related Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.213 (32.07)	-0.213 (31.94)	-0.213 (31.93)
Hispanic	-0.139 (19.87)	-0.139 (19.75)	-0.139 (19.89)
Other Race	-0.098 (8.85)	-0.097 (8.81)	-0.098 (8.85)
White Female	-0.287 (61.23)	-0.287 (61.22)	-0.287 (61.24)
Age	0.070 (72.46)	0.070 (72.47)	0.070 (72.47)
Age ²	-0.001 (57.41)	-0.001 (57.41)	-0.001 (57.42)
Washington	-0.034 (1.09)	-0.039 (0.89)	-0.020 (0.63)
Washington*Black		-0.267 (1.99)	-0.282 (2.16)
Washington*Hispanic		-0.006 (0.08)	
Washington*Other Race		-0.057 (0.29)	
Washington*White Female		0.136 (1.46)	
Time (13 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	123230	123230	123230
R ²	.399	.399	.399
F	1169	1105	1105

Source: See Table 38.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64 employed in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 42. Annual Wage Earnings Regressions, Construction and Related Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.196 (25.63)	-0.196 (25.56)	-0.196 (25.63)
Hispanic	-0.175 (29.57)	-0.176 (29.63)	-0.175 (29.57)
Asian	-0.116 (9.05)	-0.116 (8.84)	-0.116 (9.05)
Native American	-0.103 (7.2)	-0.104 (7.26)	-0.103 (7.2)
White Female	-0.245 (48.99)	-0.246 (48.67)	-0.245 (48.99)
Age	0.062 (61.08)	0.062 (61.08)	0.062 (61.08)
Age ²	-0.001 (47.95)	-0.001 (47.95)	-0.001 (47.95)
Washington	0.049 (1.8)	0.037 (1.33)	0.049 (1.8)
Washington*Black		-0.019 (.17)	
Washington*Hispanic		0.144 (1.91)	
Washington*Asian		-0.015 (.21)	
Washington*Native American		0.108 (.92)	
Washington*White Female		0.042 (1)	
Time (11 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	60581	60581	60581
R ²	.373	.373	.373
F	439	413	439

Source: See Table 39.

Notes: (1) Universe is all private sector prime age wage and salary workers between age 16 and 64 employed in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual wages between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 43. Annual Business Owner Earnings Regressions, All Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.300 (26.46)	-0.300 (26.35)	-0.300 (26.46)
Hispanic	-0.190 (18.84)	-0.191 (18.79)	-0.190 (18.84)
Asian/Pacific Islanders	-0.041 (2.86)	-0.043 (2.93)	-0.041 (2.86)
Native American	-0.384 (14.84)	-0.384 (14.55)	-0.384 (14.84)
Other Race	-0.273 (15.1)	-0.278 (15.12)	-0.273 (15.1)
White Female	-0.440 (90.29)	-0.441 (89.6)	-0.440 (90.29)
Age	0.164 (98.38)	0.164 (98.38)	0.164 (98.38)
Age ²	-0.002 (88.4)	-0.002 (88.4)	-0.002 (88.4)
Washington	-0.110 (2.18)	-0.135 (2.61)	-0.110 (2.18)
Washington*Black		-0.066 (.45)	
Washington*Hispanic		0.033 (.38)	
Washington* Asian/Pacific Islanders		0.060 (.71)	
Washington* Native American		0.024 (.15)	
Washington*Other Race		0.199 (1.61)	
Washington*White Female		0.061 (1.73)	
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	401629	401629	401629
R ²	.166	.166	.166
F	497	482	497

Source: NERA calculations from the 2000 Decennial Census Five Percent Public Use Microdata Samples.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 44. Annual Business Owner Earnings Regressions, All Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.500 (15.64)	-0.502 (15.69)	-0.501 (15.67)
Hispanic	-0.278 (9.46)	-0.280 (9.46)	-0.279 (9.48)
Other Race	-0.328 (8.29)	-0.329 (8.19)	-0.327 (8.26)
White Female	-0.729 (68.07)	-0.731 (67.87)	-0.731 (67.87)
Age	0.205 (41.42)	0.205 (41.41)	0.205 (41.41)
Age ²	-0.002 (36.5)	-0.002 (36.49)	-0.002 (36.48)
Washington	-0.238 (2.53)	-0.326 (3.33)	-0.316 (3.29)
Washington*Black		0.623 (.77)	
Washington*Hispanic		0.072 (.21)	
Washington*Other Race		0.080 (.27)	
Washington*White Female		0.384 (2.61)	0.364 (2.56)
Time (13 categories)	Yes	Yes	Yes
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	82094	82094	82094
R ²	.177	.177	.177
F	153.23	148.14	151.97

