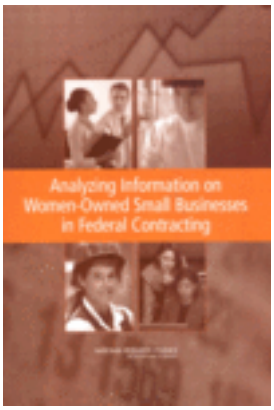

Analyzing Information on Women-Owned Small Businesses in Federal Contracting

Steering Committee for the Workshop on Women-Owned Small Businesses in Federal Contracting, National Research Council

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Analyzing Information on Women-Owned Small Businesses in Federal Contracting

Steering Committee for the Workshop on
Women-Owned Small Businesses in Federal Contracting

Committee on National Statistics

Division of Behavioral and Social Sciences and Education

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PATRICIA A. ROOS, Department of Sociology, Rutgers University-New Brunswick
J.H. (RIP) VERKERKE, School of Law, University of Virginia
JOHN E. ROLPH, Marshall School of Business, University of Southern California (*ex officio*)

CONSTANCE F. CITRO, *Study Director*
ANDREW A. WHITE, *Study Director* (through May 2004)
MICHAEL SIRI, *Senior Program Assistant*

COMMITTEE ON NATIONAL STATISTICS
2004-2005

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On behalf of the Steering Committee for the Workshop on Women-Owned Small Businesses in Federal Contracting, I would like to thank all of the individuals involved in the workshop and the production of the committee's report. I thank Eric Benderson, associate general counsel for litigation, at the U.S. Small Business Administration (SBA), for his support and assistance to the committee at the workshop and throughout the project. I also thank John Klein, associate general counsel for procurement law at SBA, who enlightened us on small business contract law and practice; Sharon Drego, Peg Mehan, and Linda Oliver, who provided insights into the contracting process at the U.S. Department of Defense; R. Preston McAfee of the California Institute of Technology, who made an informative presentation on bid-credits as a mechanism for promoting small business work with the federal government; and Robert Goldstein of the UCLA Law School, who made an informative presentation on relevant case law.

I am grateful for the excellent work of the staff of the Committee on National Statistics (CNSTAT) and the Division of Behavioral and Social Sciences and Education (DBASSE) for developing and organizing the workshop and assisting in the preparation of the report. Andrew White, who served as study director for the project through May 2004, was chiefly responsible for organizing the workshop and for preparing the initial report draft. Constance Citro, CNSTAT director, ably shepherded the report through the final drafting and revision process. Michael Siri handled all administrative matters regarding the workshop, and Christine McShane of the DBASSE reports office edited the report.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the Report Review Committee of the National Research Council. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We thank the following individuals for their review of this report: Richard Berk, Department of Statistics, University of California, Los Angeles; Farrell Bloch, Economic Consultant, Washington, DC; Barbara D. Boyan, Department of Biomedical Engineering at Georgia Institute of Technology and Emory University; Paula England, Department of Sociology, Stanford University; Joel Horowitz, Department of Economics, Northwestern University; and Barbara Valentino, President, Evolving Communications, Washington, DC.

Although the reviewers listed above provided many constructive comments and suggestions, they were not asked to endorse the recommendations or conclusions nor did they see the final draft of the report before its release. The review of this report was overseen by Burt Barnow, Institute for Policy Studies, Johns Hopkins University, and Douglas Massey, Woodrow Wilson School of Public and International Affairs, Princeton University. Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Arleen Leibowitz, *Chair*
Steering Committee for the Workshop
on Women-Owned Small Businesses
in Federal Contracting

Contents

Executive Summary

Fostering the development of small businesses has been a concern of the federal government since World War II. The charter of the U.S. Small Business Administration (SBA), established in 1953, provides that it will ensure small businesses a "fair proportion" of federal government contracts and sales. Repeatedly, legislation has charged the SBA to oversee efforts by federal contracting agencies to award specified percentages of federal contracting dollars to small businesses, including those owned by women. The Small Business Reauthorization Act of 2000 provided for set-aside contracting programs for eligible women-owned small businesses in industries in which they were underrepresented or substantially underrepresented as determined by the SBA.

In 2002 the SBA Office of Federal Contract Assistance for Women Business Owners (CAWBO) prepared a draft study containing a preliminary set of estimates of representation of women-owned small businesses in federal prime contracts over $25,000 by industry. Because of the history of legal challenges to race- and gender-conscious contracting programs at the federal and local levels, the SBA asked the Committee on National Statistics of the National Academies to conduct an independent review of relevant data and estimation methods prior to finalizing the CAWBO study.

The charge to the Steering Committee on Women-Owned Small Businesses in Federal Contracting was to hold a workshop to discuss such topics as the accuracy of data and methods to estimate the use of women-owned small businesses in federal contracting; the definition of "underrepresentation" and "substantial underrepresentation" for purposes of designating industries for which preferential contracting programs might be warranted;

and appropriate statistical methods and data needed to help understand gender disparities in federal contracting. The workshop was held April 30-May 1, 2004; this report is based primarily on the workshop materials and discussion.

CONCLUSION

From our review of the data and methods used, we conclude that the disparity ratio estimates from the CAWBO preliminary study are not adequate to identify industries in which women-owned small businesses are underrepresented (or substantially underrepresented) in federal prime contracting. For that reason, the estimates should not be used to designate industries in which to permit the use of preferential contracting programs.

The CAWBO preliminary disparity ratio estimates were developed for industry categories (defined by 2-digit Standard Industrial Classification or SIC codes) by dividing the *utilization* share for each industry by the *availability* share. Utilization was defined as the share accruing to women-owned small businesses of the total dollar amount of contract actions for federal prime contracts over $25,000 in fiscal year 1999 for the particular industry. Availability was defined as the share of women-owned businesses with paid employees among all businesses with paid employees in the particular industry from the 1997 Survey of Women-Owned Business Enterprises.

We find the CAWBO study to be problematic in several respects, including that the documentation of data sources and estimation methods is inadequate for evaluation purposes. The CAWBO study does not provide sufficient justification for the definition and data used to measure the availability of women-owned small businesses. In particular, it does not adequately justify the decision to include in the availability measures all women-owned businesses with paid employees as "ready, willing, and able" to perform federal contracting, even though "ready, willing, and able" is the judicial standard that has been invoked in lawsuits against preferential contracting programs. In addition, the CAWBO study uses an inconsistent definition for the disparity ratio (comparing dollars of contract awards with numbers of businesses), different years for estimating utilization and availability in a period of rapid growth of women-owned small businesses, and 2-digit industry SIC categories instead of the more realistically delineated 3-digit or 4-digit categories in the newly devised North American Industry Classification System (NAICS). Finally, the CAWBO estimates, which pertain to the period 1997-1999, are now out of date.

RECOMMENDATION 1— REVISE THE CAWBO PRELIMINARY ESTIMATES

The committee recommends that, instead of using the CAWBO preliminary estimates of representation of women-owned small businesses in federal contracting by industry, the Small Business Administration should estimate disparity ratios with more recent data and revised, fully documented methods.

This recommendation addresses eight specific issues, as follows.

1-1 Data for Measuring Utilization

We agree with CAWBO's decision to use data from the Federal Procurement Data System (FPDS) on prime contract actions over $25,000 to measure utilization shares for women-owned small businesses in federal contracting. The available information on smaller government contracts is not contract-specific and cannot be readily analyzed. Moreover, while smaller contracts are a large share of total contract actions in a fiscal year, their dollar value is a small share of the total dollars awarded.

CAWBO should use FPDS data for a reference period that corresponds to the reference period for the data used to measure availability shares. For example, 2002 FPDS data would be appropriate to use with data from the 2002 Survey of Business Owners (SBO).

CAWBO should assess the accuracy and completeness of the FPDS data to the extent feasible. In addition, CAWBO should examine the distribution of contract awards by size and assess the likely effects on utilization estimates of extreme values.

1-2 Data for Measuring Availability

Selecting a data source and universe definition for measuring the availability of women-owned small businesses for federal contracting is challenging. Given limitations of existing data and resource constraints on data collection and modification, there is no single data source, or combination of data sources, that is wholly satisfactory for measuring availability with a specific universe definition. Moreover, given different views about an appropriate universe, there is no single availability measure that is likely to satisfy all stakeholders.

In order to construct disparity ratio estimates for more narrowly as well as more broadly defined universes of businesses, we recommend that CAWBO make use of two sources for measuring availability: the Central Contractor Registration (CCR) for 2004 and the 2002 Survey of Business

Owners. CAWBO should evaluate both sources on data quality to the extent feasible, refine each source as appropriate for comparison with a utilization measure that is based on contract awards over $25,000, and examine the distribution of eligible contractors and businesses by size and the likely effects on availability estimates of extreme values.

The CCR, as of October 1, 2003, is supposed to contain government-wide information about all current vendors and prospective bidders on federal prime contracts and grants. Use of the CCR data would provide availability measures for a limited universe of firms—those that have actually won federal prime contracts or are interested in bidding on them. Results from the 2002 Survey of Business Owners will be available in 2005. Use of the 2002 SBO data would provide availability measures for a broader universe of firms than those that are registered with the CCR. For both the CCR and the SBO, careful evaluation should be conducted of the quality of the data and to determine whether to include all or a subset of firms in the universe for measuring availability. Because the universe for measuring utilization is prime contracts over $25,000, it is possible that the universe for measuring availability should exclude some very small firms or those with other characteristics that limit their ability to compete for contracts of this size.

1-3 Types of Disparity Ratios

The preliminary CAWBO study calculated utilization shares in monetary terms (share of total prime contract dollars awarded), but it calculated availability shares in numeric terms (share of total firms with paid employees). This inconsistent approach has been used in many disparity studies, but it inappropriately mixes apples and oranges and should not be used.

We recommend that CAWBO calculate consistent disparity ratios of two main types. First, CAWBO should calculate monetary ratios as the women-owned small business share of federal prime contract dollars for contracts over $25,000, divided by their share of total business receipts. CAWBO should also calculate numeric ratios as the women-owned small business share of the number of federal prime contract awards over $25,000, divided by their share of businesses. Separate ratios should be calculated for contract awards classified by size (e.g., $25,000 to $100,000, over $100,000).

Monetary ratios are critical to compute because the legislatively mandated goals for small business contracting are specified as percentages of contract dollars awarded, not percentages of contracts awarded. Moreover, dollar value is critical to business success, not awards per se. While not as useful as monetary ratios, numeric ratios are simple to understand and may

be helpful when thinking about possible discrimination in the process for awarding contracts because they compare numbers of decisions. We think it is important to calculate both monetary and numeric disparity ratios separately by size of contract award.

1-4 Industry Classification

The CAWBO preliminary study used 2-digit SIC categories for estimating industry-specific disparity ratios. The SIC system focused on manufacturing and had not changed in basic structure and concept for over 60 years. The NAICS represents a significant reorganization, redefinition, and differentiation of the SIC categories that provides a more coherent and detailed classification system for business activity. For example, the NAICS treats accommodation and food services as a separate sector, not included with retail trade as in the SIC. ***We recommend that CAWBO use NAICS codes for all of its estimates. The level of industry detail should be as disaggregated as the data will support. Thus, estimates could be developed for 3-digit NAICS subsectors and for 4-digit NAICS industry groups within subsectors to the extent that further disaggregation is substantively meaningful, statistically reliable, and feasible.***

1-5 Disparity Ratio Thresholds

The designation of specific values of disparity ratios to serve as thresholds for underrepresentation and substantial underrepresentation is ultimately arbitrary. Science cannot establish specific threshold values, which must be a matter of reasoned judgment. ***We conclude that CAWBO's decision to define the two thresholds as less than or equal to 0.80 for underrepresentation and less than or equal to 0.50 for substantial underrepresentation is a reasonable way to present its results.*** The threshold of 0.80 for underrepresentation, whereby the utilization share for women-owned small businesses in an industry is less than or equal to 80 percent of the corresponding availability share, follows past practice in the field. It also allows for errors in data and estimation that, with a higher threshold, might lead to an erroneous conclusion of disparity when there was in fact no disparity. The threshold of 0.50 for substantial underrepresentation appears sufficiently below 0.80 and sufficiently higher than zero to distinguish substantial from less substantial underrepresentation.

1-6 Clear Cases of Underrepresentation

Because almost any data source and measure of disparity will be subject to errors and because stakeholder views of appropriate disparity measures

may differ according to their views on the usefulness and appropriateness of preferential contracting programs, it is unlikely that a single disparity measure will go unchallenged. ***We recommend that CAWBO identify industry groups for which more than one disparity measure finds underrepresentation using a disparity ratio of 0.80 or less. The disparity measures should employ as recent data as possible.***

Four types of measures that could satisfy these criteria are (1) monetary and (2) numeric disparity ratios calculated using fiscal year 2002 FPDS contracting data for utilization shares and 2002 SBO data for availability shares; and (3) monetary and (4) numeric ratios calculated using fiscal year 2004 FPDS contracting data for utilization and 2004 CCR data for availability.

The SBA could defensibly designate for a new preferential contracting program for women-owned small businesses those industry groups that exhibit underrepresentation on all or most of this group of measures. In determining how to designate an industry group that exhibits underrepresentation on some but not all measures, greater weight should be given to monetary measures over numeric measures. Also, greater weight should be given to disparity ratios that are specific to the smaller size awards for which small firms could reasonably compete.

1-7 Cases for Further Analysis

With multiple measures, there will be industries that neither clearly underrepresent nor clearly overrepresent women-owned small businesses in federal contracting. ***We recommend that CAWBO single out industries for which a clear determination of representation is not easily made for further analysis and possible designation at a later date.***

1-8 Documentation and Evaluation

Clear, complete documentation and evaluation of data sources, methods, and the strengths and weaknesses of alternative measures are essential for credible analysis and to permit assessment and replication. Adequate documentation and evaluation are particularly important for analyses, such as the CAWBO study, that are intended to inform federal policies and practices that have economic consequences. ***The revised SBA study of women-owned small businesses in federal contracting should conform to scientific standards of evaluation, documentation, and reproducibility. All definitions should be clearly specified, the attributes and strengths and weaknesses of alternative data sources and alternative disparity measures should be clearly described, and the results of internal and external evaluations should be presented.***

RECOMMENDATION 2— PRODUCE MORE USEFUL REPORTS ON FEDERAL CONTRACTING

We recommend that the SBA work with the General Services Administration, other relevant agencies, and interested stakeholders to design and implement informative, regularly produced tables and analyses from the Federal Procurement Data System and the Central Contractor Registration on trends in federal contracting. Tables should be designed to provide readily interpretable information for use by policy makers, researchers, and stakeholders.

RECOMMENDATION 3— COLLECT DATA ON SUBCONTRACTING

Although a priority for the SBA is to revise the CAWBO study of women-owned small businesses in federal prime contracting as recommended above, ***an important longer term agenda is for the SBA to work with appropriate agencies to develop data to assess the use of women-owned and other types of small businesses in subcontracting on federal prime contracts.*** Subcontracting is an important arena for small businesses to gain experience and a track record that could enhance their capabilities to handle larger prime contracts, or to develop a substantial subcontracting business. Both surveys and administrative records systems could be useful vehicles for providing data on subcontracting.

RECOMMENDATION 4— DEVELOP A RESEARCH AGENDA ON WOMEN-OWNED SMALL BUSINESS CONTRACTING

The steering committee found that almost all of the work to date on use of women-owned and other types of small businesses in federal contracting has been in response to court decisions or legislation about preferential contracting programs. Until recently, complete, detailed information on women-owned businesses and their contracting experience has not been available for analysis on a regular basis. Now that more useful information is available from such sources as the CCR, ***we recommend that the SBA proactively develop a research agenda for analyzing the role of women-owned and other types of small businesses in federal contracting. Research on subcontracting should be included as soon as feasible.***

The research agenda should identify issues of concern to policy makers, contracting agencies, small businesses, and other stakeholders and identify priorities for data collection and analysis. Academic researchers in the field

should be involved in the design of the program. The program should include studies not only of disparities, but also of the many variables that may explain observed disparities, including the possible role of discrimination in various stages of the contracting process and, to the extent feasible, in the processes of small business formation and development.

Findings from carefully specified case studies and statistical analyses could help refine a regular series of disparity ratio estimates and contribute to analyses of discrimination and other factors as possible explanations for observed disparities. Such findings could also help the SBA refine its assistance and mentoring programs for small businesses and help contracting agencies improve their support for small businesses that seek to enter and be successful in the federal contracting market.

1

Introduction

Recognition of the disadvantages that small businesses may face in competing for U.S. government contracts dates back over 50 years. The Small Business Act of 1953 established the Small Business Administration (SBA) as an independent agency in the executive branch, and subsequent legislation extended the SBA's counsel and assistance to specific types of small businesses, including firms owned by minorities and other socially and economically disadvantaged individuals and firms owned by women. The Small Business Reauthorization Act of 2000 (P.L. 106-554) added Section 811(m) to Title 15 of the U.S. Code. It contained language to allow contracting officers the discretion to provide preferential contracting opportunities for eligible women-owned small businesses in industries in which they are underrepresented. As a starting point, Section 811(m) required the SBA to determine industries in which women-owned small businesses are "underrepresented" and "substantially underrepresented" in federal contracting and directed the head of any department or agency to provide information that the SBA administrator deemed necessary to conduct the study.

COMMITTEE CHARGE

In response to the mandate of Section 811(m), the SBA Office of Federal Contract Assistance for Women Business Owners (CAWBO) prepared a preliminary draft study of representation of women-owned small businesses in federal contracting. Completed in late 2002, the study analyzed fiscal year 1999 federal contracting data for prime contract actions of

$25,000 or more in major industry groups, defined by 2-digit Standard Industrial Classification codes. Prior to finalizing the CAWBO study, the SBA decided to obtain independent expert review of the relevant contracting data and estimation methods. The Committee on National Statistics of the National Academies was asked to conduct the review.

The committee established the Steering Committee on Women-Owned Small Businesses to plan a workshop to review existing data and methods for the SBA to use to analyze information on the use of women-owned small businesses in federal contracting. The steering committee members were selected for their expertise in statistical methods and research on disparities and discrimination. The committee did not include representatives of women-owned businesses in order to avoid the appearance of bias or conflict of interest.

Discussion topics for the workshop were to include the accuracy, soundness, and reliability of data and analytical methods to ascertain the use of women-owned small businesses in federal contracting; the definition of "underrepresentation" and "substantial underrepresentation" in the SBA draft report; appropriate regression methods (and other methods if necessary) to investigate correlates of gender disparities; the potential usefulness of additional variables in the analysis (e.g., firm size); the appropriate study sample size for further or extended studies; the appropriate amount of historical data for analysis; and methods and analyses that could help the SBA explain any identified industry-specific disparities and be of use in determining any remedial action.