Source: NERA calculations from the Annual Demographic (March) File of the 1979-1991 Current Population Survey microdata samples.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 45. Annual Business Owner Earnings Regressions, All Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.591 (14.85)	-0.589 (14.74)	-0.591 (14.85)
Hispanic	-0.390 (9.8)	-0.394 (9.89)	-0.390 (9.8)
Asian	-0.221 (3.41)	-0.214 (3.25)	-0.221 (3.41)
Native American	-0.511 (5.47)	-0.504 (5.29)	-0.511 (5.47)
White Female	-0.617 (31.34)	-0.617 (31.08)	-0.617 (31.34)
Age	0.230 (27.27)	0.230 (27.28)	0.230 (27.27)
Age ²	-0.002 (23.8)	-0.002 (23.81)	-0.002 (23.8)
Washington	0.237 (1.29)	0.259 (1.2)	0.237 (1.29)
Washington*Black		-0.517 (.94)	
Washington*Hispanic		1.360 (1.64)	
Washington*Asian		-0.284 (.75)	
Washington*Native American		-0.412 (.66)	
Washington*White Female		-0.028 (.14)	
Time (11 categories)	Yes	Yes	Yes
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	55639	55639	55639
R ²	.128	.129	.128
F	64.4	62.00	64.4

Source: NERA calculations from the Annual Demographic (March) File of the 1992-2002 Current Population Survey microdata samples.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 46. Business Owner Earnings Regressions, Construction and Related Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.338 (12.11)	-0.336 (11.97)	-0.338 (12.11)
Hispanic	-0.147 (6.89)	-0.147 (6.84)	-0.147 (6.89)
Asian/Pacific Islanders	-0.069 (1.47)	-0.071 (1.51)	-0.069 (1.47)
Native American	-0.354 (7.01)	-0.357 (6.98)	-0.354 (7.01)
Other Race	-0.149 (3.41)	-0.146 (3.3)	-0.149 (3.41)
White Female	-0.505 (30.56)	-0.506 (30.1)	-0.505 (30.56)
Age	0.136 (36.01)	0.136 (36.01)	0.136 (36.01)
Age ²	-0.001 (33.71)	-0.001 (33.71)	-0.001 (33.71)
Washington	-0.237 (1.46)	-0.235 (1.44)	-0.237 (1.46)
Washington*Black		-0.573 (1.65)	
Washington*Hispanic		-0.022 (.11)	
Washington* Asian/Pacific Islanders		0.123 (.36)	
Washington* Native American		0.175 (.46)	
Washington*Other Race		-0.097 (.37)	
Washington*White Female		0.020 (.16)	
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	64853	64853	64853
R ²	.054	.054	.054
F	49	46	49

Source: See Table 43.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64 in the construction or construction-related professional services industries; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 47. Business Owner Earnings Regressions, Construction and Related Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.428 (5.73)	-0.428 (5.72)	-0.428 (5.74)
Hispanic	-0.252 (3.96)	-0.258 (4.05)	-0.252 (3.96)
Other Race	-0.208 (1.79)	-0.175 (1.47)	-0.175 (1.47)
White Female	-0.835 (21.63)	-0.839 (21.77)	-0.839 (21.76)
Age	0.179 (16.58)	0.178 (16.56)	0.178 (16.57)
Age ²	-0.002 (15.29)	-0.002 (15.29)	-0.002 (15.3)
Washington	-0.260 (1.13)	-0.286 (1.25)	-0.267 (1.16)
Washington*Black		-0.108 (.09)	
Washington*Hispanic		1.256 (1.1)	
Washington*Other Race		-0.981 (3.12)	-0.982 (3.14)
Washington*White Female		4.432 (2.28)	4.301 (2.25)
Time (13 categories)	Yes	Yes	Yes
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	12577	12577	12577
R ²	.077	.079	.079
F	14.99	14.42	14.80

Source: See Table 44.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64 in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 48. Business Owner Earnings Regressions, Construction and Related Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.323 (2.4)	-0.323 (2.4)	-0.323 (2.4)
Hispanic	-0.145 (1.38)	-0.145 (1.38)	-0.145 (1.38)
Asian	-0.180 (.84)	-0.207 (.97)	-0.180 (.84)
Native American	-0.208 (.76)	-0.208 (.76)	-0.208 (.76)
White Female	-0.839 (15.73)	-0.840 (15.56)	-0.839 (15.73)
Age	0.190 (8.71)	0.190 (8.71)	0.190 (8.71)
Age ²	-0.002 (7.89)	-0.002 (7.9)	-0.002 (7.89)
Washington	0.560 (1.11)	0.479 (.94)	0.560 (1.11)
Washington*Black			
Washington*Hispanic		-0.047 (.03)	
Washington*Asian		1.840 (.79)	
Washington*Native American			
Washington*White Female		0.184 (.22)	
Time (11 categories)	Yes	Yes	Yes
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (88 categories)	Yes	Yes	Yes
N	8446	8446	8446
R ²	.064	.064	.064
F	6.97	6.73	6.97

Source: See Table 45.

Notes: (1) Universe is all persons in the private sector with positive business income between age 16 and 64 in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number is the percentage difference in annual business earnings between a given group and white men; (3) Number in parentheses is the absolute value of the associated t-statistic. Using a two-tailed test, t-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 49. Self-Employment Rates in 2000 for Selected Race and Sex Groups: All Industries; United States and the State of Washington

Race/Sex	U.S.	State of Washington
Black	5.1	5.7
Hispanic	7.3	5.9
Asian	10.1	9.3
Native American	8.4	8.0
Multiple Races	9.2	8.3
White female	8.2	10.4
White male	13.6	13.3

Source: NERA calculations from the 2000 Decennial Census Five Percent Public Use Microdata Samples.

Table 50. Self-Employment Rates in 2000 for Selected Race and Sex Groups: Construction and Related Industries; United States and the State of Washington

Race/Sex	U.S. (%)	Washington
Black	14.9	5.5
Hispanic	12.9	10.5
Asian	16.7	13.4
Native American	16.7	13.3
Multiple Races	20.4	10.3
White female	14.7	14.5
White male	25.0	21.9

Source: NERA calculations from the 2000 Decennial Census Five Percent Public Use Microdata Samples.

Table 51. Business Formation Regressions, All Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.047 (104.87)	-0.047 (104.88)	-0.047 (105.10)
Hispanic	-0.036 (85.08)	-0.036 (84.19)	-0.036 (84.18)
Asian/Pacific Islanders	-0.016 (26.13)	-0.016 (26.05)	-0.016 (26.04)
Native American	-0.033 (26.22)	-0.033 (25.48)	-0.033 (26.07)
Other Race	-0.018 (19.75)	-0.018 (19.65)	-0.018 (19.65)
White Female	-0.030 (105.61)	-0.031 (106.63)	-0.031 (106.62)
Age	0.011 (152.62)	0.011 (152.59)	0.011 (152.59)
Age ²	-0.000 (108.22)	-0.000 (108.2)	-0.000 (108.20)
Washington	0.025 (7.07)	0.014 (3.91)	0.014 (4.04)
Washington*Black		0.013 (1.83)	
Washington*Hispanic		-0.019 (5.49)	-0.019 (5.59)
Washington* Asian/Pacific Islanders		0.011 (2.86)	0.011 (2.78)
Washington* Native American		0.001 (0.12)	
Washington*Other Race		0.012 (2.09)	0.012 (2.03)
Washington*White Female		0.030 (15.12)	0.029 (15.09)
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (25 categories)	Yes	Yes	Yes
N	4406525	4406525	4406525
Pseudo R ²	0.162	0.162	0.162
Chi ²	480000	480000	480000
Log Likelihood	-1255764	-1255610	-1255612

Source: NERA calculations from the 2000 Decennial Census Five Percent Public Use Microdata Samples.