At the workshop, held on April 30-May 1, 2004, the steering committee heard from staff of the SBA and the U.S. Department of Defense about small business contracting and discussed definitional issues, estimation methodology, and available data (see Appendix A). The committee also reviewed findings of a recent report of a panel of the Committee on National Statistics on measuring racial discrimination (National Research Council, 2004). Because of limited resources, this report is based primarily on the workshop materials and discussions.

OUTLINE OF THE REPORT

This report contains six chapters and two appendixes. Chapter 2 discusses the legal framework within which a new women-owned small business contracting set-aside program would operate. Chapter 3 describes the federal contracting process with regard to small businesses. This process needs to be understood in order to develop meaningful models for the many potential causes of gender-based statistical disparities. Contracting at the Department of Defense is used as a case study, because that department has been responsible in recent years for approximately 50 percent of total

federal government prime contract awards and 65 percent of total federal contracting expenditures in any given year.

Chapter 4 defines concepts of disparity and representation, responding to congressional interest in measures of representation. The chapter considers a range of issues in constructing disparity measures, including the strengths and weaknesses of available data for estimation, and it critiques the SBA preliminary study and other studies. Chapter 5 considers the difficult challenges of inferring the reasons for observed disparities, including the possible role of discriminatory practices or behaviors. Chapter 6 presents the committee's major conclusion regarding the SBA preliminary study and recommendations for revised disparity ratio estimates, more useful reports on federal contracting, collection of data on subcontracting, and development of a research agenda for women-owned small businesses in federal contracting.

Following a section of references, two appendixes provide additional background information. Appendix A includes the workshop agenda and participants, and Appendix B provides biographical sketches of committee members and staff.

2

Legal Framework

The Small Business Reauthorization Act of 2000, Public Law 106-554, Section 811(m), paragraph (2), permits federal contracting officers to restrict competition for certain types of federal contracts to women-owned small businesses. Paragraph (4) requires the Small Business Administration (SBA) to "conduct a study to identify industries in which small business concerns owned and controlled by women are underrepre-sented with respect to Federal procurement contracting." Paragraph (3) contains language that expands the scope of the SBA study to determine industries in which women-owned small businesses are "substantially underrepresented." Box 2-1 presents relevant excerpts from the legislation.

To provide a context for the SBA study and its evaluation, this chapter briefly reviews the legislative and judicial history of small business preferential treatment in contracting (see www.sba.gov/aboutsba/history.html [December 2004]; Enchautegui et al., 1997). Contracting policy toward women-owned small businesses can be seen as developing from policy toward minority-owned small businesses. Box 2-2 defines various kinds of small businesses, including women-owned firms.

LEGISLATION AND EXECUTIVE ORDERS

The SBA was officially established in 1953, but its mission began to take shape years earlier in a number of predecessor agencies, largely as a response to the pressures of economic depression and war. These agencies included the Reconstruction Finance Corporation (RFC), created by Presi-

dent Hoover in 1932 to lend funds to all businesses hurt by the Great Depression, large and small; the Smaller War Plants Corporation, authorized by the Small Business Mobilization Act of 1942, which made loans to and advocated for small enterprises; the Office of Small Business in the U.S. Department of Commerce, which provided individual entrepreneurs with education and training; and the Small Defense Plants Administration, established during the Korean War, which certified small businesses to the RFC that it determined to be competent to perform the work of government contracts.

In the Small Business Act of July 30, 1953, Congress created the Small Business Administration, whose function was to "aid, counsel, assist and protect, insofar as is possible, the interests of small business concerns." Its charter also stipulated that it would ensure small businesses a "fair proportion" of government contracts and sales. By 1954, the SBA was making direct business loans and guaranteeing bank loans to small businesses, working to obtain government procurement contracts for small businesses, and helping business owners with management and technical assistance and business training. The Investment Company Act of 1958, among other things, authorized the SBA to license, regulate, and help provide funds for privately owned and operated venture capital investment firms, which provided long-term debt and equity investments to high-risk small businesses. The creation of this program resulted from a Federal Reserve Board study that determined, in the simplest terms, that small businesses could not get the credit they needed to keep pace with technological advancement.[1]

1961 to 1980

The 1960s saw the beginning of small business contracting assistance programs that focused specifically on socially and economically disadvantaged small businesses (principally minority-owned businesses), subsequently bringing in women-owned small businesses. In 1964, the SBA adopted the Equal Opportunity Loan Program. The program relaxed the credit and collateral requirements for business loan applicants living below the poverty level in an effort to encourage new businesses that had been unable to attract financial backing but were nevertheless deemed to be sound commercial initiatives.

Following the 1967 Report of the Commission on Civil Disorders (the Kerner Commission), which found that minorities did not own many busi-

[1]Every 5 years since 1987, the Federal Reserve Board has conducted a Survey of Small Business Finances, which provides information on credit availability for businesses with fewer than 500 employees (see Federal Reserve Board, 2002).

BOX 2-1
Small Business Reauthorization Act of 2000,
Section 811(m), Excerpts

A. Section 8 of the Small Business Act (15 U.S.C. 637) is amended by adding at the end the following: 811(m) PROCUREMENT PROGRAM FOR WOMEN-OWNED SMALL BUSINESS CONCERNS—
(1) DEFINITIONS—In this subsection, the following definitions apply:
(A) CONTRACTING OFFICER . . . .
(B) SMALL BUSINESS CONCERN OWNED AND CONTROLLED BY WOMEN—The term "small business concern owned and controlled by women" has the meaning given such term in section 3(n), except that ownership shall be determined without regard to any community property law. [see Box 2-2]
(2) AUTHORITY TO RESTRICT COMPETITION—In accordance with this subsection, a contracting officer may restrict competition for any contract for the procurement of goods or services by the Federal Government to small business concerns owned and controlled by women, if—
(A) each of the concerns is not less than 51 percent owned by 1 or more women who are *economically disadvantaged* . . . [italics added];
(B) the contracting officer has a reasonable expectation that 2 or more small business concerns owned and controlled by women will submit offers for the contract;
(C) the contract is for the procurement of goods or services with respect to an industry identified by the Administrator pursuant to paragraph (3);
(D) the anticipated award price of the contract (including options) does not exceed—
(i) $5,000,000, in the case of a contract assigned to an industrial classification code for manufacturing; or
(ii) $3,000,000, in the case of all other contracts;

nesses, the SBA adopted regulations to require federal contracts to be set aside for firms owned by "socially and economically disadvantaged " persons. All blacks, Hispanics, Asians, and Native Americans were determined to qualify as socially disadvantaged.

A 1978 amendment to the Small Business Act (P.L. 95-507) provided a statutory basis for the SBA program in Section 8(a), which allowed contracts of any size to be awarded on a sole-source basis to eligible firms. The amendment also required all federal agencies to establish goals for awarding contracts to small minority-owned businesses and to explain to Congress when the goals were not met. It reserved all awards under $25,000 for small businesses (unless no qualified small businesses were available to bid) and required agencies to establish goals for larger businesses to subcontract to small businesses. To carry out these provisions, the amendment estab-

(E) in the estimation of the contracting officer, the contract award can be made at a fair and reasonable price; and

(F) each of the concerns:

(i) is certified by a Federal agency, a State government, or a national certifying entity approved by the Administrator, as a small business concern owned and controlled by women; or

(i) certifies to the contracting officer that it is a small business concern owned and controlled by women and provides adequate documentation, in accordance with standards established by the Administration, to support such certification.

(3) WAIVER—With respect to a small business concern owned and controlled by women, the Administrator may waive subparagraph (2)(A) if the Administrator determines that the concern is in an industry in which small business concerns owned and controlled by women are *substantially underrepresented* [italics added].

(4) IDENTIFICATION OF INDUSTRIES—The Administrator shall conduct a study to identify industries in which small business concerns owned and controlled by women are *underrepresented* with respect to Federal procurement contracting. [italics added]

(5) ENFORCEMENT; PENALTIES— . . . .

(6) PROVISION OF DATA—Upon the request of the Administrator, the head of any Federal department or agency shall promptly provide to the Administrator such information as the Administrator determines to be necessary to carry out this subsection.

NOTE: The reference to paragraph (3) in subsection A(2)(C) is incorrect, as paragraph (3) refers to the waiver provision and not to the identification of industries, which is in paragraph (4).

SOURCE: Questions and Answers Regarding WOSB Certification, Question 4, www.sba.gov/GC/cawbo-teaming.htm [December 2004].

lished a Small and Disadvantaged Business Utilization Office at each federal agency that engaged in contracting.

The 1978 amendment required both social and economic disadvantage for participation in the Section 8(a) program. Certain groups (racial minorities) that were given preference were presumed to be socially disadvantaged. At the time, Congress could not decide how to treat white women, and this indecision led to some litigation over allowing white women into the program. White women challenged the program on grounds that it was too difficult to become qualified on an individual test basis. In 1979, President Carter issued Executive Order 12138, which charged all agencies to assist women-owned businesses in federal contracting. At that time, it was estimated that women-owned small businesses received only 0.2 percent of all federal procurements (U.S. General Accounting Office, 2001:8).

BOX 2-2
Generic Definitions for Small Businesses,
13 *Code of Federal Regulations*, Part 124

A *small business* is organized for profit; has a place of business in the United States; pays taxes or uses American products, materials, or labor; and does not exceed the numerical size standard for the industry. It may be a sole proprietorship, partnership, corporation, or any other legal form.

> There is a small business *size standard*, usually stated as the maximum qualifying number of employees or average annual receipts, for every private sector industry defined in the North American Industry Classification System (NAICS). There are general size standards for industry groups: for example, 500 employees for a manufacturing business; 100 employees for a wholesale trade business; $28.5 million average annual receipts for a general or heavy construction business (except dredging); and $3 million average annual receipts (including commissions and other income) for a travel agency. Some industries have higher size standards than the general one for the industry group. See www.sba.gov/tableofsizestandards for details [December 2004].

A *socially disadvantaged* small business is one that is at least 51 percent unconditionally and directly owned by one or more individuals who are U.S. citizens and determined to have suffered from bias or discrimination. The law allows groups to petition to be designated as socially disadvantaged; and a 1978 amendment to the Small Business Act designated minorities as such.

An *economically disadvantaged* small business is one that is at least 51 percent unconditionally and directly owned by one or more individuals who submit financial and narrative information that the SBA determines qualifies them for the designation. For initial designation as eligible for the Section 8(a) Program, the net worth of an individual claiming disadvantage must be less than $250,000; for continued eligibility after initial admission to the program, the individual's net worth must be less than $750,000 (in both instances excluding equity in one's primary residence and equity in the socially and economically disadvantaged small business).

A *small disadvantaged business (SDB)* is an economically disadvantaged small business certified by the SBA, except that the net worth of the owner can be as high as $750,000 (excluding equity in a primary residence and in the SDB). The Department of Transportation classifies women-owned small businesses as a "disadvantaged business enterprise" (DBE).

A *woman-owned* small business is "one that is at least 51 percent owned by one or more women; and whose management and daily business operations are controlled by one or more of such women." A woman-owned small business may also qualify as socially and economically disadvantaged. Self-certification as a woman-owned business is currently allowed.

NOTE**:** Other categories of small businesses may receive preferential treatment: veteran-owned small businesses, service-disabled veteran-owned small businesses, and "HUBZone" small businesses (see www.sba.gov/GC/goals/ [December 2004]).
SOURCE: Compiled from information on the SBA web site, www.sba.gov.

1981 to 2000

The 1980s and 1990s saw a continuation and expansion of programs to assist minority-owned small businesses and, to a lesser extent, women-owned small businesses. The National Defense Authorization Act of 1987 (P.L. 99-661) established the Small Disadvantaged Business Program in the Department of Defense. The act set a goal of 5 percent of total dollar awards of prime contracts to be made to small disadvantaged businesses, which were given a 10 percent evaluation preference over other competitors. The act also provided for contracting set-asides, that is, competitions restricted to small disadvantaged businesses. A "rule of two" was adopted, whereby a competition was set aside for small disadvantaged businesses if the contracting officer determined that two or more such businesses were likely to bid.

The Business Opportunity Development Reform Act of 1988 (P.L. 100-656) amended the Section 8(a) program to limit sole-source awards of contracts to 8(a) participants to $5 million or less for manufacturing contracts and to $3 million or less for all other contracts. It required competition for larger contracts that were restricted to Section 8(a) participants. The Women's Business Ownership Act of 1988 (P.L. 100-588) provided for assistance to women in starting, managing, and growing small businesses. This law set up an office of women's business ownership in the SBA, which helped women-owned small businesses with loans and management. Under the Department of Transportation statute, women-owned small businesses qualified for the "disadvantaged business enterprise" (DBE) program.

The Federal Acquisition Streamlining Act of 1994 contained provisions to encourage agencies to consolidate contracts and streamline contracting processes, while ensuring a role for small businesses. It established a threshold of $100,000 for simplified acquisition and reserved all contracts from $2,500 to $100,000 for small businesses. It extended to all federal agencies authority to establish certain kinds of race-based contracting preference programs (authority that was previously authorized for the Department of Defense, Department of Transportation, and the National Aeronautics and Space Administration—see U.S. Department of Justice, 1996). It established a goal that 5 percent of total federal procurement dollars for both prime contracts and subcontracts go to women-owned small businesses.

The Small Business Reauthorization Act of 1997 (P.L. 105-135) established a goal of 23 percent of federal procurement dollars for small businesses beginning in fiscal year 2003. It also included language to restrict unnecessary bundling of contracts so that contracts would not be so big that small businesses could not credibly bid on them.

Finally, the Small Business Reauthorization Act of 2000 (P.L. 106-554) approved a set-aside program for women-owned small businesses to assist

agencies in meeting the 5 percent goal. The act also required the SBA to determine the representation of women-owned small businesses by industry (see Box 2-1).

COURT DECISIONS AND AGENCY RESPONSE: RACE-BASED PROGRAMS

Croson Case

As this brief history makes clear, programs to affirmatively assist small businesses, including minority-owned and, subsequently, women-owned small businesses, were regularly and almost routinely passed by Congress. At the same time, race-based programs were challenged in court (see Enchautegui et al., 1997:3-4). By the late 1980s, such challenges were beginning to succeed.

In a 1989 case, *City of Richmond v. J.A. Croson Co.*, 488 U.S. 469 (1989), the U.S. Supreme Court determined that state and local preference programs for minority-owned firms must meet the court's "strict scrutiny standard" under which racial preferences must serve a "compelling interest" and be "narrowly tailored" to meet that need. Culminating a trend in the Supreme Court and appellate courts toward tightening the standards for race-based programs of state and local governments, *Croson* affirmed that state and local agencies may act to remedy direct or indirect discrimination in their own contracting processes but could not use evidence of society-wide discrimination or past discrimination in an industry as the basis for giving preferences to minorities. Furthermore, state and local agencies could not assume that evidence of discrimination against one minority or in one market supported a finding of discrimination against all minorities or in all markets. The test of discrimination in contracting, according to *Croson,* was whether qualified, willing, and able minority-owned firms were underused. If such evidence were found, then agencies must first use race-neutral remedies (for example, outreach, mentoring, assistance in receiving bonding); if such programs were deemed insufficient, agencies could then develop race-based remedies that were narrowly tailored to serve the purpose.

In response to *Croson*, many state and local governments commissioned "disparity studies," which attempted to demonstrate differences between minority ownership as a share of all businesses in their jurisdiction and as a share of state or local government contracts received. These studies also described barriers to minorities in attempting to start or grow their own businesses and, in some instances, contracting practices by state and local governments and the private sector that impeded the ability of minority-owned businesses to win awards. Such studies have been cri-

tiqued on a number of grounds (see Chapter 4 for a methodological review).

Adarand Case

In 1990, Adarand Constructors, Inc., brought suit alleging that a U.S. Department of Transportation regulation that gave a preference to minority subcontractors on federal highway projects was unlawful. The case made its way through the courts, and, in 1995, the U.S. Supreme Court determined in *Adarand Constructors, Inc. v. Pena,* 515 U.S. 200 (1995), that the *Croson* strict scrutiny standard must also apply to federal affirmative action programs, including federal contracting and other areas (www.usdoj.gov/olc/adarand.htm [December 2004]). In this decision, the court explicitly overruled an earlier decision, *Metro Broadcasting, Inc. v. FCC*, 497 U.S. 547 (1990), which had stipulated that congressionally mandated "benign" racial classifications need only satisfy a less exacting standard of intermediate scrutiny (see "Gender-Based Programs" below).

Agency Response

Reacting to *Adarand*'s threat to the federal contracting programs favoring small disadvantaged businesses, the Clinton administration decided to "mend it [affirmative action] not end it." The administration required that every department list all race-conscious programs and evaluate these programs in light of the decision. The Department of Justice contracted with the Urban Institute to review and combine the findings of 95 disparity studies in contracting outcomes conducted by state and local governments. On the basis of results from 58 of these studies (the other 37 were discarded for various reasons), the Urban Institute study estimated that there were "substantial disparities between the share of contract dollars received by minority-owned firms and the share of all firms that they represent. Based on their number, minority-owned firms received only 57 cents for every dollar they would be expected to receive" (Enchautegui et al., 1997:vii; see Chapter 4 for a review of the methodology). The Urban Institute study also estimated that women-owned small businesses received only 29 percent of the expected dollars.

From the legislative history of relevant statutes, the Urban Institute study, and other evidence of barriers to participation of minority-owned firms in government contracting, the Justice Department concluded that race-based "affirmative action in federal procurement is necessary, and that the federal government has a compelling interest to act on that basis in the award of federal contracts" (U.S. Department of Justice, 1996:26042). The department focused its efforts on revising race-based procurement pro-

grams to tailor them narrowly to serve the government's interest, making three kinds of changes to the programs.

First, the Justice Department required SBA certification of small disadvantaged businesses for the entire government instead of allowing such businesses to self-designate. (Firms eligible under the Section 8(a) program were always required to be certified by the SBA.) Second, it established a procedure whereby the Department of Commerce would develop benchmarks to be used in determining which industry groups and, possibly, regions of the country would be eligible for race-based procurement, thus targeting race-based programs to specific industries. Third, it required agencies to conduct proactive outreach and technical assistance efforts for minority-owned firms, and it allowed agencies to use three race-based contracting mechanisms, putting a fourth mechanism—set-aside procurements for small disadvantaged businesses—on hold.

The permitted race-based contracting mechanisms include: the SBA Section 8(a) program;[2] bidding or price evaluation credits for small disadvantaged business prime contractors; and evaluation credits for nonminority prime contractors that proposed to use small disadvantaged businesses as subcontractors (see Chapter 3). Use of bidding credits and evaluation credits was made subject to the Department of Commerce benchmark results: for example, the size of a bidding credit could be less than the maximum 10 percent depending on the extent of the disparity between the benchmark and the actual participation of minority-owned small businesses in federal contracting.

The Department of Commerce published its first industry benchmarks in June 1998, determining that a 10 percent bidding credit for small disadvantaged businesses could be employed in contracts in 71 industry groups (defined by 2-digit Standard Industrial Classification codes), as well as in all 9 geographic divisions for 3 construction industry groups (U.S. Office of Management and Budget, 1998:35714). In September 1999, the department issued updated benchmarks, which provided for a 10 percent bidding credit for small disadvantaged businesses in a smaller number of industry groups (51), as well as in all 9 geographic divisions for 3 construction industry groups (U.S. Office of Management and Budget, 1999:52806). The benchmark analyses were discontinued by the present Administration.

The Commerce Department's methodology involved four steps for each industry group (see Chapter 4 for more detail): (1) identifying a set of firms that were "ready and willing" to supply the federal government by combin-

[2]The Section 8(a) program is currently under challenge in a court case, ongoing in Washington, DC, since 1996, brought by the Center for Individual Rights.

ing and removing duplicates from three relevant lists of firms; (2) estimating a "use" share for small disadvantaged firms in the set as their share of the total net contract dollars awarded to the entire set; (3) estimating the capacity to supply the government of each ready and willing firm in the set from a regression equation using variables related to firm size and age and estimating a "capacity" share for the small disadvantaged firms in the set; and (4) comparing the use and capacity shares for small disadvantaged firms and recommending price evaluation credits when the use share fell short of the capacity share. (See Chapter 4 for a review of the methodology.)

Other actions taken in response to the *Adarand* decision included suspension by the Defense Department in October 1995 of its small disadvantaged business set-aside program based on the rule of two: that is, limiting competition to minority firms whenever the contracting officer determined that two or more responsible small disadvantaged firms could bid on a project. Such rule-of-two contracting accounted for one-sixth of all Defense Department contracting with minority-owned firms in 1994 (U.S. Department of Justice, 1996:26042).

GENDER-BASED PROGRAMS

To date, the legal history with regard to gender-based programs for promoting women-owned small businesses is sparse. There have been two or three lawsuits brought by women who were seeking disadvantaged status to get into the Section 8(a) program. There have been no challenges to the planned new federal program for set-asides for women-owned small businesses as yet or from women-owned small businesses alleging gender discrimination in federal contracting.[3] A few relevant cases have involved state and local contracting or related areas, such as alleged discrimination against women in employment and college admission.

Standard of Review

The constitutional basis under which a new procurement program for women-owned small businesses would be reviewed by the courts derives from the due process clause of the Fifth Amendment to the U.S. Constitution, which provides that no "person" shall be "deprived of life, liberty, or property, without due process of law." This language has been interpreted

[3]A lawsuit was brought in November 2004 to require the SBA to proceed with the regulations for women-owned small business set-asides.

by the U.S. Supreme Court to include the equal protection of the law, although the amendment contains no express language to that effect.

Equal protection, as the term implies, requires that all individuals (including corporations as "persons") be treated equally by the government, unless there is some overriding reason to prefer one group over another. This legal doctrine bars the federal government from giving contracting preferences to particular groups unless there is some compelling reason for doing so and the scope of the preference is not too broad so as to unduly injure innocent third parties. The Fourteenth Amendment has a similar provision applicable to the states.

The Supreme Court has enunciated two different standards for judging whether racial or gender preferences are permissible in contracting. Racial preferences in federal contracting must meet the strict scrutiny standard of review, according to the 1995 *Adarand* decision discussed above. This is a two-pronged test. Under the first prong of the test, the government must have a compelling governmental interest in employing the preference, such as remedying past discrimination in a specific area (general societal discrimination is not enough).[4] Under the second prong of the test, the remedy must be narrowly tailored so that its scope, duration, and effects are as limited as possible. Satisfying the requirement for narrow tailoring includes examining whether race-neutral remedies were tried and were unsuccessful, determining whether the preference is of limited duration, and examining the harm to persons not eligible for the race-conscious remedy or program.

Gender preferences are subject to a lesser standard, which has been referred to as "intermediate scrutiny." That standard was most recently enunciated by the U.S. Supreme Court in *United States v. Virginia*, 518 U.S. 515 (1996), which held that the exclusion of women from the state-run Virginia Military Institute was unconstitutional. In making its ruling, the Supreme Court stated that, in seeking to uphold a gender preference, the government must establish "an exceedingly persuasive justification" for it. In essence the government must show that the preference "serves important governmental objectives and that the discriminatory means employed are substantially related to the achievement of those objectives."

While the two standards may appear somewhat different, lower court decisions applying the equal protection doctrine to government contracting have not yet clarified precisely how the standards differ. In particular, they have not agreed on the extent to which the intermediate scrutiny standard is

[4]Recent cases involving admissions at the University of Michigan entertain diversity as a justification for racial preferences in the educational setting—*Gratz et al. v. Bollinger et al.*, 123 U.S. 2411 (2003), and *Grutter v. Bollinger et al.*, 123 U.S. 2325 (2003).

less demanding than strict scrutiny. On one hand, the Eleventh Circuit has held that under intermediate scrutiny the party defending preferences for women-owned businesses is not limited to a showing of past discrimination against women-owned businesses by the governmental entity alone, but it may also show more general societal discrimination against women—see *Engineering Contractors Ass'n of South Florida Inc. v. Metropolitan Dade County*, 122 F.3d 895 (11th Cir. 1997), and *Ensley Branch, N.A.A.C.P. v. Siebels,* 31 F.3d 1548 (11th Cir. 1994), involving employment discrimination. On the other hand, the Seventh Circuit has said in a case involving a contracting preference program for women and minorities in Chicago that the difference between the two standards is "vanishing"—*Builders Assoc. of Greater Chicago v. County of Cook*, 256 F.3d 642 (7th Cir. 2001).

Justification: Statistical Disparity

Whatever the difference between the two standards of review, the justification of a governmental preference program in contracting, whether based on race or gender, typically depends in part on its claimed remedial necessity. Justification of that necessity is often made by offering statistical evidence of disparities between the target group's share of contract awards (utilization) and its share of a universe or population of firms (availability).

The procurement program for women-owned small businesses provided for in the 2000 Small Business Reauthorization Act, 15 U.S.C. 637(m)(4), requires the SBA to undertake a study to determine the industries in which women-owned small businesses are underrepresented in terms of federal contract awards. The legislation does not specify the meaning of underrepresentation (or substantial underrepresentation).

In its administration of laws barring employment discrimination, the Equal Employment Opportunity Commission (EEOC) has used a four-fifths (4/5 or 0.8) rule of thumb as a disparity threshold, below which a group may be taken to be underrepresented relative to its share of a total population. However, even in the context of EEOC enforcement activity, the four-fifths rule is somewhat flexible. Outside that realm, it has no legal significance and has not been controlling in the courts, which have favored formal tests of statistical significance. Nonetheless, common practice in the literature of disparity studies has been to use a disparity ratio of less than 0.80 as a definition of underrepresentation for minority-owned or women-owned small businesses in federal contracting (see Chapter 4 on disparity ratios and issues in measuring them).

The 2000 legislation also does not define the universe of firms to be used in estimating availability, implying that the universe could encompass all firms. Yet case law to date, involving challenges to preferential contract-

ing programs of local governments for women-owned and minority-owned small businesses, indicates that it is not enough to show evidence of disparities based on a broad definition of the available universe of firms. Instead, for a program to pass constitutional muster, what appears to be required is evidence of disparities when the universe is defined to be only those firms that are ready, willing, and able to compete for government contracts.

In disparity studies that have restricted the universe of available firms, the determination of ready, willing, and able has been variously based on lists of registered firms, responses to sample surveys to ascertain interest in applying for contracts, and predictions from statistical regression equations that include such variables as firm size and age (see Chapter 4). Studies that do not attempt to narrow the universe of firms in a defensible way have been thrown out of court. Thus, in *Contractors Association of Eastern Pennsylvania, Inc. v. City of Philadelphia*, 893 F. Supp. 419 (3rd Cir. 1995), the Third Circuit invalidated a local preferential contracting plan favoring women and minorities because the government's disparity analysis assumed that all firms were equally ready, willing, and able to perform city-financed public works contracts without considering how many minority-owned and women-owned firms actually sought to bid on them. The court wanted to ensure that measured disparities were attributable to discrimination in the contracting process and not to other factors that might limit the contractor pool—for example, that women-owned and minority-owned small businesses might be smaller and less experienced on average than other businesses and so less likely to bid on or be selected for contracts.

Another way of stating the standard that extant case law appears to require for a disparity analysis is that it should not only meet statistical standards regarding the reliability of the data, but it should also support a hypothesis of discrimination in the contracting process. However, this concept has not been rigorously defined. Thus, in *Bazemore v. Friday,* 478 U.S. 385 (1986), the court stated that a statistical model does not have to include all measurable variables in order to be admissible as evidence of discrimination. In that case, which involved allegations of discrimination against minorities in employment and provision of services by the U.S. Department of Agriculture Extension Service, the court held that "a plaintiff . . . need not prove discrimination with scientific certainty; rather, his or her burden is to prove discrimination by a preponderance of the evidence." Basically, it appears that one side must put forward a model that rules out as many obvious explanations of disparities as seems possible with the available data, while the other side strives to put up a better model. At that point, the adversarial process takes over.

In fact, it is no easy matter to produce valid estimates of disparities. Moreover, inferring discrimination from reliably measured statistical dis-

parities is fraught with methodological difficulties. After describing the federal contracting process in Chapter 3, we discuss conceptual, measurement, and data issues in estimating disparities in Chapter 4 and issues in inferring discrimination from statistical evidence of disparities in Chapter 5.

3

The Federal Small Business Contracting Process

A market-based supply and demand conceptual framework can be helpful in understanding the position of women-owned small businesses in the federal contracting process. If the federal contract market were perfectly efficient, there would be no barriers to firms bidding on contracts for which they were qualified, and federal agencies would award contracts to the firms offering the best value to the government among all qualified bidders. Barriers, however, can impede the competitiveness of women-owned small businesses in securing contract awards and thereby contribute to observed disparities. Barriers may be of two types. They can come from the business supply side, in that women-owned small businesses may lack experience or other attributes that are needed for success in the contracting market. Barriers can also come from the government demand side, in that aspects of the contracting process may make it harder for women-owned small businesses to obtain contracts for which they are qualified.

This chapter provides background on the federal contracting process. It begins with an overview of the current status of women-owned small businesses in the federal contracting market. It then reviews the steps in the procurement process in a major agency, types of preferential contracting mechanisms, and data on contracting outcomes.

WOMEN-OWNED SMALL BUSINESSES IN THE FEDERAL CONTRACT MARKET

Congress has voiced concern that women-owned small businesses are not receiving an appropriate share of federal contracts. The goal set by Congress for that share is at least 5 percent of the value of contract dollars awarded, separately for prime contracts and subcontracts. Aggregate estimates suggest that this concern may be warranted. The estimates are suggestive, not definitive, because of limitations in the publicly available data (see "Limited Data on Outcomes," below, and Chapter 4).

In 1997, women-owned small businesses were estimated to be 26 percent of the total number of 20.8 million U.S. businesses with at least $1,000 in gross receipts (including corporations, partnerships, and individual proprietorships). They were estimated to be 16 percent of the 5.3 million businesses with one or more paid employees (and at least $1,000 in gross receipts). Based on revenues, however, women-owned small businesses were estimated to account for only 4.4 percent of total dollar gross receipts of businesses with at least $1,000 in gross receipts (www.census.gov/epcd/mwb97.us/us.html [December 2004]).

In fiscal year 1998, women-owned small businesses received only 2.2 percent of the value of total federal prime contract awards of $181.7 billion in fiscal year 1998—less than one-half the congressional goal. By fiscal year 2003, the share of federal prime contract awards going to women-owned small businesses had increased to 3 percent of the total amount of $277.5 billion (Federal Procurement Report FY 2003, p. ix, https://www.fpds.gov [December 2004]).[1] More recent Census Bureau data that would indicate whether women-owned businesses had increased their share of total businesses or total business gross receipts are not yet available.

Both business supply-side and government demand-side barriers may impair market efficiency, leading to aggregate disparities and disparities among industries in the share of women-owned businesses receiving federal contracts. An example of a business supply-side barrier would be if women entrepreneurs experienced greater difficulties in obtaining sources of start-up and working capital compared with other businesses, so that fewer women-owned small businesses were large enough to be credible bidders on federal contracts. An example of a government demand-side barrier would be if federal contracting officers were less active in networking with women than with men entrepreneurs or engaged in other possibly discriminatory practices and behaviors.

[1]Data are not available about subcontract awards.

At the request of Congress, the U.S. General Accounting Office—now the Government Accountability Office (GAO)—conducted a study to identify trends and obstacles in contracting with women-owned small businesses. GAO interviews with federal contracting officers suggested that two government demand-side barriers—the numerous and complex federal contracting programs for small businesses, and the absence of a specific program targeted to women-owned small businesses—were important obstacles (U.S. General Accounting Office, 2001). Other possible demand-side barriers identified in the study include the practice of contract consolidation (bundling), which could reduce contracting opportunities for all small businesses; a lack of accountability for federal officials not meeting contracting goals; and resource constraints that limited efforts to monitor and enforce the plans submitted by prime contractors to subcontract with small businesses. Business supply-side barriers suggested by federal officials include lack of access for women-owned small businesses to working capital and lack of qualified women-owned small businesses in specific areas and industries.

THE CONTRACTING PROCESS—A CASE STUDY

Although governed by the same large, complex body of regulations, namely, the Federal Acquisition Regulations or FAR (48 CFR Chapter 1—see www.arnet.gov/far/ [December 2004]), the face of federal contracting varies across agency cultures, industry classifications, and geographic localities. Four agencies—the Department of Defense (DoD), the Department of Energy (DOE), the General Services Administration (GSA), and the National Aeronautics and Space Administration (NASA)—do 80 percent of federal contracting. In the period 2000 to 2003, DoD alone was responsible for approximately 65 percent of total federal contracting expenditures in any given year. In fiscal year 2003, DoD awarded only 2.5 percent of its contract dollars to women-owned small businesses, yet those dollars ($4.9 billion) represented 59 percent of total dollars awarded to women-owned small businesses (see Table 3-1). Hence, the committee chose to examine DoD contracting to understand the basic process. Resource restrictions on our study precluded a more wide-ranging investigation of other agencies.

DoD's contracting is highly decentralized. There are contracting officers located all over the United States and around the world. The DoD Small and Disadvantaged Business Utilization Office has over 800 small business specialists distributed among contracting offices to help maximize opportunities for small businesses. A basic description of DoD contracting is available at www.acq.osd.mil/sadbu [December 2004].

TABLE 3-1 Federal Prime Contracting Actions and Dollar Awards for Women-Owned Small Businesses, Agencies with $2 Billion or More in Total Contract Awards, Fiscal Year 2003

	Women-Owned Small Business Prime Contract Actions			
	Number of Actions	Percentage of Agency Total	Dollars Awarded (thousands)	Percentage of Agency Total
Total (all agencies)	595,051	5.3	8,277,298	3.0
Department of Agriculture	8,987	5.1	214,811	5.2
Department of Defense	272,976	4.8	4,851,860	2.5
Department of Energy	1,998	14.6	106,402	0.5
Department of Health and Human Services	9,212	3.9	314,375	4.8
Department of Homeland Security	2,465	4.6	140,411	5.6
Department of the Interior	4,917	5.6	267,375	7.3
Department of Justice	11,228	4.1	166,135	4.2
Department of State	3,936	2.6	123,111	5.2
Department of Transportation	1,328	3.0	75,405	3.7
Department of Veterans Affairs	202,675	5.5	315,225	3.7
General Services Administration	57,959	9.8	519,527	6.5
National Aeronautics and Space Administration	1,279	6.0	283,467	2.4

NOTE: Total federal prime contract actions (new awards, modifications, etc.) included in the goaling achievement report in fiscal year 2003 amounted to 11.3 million; total dollars awarded amounted to $277.5 billion. These totals include actions reported on SF-279 and SF-281 (see text); they exclude 190 thousand actions and $28 billion (see Table 3-2).

Target goals for the percentage of dollars awarded to women-owned small businesses negotiated with the SBA for fiscal year 2003 were 5 percent government-wide and 5 percent for most agencies shown; for the Departments of Commerce, Housing and Urban Development, and Labor, the goals were 6.28 percent, 10 percent, and 5.2 percent, respectively. No fiscal year 2003 goals were set for the Department of Homeland Security (www.sba.gov/GC/goals/).

SOURCE: Federal Procurement Report, FY 2003, Report on Annual Procurement Preference Goaling Achievements, Actions Reported on SF-279 and SF-281 by Agency, p. ix (https://www.fpds.gov).

Acquisition Team

Procurement begins with program planners, managers, and other DoD staff specifying an acquisition need or set of needs for the department. Once a need is defined, then an integrated product/service acquisition team is formed that may include technicians, a lawyer, procurement specialists, small business specialists, and others. This team develops an acquisition strategy. The acquisition team needs intelligence on what firms exist that can supply what the department requires. It has a responsibility to maximize small business participation at the prime contract and subcontract levels. In this regard, the department, like other federal agencies, has department-wide goals to meet by the end of the year, which are determined by negotiation with the Small Business Administration (SBA) (see www.sba. gov/GC/goals/ [December 2004]).

Information, Marketing, and Facilitation

An important demand-side limitation on contracting with women-owned or other types of small businesses is the ability of the DoD acquisition team to learn about available small businesses. It is largely the responsibility of the small business specialist to do market research for the procurement. The specialist will look at previous suppliers and bidders, check the Central Contractor Registration (CCR) at www.ccr.gov [December 2004], check for responses to procurements of more than $25,000 that are advertised on FedBizOpps at www.fedbizopps.gov [December 2004], and check GSA schedules, as appropriate (see www.gsa.gov [December 2004]).

Historically, the CCR was the main database of information about vendors for DoD, NASA, the Department of Transportation, and the Treasury Department. As of October 1, 2003, vendors—and would-be vendors—for all federal agencies are required to register with the CCR. As of January 1, 2004, the SBA PRO-*Net* database of small businesses certified as eligible for various preferential contracting programs was integrated into the CCR, which is now a one-stop source of information about vendors for the federal government, including small businesses eligible for preferential contracting opportunities.

FedBizOpps is an electronic point of entry for all federal contracting opportunities of more than $25,000—vendors can search for solicitations posted by contracting agencies, and agencies can search for vendors that register to receive information about particular types of procurements or specific solicitations.[2] GSA schedules list preapproved vendors for supply

[2]As of January 1, 2002, FedBizOpps replaced the *Commerce Business Daily* as the vehicle for publishing notices of all federal procurements of more than $25,000.

of specified items. In addition, SBA Procurement Center representatives are stationed at major contracting venues to help procurement officials identify small businesses capable of carrying out specific procurement requirements.

The small business specialist on the acquisition team may also use a variety of informal methods to gather information about potential small business suppliers. These informal methods include going to conferences, saving business cards collected at business events, following up marketing contacts initiated by small businesses, and attending meetings held for small business specialists. The small business specialists are fully trained and experienced government contract officers who are focused on small businesses.