Notes: (1) Universe is all private sector prime age labor force participants between age 16 and 64; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 52. Business Formation Regressions, All Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.037 (93.66)	-0.037 (93.69)	-0.037 (93.68)
Hispanic	-0.028 (58.68)	-0.028 (58.66)	-0.028 (58.76)
Other Race	-0.016 (25.92)	-0.016 (25.97)	-0.016 (25.97)
White Female	-0.027 (100.93)	-0.027 (100.97)	-0.027 (100.97)
Age	0.011 (178.81)	0.011 (.178.81)	0.011 (.178.81)
Age ²	-0.000 (139.92)	-0.000 (139.91)	-0.000 (139.91)
Washington	0.023 (12.85)	0.016 (7.80)	0.016 (7.80)
Washington*Black		0.026 (2.70)	0.025 (2.67)
Washington*Hispanic		0.008 (1.00)	
Washington*Other Race		0.014 (2.70)	0.014 (2.66)
Washington*White Female		0.014 (6.38)	0.014 (6.31)
Time (6 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	2684590	2684590	2684590
Pseudo R ²	.245	.245	.245
Chi ²	4.4e+05	4.4e+05	4.4e+05
Log Likelihood	-671453	-671430	-671430

Source: NERA calculations from the Merged Outgoing Rotation Groups of the 1979-1991 Current Population Survey microdata samples.

Notes: (1) Universe is all private sector prime age labor force participants between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 53. Business Formation Regressions, All Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.048 (78.37)	-0.048 (78.41)	-0.048 (78.41)
Hispanic	-0.041 (61.79)	-0.041 (61.50)	-0.041 (61.50)
Asian	-0.015 (16.51)	-0.016 (16.65)	-0.016 (16.65)
Native American	-0.030 (19.24)	-0.030 (18.98)	-0.030 (19.22)
White Female	-0.026 (62.43)	-0.026 (62.66)	-0.026 (62.67)
Age	0.013 (125.43)	0.013 (125.44)	0.013 (125.44)
Age ²	-0.000 (89.59)	-0.000 (89.60)	-0.000 (89.60)
Washington	0.010 (4.07)	0.002 (0.69)	0.002 (0.65)
Washington*Black		0.031 (2.24)	0.032 (2.25)
Washington*Hispanic		-0.023 (2.69)	-0.023 (2.68)
Washington*Asian		0.020 (2.56)	0.020 (2.58)
Washington*Native American		-0.005 (0.38)	
Washington*White Female		0.020 (5.72)	0.020 (5.78)
Time (11 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	1924167	1924167	1924167
Pseudo R ²	.215	.215	.215
Chi ²	3.1e+05	3.1e+05	3.1e+05
Log Likelihood	-568248	-568222	-568222

Source: NERA calculations from the Merged Outgoing Rotation Groups of the 1992-2002 Current Population.

Notes: (1) Universe is all private sector prime age labor force participants between age 16 and 64; observations with imputed earnings are excluded where identified; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 54. Business Formation Regressions, Construction and Related Industries, 2000

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.097 (31.11)	-0.096 (30.87)	-0.096 (30.88)
Hispanic	-0.076 (32.23)	-0.076 (32.13)	-0.076 (32.24)
Asian/Pacific Islanders	-0.056 (10.58)	-0.056 (10.48)	-0.056 (10.58)
Native American	-0.076 (11.82)	-0.076 (11.55)	-0.076 (11.81)
Other Race	-0.030 (5.47)	-0.029 (5.25)	-0.030 (5.47)
White Female	-0.086 (41.45)	-0.087 (41.36)	-0.087 (41.36)
Age	0.026 (63.86)	0.026 (63.86)	0.026 (63.86)
Age ²	-0.000 (46.81)	-0.000 (46.81)	-0.000 (46.81)
Washington	-0.023 (1.13)	-0.026 (1.29)	-0.026 (1.29)
Washington*Black		-0.103 (2.25)	-0.103 (2.25)
Washington*Hispanic		0.010 (0.40)	
Washington* Asian/Pacific Islanders		0.013 (0.37)	
Washington* Native American		-0.004 (0.10)	
Washington*Other Race		-0.024 (0.74)	
Washington*White Female		0.045 (3.05)	0.045 (3.07)
Education (16 categories)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (25 categories)	Yes	Yes	Yes
N	376898	376898	376898
Pseudo R ²	.075	.075	.075
Chi ²	30026	30042	30026
Log Likelihood	-184677	-184669	-184670

Source: See Table 51.

Notes: (1) Universe is all private sector prime age labor force participants in the construction sector between age 16 and 64; observations with imputed values to the dependent variable and all independent variables are excluded; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes persons identifying themselves as belonging in more than one racial category; (5) Geography is defined based on place of residence.

Table 55. Business Formation Regressions, Construction and Related Industries, 1979-1991

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.085 (25.12)	-0.085 (25.11)	-0.085 (25.12)
Hispanic	-0.065 (16.79)	-0.065 (16.83)	-0.065 (16.79)
Other Race	-0.095 (18.24)	-0.095 (18.13)	-0.095 (18.24)
White Female	-0.099 (36.87)	-0.099 (36.55)	-0.099 (36.87)
Age	0.028 (61.25)	0.028 (61.25)	0.028 (61.25)
Age ²	-0.000 (49.49)	-0.000 (49.49)	-0.000 (49.49)
Washington	-0.014 (1.07)	-0.015 (1.20)	-0.014 (1.07)
Washington*Black		0.047 (0.71)	
Washington*Hispanic		0.082 (1.30)	
Washington*Other Race		0.026 (0.52)	
Washington*White Female		-0.001 (0.06)	
Time (6 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	209444	209444	209444
Pseudo R ²	.082	.083	.082
Chi ²	16816	16819	16816
Log Likelihood	-93584	-93583	-93584

Source: See Table 52.

Notes: (1) Universe is all private sector prime age labor force participants between age 16 and 64 in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

Table 56. Business Formation Regressions, Construction and Related Industries, 1992-2002

Independent Variables	Specification		
	(1)	(2)	(3)
Black	-0.110 (23.82)	-0.110 (23.84)	-0.110 (23.82)
Hispanic	-0.091 (21.01)	-0.091 (20.91)	-0.091 (21.01)
Asian	-0.075 (8.94)	-0.075 (8.76)	-0.075 (8.94)
Native American	-0.089 (10.1)	-0.089 (9.99)	-0.089 (10.1)
White Female	-0.048 (13.72)	-0.049 (13.84)	-0.048 (13.72)
Age	0.033 (48.78)	0.033 (48.79)	0.033 (48.78)
Age ²	-0.000 (36.89)	-0.000 (36.89)	-0.000 (36.89)
Washington	-0.012 (.69)	-0.018 (0.96)	-0.012 (.69)
Washington*Black		0.101 (1.06)	
Washington*Hispanic		-0.044 (0.75)	
Washington*Asian		-0.034 (0.54)	
Washington*Native American		-0.008 (0.10)	
Washington*White Female		0.051 (1.82)	
Time (11 categories)	Yes	Yes	Yes
Education (continuous)	Yes	Yes	Yes
Geography (51 categories)	Yes	Yes	Yes
Industry (49 categories)	Yes	Yes	Yes
N	153805	153805	153805
Pseudo R ²	.090	.090	.090
Chi ²	15294	15300	15294
Log Likelihood	-77525	-77523	-77525

Source: See Table 53.

Notes: (1) Universe is all private sector prime age labor force participants between age 16 and 64 in the construction or construction-related professional services industries; observations with imputed earnings are excluded where identified; (2) Reported number represents the percentage point probability difference in business ownership rates between a given group and white men, evaluated at the mean business ownership rate for the estimation sample; (3) Number in parentheses is the absolute value of the associated z-statistic. Using a two-tailed test, z-statistics greater than 1.67 (1.99) (2.64) are statistically significant at a 90 (95) (99) percent confidence level; (4) "Other Race" includes Hispanics, Asian/Pacific Islanders, and American Indians/Alaska Natives; (5) Geography is defined based on place of residence.