If the small business specialist determines for a planned procurement that only a very small number of businesses appear able to furnish the required goods or services, the specialist may hold a presolicitation meeting to gather information. In such a meeting the specialist would seek to find out which firms are interested in selling to the government and whether they can handle the order (e.g., whether they have sufficient plant capacity). Small businesses must be on the CCR to sell to DoD (or other federal agencies), and the specialist may have to encourage capable firms to go through the registration process. The specialist has a great deal of discretionary power in this process. The thoroughness of the resulting list of vendors is the result of the specialist's skills and initiative. The department evaluates specialists primarily on the results of their searches rather than on the methods used to identify willing and capable small businesses.

From the business supply side, one question is how a small business finds out about opportunities to bid as a prime contractor or as a subcontractor. The formal options are limited. In order of increasing investment by the small business in time and resources, businesses can keep an eye on the FedBizOpps web site, which is updated daily and lists all federal government procurement opportunities over $25,000; follow guidelines on the SBA web site at www.sba.gov [December 2004]; follow the 10 recommended steps for becoming a federal contractor on the DoD Small Business site at www.acq.osd.mil/sadbu/doing_business/index.htm [December 2004], which include getting registered on the CCR; and establish formal subcontractor relationships with larger companies. Informal methods, which require further investment, include getting to know the SBA or agency small business specialists, contacting agencies about contracting opportunities under $25,000, making the business's capabilities known to large businesses, and attending conferences and professional events to network about opportunities. Subcontracting opportunities are more difficult to identify than are prime contracting opportunities over $25,000.

Qualification Process

To win and execute contracts successfully, at DoD or another agency, small businesses must be qualified. Required qualifications are both technical and statutory.

Technical qualifications include an array of such factors as ability, availability, and location, among others. These factors are evaluated during the bidding process when a firm formally presents its qualifications. They are also sometimes evaluated by small business specialists during prebid market research.

In addition, firms must meet a number of statutory qualifications to be considered eligible small businesses. In this process, they may also qualify as women-owned, service-disabled veteran-owned, or economically and socially disadvantaged small businesses. The definition of "small" varies by type of business and industry (refer back to Box 2-2 in Chapter 2). Formal government evaluation and certification must be obtained for status as a small disadvantaged business or socially and economically disadvantaged small business. Women-owned small businesses may be certified in these categories; they are allowed, at present, to self-certify their status as women-owned.

Selection Process

Small businesses are given an opportunity to bid on projects for which they are qualified. The specialist will note the number of small businesses (in total or of a certain type, such as service-disabled veteran) available to bid on a particular procurement so that a set-aside may be created if there are two or more qualified firms that are eligible for set-aside participation. (Currently, there are no set-asides for small disadvantaged businesses other than through the Section 8(a) program—see Chapter 2.)

If no small businesses are identified to bid on a procurement, then DoD has a process for every contract over $10,000 whereby the contract officer must produce a small business coordination record. This record outlines how the contracting will proceed. For example, it may be unrestricted by size of business, it may have a 10 percent small disadvantaged business price evaluation or bid-credit (explained below), or it may take another form. Both the DoD small business specialist on the procurement team and a representative from the SBA must sign off on the plan before it can be executed. When decisions are made regarding sole or single-source awards, those given to large companies will often contain requirements that a percentage of the contract must be subcontracted out to small businesses generally or particular types of small businesses.

Role of the SBA

The SBA negotiates annual goals with the DoD, as well as other federal agencies, regarding the percentage of contract funding that should go to small businesses in various classes (see www.sba.gov/GC/goals/ [December 2004]). Goals always play a role in the DoD acquisition process. Acquisition teams have a requirement to maximize small business participation at the contractor and subcontractor levels. They also have specific goals that are measured at the end of a fiscal year. Administered this way, there are informal pressures to meet these goals, although agencies are not supposed to treat the goals as quotas that could change procurement behavior toward the end of the year.

The SBA small business representatives and the DoD small business specialists facilitate small business awards throughout the procurement year. Some awards are counted as "two-fers." A two-fer is a contract awarded to a firm that can count against more than one of the agency's goals, for example, toward small disadvantaged business contracting and toward women-owned small business contracting (U.S. General Accounting Office, 2001:9).

TYPES OF RESTRICTED COMPETITION

There are several major types of restricted or preferential competition used in the federal contracting process. Socially and economically disadvantaged small businesses that are certified by the SBA as eligible for the Section 8(a) program may receive noncompetitive, sole-source contracts (including options) up to $3 million for goods and services and $5 million for manufacturing. (Economically disadvantaged women-owned firms may qualify for this program if they are minority-owned or if they are deemed socially disadvantaged on an individual basis.)

Many restricted competitions are conducted using set-asides, in which particular procurement opportunities are set aside to be bid on only by selected classes of small businesses. Another concept that has been used at some agencies is a price evaluation adjustment (PEA,) or bid-credit, competition, which may be used for contracts over $100,000 involving designated industries. Briefly, selected classes of small businesses are given an economic advantage in the competition. For example, technically qualified small disadvantaged businesses or HUBZone small businesses may be given up to a 10 percent price evaluation adjustment, or bid-credit, in a particular competition. In broad terms, the 10 percent credit works as follows: if a technically qualified large business has the potential winning bid of, say, $160,000, then the small business bid would be accepted over the large business bid if it does not exceed $176,000.

A similar mechanism, termed an evaluation credit or factor, has been used in some competitions to give an advantage to prime contractors that propose to subcontract with small disadvantaged businesses or other types of small businesses. In this instance, large company bidders with acceptable subcontracting plans may be given an evaluation credit of a specified percentage of the designated evaluation points for the contract. Small disadvantaged businesses that subcontract with other small businesses may also be eligible for an evaluation credit. Finally, contracting officers may offer a monetary incentive to prime contractors if they exceed the small disadvantaged business subcontracting goal for the procurement.

The committee at its workshop heard a presentation from R. Preston McAfee about the advantages and disadvantages of various contracting mechanisms to encourage the use of small business contractors without unduly harming other bidders (see Appendix A). In particular, McAfee argued that the use of bid-credits offers a number of advantages compared with set-asides. Bid-credits are flexible, maintain competitive pressure among bidders, and may be adjusted in size and frequency of use to address a perceived lack of opportunities for small business contractors. Indeed, situations that appear to require larger or more numerous bid-credits to achieve contracting goals for women-owned or other types of small businesses will draw attention to the reasonableness of the goals, the accuracy of the information on availability, and the possible existence of barriers to participation in the contracting process. In contrast, set-asides are equivalent to granting an infinite bid preference to the target class. They eliminate competition from outside that class and represent an all-or-nothing type of preferential contracting program. Federal agencies have successfully used bid-credits, for example, in allocating the telecommunications spectrum.

LIMITED DATA ON OUTCOMES

Our brief review of the federal small business contracting process in the Department of Defense made clear the considerable latitude that is afforded acquisition teams and small business specialists in determining acquisition and information-gathering strategies. It is likely that considerable variation also exists in contracting practices across departments and agencies, which, in turn, may have differential effects on the outcomes of the process for small businesses of different types. Yet few regularly issued reports on contracting outcomes are accessible, so we know little about small business contracting trends and variations across agencies, industries, regions, time periods, and types of small businesses.

Some yearly reports are available on the Internet from the SBA and from the Federal Procurement Data System (FPDS)—refer back to Table 3-1 for basic statistics on women-owned small businesses. The SBA provides

tables of percentage goals for small business contracting dollars for each fiscal year, separately for prime contracts and subcontracts, by agency for all small businesses, 8(a)-certified small businesses, other small disadvantaged businesses, women-owned small businesses, and service-disabled veteran-owned small businesses (see www.sba.gov/GC/goals/ [December 2004]).

Beginning for fiscal year 2000, the FPDS (https://www.fpds.gov [December 2004]) provides tables of prime contract actions and dollars awarded by agency, by industry, and by state (these attributes are not cross-classified). In addition, the FPDS provides tables of prime contract actions and dollars for small businesses by type. By agency, the system provides tables of small business and small disadvantaged business contracting by type of competition (noncompetitive, restricted competition, unrestricted competition). Other tables by agency report prime contract actions and dollars by type of preference program (e.g., small disadvantaged business price evaluation adjustment).

The FPDS is built primarily on the GSA individual contract action report (ICAR) database, containing records of individual contract actions provided by federal contracting officers on SF-279 forms (the civilian agency standard form for reporting individual contract actions, typically involving contracts of over $25,000) and DD-350 forms (the equivalent defense agency form). Small purchases reported on SF-281 forms (the standard form used to report purchases of less than $25,000, which may be combined on one form) and credit card purchases are excluded from the ICAR database, although some FPDS reports provide aggregate SF-281 data, and there is a standard report for aggregate credit card purchases. In addition, a few agencies are not required to report any contracting actions to GSA; they include Congress, the GAO, the federal courts, the Federal Aviation Administration, the Tennessee Valley Authority, the Federal Deposit Insurance Corporation, the Central Intelligence Agency, and the National Security Agency (see Eagle Eye Publishers, Inc., 2004b:3-4). Finally, ICAR does not contain information on subcontracts.

There are at least three major problems with the standard FPDS reports, which, at present, preclude their use in providing an informative year-by-year picture of federal contracting outcomes. First, although easy to access on the Internet, the tables are poorly documented, which handicaps those not exceptionally well versed in federal contracting from being able to readily interpret the numbers. For example, it is easy to misinterpret reported numbers of contract actions to mean contract awards, when a single contract may have multiple actions, such as the original award and modifications or additional task orders. No table entries are provided for numbers of individual awards. As another example, there is no indication in the report by agency on SF-281 purchases of whether the separate line

for "small business set-aside" is a subset of the line for "small business concerns."

Second, the data content of the regular FPDS reports is very limited. There are no tabulations of contract actions or dollar amounts of awards cross-tabulated for, say, federal agencies by industry. As noted above, because of the lack of information, there are no reports for subcontracts. There is also not a complete picture of small business contract outcomes, either in total or by type of small business. Useful tables would include not only awards by type of competition, but also procurements in which small businesses submitted offers but did not win and procurements in which no small businesses submitted an offer.

Third, tables are not consistent in their coverage of contracts, and no information is provided that would permit reconciliation across tables. Thus, some tables include information for contracts reported on SF-279 from the ICAR database, while others aggregate information for contracts reported on SF-279 and SF-281. In addition, tables for small business "goaling achievements," showing percentages of total actions and dollars awarded by type of small business, exclude some contract actions that are reported in other tables on small businesses (see Table 3-2 for an illustration of consistency problems in the standard reported data for small businesses).

Given our study's limited resources, although we make a general recommendation that more informative and regularly generated reports of federal contracting outcomes need to be issued (see Chapter 6), we do not specify their specific contents. Generating more informative reports, particularly when individual action records must be assembled into records for contracts, will not be easy. The difficulties of working with the individual SF-279 micro records and other sources to produce consistent, detailed tabulations and analyses are well described in a recent study of veteran-owned small businesses in federal contracting that was commissioned by the SBA (Eagle Eye Publishers, Inc., 2004b). The benefits of having more informative reports produced on a regular basis, however, could be substantial for the SBA, federal contracting agencies, Congress, business owners, and their trade associations, researchers, and other stakeholders. We urge the SBA to consult with major contracting agencies, stakeholder groups, and researchers to design a system of informative, carefully documented reports from the FPDS on contracting outcomes by type of small business, agency, and industry. If data are systematically collected on subcontracting outcomes, as we recommend (see Chapter 6), then regular reports on subcontracting actions should be developed as well.

TABLE 3-2 Different Reports of Federal Contracting, for Selected Types of Businesses, Fiscal Year 2003

Contract actions	Number	Percentage of Total
Women-owned small businesses		
Report on Annual Procurement Preference Goaling Achievements	595,051	5.3
Total federal snapshot (aggregating SF-279 and SF-281 actions)	595,315	5.2
Small businesses, total		
Report on Annual Procurement Preference Goaling Achievements	6,081,080	53.7
Total federal snapshot (aggregating SF-279 and SF-281 actions)	6,083,267	52.8
Total businesses		
Report on Annual Procurement Preference Goaling Achievements	11,330,377	100.0
Total federal snapshot (aggregating SF-279 and SF-281 actions)	11,520,433	100.0

Dollar amount of contract awards	Thousands of dollars	Percentage of Total
Women-owned small businesses		
Report on Annual Procurement Preference Goaling Achievements	8,227,298	3.0
Total federal snapshot (aggregating SF-279 and SF-281 actions)	8,303,604	2.7
Small businesses, total		
Report on Annual Procurement Preference Goaling Achievements	65,505,924	23.6
Total federal snapshot (aggregating SF-279 and SF-281 actions)	65,781,170	21.5
Total businesses		
Report on Annual Procurement Preference Goaling Achievements	277,477,716	100.0
Total federal snapshot (aggregating SF-279 and SF-281 actions)	305,495,128	100.0

NOTE: Although the total federal snapshot is inclusive, the goaling achievements report excludes some contract actions (see Table 3-1).
SOURCE: Federal Procurement Report FY 2003: pp. viii-ix for goaling achievements; pp. 74-75 for federal snapshot (https://www.fpds.gov).

4

Disparities and Representation

Disparity, underrepresentation, and discrimination are different concepts. Disparity is simply a measured difference between two groups on an outcome of interest, such as differences in average earnings between men and women. Underrepresentation is a disparity in which the difference goes against a particular group (for example, lower earnings for women than men). Discrimination involves differential (adverse) treatment of a group compared with others based on membership in the group. Discrimination may also involve differential treatment on the basis of other factors that results in an adverse outcome for a particular group. Disparities may be due to any number of factors, including, but not necessarily and not limited to, discriminatory practices and behaviors.

This chapter focuses on the definition and measurement of disparities and underrepresentation of women-owned small businesses in federal contracting. It thereby responds to the committee's charge to review the preliminary study, completed in late 2002, by the Office of Federal Contract Assistance for Women Business Owners (CAWBO) of the Small Business Administration (SBA). Chapter 5 considers the challenging task of inferring discrimination as a possible reason for any observed adverse disparities or underrepresentation. Our recommendations about the CAWBO study are presented in Chapter 6.

DISPARITY

Evidence of large and persistent differences, or disparities, in economic outcomes among men and women in the United States is not hard to find.

For example, for as long as wages have been measured, women have been estimated to earn less than men, although the gap has lessened over time and among some groups (see, e.g., Bureau of Labor Statistics, 2002). By occupation, adult women currently outnumber adult men in such occupations as nurses, elementary school teachers, social workers, bank tellers, and librarians, whereas men outnumber women in such occupations as purchasing managers, dentists, carpenters, firefighters, and mail carriers. By industry, more women are employed than men in the health care and education sectors and more men are employed in agriculture, construction, and mining (U.S. Census Bureau, 2003:Tables 615, 619). Properly measured, these examples illustrate disparities on the basis of gender.

The Small Business Reauthorization Act of 2000, Section 811(m), required the SBA to determine industries in which women-owned small businesses were "underrepresented" and "substantially underrepresented." In other words, SBA was required to identify industries that evidenced disparities or differentials between women-owned small businesses and other businesses in which the disparity was adverse to women-owned small businesses.

Disparity Ratio

Congress did not indicate how to measure disparities, adverse or otherwise. Studies of preferential contracting programs commonly use a measure termed the "disparity ratio," D. Calculating the disparity ratio begins by calculating the values of two shares for a target group, in this case women-owned small businesses. The two shares are a utilization share, U, and an availability share, A.[1] The utilization share looks at an outcome of interest, which in this case is winning government contracts, measured in number of contracts or dollars awarded. The utilization share measures contracts (or dollars) awarded to women-owned small businesses, C_w, as a share of total contracts (or dollars) awarded, C_t. The availability share looks at the available universe or pool for contracting, measured as numbers of businesses or gross dollar receipts. The availability share measures women-owned small businesses (or their gross receipts), W, as a share of total businesses (or total gross receipts), T. Taking the two shares as a ratio gives an estimated value for the disparity ratio:

[1]The terms "utilization" and "availability" are defined in the disparity ratio literature, which has addressed primarily minority contracting disparities (see, e.g., Enchautegui et al., 1997; Marcus Weiss & Affiliates, 1990; Mason Tillman Associates, 1998).

$D = U / A$, where (1)
U, or utilization = C_w / C_t and
A, or availability = W / T.

If D is 1.00, then there is no disparity for women-owned small businesses: their actual share, U, of contracts is the same as their expected share, A, based on their representation in the total business population. If the ratio is less than 1.00, then there is an adverse disparity or underrepresentation of women-owned small businesses among successful government contractors relative to the total business population. If the ratio is more than 1.00, then women-owned small businesses are overrepresented among successful government contractors relative to the total business population.

A more statistically tractable and interpretable alternative widely used in the legal and academic analysis of employment discrimination takes the difference between U and A as a measure of disparity. Thus, a difference of zero would indicate no disparity; a difference of less than zero (i.e., U is a smaller proportion than A) would indicate underrepresentation of the target group for the outcome of interest relative to the total population; a difference of greater than zero (i.e., U is a larger proportion than A) would indicate overrepresentation of the target group.

In the contracting arena, the availability share for such a target group as women-owned small businesses can be expected to vary across industries and other characteristics of businesses and contracts. For this reason, it is critical to use disparity ratios (or differences) to measure representation and not simple counts or percentages of utilization. For example, if industry A has 10 percent women-owned small businesses and industry B only 2 percent women-owned small businesses, a comparison of counts or percentages of contracts awarded would be misleading because one would not expect women-owned small businesses to win as many contracts in industry B as in industry A. Differences among industries also suggest the importance of examining each industry separately and not lumping industries together in the calculation of a single disparity ratio (or difference). Separate ratios should be calculated instead. The example in Table 4-1 makes this point clear.

Constituent Elements

Critical to appropriate calculation of disparity ratios is an agreed-on definition and measurement of each element of the ratio—the target group, the outcome of interest, and the total population—and of any other variables to be included in the analysis, such as industry. We first discuss issues of defining and measuring the constituent elements of the disparity ratio

TABLE 4-1 Hypothetical Calculation of Disparity Ratios for Two Industries

		Industry A	Industry B	Total
a.	Women-owned federal contractors	25	50	75
b.	Total federal contractors	1,000	1,000	2,000
c.	Women-owned firms	1,000	1,000	2,000
d.	All firms	10,000	50,000	60,000
Utilization share, U = (a) / (b)		0.025	0.05	0.038
Availability share, A = (c) / (d)		0.10	0.02	0.033
Disparity ratio, D = (U / A)		0.25	2.50	1.15

NOTE: Calculating the disparity ratio for the two industries combined would lead to the conclusion that women-owned small businesses were overrepresented in federal contracting, when the data indicate that they are underrepresented in industry A.

and then summarize and assess the approach to these issues in the SBA CAWBO study and other studies.