**Table 57. Actual and Potential Business Formation Rates—
Washington State Construction and Consulting Markets**

Race/Sex	Business Formation Rate (%)	Potential Business Formation Rate (%)	Disparity Ratio
	(1)	(2)	(3)
Black	5.5	25.5	0.22
Hispanic	10.5	18.1	0.58
Asian/Pacific Islander	13.4	19.0	0.71
American Indian/Alaska Native	13.3	20.9	0.64
Multiple races reported	10.3	13.3	0.77
White female	14.5	18.7	0.78
All minority and female	14.4	20.7	0.70

Notes: Figures in column (1) are average self-employment rates weighted using PUMS population-based person weights. Figures in column (2) are derived from combining the figure in column (1) with the corresponding result from Table 54. Column (3) is simply column (1) divided by column (2).

Source: 2000: Five Percent PUMS. See Table 54.

Table 58. Comparison of Baseline to Adjusted DBE Availability for WSDOT

Contracting Area	Baseline DBE Availability (%)	Adjusted DBE Availability (%)
Construction	19.59	28.31
Consulting	14.88	24.32
TOTAL – All FEDERAL-AID PROJECTS	18.77	28.12

Source: (1) WSDOT contract databases; (2) Dun & Bradstreet’s *MarketPlace*; (3) business directory information compiled by NERA; (4) NERA telephone surveys; and (5) the Five Percent 2000 PUMS.

VIII. CONCLUSION

In this study, NERA estimated the availability of minority-owned and woman-owned businesses in WSDOT's contracting markets. This involved identifying the relevant markets for federally-assisted WSDOT contracting—that is, the main industries and localities where WSDOT spends its dollars. In consultation with WSDOT, NERA identified 26 distinct four-digit SIC codes in construction and 6 in consulting that account for virtually all contract, subcontract and supplier spending on WSDOT projects. We found that from FFY 1999 and FFY 2003, 94 percent of WSDOT's spending was with businesses located in the State of Washington, compared with 93 percent in consulting, and 94 percent overall.

A further challenge was to count businesses in the relevant markets and determine the proportion that was owned by minorities and women. To count the number of businesses, we used Dun & Bradstreet's *MarketPlace* database to determine the total number operating in the relevant geographic and product markets. *MarketPlace* does not adequately identify all businesses owned by minorities and women however. NERA took a number of steps to overcome this limitation. First, we completed an intensive regional search for information on minority-owned and woman-owned businesses in and surrounding the Washington area. Second, we conducted a survey to check whether the ownership status of these businesses was correct—some firms classified as DBEs were in fact not minority-owned and vice versa. We found that of the firms that were listed as DBEs, more than one-in-five, on average, were wrongly classified and were actually owned by White males. Similarly, a large number of businesses in the *MarketPlace* database did not have the race or gender of their owners identified. Most, but not all, of these firms are likely to be White male owned. To test and quantify this, we conducted a second survey and found that on average 11.4 percent of these initially unclassified businesses were actually owned by women and/or minorities.

Once the relevant product markets were established and we had an accurate estimate of the ownership status of the businesses in the database, we estimated final baseline DBE availability. Our final baseline estimates are 19.59 percent in construction, 14.88 percent in consulting, and 18.77 percent overall. Finally, Step 2 adjustments were estimated using data from the 2000 Five Percent PUMS to take account of the fact that the

baseline numbers are lower than what would be expected in a race and sex neutral marketplace. Step 2 adjusted availability estimates are 28.31 percent for construction, 24.32 percent for consulting, and 28.12 percent overall.

IX. REFERENCES

- [1] Z. Acs and D. Evans, "The determinants of variations in self-employment rates across countries and over time," working paper (1994).
- [2] A. Alba-Ramirez, "Self-employment in the midst of unemployment; the case of Spain and the United States," *Applied Economics* 26 (1994): 189-204.
- [3] A. B. Arai, "The road not taken: The transition from unemployment to self-employment in Canada, 1961-1994," *Canadian Journal of Sociology* 22 (Summer 1997): 365-382.
- [4] R. L. Aronson, *Self-employment*. ILR Press, Ithaca, NY: ILR Press, 1991.
- [5] T. Bates, "The changing nature of minority business: A comparative analysis of Asian, Non-minority, and Black-Owned businesses," *The Review of Black Political Economy* (1989): 25-42.
- [6] I. Bernhardt, "Comparative advantage in self-employment and paid work," *Canadian Journal of Economics* (May 1994): 273-289.
- [7] J. Black, D. De Meza, and D. Jeffreys, "House prices, the supply of collateral, and the enterprise economy," *Economic Journal* 106 (January 1996): 60-75.
- [8] D. G. Blanchflower, "Self-Employment in OECD countries," *Labour Economics* 7 (September 2000): 471-505.
- [9] D. G. Blanchflower, "Self-employment: More may not be better," working paper, National Bureau of Economic Research w10286, February 2004.
- [10] D. G. Blanchflower and B. Meyer, "A longitudinal analysis of the young self-employed in Australia and the United States," *Small Business Economics* 6 (1994): 1-20.
- [11] D. G. Blanchflower and A. J. Oswald, "Self-employment and the enterprise culture," *British Social Attitudes: the 1990 Report*. Edited by R. Jowell, and S. Witherspoon. Aldershot: Gower Press, 1990.
- [12] D. G. Blanchflower and A. J. Oswald, "What makes an entrepreneur?" *Journal of Labor Economics* 16 no. 1 (January 1998): 26-60.
- [13] D. G. Blanchflower and A. J. Oswald, *The Wage Curve*. Cambridge: MIT Press, 1994.
- [14] D. G. Blanchflower, A. J. Oswald, and A. Stutzer, "Latent entrepreneurship across nations," *European Economic Review* 45 no.4-6 (May 2001): 680-691.
- [15] D. Blau, "A time-series analysis of self-employment in the United States," *Journal of Political Economy* 95 (1987): 445-467.

- [16] D. Bogenhold and U. Staber, "The decline and rise of self-employment," *Employment and Society* 5 (1991): 223-239.
- [17] G. J. Borjas and S. Bronars, "Consumer discrimination and self-employment," *Journal of Political Economy* 97 (1989): 581-605.
- [18] N. Brossard, R. Chami, and G. Hess, "(Why) do self-employed parents have more children?" working paper (September 2003).
- [19] S. Coate and S. Tennyson, "Labor market discrimination, imperfect information and self-employment," *Oxford Economic Papers* 44 (1992): 272-288.
- [20] M. Cowling and P. Mitchell, "The evolution of UK self-employment: A study of government policy and the role of the macroeconomy," *Manchester School of Economic and Social Studies* 65 no.4 (September 1997): 427-442.
- [21] G. DeWit and F. A. Van Winden, "An empirical analysis of self-employment in the Netherlands," *Economics Letters* 32 (1990): 97-100.
- [22] D. Evans and B. Jovanovic, "An estimated model of entrepreneurial choice under liquidity constraints," *Journal of Political Economy* 97 (1989): 808-827.
- [23] D. Evans and L. Leighton, "Some empirical aspects of entrepreneurship," *American Economic Review* 79 (1989): 519-535.
- [24] R. W. Fairlie, "The absence of the Black owned business: An analysis of the dynamics of self-employment," *Journal of Labor Economics* 17 no.1 (1999): 80-108.
- [25] R. W. Fairlie and B. D. Meyer, "Ethnic and racial self-employment differences and possible explanations," *Journal of Human Resources* 31 no. 4 (1996): 757-793.
- [26] R. W. Fairlie and B. D. Meyer, "Does immigration hurt Black self-employment?" Help or Hindrance? The Economic Implications of Immigration for Blacks. Edited by D. S. Hamermesh and F. D. Bean. New York: Russell Sage Foundation, 1998
- [27] R. W. Fairlie and B. D. Meyer, "Trends in self-employment among white and black men during the twentieth century," *Journal of Human Resources* XXXV no.4 (2000): 643-669.
- [28] R. W. Fairlie and B. D. Meyer, "The effect of immigration on native self-employment," forthcoming in *Journal of Labor Economics* (2003).
- [29] A. Foti and M. Vivarelli, "An econometric test of the self-employment model - the case of Italy," *Small Business Economics* 6 no.2 (April 1994): 81-93.
- [30] Victor Fuchs, "Self-employment and labor force participation of older males," *Journal of Human Resources* 17 (Fall 1982): 339-357.