Target Group

The target group of interest for the congressionally mandated SBA study comprises women-owned small businesses. There is a clear formal definition in the legislation governing the SBA of businesses that are "women-owned" (see Box 2-2). In implementing the definition, errors of classification can occur because of differences between the SBA definition and the definition employed in a relevant data source. For example, the 1997 Survey of Women-Owned Business Enterprises conducted by the U.S. Census Bureau as part of the 1997 Economic Census provided separate tabulations for firms with 50-50 male-female ownership and those with 51 percent or greater female ownership, but earlier surveys in the series counted some equally owned businesses as women-owned. This change reduced the number of women-owned businesses in the 1997 survey by an estimated 37 percent (U.S. Census Bureau, 2001:12).[2]

[2]This survey and the Survey of Minority-Owned Business Enterprises have been renamed the Survey of Business Owners and Self-Employed Persons; the most recent round is for 2002.

In addition, there may be efforts to game the status of being woman-owned, which could affect not only the quality of the data on which the targeting of a set-aside program depends, but also its effectiveness. Businesses may fraudulently claim to be women-owned according to the official definition, or they may transfer ownership but not actual control to a woman. Front organizations may also be formed for the purpose of bidding on contracts that are then substantially subcontracted to other firms that do not meet the definition. In each such case, the estimated number of women-owned small businesses exceeds the true number and contracts are diverted from legitimate women-owned small businesses.

The SBA also operates with a formal definition of "small," or, rather, it has a set of definitions, which vary by industry in terms of the variable used for measurement (e.g., number of employees, gross receipts) and the threshold value (e.g., maximum of 100 employees for a retail trade business, maximum of $3 million average annual receipts for a travel agency) (see Box 2-2). Errors of classification can occur because of differences between the SBA definition and the definition employed in a relevant data source, advertent or inadvertent reporting errors for measures of firm size, fluctuations in firm size, differences in organizational form, and other factors. Contracting preferences for small businesses create an incentive to maintain status as an SBA-defined small business.

Outcome of Interest

The outcome of interest for the SBA study is federal contract awards, which can potentially be defined in terms of numbers of awards or dollar amounts of awards. The latter measure is most commonly used in the literature, which reflects the fact that the yearly goals for use of women-owned and other types of small businesses established by Congress and negotiated between the SBA and individual contracting agencies represent percentages of total awarded dollars, usually separately for prime contracts and subcontracts. In addition, data on dollar amounts awarded are readily accessible from the Federal Procurement Data System (FPDS), whereas data on number of contract awards require combining FPDS records for individual actions (new awards, modifications, etc.) into records for individual awards, or else using contract actions as a rough proxy for awards. Data on total size of awards for individual contracts also require combining FPDS individual action records.

Although defining the outcome measure in terms of dollar amounts awarded makes sense for estimating utilization shares to respond to the congressional mandate, it would also be useful to examine utilization shares in terms of contract awards, or actions, in order to better understand the contracting picture for women-owned small businesses. Table 3-1 in Chap-

ter 3 shows that shares in terms of dollars and actions are similar for many cabinet departments, but there are exceptions. Notably, the Department of Energy in fiscal year 2003 exhibited a relatively high share of contract actions going to women-owned small businesses (15 percent), but the share of its contract dollars awarded to women-owned small businesses was only 0.5 percent. This finding presumably reflects the fact that this department has a small number of very large contracts for its laboratories, which are neither bid on nor won by small businesses.

Because the distribution of contract awards by dollar value may be highly skewed for some agencies, time periods, or industries, a careful analysis of utilization estimates should determine their sensitivity to outliers and whether some contract awards should be excluded from the estimation. For example, the distribution of prime contract dollars awarded by the Defense Department for fiscal year 2004 (data not yet available) may be skewed upward by the small number of very large contracts awarded for military support operations and reconstruction in Iraq.

With regard to the universe of awards to include, it would be desirable to examine separately awards between $2,500 and $100,000, as procurements in this dollar range are designated for small businesses (to the extent feasible). Utilization shares for awards under $100,000 would be informative regarding the relative success of women-owned small businesses compared with other small businesses in obtaining these small-size contracts, whereas the shares for larger awards would be informative regarding the success of women-owned small businesses in obtaining contracts that larger businesses may bid on as well.

Because the congressionally mandated study of women-owned small businesses requires estimating disparity ratios separately by industry, the universe of contract actions must of necessity be limited to those over $25,000. The FPDS does not include smaller awards, and only very limited information, not including industry classification, is maintained for small contracts by the General Services Administration (see Chapter 3).[3] The detailed information in the FPDS for awards over $25,000 permits estimating utilization shares for smaller and larger award size categories. Also, with the currently available data, disparity ratios can be calculated only for prime contract awards but not for subcontracts. The many small businesses that bid on and win subcontracts are not recorded in the FPDS.

[3]Contracting officers may fill out SF-279, which is input to the FPDS, for contracts as small as $10,000, but most such contracts are combined and aggregate information for them entered onto the SF-281.

Total Population

The total population of interest for the SBA study concerns businesses operating in the United States. The population can potentially be defined in terms of numbers of businesses or total business receipts. Typically, only the first definition has been used in the literature for estimating availability shares. Whichever measure is used (numbers or dollars), it is important that it is consistent with the measure used for the outcome of interest (see "Consistency of Elements ," below). Specification of an appropriate population measure must also consider the universe of firms to include, specifically, the treatment of very small firms and other firms that may not be ready, willing, and able to bid on federal procurements.

Very small firms Small businesses are defined to include not only corporations and partnerships, but also sole proprietorships (see Box 2-2). Consequently, a broad definition of the business universe is likely to include a large number of very small firms defined by some metric.

One available measure of smallness is a business having no paid employees. Thus, data from the 1997 Survey of Women-Owned Business Enterprises, which included in its universe all firms operating in the United States with $1,000 or more in gross annual receipts, showed that 75 percent of the estimated total number of 20.8 million firms had no paid employees. By gender of ownership, 84 percent of the estimated number of 5.4 million women-owned firms had no paid employees, as did 67 percent of 3.6 million equally male and female-owned firms, 45 percent of 11.4 million male-owned firms, and 33 percent of 0.4 million publicly held, foreign-owned, and nonprofit firms, which are not classified by gender of ownership (U.S. Census Bureau, 2001:12).

These percentages may be misleading, however, regarding the capabilities of small businesses to handle federal contracts. Some businesses without paid employees may in fact be much larger operations because they use such mechanisms as hiring independent contractors as needed instead of having salaried employees.

Another, perhaps more appropriate, measure of smallness is sales volume. For 1997, 20 percent of all firms with $1,000 or more gross receipts had less than $5,000 in gross receipts; the comparable figure for women-owned businesses was 33 percent. These data suggest that significant fractions of businesses may represent occasional efforts of people who are fully employed as wage and salary workers and do not intend to grow their "business." An example would be a full-time employed manager or teacher who reported a couple of thousand dollars of income from honoraria for presenting papers at a few meetings.

Given that available contracting data limit the estimation of utilization shares to contract awards over $25,000, then the universe of firms for estimating availability shares should be limited in some appropriate manner. For example, the universe could be limited to firms that reported a specified minimum amount of gross receipts in the 1997 Survey of Women-Owned Business Enterprises. Determining the minimum amount of gross receipts would require careful analysis of the distribution of gross receipts for small businesses and could perhaps be informed by data from the Central Contractor Registration (CCR) on the size distribution of small businesses that have registered to do business with the federal government. (The CCR obtains data on number of employees and 3-year average annual receipts.)

If separate utilization shares are calculated for smaller and larger contract awards (say, $25,000 to $100,000 and $100,000 or more), as suggested above, then the universe of firms should be appropriately classified for calculating availability shares. For smaller contract awards, the universe could be limited to small businesses as defined by the SBA (perhaps excluding some very small businesses), while, for larger awards, it could include both small and larger businesses.

Other criteria for defining "ready, willing, and able" A related issue that arises in determining an appropriate universe of firms for estimating availability shares is whether to use criteria in addition to firm size to further limit the universe to firms that are likely bidders on federal contracts. This decision depends largely on the intended use of the disparity ratios. Possible uses are to help justify remedial preferential contracting programs for women-owned small businesses in court, to help refine the design of such programs, or to be part of a broad analysis of barriers that women may face in business ownership and growth.

If disparity ratios are to be used in a comprehensive analysis of barriers that women may face in business ownership and growth, which could, in turn, produce underrepresentation in federal contracting, then a broad definition of the total population of firms for estimating availability shares is likely to be appropriate. If, however, disparity ratios are to be used in court to justify remedial preferential contracting programs for women-owned small businesses, then a broad definition is likely to be inappropriate. Case law in this area has put forward a standard for the total population universe of firms, which includes those that are ready, willing, and able to be federal contractors (see Chapter 2). The notion is that remedial programs are justified when there is evidence of possible discrimination by the federal contracting process against a class of firms in the "ready, willing, and able" universe. Remediation is not necessarily justified, according to case law, when the evidence pertains to a broader universe of

firms, which may indicate societal barriers to business development and growth by a class of firms, but not additional discrimination in the contracting process.

Not only would a "ready, willing, and able" standard for procurements over $25,000 probably exclude very small businesses from the total population universe, but it would also probably exclude other businesses that are too new or are not technically qualified for one or another reason in bidding on federal contracts. Some studies of disparities in state and local contracting have used restricted business lists, such as contractor registries and survey respondents that report interest in or efforts to obtain contracts, to estimate availability shares. The Department of Commerce used a regression methodology with several data sources to estimate a ready, willing, and able population of firms for estimating availability shares for federal contracting (see "Disparity Ratios in the Literature," below).

At present, the CCR maintained by the Department of Defense for the entire federal government could be used for this purpose. Beginning October 1, 2003, every business that intends to bid on a federal contract must register on the CCR. Still, it could be argued that the CCR is too limited a list and that other ready, willing, and able firms exist that, for one or another reason, are not registered on the CCR.

Ideally, one would be able to estimate availability shares and calculate disparity ratios with broader and narrower definitions of the total population. Constructing and comparing multiple measures would provide a fuller picture of the role of women-owned small businesses in economic activity, generally, and in federal contracting specifically. It may also facilitate an investigation of where in the business development and contracting process disparities arise.

Consistency of Elements

A statistically defensible disparity ratio for women-owned small businesses (or another target group) in federal contracting requires consistency among its elements. In particular, if the utilization share is defined in terms of contract award dollars, as is most commonly done, then the availability share should be defined in monetary terms as well, such as annual gross receipts.

Most often, however, disparity studies have used inconsistently defined elements, such as contract award dollars for the utilization share and number of firms for the availability share. The extreme implicit assumption is that every business in the available pool is equally ready, willing, and able to bid on and perform every contract. Some studies have used consistent measures, such as number of contract awards and number of firms. We did not find examples of studies that have used contract award dollars and

gross receipts. A Department of Commerce study used contract award dollars and estimated dollar value of capacity for federal contracting (see "Disparity Ratios in the Literature," below).

One reason for not using gross receipts may be the belief that the availability shares for women-owned small businesses would be systematically smaller because of the very large gross earnings of a small number of very large firms. To the extent this distortion occurs, then the resulting disparity ratios would be closer to 1.0, perhaps undercutting the rationale for preferential contracting programs. More substantive is a concern that the current size, capabilities, and resources of a firm may themselves be influenced by past discrimination. Yet an inconsistent calculation that bases utilization shares on contract dollars awarded and availability shares on number of firms could well produce downwardly biased disparity ratios, thereby overstating the need for preferential contracting programs. The reason is the heavily skewed distribution of U.S. firms by size. Small women-owned businesses make up a disproportionately large percentage of firms compared with their share of business receipts.

Publicly held corporations that account for the majority of business receipts have no official gender, although their shareholders do. The gender of ownership of a business is only specified in the case of proprietorships, partnerships, and Schedule C businesses. These types of businesses are generally considerably smaller in scale than corporations. If the women-owned share of businesses is calculated only among businesses for which the gender of ownership is known, then, for consistency, the women-owned share of contracting should be calculated only among contracts awarded to such businesses.

A careful analysis will look at the results of several different types of disparity ratios. To the extent that different measures—such as receipts-based measures, numbers-based measures, measures that vary the lower limit of receipts for inclusion in the universe of firms, and measures that exclude outliers (e.g., very large contract awards, very large businesses in terms of receipts)—tell a similar story, then the justification for (or against) preferential contracting programs will be strengthened. To the extent that different measures tell very different stories (e.g., the large percentage of contract actions compared with the small percentage of contract dollars awarded to women-owned small businesses by the Department of Energy), then additional analysis will be required to make a case for preferring a particular measure or set of measures among all those calculated.

In addition to consistency among the elements of the disparity ratio, the reference periods for the utilization and availability shares should be as close in time as possible. The number of women-owned small businesses has grown rapidly in the recent past, with an estimated 16 percent increase over the period 1992 to 1997 (37 percent among firms with paid employ-

ees), compared with a 6 percent growth rate in the same time period for all businesses, with or without paid employees (U.S. Census Bureau, 2001:12). As a consequence, if the time period for the availability share lags the time period for the utilization share by more than a year or so (as is likely to be the case given data availability), then the disparity ratio will probably be biased upward, indicating a better position for women-owned small businesses in federal contracting compared with their position in the business sector than is probably true.

Industry Breakdowns

The congressionally mandated study of women-owned small businesses in federal contracting requires estimates of representation by industry. The current standard set of industry codes, the North American Industry Classification System (NAICS), has five levels of classification. At the broadest level, NAICS consists of 20 industry sectors, identified by the first two digits of the individual 6-digit industry codes (1,170 in all). Subsectors, industry groups, NAICS industries, and U.S. industries are identified by the first three digits, four digits, five digits, and six digits, respectively, of the specific industry codes. The NAICS system, developed jointly by Canada, Mexico, and the United States, was first issued in 1997 and most recently updated in 2002. It replaced the previous 4-digit Standard Industrial Classification (SIC) system, last updated in 1987, which emphasized the manufacturing sector. NAICS focuses on new and emerging industries, industries using new technology, and service industries. The 2002 NAICS update made substantial revisions in the construction and wholesale trade sectors and minor revisions in the retail and information sectors (see www.census.gov/epcd/www/naics/html [December 2004]).

A key issue for calculating disparity ratios (or differences) by industry is which level of NAICS codes to use. The 20 industry sectors (defined by the first two digits in the NAICS coding scheme) appear too broad to be used as the basis of disparity ratios to inform understanding of the role of women-owned small businesses in federal contracting and what kinds of preferential treatment may be indicated. At the other extreme, there are so many specific industries identified by 6-digit NAICS codes that the resulting disparity ratios are likely to be adversely affected by sampling variability and also by errors of classification.

Ideally, the level of NAICS codes used for calculation of disparity ratios will be chosen to optimize two criteria. First, each industry-specific disparity ratio should meet a specified reliability standard (see "Data Quality Issues," below). Second, the level of industry detail should be as disaggregated as the data will support so that preferential treatment programs (if

any) are targeted to relevant industries and exclude industries for which such programs do not appear to be warranted. With this approach, disparity ratios could be calculated for 3-digit categories when the industries in a 3-digit grouping are reasonably homogeneous (e.g., in scale of operations), or when there is insufficient sample size for further disaggregation. Given sufficient sample size and heterogeneity in a 3-digit category, then disparity ratios could also be calculated separately for two or more 4-digit groupings.

UNDERREPRESENTATION

Congress did not define underrepresentation or substantial underrepresentation—that is, how small the disparity ratio must be to single out an industry for instituting preferential treatment programs for women-owned small businesses in federal contracting. In the literature, a disparity ratio of 0.80 or smaller has been used to denote industries in which women-owned or minority-owned small businesses are underrepresented in contracting (see, e.g., Enchautegui et al., 1997). Adoption of the threshold value of 0.80 may in part stem from its use by the Equal Employment Opportunity Commission as a rule of thumb for defining underrepresentation in enforcing antidiscrimination employment laws (see Chapter 2). The 0.80 threshold value also has the advantage, compared with a higher value, of reducing classification errors due to sampling variability or other sources of error in the underlying data.

No threshold, formal or informal, has been set for identifying industries in which women-owned small businesses are considered substantially underrepresented in contracting. The SBA CAWBO preliminary study reviewed below adopted a threshold of 0.50 or smaller to denote substantial underrepresentation.

Ultimately, the selection of threshold is a matter of judgment and face validity. Scientific methods can help narrow the range of reasonable values but cannot determine a specific threshold value to denote underrepresentation or substantial underrepresentation in federal contracting. In order to arrive at a scientifically defensible definition of "underrepresentation," one needs to specify an underlying model of the processes that would generate such underrepresentation—see the discussion of theory-based models of discrimination in Chapter 5.[4]

[4]Formal theory-based models make it possible to estimate statistically the probable effects of discriminatory factors as an explanation for observed disparities (see Chapter 5).

DATA QUALITY ISSUES

Whether the purpose of calculating disparity ratios is to support the use of preferential contracting programs or to be informative about the role of women-owned small businesses in federal contracting, it is critical that good practices be followed with regard to selecting suitable data sources, estimating the elements of the disparity ratios, evaluating sampling and nonsampling errors in the estimates, testing the sensitivity of the estimates to alternative data sources and methods, and documenting the procedures used in every step of the process. Good documentation is particularly important to permit outside review.

There are no perfect data sources for estimating disparity ratios by industry for women-owned small businesses in federal contracting, particularly in the case of availability shares. Better-suited data are available for estimating utilization shares, except that detailed information is not available about contracts under $25,000, and no information is available about subcontracts. The lack of data for subcontracts is unfortunate, because one would expect subcontracting to be an important means by which women-owned and other types of small businesses participate and gain experience in federal contracting.

Generally, careful evaluation is required of the strengths and weaknesses of alternative data sources. Table 4-2 summarizes key features of the FPDS for estimating utilization shares for prime contract awards over $25,000. It also summarizes key features of two possible sources for estimating availability shares—the Census Bureau's Survey of Women-Owned Business Enterprises conducted every 5 years (SWOBE, renamed the Survey of Business Owners) and the CCR. Because of changes in these sources over time, comparable time series of utilization and availability shares for past years are not easy to construct.

Once a data source is selected for use in constructing disparity ratios for women-owned small businesses, then it is important to evaluate several dimensions of data quality and carefully document the findings. At least five quality features should be considered: sampling variability, nonsampling errors, outliers, consistency of reference period, and consistency of concept.

Sampling variability Some data sources, such as the SWOBE, are sample surveys, for which estimates are subject to sampling variability. Such variability is important to take into account when determining the level of detail of industry classifications for preparing separate disparity ratios and when selecting threshold values for underrepresentation and substantial underrepresentation. Other data sources are virtually a census of a universe—for example, the FPDS is a census of actions involving contracts over $25,000 for almost all federal contracting agencies. However, utiliza-

tion shares estimated from the FPDS may not be reliable in a broader sense if the number of contracts on which the shares are based is small for a particular industry and year. At the limit, if there is only one contract, the utilization share will be 1 or zero. In such instances, it may be advisable to pool data across years and industries for estimation.

Nonsampling errors In a survey such as the SWOBE, nonsampling errors include nonresponse to the questionnaire or to specific items on the questionnaire, underreporting or overreporting of such items as gross receipts and number of employees, and errors introduced by sample weighting and nonresponse imputation procedures. In an administrative records system like the FPDS, nonsampling errors may include inadvertent failure to file forms for some contract actions, late filing, and misreporting of some information for a contract action.

It is usually difficult to estimate the magnitude and effects of nonsampling errors on estimates from the data. At a minimum, users should ask the producing agency for information about nonsampling errors and about procedures that are used to assess and correct for errors (for example, auditing procedures for the data in the FPDS, respondent reinterviews for a survey). Because nonsampling errors may have important effects that are hard to estimate, users should plan to conduct sensitivity analyses to determine how much variability in estimates of disparity ratios results under different assumptions about the quality of the data.

Outliers Careful examination of the distribution of the data on important dimensions, such as contract award size or firm size, should be part of the process of estimating disparity ratios. It may be that outliers or extreme values are present that distort the estimates for a given industry, contracting agency, or time period. Examples include the likely spike in contracting dollars awarded in fiscal year 2004 because of the war in Iraq and such unique, very large contracts as the Department of Energy national laboratories, requiring highly specialized capabilities. Graphical display techniques, such as box plots, can help identify outliers. Whether to exclude them from the estimation will not always be clear, but the decision should be carefully documented and the rationale explained. Again, sensitivity analysis of the effects on the estimates of excluding or including various outliers will be helpful in determining and justifying an appropriate decision.

Outliers are a particular problem for the contracting application, in contrast to the much more developed case of employment discrimination. In the employment application, the unit of analysis is an individual man or woman applying for a particular position. In the contracting application, however, firms vary widely in such measures of capacity as revenues and

TABLE 4-2 Features of Relevant Data Sources for Study of Use of Women-Owned Small Businesses in Federal Contracting

Name and Sponsor Agency	Survey of Business Owners and Self-Employed Persons (SBO); combines Surveys of Women-Owned and Minority-Owned Business Enterprises (SWOBE/SMOBE); conducted by the U.S. Census Bureau	Central Contractor Registration (CCR); contractor-operated on behalf of the U.S. General Services Administration, Office of Management and Budget, Small Business Administration, and Department of Defense	Federal Procurement Data System (FPDS); being upgraded as FPDS-Next Generation (FPDS-NG); contractor-operated on behalf of the U.S. General Services Administration
Universe	As of 2002, all business enterprises with gross receipts of $1,000 or more, including sole proprietorships, partnerships, subchapter S-corporations, and a small sample of C-corporations; all businesses with the same owner treated as single business regardless of how many tax returns filed	As of October 1, 2003, all vendors and prospective vendors (must be registered prior to submitting a bid)	Individual Contract Action Reports database (ICAR) for prime contracting actions reported on form DD-350 (defense) and SF-279 (civilian agencies) for every contract over $25,000 (and some smaller contracts); also produces reports from aggregate data (e.g., for groups of contracts under $25,000 reported on form 281); excludes Congress, GAO, federal courts, FAA, TVA, FDIC, CIA, and NSA
Sample Size and Design	Information on sole proprietorships obtained from IRS tax returns; other types of businesses included in survey with complex, stratified design	N.A.	N.A.

Frequency and Timeliness	Every 5 years, part of Economic Census, data released 2-3 years after collection; most recent survey provides data for 2002, collected in 2003, released in 2005; special analyses on request	Updated daily; no regular reports; accessible by federal agencies and contractor registrants	Updated quarterly; annual reports produced beginning for fiscal year 2000; special analyses on request
Content for Each Data Record	Percentage ownership by gender, Hispanic origin, and race, number of owners, whether did business with federal government, type of business (e.g., sole proprietorship), number of employees, annual payroll, annual gross revenues, number of establishments, places of operation, industries of operation	DUNS Number, Tax ID or SSN, corporate web page URL, physical address, mailing address, business start date, number of employees, 3-year average annual revenue, fiscal year close date, whether accept federal contracts or grants or both, type of organization (e.g., sole proprietorship), where incorporated, business types (e.g., government entity by type, educational entity by type, business by field), socioeconomic factors (e.g., small business, woman-owned), socioeconomic certification, party performing certification, up to six NAICS codes, up to six SIC codes, financial and contact information for billing	ICAR records: reporting agency, contract identification, action date, kind of contract action, dollars obligated or deobligated, principal product or service code, principal NAICS code, contractor identification, principal place of performance, whether bundled, type of contract or modification (e.g., fixed-price), solicitation procedure (e.g., set-aside), authority for other than open competition, number of offers received, extent competed, type of contractor (e.g., SDB), whether women-owned, HUBZone, SDB, or other preference program, price evaluation adjustment percent difference, whether subcontracting plan, whether subject to labor statutes,

continued

TABLE 4-2 Continued

			estimated contract completion date, contractor's taxpayer ID, parent company's taxpayer ID, whether part of small business competitiveness demonstration program (selected agencies), number of employees category (small businesses only), average annual gross revenue category (small businesses only)
Historical Information	First conducted in 1972; prior to 1997 had only a small sample of C-corporations (none prior to 1992) and treated each business tax return as a separate business; identification of sole proprietorships with employees revised in 1997 (reduced estimated number relative to 1992 method); identification of women-owned businesses revised in 1997 (reduced estimated number of women-owned businesses by separately identifying 50-50 men-women-owned)	Prior to October 1, 2003, covered vendors for the Defense Department, Transportation Department, Treasury Department, and NASA only; as of January 1, 2004, integrates the SBA PRO-*Net* database of certified small businesses	

NOTE: N.A. = not applicable. CIA = Central Intelligence Agency; DUNS = Data Universal Numbering System number provided by Dun & Bradstreet; FAA = Federal Aviation Administration; FDIC = Federal Deposit Insurance Corporation; GAO = Government Accountability Office; IRS = Internal Revenue Service; NAICS = North American Industry Classification System; NASA = National Aeronautics and Space Administration; NSA = National Security Agency; SDB = small disadvantaged business; TVA = Tennessee Valley Authority.

SOURCE: U.S. Census Bureau (2001); www.ccr.gov [December 2004]; www.fpds.gov [December 2004]; see also Eagle Eye Publishers, Inc. (2004b).

number of employees, and contracts vary widely in such characteristics as technical requirements and dollar value.

Consistency of reference period Given that utilization shares or availability shares or both may exhibit dynamic changes over time, it is important that the reference period be as consistent as possible. Take an example in which the share of women-owned small businesses increases, but their share of contracts does not. If the availability share is computed from the 1997 SWOBE (because 2002 SWOBE data are not yet available) and the utilization share from the 2003 FPDS as the year of interest, the result would be to underestimate the current availability share and overestimate the disparity ratio. Such an outcome could lead to an erroneous conclusion that little disparity was evident because the estimated disparity ratio was higher than the true disparity ratio. If data sources with consistent reference periods are not available, then consideration could be given to adjusting one or another source to achieve greater consistency—for example, trend indicators from other sources might be used to project the 1997 SWOBE data forward in time.

Consistency of concept As discussed above, the concept underlying the utilization and availability shares must be as consistent as possible for appropriate estimation of disparity ratios. Thus, if data limitations dictate a universe of federal contracts over $25,000 for estimating utilization, then the universe of businesses for estimating availability should probably exclude very small businesses that are not realistically likely to bid on or be qualified for such contracts.

DISPARITY RATIOS IN THE LITERATURE

In the years immediately following *City of Richmond v. J.A. Croson Co.,* 488 U.S. 469 (1989), many state and local governments commissioned studies of disparities in government contracting for minority-owned and, less often, women-owned small businesses using a variety of measures of utilization and availability. The Urban Institute subsequently conducted a meta-analysis of these studies (Enchautegui et al., 1997).[5] In the late 1990s, the Department of Commerce performed analyses to identify industries in which ready, willing, and able minority-owned businesses were underrepresented in federal contracting. Finally, CAWBO conducted industry-specific analyses of disparities in federal contracting for women-owned

[5]In meta-analysis, the researcher produces statistics that combine and summarize the results of more than one study on an outcome variable of interest, selecting studies that meet specified criteria for content and quality.

small businesses pursuant to the Small Business Reauthorization Act of 2000, using 1997 SWOBE data on businesses with paid employees to calculate availability shares.

We review each of these efforts below. With the exception of the Urban Institute meta-analysis, the possible usefulness of the various study results is severely impaired by the poor quality of documentation of the methods and data sources employed.

State and Local Disparity Studies

Over 100 jurisdictions have conducted studies of the contracting experience of minority-owned small businesses and, in some instances, women-owned small businesses. These studies have been criticized as too often relying on anecdotal evidence of discrimination provided by minority and women owners or on a general history of discrimination in the locality and not on statistical evidence of disparities (see, e.g., La Noue, 1992, 1995).

We were not able to review any of the individual studies, which, in any case, deal with state and local contracting, not federal contracting. We reviewed the Urban Institute meta-analysis (Enchautegui et al., 1997), which combined results from many of these studies to estimate statistical disparities across states and localities in contracting for minority-owned and women-owned small businesses in broad industry groups. The Urban Institute study was conducted for the U.S. Department of Justice as part of an evaluation in the mid-1990s of the need for federal preferential contracting programs (see Chapter 2). Its approach and findings provide useful insights for the estimation of valid, informative disparity ratios.

Urban Institute Meta-Analysis

The Urban Institute collected reports of 95 state and local government-commissioned disparity analyses and reviewed them to screen out those that did not provide relevant or statistically defensible results. Studies were included only if they satisfied all four of the following criteria: they provided disparity ratios or the data to construct ratios and not just anecdotes; they reported findings separately by industry category; they reported the number of contracts used in the analysis or the statistical significance of the calculated ratios; and they included more than 80 contracts in total. In addition, some studies that satisfied these criteria were dropped because of significant inconsistencies in their results or poor documentation for key calculations. After the screening, 58 studies remained for the Urban Institute meta-analysis.

These 58 studies varied in their measures of utilization and availability for constructing disparity ratios. Most commonly, utilization was measured

in monetary terms, either as the dollar amount of contract awards or the dollar amount actually paid out. Some studies also defined utilization in terms of numbers of contract awards. Measures of availability were expressed in numerical terms (numbers of firms) and never in monetary terms (e.g., gross receipts), and they differed in the universe definition. The six most common universe definitions, listed in order from a narrow to a broad definition of availability, were previous award winners (firms on vendor lists), firms that bid on past contracts or appeared on lists to receive information about procurements, firms certified as minority owned or women owned, firms that expressed interest in government contracting work in response to a survey, all firms with paid employees, and all firms. Some studies used more than one definition. Availability measures based on all firms or all firms with paid employees used data from the 1987 SWOBE.

To combine results across studies, the Urban Institute first averaged the disparity ratios for each study (jurisdiction) that reported more than one ratio (most did) and then took the median of the study averages in order to minimize the effects of outliers. The averaging was performed separately for groups defined by ownership status (black, Hispanic, Asian, American Indian, women-owned) and industry category (construction, construction subcontracts, goods, professional services, other services).[6]

The Urban Institute estimated an overall disparity ratio of 0.29 for women-owned businesses in state and local contracting. This ratio was estimated to differ significantly from a chance result, using a 0.05 probability test. Estimated disparity ratios for women-owned businesses by industry category varied from 0.17 for professional services to 0.77 for construction subcontracting (the latter estimate was not statistically significantly different from 0.80 or 1.00).

The Urban Institute tested the sensitivity of the results to several methodological features of the various studies. Disparity ratios were calculated separately for studies with large numbers of contracts or high levels of availability of minority-owned or women-owned businesses and all other studies. Separate ratios were also calculated for each of three research firms that conducted multiple disparity studies for state and local governments and all other studies. These breakdowns did not alter the picture conveyed by the overall results. Disparity ratios for women were low, no matter how they were computed—that is, women-owned businesses received a very small share of contracts and contract dollars compared with their share of the business population (Enchautegui et al., 1997:Tables 2.4, 2.9).

[6]The results are not specific to minority-owned or women-owned businesses that are small businesses as defined by the SBA. Data from the 1997 SWOBE indicate that a very high percentage of women-owned businesses (99 percent) would probably be classified as small by the SBA (U.S. Census Bureau, 2001:Table 9).

The Urban Institute also tested the sensitivity of the results to the universe definition for the measure of availability, specifically, whether the measure used SWOBE data on all firms or all firms with paid employees to define the universe, or, instead, used a measure that could be construed as "ready, willing, and able" (e.g., defining the universe in terms of registered bidders). Using SWOBE data could present several problems (see Enchautegui et al., 1997:70-71). Some of these problems, if not corrected, would probably generate overestimates of availability—for example, the fact that SWOBE includes very small businesses and prior to 1992 excluded C-corporations (primarily those with more than 35 shareholders). Other problems would probably generate underestimates of availability—for example, known undercounts of Hispanic-owned and Asian-owned businesses in SWOBE. Underestimation might also occur if the survey reference year preceded the estimation year in a particular study. Yet a list of bidders or registrants might be out of date or exclude some capable and interested firms. Finally, respondents to a survey of interest in government contracting might not accurately represent the entire sample because of differences between respondents and nonrespondents, or the sampling frame for the survey might have excluded some businesses.

As it turned out, across all studies, the median disparity ratios for women-owned businesses differed little by whether the universe of available firms was defined broadly or more narrowly (Enchautegui et al., 1997:Table 2.5). Given that the measure of utilization was held constant, this finding suggests that, on average, women-owned firms were neither overrepresented nor underrepresented on vendor or bidder lists of state and local governments compared with their share of all firms. In contrast, disparity ratios for minority-owned firms were significantly higher when the universe of available firms was defined broadly than when it was defined more narrowly. This finding suggests that, in the states and localities studied, minority-owned firms were overrepresented on vendor or bidder lists compared with their share of all firms.

As noted above, almost all 58 studies calculated disparity ratios that were internally inconsistent because the utilization measure was in terms of contract dollars awarded and the availability measure was in terms of number of firms in a specified universe. Some studies also calculated disparity ratios consistently, in that the utilization measure was in terms of numbers of contracts awarded, not dollars. No jurisdiction compared shares of contract dollars awarded with shares of gross business receipts.

Comparing the consistently and inconsistently calculated ratios for women-owned small businesses for jurisdictions for which both types of ratios were reported suggests few differences between them. The exception was construction subcontracting, for which the median disparity ratio for the consistent calculations (numbers of contracts and firms) was 0.52 points

higher than that for the inconsistent calculations (contract dollars and numbers of firms). This finding suggests that women-owned businesses received a higher percentage of construction subcontracts than of the subcontract dollars awarded.[7]

The Urban Institute meta-analysis is not directly useful to the SBA to respond to the congressional charge to estimate disparity ratios by industry for women-owned small businesses in federal contracting. The data pertain to state and local contracting for those jurisdictions that chose to conduct disparity studies, and they are out of date. The study approach is useful, however, because it demonstrates attention to detailed documentation of data and methods and careful explication of limitations of the analysis and the sensitivity of the results to factors that could have biased them. The data for each study included in the analysis are provided in the report, so that other researchers can examine them. One useful addition to the study would have been a display of the data points for each industry using a box plot, which would graphically allow conclusions about the spread in the data.

Department of Commerce "Ready, Willing, and Able" Analyses

In 1996, the Department of Justice put forward a plan to revamp the federal government's preferential contracting programs for small disadvantaged businesses (see Chapter 2). One provision of the revised acquisition regulations provided that small disadvantaged businesses could receive a price evaluation adjustment, or bid-credit, to level the playing field with larger businesses. However, the bid-credit could be used only for contracts in industries designated by the Department of Commerce as falling below an industry-specific benchmark limit with regard to utilization of small disadvantaged businesses. The Justice Department intended these benchmarks to represent the "level of minority contracting that one would reasonably expect to find in a market absent discrimination or its effects." The Commerce Department's Office of the Chief Economist and Office of Policy Development in the Economics and Statistics Administration released the results of its first benchmark study in 1998, which pertained to contracting in fiscal year 1996, and updated those results in 1999. No further studies have been conducted (U.S. Office of Management and Budget, 1998, 1999).

The Commerce Department's study has been harshly criticized for the lack of documentation of data sources, analytical methods, and limitations

[7]Estimates were computed by the steering committee staff, averaging results for each jurisdiction reporting more than one consistent, or inconsistent, disparity ratio, and taking the median of consistent (inconsistent) ratios across studies in an industry group.

of the results; for failure to develop meaningful industry groupings for a study of federal contracting; and for the lack of a theory of discrimination underlying the study (La Noue, 2000). We agree with the criticisms about the deficiencies of documentation, which make it difficult to assess the value of the approach for possible use by the SBA, and about the superficial approach to defining industries. Articulating a theory of discrimination requires defining the universe of available firms—whether it is appropriate to use an "all firms" definition from a source such as the Survey of Business Owners, or whether a definition of "ready, willing, and able" firms is more appropriate and what should be the precise definition of "ready, willing, and able." We consider the suitability of various definitions in light of the intended uses of the calculated disparity ratios, but do not recommend a specific definition for the universe of available firms (see Chapter 6).

The only available documentation for the Commerce Department's benchmark study is contained in a brief appendix to a *Federal Register* notice (U.S. Office of Management and Budget, 1998:35716-35717). It summarizes the methodology in the briefest terms.

Creating a Data Set

The Commerce Department first sought to assemble a data set of firms that were "ready and willing" to supply the federal government. The department rejected using the 1992 Survey of Minority-Owned Business Enterprises, presumably because it was out of date for a study of contracting experience in fiscal year 1996 and also because of uncertainty about how to screen out firms that were not interested in or capable of supplying the federal government. Instead, the department used three data sets for fiscal year 1996:

1. Bidders from a sample of competitive procurements over $25,000. These firms were identified from a survey of federal contracting officers, who were asked to provide names of bidders for a sample of 16,616 new, competitive procurements stratified by industry and, for construction industries, by the 9 census geographic divisions. The survey had a 76 percent response rate.
2. All firms that won sole-source or other noncompetitive procurements over $25,000.
3. All firms certified by the SBA as active and eligible for Section 8(a) contracts, whether or not the firms won new contracts in fiscal year 1996.[8]

[8]The addition of all firms on the 8(a) list was criticized on the grounds that most of them do not bid in open competitions (La Noue, 2000:95).

The department matched the firms in these three data sets by taxpayer identification number and federal contracting arena (that is, major industry grouping corresponding to a 2-digit SIC category or, sometimes, a 1-digit SIC category) to eliminate duplication. It then added measures of size (annual payroll), age in years of existence, and profit-nonprofit status for each firm by matching with the Census Bureau's 1995 Standard Statistical Establishment List (SSEL).[9] It also resolved cases of inconsistent reporting of small disadvantaged business status. Finally, the department added a utilization measure for each successful bidder in the integrated data set by matching with the FPDS to obtain total net prime contract obligations over $25,000 awarded to a firm in fiscal year 1996.