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- [31] T. J. Holmes and J. A. Schmitz, "A theory of entrepreneurship and its application to the study of business transfers," *Journal of Political Economy* 89 (1990): 265-294.
- [32] D. Holtz-Eakin, D. Joulfaian, and H. S. Rosen, "Entrepreneurial decisions and liquidity constraints," *Journal of Political Economy* 102 (1994): 53-75.
- [33] D. Holtz-Eakin, D. Joulfaian, and H. S. Rosen, "Sticking it out: entrepreneurial survival and liquidity constraints," *Rand Journal of Economics* 25 no.2 (Summer 1994): 334-347.
- [34] M. Hout and H. Rosen, "Self-Employment, family background, and race," *Journal of Human Resources* 35 no.4 (Fall 2000): 670-92.
- [35] S. M. Ravi Kanbur, "Entrepreneurial risk taking, inequality, and public policy: an application of inequality decomposition analysis to the general equilibrium effects of progressive taxation," *Journal of Political Economy* 90 (1982): 1-21.
- [36] M. Kidd, "Immigrant wage differentials and the role of self-employment in Australia," *Australian Economic Papers* 32 no.60 (June 1993): 92-115.
- [37] R. E. Kihlstrom and J. J. Laffont, "A general equilibrium entrepreneurial theory of firm formation based on risk aversion," *Journal of Political Economy* 87 (1979): 719-848.
- [38] P. J. Kuhn and H. J. Schuetze, "The dynamics of self-employment in Canada," working paper, McMaster University, 1998.
- [39] A. Laferrere and P. McEntee, "Self-employment and intergenerational transfers of physical and human capital: An empirical analysis of French data," *Economic and Social Review* 27 no.1 (October 1995): 43-54.
- [40] B. F. Lentz and D. N. Laband, "Entrepreneurial success and occupational inheritance among proprietors," *Canadian Journal of Economics* 23 (1990): 563-579.
- [41] T. Lindh and H. Ohlsson, "Self-employment and windfall gains: evidence from the Swedish lottery," *Economic Journal* 106 no.439 (November 1996):1515-1526.
- [42] J. E. Long, "The income tax and self-employment," *National Tax Journal* 35 (March 1982) 31-42.
- [43] N. Meager, "Does unemployment lead to self-employment?" *Small Business Economics* 4 (1992): 87-103.
- [44] NERA Economic Consulting, "Minority Business Enterprise/Women Business Enterprise Availability Study," (2001).
- [45] NERA Economic Consulting and Anchondo Research Management & Strategies, "Summary of MWBE Coverage Analysis," (2003).

- [46] A. R. Pickles and P. N. O'Farrell, "An analysis of entrepreneurial behavior from male work histories," *Regional Studies* 21 (1987): 425-444.
- [47] J. F. Quinn, "Labor force participation patterns of older self-employed workers," *Social Security Bulletin* 43 (1980): 17-28.
- [48] E. Reardon, "Are the self-employed misfits or superstars?" working paper, Rand Corporation (1998).
- [49] H. Rees and A. Shah, "An empirical analysis of self-employment in the UK," *Journal of Applied Econometrics* 1 (1986): 95-108.
- [50] M. T. Robson, "The rise in self-employment amongst UK males," *Small Business Economics* 10 no.3 (1998): 199-212
- [51] M. T. Robson, "Self-employment in the UK regions," *Applied Economics* 30 no.3 (1998): pp. 313-322.
- [52] H. J. Schuetze, "Taxes, economic conditions and recent trends in male self-employment; a Canada-U.S. comparison," working paper, McMaster University, Hamilton, Ontario, Canada, 1998.
- [53] M. P. Taylor, "Earnings, independence or unemployment; why become self-employed?" *Oxford Bulletin of Economics and Statistics* 58 no.2 (1996): 253-265.
- [54] J. S. Wainwright, "Racial discrimination and minority business enterprise: evidence from the 1990 Census," *Studies in Entrepreneurship Series*. Edited by S. Bruchey. New York: Garland Publishing, 2000.