Smaller contracts were excluded from the analysis because of the lack of detailed information about them. The department found that small disadvantaged businesses received a smaller percentage of small awards compared with awards over $25,000, so that excluding small awards would somewhat overestimate utilization.

Measuring "Ready, Willing, and Able"

The next step in the Commerce Department's methodology was to measure the capacity of the ready and willing firms in the integrated data set. A dollar value for capacity was assigned to each firm equal to the geometric mean value of federal contracting work for contractors of a given size and age in a given industry group. The capacity values were estimated through regression equations for each industry group, using those firms in the integrated data set that were successful bidders in fiscal year 1996. The dependent variable for each such firm was the log of the utilization measure (amount of federal contract dollars); independent variables included the log of the number of years since the firm first appeared in the SSEL, a dummy variable if the firm first appeared before 1975, the log of 1995 payroll, interaction terms between the payroll and age variables, and a dummy variable if the firm certified that it met the SBA's definition of a small business in the contracting arena. For firms missing one or more of the independent variables for the equations and for nonprofit and government establishments, the mean log of utilization was computed separately within industry group.

[9]The SSEL has been renamed the Business Register; it is confidential and was used under an arrangement by which Department of Commerce staff were sworn as special census agents and worked on-site at Census Bureau headquarters in Suitland, Maryland.

Calculating Utilization and Availability Shares

Finally, the Commerce Department used the integrated data set to measure utilization and availability shares for small disadvantaged businesses in major industry groups. Utilization shares were calculated as the total value of prime contract dollars awarded in fiscal year 1996 to small disadvantaged businesses in the data set divided by the total value of prime contract dollars awarded to all firms in the data set. Availability shares were calculated as the total capacity value assigned to all small disadvantaged businesses in the data set divided by the total capacity value assigned to all firms in the data set.

Based on the results, the Department of Commerce determined that small disadvantaged firms were eligible for a 10 percent price evaluation adjustment, or bid-credit, in 71 industry groups, and for 3 construction industries, within each of 9 geographic divisions. By comparison, the SIC includes 83 2-digit industry categories in all. An updated analysis, released in 1999, limited the bid-credit to small disadvantaged businesses in 51 industry groups plus each of 9 geographic divisions for 3 construction industries. No documentation was published of the threshold level of disparity used by the department in determining eligible industry groups.

Assessment

On the positive side, the Department of Commerce study exhibited diligent and innovative work to attempt to develop a defensible measure by which to classify firms as ready, willing, and able to supply federal procurement needs for prime contracts over $25,000. Utilization shares and availability shares were also consistently defined in dollar terms.

Greatly impairing the usefulness of the study results and methodology, however, is the lack of documentation for key components in the estimation, particularly for the regression equations that were used to predict capacity values. For example, there is no description of the values of the estimated coefficients for the independent variables, no information on standard errors or how much of the variance in the dependent variable is explained by the independent variables, no analysis of the distribution of the residuals (that is, the differences between the predicted and reported values of the dependent variable for each observation) to look for possible prediction biases, no discussion of alternative functional forms of the regressions that were tested (if any), and no reports of outliers and their effects on the estimated coefficients. Analyses of these kinds are essential to verify that a regression equation performs well for the observations for which it is estimated.

Also important for evaluation is to cross-validate the analysis by find-

ing ways to compare the regression predictions with a set of target or "true" values that were not used to develop the equations (see National Research Council, 2000:Ch. 6). In this application, it would have been possible to estimate the equations on a random half-sample of the observations for successful bidders, use the equation results to predict capacity for other successful bidders in the integrated data set, and compare the predicted values with the reported values of contract dollars awarded for the other successful bidders. Whether such analysis was done for the equations used by the department or alternative forms of those equations is not known.

SBA CAWBO Study

The preliminary CAWBO study of women-owned businesses in federal contracting was summarized for the committee in the open session of its spring 2004 workshop. Later on in the project, the committee members were able to receive a copy and examine it. The committee does not comment on specific estimates in the document, but only on general methodological points.

Methodology

The basic methodology used by CAWBO followed that of many of the state and local contracting studies reviewed by the Urban Institute, and it refers to the Urban Institute analysis as the basis for a number of methodological decisions (Enchautegui et al., 1997). Like many of the state and local studies, CAWBO used inconsistent definitions for the utilization share, U, and the availability share, A, in calculating disparity ratios within industry group. This difference may have affected the estimates of disparity ratios for industries, although whether the effects were small or large is not known by the committee.

For the utilization share (U), the CAWBO study defined both the numerator and the denominator in monetary terms. The numerator of U was defined as total dollars of federal prime contracts over $25,000 awarded in fiscal year 1999 to women-owned small businesses as defined by the SBA. The denominator was defined as total dollars of federal prime contracts over $25,000 awarded in fiscal year 1999 to all firms, including women-owned small businesses, nonwomen-owned small businesses, and larger businesses. The data source was the FPDS, which contains detailed information for all federal prime contracts over $25,000, accounting for over 90 percent of the $200 billion spent in fiscal year 1999. Contracting data for fiscal year 1999 were used instead of the most recent data available at the

time of the study (for fiscal year 2000), in order to be more comparable to the reference period for the SWOBE data used to measure availability.

For the availability share (*A*), the CAWBO study defined both the numerator and the denominator as counts. The numerator of *A* was defined, not in dollar terms similar to the numerator of *U* above, but as the number of women-owned businesses (firms) with paid employees identified in the 1997 SWOBE. The denominator of *A* was defined as the total number of business firms with paid employees, including women-owned businesses (assumed to be primarily small businesses), other small businesses, and larger businesses, from the same 1997 survey.

Defining underrepresentation as a disparity ratio of 0.80 or less, the CAWBO study estimated that women-owned small businesses were underrepresented in all but 5 of 71 industry groups (2-digit SIC categories) for which disparity ratios were calculated. Defining substantial underrepresentation to be a disparity ratio of 0.50 or less, the study estimated that women-owned small businesses were substantially underrepresented in 56 industry groups. The CAWBO study stated that it chose 0.80 as the level between representation and underrepresentation to allow for the possibility of measurement error. That level is also congruent with the Urban Institute meta-analysis and the rule of thumb used by the Equal Employment Opportunity Commission in employment discrimination cases. The CAWBO study stated that it chose 0.50 as the level between underrepresentation and substantial underrepresentation to be conservative, noting that the few studies that offered a level set it at higher than 0.50.

Assessment

A major limitation of the CAWBO study is the same as that of the Department of Commerce study reviewed above—namely, incomplete and unclear documentation of data sources and estimation methods and the lack of any published sensitivity analysis that would indicate the robustness of the estimated disparity ratios to alternative measures of utilization and availability. Tables and graphs are not clearly labeled, and the steps followed to evaluate and select data sources and construct estimates are not clearly described. The presentation is in the form of a series of questions and answers (for example, "Why use FY 1999 data when the FY 2000 data are available for contracting?"). Such a presentation could be useful to provide as a supplement for stakeholders, but it does not substitute for a clear, ordered description of estimation techniques and procedures. Finally, although the document mentions many studies that were consulted, it provides only two references.

The CAWBO document indicates that a variety of data sources were examined for measuring availability prior to selecting the 1997 SWOBE

data on firms with paid employees to use in the analysis. Specifically, the study examined seven data sets: (1) the SBA PRO-*Net* database of small businesses registered to do contracting with the federal government, which carries a self-designation of women-owned status; (2) the 1997 SWOBE tabulation for all firms; (3) the 1997 SWOBE restricted to firms with paid employees; (4) a special tabulation of the 1997 SWOBE for all firms in which some firms reporting 50-50 male-female ownership were assigned to the women-owned category (as was done in the 1992 SWOBE); (5) the same special tabulation restricted to firms with paid employees; (6) the Department of Defense CCR; and (7) the Department of Commerce database of firms active in federal prime contracting in fiscal year 1999, including contract winners and bidders from a survey of contracting officers.

The CAWBO document does not present disparity ratios estimated using these various sources. It presents a summary justification for selecting the 1997 SWOBE data for firms with paid employees, but it does not indicate whether that justification applied to all industries. According to the document, this choice was conservative in that the only data set indicating that women-owned small businesses were a smaller share of all businesses than the SWOBE data on firms with paid employees was the Department of Commerce file of successful and unsuccessful bidders.

CAWBO declined to use the Department of Commerce data set (which may be subject to significant sampling and nonsampling errors), given its belief that more firms are ready, willing, and able to be federal contractors than those on the list of active bidders. To assess the validity of this belief, CAWBO looked at a sample of industries to determine if only the largest firms could handle the typical federal contract. The document summarizes the findings, stating that the majority of contracts in an industry are below the average size contract (a small number of large contracts pull up the average), and that women-owned small businesses have obtained contracts at the average size, indicating that firms with employees in an industry should be able to handle the typical contract. CAWBO noted that small firms can subcontract, engage in joint ventures, hire temporary staff, or take other steps to expand their capacity as needed.

CAWBO rejected the idea of a regression analysis to estimate the capacity of available firms to handle federal contracting on the grounds of lack of time and resources to assemble the necessary firm-specific data. CAWBO also said that the SBA was not charged to explain observed disparities in federal contracting within industries, but simply to measure them.

Finally, the CAWBO document summarizes an analysis of the success of women-owned small businesses in the private sector compared with the government sector. Marketplace disparity ratios were calculated for every industry—the method is not explained but may have involved comparing

shares of numbers of firms with shares of business receipts for women-owned businesses. The marketplace ratios were then compared with the federal contracting disparity ratios. Women-owned small businesses were underrepresented in the private market as well, but not as much as in the government market, a finding that CAWBO believes supports the conclusion that capable women-owned small businesses are not being well used in federal contracting. This and the other analyses summarized in the CAWBO document indicate the hard work that the analysts put into the study. The analyses would be more useful and convincing if the detailed results were provided, as was done in the Urban Institute meta-analysis. Our recommendations regarding the CAWBO study and the development of disparity ratios to respond to the SBA's congressional mandate are presented in Chapter 6.

5

Measuring Discrimination

Disparities are often taken to indicate the presence of discrimination—for example, that observed differences in earnings between women and men must be due in part to discrimination against women by employers. However, measured disparities may be due to any number of factors, and they need not imply discrimination. This chapter briefly reviews methodological issues involved in explaining statistically measured disparities that are found in the use of women-owned small businesses in federal contracting. Research on factors that result in barriers for women-owned small businesses, including possible discriminatory practices or behaviors in the contracting process or discrimination in other domains, such as bank lending, seems useful to include in the longer term research agenda that we recommend that the SBA develop in this area (see Chapter 6).

Determining the factors that explain observed disparities is a difficult task. Determining the extent to which discriminatory practices or behaviors are among the causal factors is a particular challenge. A recent panel of the Committee on National Statistics conducted an extensive review of data and methods for measuring racial discrimination, which are also relevant for measuring gender discrimination. Much of the discussion below of concepts and estimation methods draws on that panel report (National Research Council, 2004).

DEFINING DISCRIMINATION

The National Research Council (2004:Ch.3) used a social science definition of racial discrimination that can be translated into a similar definition of discrimination against women (or women-owned small businesses).[1] This social science definition has two components: (1) *differential treatment on the basis of gender* that disadvantages women and (2) *treatment on the basis of inadequately justified factors other than gender* that disadvantages women (differential effect). The first component, which constitutes intentional discrimination, is frequently unlawful under either the U.S. Constitution or specific legislation under the "disparate treatment" legal standard. The second component includes instances in which treatment based on inadequately justified factors other than gender results in adverse consequences for women, such as a promotion practice that generates differential effects.[2] A process with adverse consequences for women may or may not be considered discrimination under the law under the "disparate impact" legal standard, depending on whether there is a sufficiently compelling reason for its use and whether there are alternative processes that would not produce gender disparities.[3] In the areas in which this type of discrimination is unlawful, the reason is to curtail the use of unintentional practices that can harm women, as well as to sanction intentional discrimination that might not be identified because of the difficulty in establishing intent in the legal setting.[4]

The social science definition of discrimination is broader than the legal standards of disparate treatment and disparate impact because it includes processes and behaviors that warrant attention by policy makers, even though they would not meet a legal standard of proof. For example, subtle—but not necessarily illegal—forms of discrimination in the contracting process could adversely affect the probabilities of women-owned small businesses obtaining federal contracts on which they bid. Also, overt or subtle

[1]Because the focus of this report is on underrepresentation of women-owned small businesses in federal contracting, we do not address the issue of discrimination against men.

[2]Inadequately justified factors refer to those factors within a particular domain that are not justified (germane) for the purpose for which they are used.

[3]Because the Constitution does not itself prohibit disparate impact discrimination, governmental actions will be scrutinized under this second legal theory of discrimination if they are covered by a specific legislative command.

[4]For example, in a racial discrimination employment case, *Griggs v. Duke Power Co.*, 401 U.S. 424 (1971), the Supreme Court held that the Duke Power Company used high school graduation and standardized testing requirements to mask its policy of giving job preferences to whites and not to blacks. Neither requirement was intended to measure an employee's ability or performance in a particular job or job category within the company.

discrimination could occur outside the contracting process (for example, lending practices that gave women-owned businesses less access to venture capital), which could discourage women from bidding on federal contracts. The result could be underrepresentation of women-owned small businesses, even if the contracting process were totally neutral among bidders.

CAUSAL INFERENCE

Because discriminatory behavior can rarely be directly observed, researchers face the challenge of determining when discrimination against women-owned small businesses has actually occurred and whether it explains some portion of an adverse outcome for these businesses. To measure discrimination, researchers must answer the counterfactual question: What would have happened to a woman-owned small business if the business had not been woman-owned? Answering this question is fundamental to being able to conclude that there is a causal relationship between the gender of the business owner and discrimination, which, in turn, is necessary to conclude that gender-based discriminatory behaviors or processes contributed to an observed differential outcome for women-owned small businesses compared with other businesses.

By definition, literally answering the counterfactual question is impossible, because one cannot clone the contracting situation, substitute an owner identical in all respects except for gender, and rerun the decision process. It is scarcely even possible to conduct a carefully controlled laboratory or field experiment in which the only variable that is manipulated by the researcher is the gender of the business owner.

Field experiments, called audit studies, have been successfully used to examine race-based discrimination in housing markets by real estate firms. In these studies, prospective renters or buyers that have similar characteristics except for their race or ethnicity visit real estate offices to see how many referrals they are given and in what locations (see, e.g., National Research Council, 2002; Turner et al., 2002, 2003; Yinger, 1986, 1993, 1995). Similar kinds of audit studies have been conducted of decisions by employers to interview job seekers who are matched in terms of job readiness but differ in terms of race (see, e.g., Turner, Fix, and Struyk, 1991).

It appears to be more difficult, however, to conduct such experiments for federal contracting. It would be fraudulent for independent researchers to enlist firms to misrepresent their ownership status in bidding, using random assignment by the experimenter. If the federal government were to decide to commission such an experiment, it would still be difficult to carry out given all of the steps that bidders must go through in the registration and bidding process and the detailed information about their experience and credentials that they must provide.

Thus, in practical terms, the question becomes what are acceptable statistical methods to move from observing a statistical disparity to concluding the existence of discrimination. Yet as one moves from meticulously designed and executed laboratory experiments through the variety of studies based on observational data, increasingly strong assumptions are needed to support the claim that X "causes" Y.[5]

STATISTICAL ESTIMATION METHODS

There are many aspects of potential discrimination in the federal contracting process and in the processes that produce ready, willing, and able bidders that could be studied by the SBA and others with regard to the experience of women-owned small businesses. Because federal contracting is the domain of most direct interest for the federal government, we primarily discuss the uses and limitations of statistical estimation methods for studying one or more aspects of the contracting process. That process includes not only the decision to accept or reject a bid, but also such decisions as whether to bundle agency requirements into fewer, larger procurements or more and smaller procurements, whether to add more work to existing contracts or let new contracts, what criteria to use and what weights to give to different criteria in making a contract award, and allocations of time and resources to reach out to various types of businesses with various methods to encourage them to register and become capable of federal contracting work. Decisions in each of these areas may affect the opportunities for women-owned small businesses in federal contracting. For example, the use of one or more award criteria that are not good predictors of successful performance could have an adverse impact on businesses that are less qualified on these criteria. The methods we discuss for analyses of one or more aspects of the contracting process include multivariate regression models (both statistical decomposition models and theory-based models), matching and propensity score methods, and natural experiments. Such methods could also be used for studies that peer further back into the causal chain by which pools of ready, willing, and able bidders are developed—for example, studies of sources of venture and working capital for new and continuing businesses, various forms of technical assistance and mentoring, and the like.

[5]According to a statistical position articulated by Freedman (2003) and others, one cannot draw *any* causal inferences in the absence of manipulability. Thus, viewed as a nonmanipulable element, gender cannot be said to have a causal effect. Others have suggested that by considering the manipulation of all relevant confounders, one can at least create a framework in which causal statements about nonmanipulable variables such as gender are possible.

Multivariate Regression Models

Statistical Decomposition Models

It is quite common for researchers to employ statistical regression models when addressing questions of discrimination, such as racial or gender discrimination in hiring and promotions. Two types of models have been used to decompose racial or gender differences in outcomes. They are (1) regression models with gender-specific intercepts, which assume that the effects of other variables (e.g., education) are the same for both men and women, and (2) gender-specific regression models that relax this assumption by allowing for interaction between gender and other variables. All such models pose problems for interpretation and are basically descriptive rather than causal.

A standard way to explore the difference in an outcome between groups is to decompose the difference into "explained" and "unexplained" components. A primary concern of the SBA is the success in the federal contracting process of women-owned small businesses that are registered with the Central Contractor Registration (CCR) versus other registered businesses. The simplest formulation to compare outcomes for these two groups would be a regression model in which the dependent variable, Y, is the outcome of interest for each business, such as the amount of contract dollars won as reported in the Federal Procurement Data System (FPDS). The right side of the equation would include an intercept term, B; an indicator variable, W (1 for women-owned small businesses and 0 for others); a set of other variables, $X_1 \ldots X_j$, that are believed to relate to the outcome; and an error term, u. Similar to the regression equations developed by the Department of Commerce (but for a different purpose), the X variables might include the age of the firm since founding and a measure of firm size (number of employees or revenues), although there are likely to be many more explanatory variables than these two. Alternatively, separate models could be developed for each group, or, equivalently, a model with interactions, to allow for the possibility that the relationships of each group to one or more of the X variables might differ.

In such a model (see National Research Council, 2004:121-125, for precise mathematical formulations), the coefficients on the X variables are used to estimate the contribution of differences in these variables to measured disparities. Thus, if registered women-owned small businesses, on average, obtain a smaller share of federal contract dollars and if they are, on average, newer and smaller than other businesses, then the age and size variables will probably explain some of the disparity.

The part of the gap that is "unexplained" by the *X* variables is sometimes referred to as the "share due to discrimination."[6] This is misleading terminology, however, because if any important control variables are omitted from the *X* set, then one or more of the equation coefficients, including the intercept, may be affected. More properly, the unexplained part of the gap represents not only the effects of discrimination in the contracting process, but also any unobserved differences between women-owned small businesses and other businesses in factors that would be expected to determine *Y* in the absence of discrimination. The unobserved variables may result in the equation underestimating or overestimating the effects of discrimination depending on how they correlate with variables in *X* or whether they mostly favor or mostly do not favor women-owned small businesses vis-à-vis other businesses. The inclusion in *X* of variables that are themselves an outcome in a particular domain (e.g., occupation or position within a firm in a study of earnings differences, or status as an economically disadvantaged firm in a study of contracting outcomes by gender of ownership) may also result in the equation misestimating the effect of discrimination.

In addition, it is misleading not to recognize that discrimination may affect the "explained" component of the equation (the *X* variables) and not just the unexplained component. For example, discrimination in lending practices may possibly result in women-owned businesses remaining smaller than others and therefore less likely to win contracts, regardless of whether discriminatory barriers exist in the contracting process itself.

Finally, it is important to keep in mind that the quality of the input data affects the validity and interpretability of regression model results (see "Data Quality" section below). Poorly measured variables in a multiple regression equation will result in biased and inconsistent regression coefficient estimates. Moreover, when the model and the input data are problematic, caution must be used in interpreting the results with standard tests for statistical significance.

Theory-Based Statistical Models

Statistical decomposition of the factors affecting an outcome of interest, such as disparities between women-owned and other small businesses in dollars of federal contract awards, is a useful descriptive tool, providing such decomposition is carefully performed. More powerful, although very

[6]In terms of the definitions outlined above, the share due to discrimination corresponds to differential treatment discrimination.

difficult to implement, are statistical models that are informed by a theory of the discriminatory processes that may be at work and that address two important sources of bias—omitted variables bias and sample selection bias.

For statistical modeling (see National Research Council, 2004:Ch.7), the researcher needs to develop a theory of how discriminatory processes may operate in the domain of interest and formalize assumptions and conditions under which counterfactual logic can be applied. More specifically, for developing a set of *X* variables, the researcher would need to have a good understanding of the process that would determine *Y* in both the absence and presence of discrimination in order to be able to make causal assertions. The National Research Council report (2004:130-145) works through a detailed example of a theory-based regression model of discrimination in the labor market based on determining how a rational firm would make hiring decisions to improve productivity. The example also discusses methods to address omitted variables and sample selection bias.

For a theory-based model of success in federal contracting, measured as dollars awarded, one would need a detailed understanding of the factors that contracting officials take into account in making accept or reject decisions. Interviews with contracting officials on important determinants of contracting success together with analysis of the types of firms that tend to win competitive contracts with specified features could suggest the characteristics of registered vendors for which data are needed as input to the model. Such characteristics might include not only standard measures of firm age and size, but also measures of facilities, equipment, geographic location, previous bids, previous successful bids and add-ons to existing contracts, previous business experience of key personnel, whether the firm qualifies as economically disadvantaged, and the like. To be able to reliably infer discrimination from the results of the analysis, it is very important that the equation include all of the relevant variables that are known to the contracting officials in charge of decisions and that it not include variables that may be known to the researcher but not to the contracting officials.[7] More generally, to develop an appropriate statistical model with a good fit to the data, the researcher should be prepared to conduct considerable exploratory work with test data sets to assess alternative forms of the equation and the input variables.

Because the target group of interest is registered women-owned *small* businesses, some restrictions might be placed on the outcome variable in a

[7]Through a special survey or series of case studies, the researcher might learn of characteristics of firms that could be relevant to a contracting decision but that are not included in the information requested for a bid.

theory-based model, such as defining it as dollars awarded in contracts below a threshold size. Alternatively, the comparison group might be defined as other registered small businesses and not all other registered businesses regardless of size. Moreover, instead of registered businesses, it might be preferable, first, to define the target group as bidders on procurements. If, controlling for other factors, women-owned small businesses are successful in competing for contracts on which they bid and could be reasonably expected to win (e.g., the contracts are not too big), then analytical interest might shift to prior steps in the contracting process, such as decisions on outreach to businesses by type to encourage them to bid or decisions on how to bundle agency requirements into contracts.

Because contracting practices may vary by agency and among agencies or regions within a large cabinet department (see Chapter 3 on contracting practices in the Defense Department), an appropriate analysis would need to look at contracting agencies separately or include variables for them in an equation. In-depth case studies of contracting practices for specific agencies and offices that vary in the percentage of contracts with specified characteristics that are awarded to women-owned small businesses could help generate hypotheses about causal processes and what kinds of *X* variables to include in models. To recognize the possible effects of supply-side variation, it would be also necessary for the case studies to take account of differences among industries or product lines in the availability of women-owned small businesses and all others.

Matching and Propensity Score Methods

Matching methods provide an alternative to multivariate linear regression as a way to control for variables that are likely to matter for an outcome. In this case, matching consists of comparing outcomes of two paired firms (or, more generally, two paired groups of firms) that are comparable on relevant observed attributes except for ownership. Matching of observational data attempts to mimic the experimental setting in the same way as the paired testing that is used in audit studies of housing markets. To the extent that (1) the observed factors capture the relevant variables affecting the outcome and (2) the comparability is close, differences in the outcome variable on the basis of ownership in a matching study can be attributed to discrimination. (However, the same caveats expressed above about making causal inferences from fitting multiple regression models to observational data apply to the use of matching methods with observational data.) Matching has been the subject of considerable research, and relatively sophisticated matching methods, such as propensity score matching, have been developed.

The objective in matching for the federal contracting process would be to construct matched sets or strata using relevant nonownership variables that are available for firms. Analogous to overfitting in specifying a multiple regression, the analyst doing the matching must make the trade-off between matching on too few variables, with the result of poor comparability within matched sets, and matching on too many variables, with the result of poor statistical power and problems with interpretation. A common way to manage this trade-off is to combine matching on a small number of variables that are known to have large effects together with matching on propensity scores estimated from a larger set of additional variables thought to be relevant.

The propensity score is a device for constructing matched sets when there are too many covariates so that it becomes increasingly difficult to find matched pairs with similar values of all of the covariates. The propensity score would be estimated by fitting a logistic regression to women-owned small businesses versus other businesses (or other small businesses) using the covariates as the explanatory variables. Firms with similar propensity scores are grouped into the same strata to create matched sets.

In comparison to multiple regression, matching methods reduce the risk of imposing an inappropriate functional form on the relationship between the outcome variable and the observed covariates. A drawback, however, is that a matched analysis does not use the entire pool of observations; rather, in the contracting case, each woman-owned small business would typically be matched to one nonwoman-owned small business and the unmatched businesses would be discarded. When the number of women-owned small businesses to be matched is small, the size of this sample drives the accuracy of the estimated difference. In this situation, the incremental loss of precision from discarding the nonmatched members of the other business group is low.

Choosing between matching and regression methods often involves weighing the trade-off between reduced sample size from matching and the functional-form assumptions needed for regression, such as linearity of the relationship between the explanatory variables and the dependent variable. Rosenbaum (2002) provides an excellent review of these methods and a discussion of the advantages and disadvantages of matching versus multiple regression in various situations. However, these methods do not help with the key problems of omitted variables bias or sample selection bias because matching is performed on the basis of observed variables only. More accurate and complete data collection, which may involve case studies and surveys, is critical to reducing omitted variables bias by permitting more complete matching and model specification.

Natural Experiments

Another approach to addressing the problem of omitted variables is to exploit so-called natural experiments to observe the natural variations that occur both before and after a specified time period during which an intervention is introduced. Instead of random assignment, as in a controlled laboratory or field experiment, the researcher defines treatment and comparison groups and uses naturally occurring events for comparisons.

Social scientists have used a "differences-in-differences" approach (i.e., the gender difference in some outcome of interest both before and after an intervention) to test the effects of changes occurring at some specified time period that affect some actors but not others (see, e.g., Card and Krueger, 1994; Tyler et al., 1998; National Research Council, 2004:148-154). In the language of causal modeling, the policy change is a formal manipulation, which is applied to some actors but not others. (In some studies, the policy change affects all actors, and the comparison is done before and after the change.) The pre-policy-change data are used to estimate the counterfactual condition of what would have happened had the policy change not occurred. Such designs are also sometimes called quasi-experiments (see Campbell and Stanley, 1963; Meyer, 1995; Shadish, Cook, and Campbell, 2002).

In the context of federal contracting, should the SBA decide to authorize preferential set-aside contracting programs for women-owned small businesses for selected industries, then researchers could analyze this set of interventions as a natural experiment. Comparisons could be made of the contracting success of women-owned small businesses in the affected industries before and after the program introduction. Comparisons could also be made of the contracting success of women-owned small businesses after the program introduction in the affected industries and other industries. To take full advantage for research of such a policy change (if it indeed is put into effect), the SBA should plan for needed additional data collection in the CCR, the FPDS, and other pertinent data systems as soon as possible after a decision to authorize any new set-aside programs is reached.

Natural experiments have a number of limitations for the study of discrimination:

- The change under study may be endogenous—that is, a reaction to particular circumstances that warranted a policy change or intervention. To the extent that discrimination against women-owned small businesses in contracting exists for industries designated as "underrepresented" but not other industries, then the estimated effect of comparing these industries with other industries before and after the policy change would tend to

overstate the amount of discrimination against women-owned small businesses overall prior to the change.

- The effects of policy interventions may spill over into the control group used in the study. For example, the effects of set-aside programs for women-owned small businesses for some industries may encourage contracting agencies to become more favorable to women-owned small businesses generally. This phenomenon would reduce estimates of the effect of the policy change based on a differences-in-differences design.
- Differences in trends in other factors that affect outcomes cannot always be addressed adequately even in a differences-in-differences design, particularly when the policy intervention takes place over a period of time, as is likely to be the case with a new set-aside program for women-owned small businesses.
- One can hardly ever be sure that the change in policy under study has eliminated a role for discrimination in the decision under study. In most cases, the best one can hope for is that a comparison of groups affected by the change in policy will identify the reduction in discrimination induced by the policy rather than the level of discrimination that existed prior to the change.
- In some cases, changes in policy that lead to positive effects in one dimension may induce negative effects in another. For example, the introduction of a new set-aside contracting program for women-owned small businesses might possibly lead to fewer efforts at outreach.
- Natural variation in the data may be insufficient to identify the effects of interest or may be correlated with other, unmeasured factors that may bias the results. (See Holzer and Ludwig, 2003, on the use of natural experiments to study discrimination; see Meyer, 1995, and Shadish, Cook, and Campbell, 2002, for a general discussion of the strengths and weaknesses of these designs.)

Data Quality

Careful assessment of the quality of input data would be critical for appropriate use of the statistical analysis methods discussed above, as would consideration of needed sample sizes. If sample size is inadequate in disaggregated samples, it may be useful to pool data across several years, agencies, and industries, provided such pooling does not obscure important differences on these dimensions.

With regard to data quality, an important consideration is accurate classification of businesses by type. A recent study commissioned by the SBA Office of Advocacy (Eagle Eye Publishers, Inc., 2004a) estimated that $2 billion of a total of $54 billion of federal contracting funds in 2002 that were classified as awards to small businesses in fact went to businesses for

which the parent company was a large business or to nonprofit organizations or government agencies. A sample-based audit of the CCR and the FPDS could be a way to establish the reliability of the classification of women-owned small businesses versus other businesses in these two key databases on federal procurement. A match commissioned from the Census Bureau of CCR and FPDS records with the Survey of Women-Owned Business Enterprises could be another way of verifying the quality of the CCR and FPDS data.

Other data quality issues would depend on the nature of the analysis and the data sources used. For example, a study of financing barriers for women-owned businesses would require an assessment of sampling and nonsampling errors in such data sources as the Federal Reserve Board's Survey of Small Business Finances.

CONCLUSION

We support the conclusion of the Panel on Methods for Assessing Discrimination (National Research Council, 2004:159) that "the use of statistical models, such as multiple regressions, to draw valid inferences about discriminatory behavior requires appropriate data and methods, coupled with a sufficient understanding of the process being studied to justify the necessary assumptions." It is a challenging undertaking to analyze the possible role of discriminatory practices and behaviors at any point in the federal contracting process, let alone the chain from new business formation to registering and bidding to supply federal requirements.

We believe that in-depth research on disparities and possible discrimination in the contracting process could usefully inform policy making, but such research should be viewed as a long-term investment on the part of the SBA and other interested agencies. It requires development of a staged, prioritized research agenda; collection and evaluation of needed data from small-scale case studies, surveys, and administrative records; and sophisticated, careful analysis using best practices and state-of-the-art research methods.

6

Conclusion and Recommendations

From our review of data, methods, and prior assessments of the use of women-owned small businesses in government contracting, we draw one conclusion and make four major recommendations. We conclude that the disparity ratio estimates developed by the Office of Federal Contract Assistance for Women Business Owners (CAWBO) are not adequate to identify industries in which women-owned small businesses are underrepresented in federal prime contracting. Our recommendations cover: (1) data and methods for producing revised disparity ratio estimates, (2) development of more useful reports on trends in federal contracting, (3) collection of data on subcontracting, and (4) development of a research agenda for analyzing the role of women-owned and other types of small businesses in federal contracting, including studies of disparities and the possible role of discrimination in the contracting process.

CONCLUSION

The committee concludes that the disparity ratio estimates from the SBA Office of Federal Contract Assistance for Women Business Owners preliminary study (completed in late 2002) are not adequate to identify industries in which women-owned small businesses are underrepresented (or substantially underrepresented) in federal prime contracting. As discussed in Chapter 4, the CAWBO study has the following problems: it does not provide sufficient justification for the definition and data used to measure the availability of women-owned small businesses, in particular the decision to include in the availability measures all women-owned busi-

nesses with paid employees as "ready, willing, and able" to perform federal contracting; it uses an inconsistent definition for the disparity ratio (comparing dollars of contract awards with numbers of businesses); it uses different years for estimating utilization and availability in a period of rapid growth of women-owned small businesses; it uses Standard Industrial Classification (SIC) 2-digit industry categories instead of North American Industry Classification System (NAICS) 3-digit or 4-digit categories; and it provides inadequate documentation of the source data and estimation methods. Finally, the CAWBO estimates are now out of date. For these reasons, the CAWBO estimates should not be used to designate industries in which to permit the use of preferential contracting programs for women-owned small businesses.

RECOMMENDATION 1— REVISE THE CAWBO PRELIMINARY ESTIMATES

The committee recommends that, instead of using the CAWBO preliminary estimates of representation of women-owned small businesses in federal contracting by industry, the Small Business Administration should estimate disparity ratios with more recent data and revised, fully documented methods. New data have become available since the CAWBO preliminary study was completed, and revisions to the basic approach are needed. It is also critically important that the revised study clearly and comprehensively document and base its identification of target industries (those in which women-owned small businesses are underrepresented) on carefully evaluated alternative measures of utilization and availability.

This recommendation addresses eight specific issues: (1) data for measuring utilization, (2) data for measuring availability, (3) types of disparity ratios, (4) industry classification detail consistent with substantive meaning and precision requirements, (5) choice of levels of the disparity ratio for distinguishing underrepresentation and substantial underrepresentation, (6) identification of industries that clearly underrepresent women-owned small businesses on the basis of multiple measures of disparity with more recent data, (7) identification of industries for further analysis, and (8) documentation and evaluation.

1-1 Data for Measuring Utilization

Selecting a data source for measuring utilization shares for women-owned small businesses in federal contracting requires deciding the size of contracts to include and the reference year. The data source must also be carefully evaluated for completeness and quality and to determine outliers and their possible effects on estimates.

We agree with CAWBO's decision to use data from the Federal Procurement Data System (FPDS) on prime contract actions over $25,000. The available information on smaller government contracts is not contract-specific and cannot be readily analyzed (see Chapter 3). Moreover, while smaller contracts are a large share of total contract actions in a fiscal year, their dollar value is a small share of the total dollars awarded. For example, in fiscal year 2003, contract actions reported on SF-281 (the government form used to aggregate data for smaller contracts—see Chapter 3) represented 91 percent of 11.5 million total contract actions, including new awards, modifications, and others; however, in the same year, the dollar value of SF-281 contract actions represented only 5 percent of $305 billion total net dollars awarded (see www.fpds.gov).

CAWBO should use FPDS data for a reference period that corresponds to the reference period for the data used to measure availability shares. For example, 2002 FPDS data would be appropriate to use with data from the 2002 Survey of Business Owners (SBO).[1]

CAWBO should assess the accuracy and completeness of the FPDS data to the extent feasible. In addition, CAWBO should examine the distribution of contract awards by size and assess the likely effects on utilization estimates of extreme values.

A useful analysis would link Central Contractor Registration (CCR) records for nonwomen-owned small businesses with FPDS records for initial competitive contract awards to determine a threshold dollar value above which small businesses never or hardly ever are successful bidders. Some or all of the contracts over that threshold value might then be excluded from the FPDS for calculating utilization shares. The reason to perform the analysis for nonwomen-owned small businesses is to avoid excluding contract size classes in which women-owned small businesses may not be successful.

Whether and which contracts above the threshold value to exclude from the estimation of disparity ratios would require further analysis. Some large contracts, such as the Department of Energy procurements to operate the national laboratories or Department of Defense procurements for major weapons systems, may be appropriate to exclude because they could not realistically be structured to enable small businesses to bid successfully. Other large contracts may, however, represent bundling of work that could have been separated into several smaller contracts and, consequently, should

[1]Should CAWBO wish to revise its earlier estimates to produce a time series, we recommend that it use fiscal year 1997 utilization data from the FPDS to compare with the 1997 Survey of Women-Owned Business Enterprises (SWOBE) data on availability (see Chapter 4).

be retained in the analysis. While a full evaluation of the characteristics of contracts that may affect the expected success rate of women-owned small businesses is likely to be beyond the SBA's resources, some sensitivity analyses should be performed of the effects on disparity ratios of removing contracts above specified size limits.

Other aspects of data quality in the FPDS concern the accuracy of classification of contractors by type of business (see the "Data Quality" section of Chapter 5) and the accuracy of classification of the type of work by NAICS industry code. Finally, there may be industries for which few contract awards or other contracting actions occur in a given year. In such instances, consideration should be given to pooling FPDS data for more than one year, providing such pooling does not obscure important time trends.

1-2 Data for Measuring Availability

Selecting a data source and universe definition for measuring the availability of women-owned small businesses for federal contracting is a challenging task. Given limitations of existing data and resource constraints on data collection and modification, there is no single data source, or combination of data sources, that is wholly satisfactory for measuring availability with a specific universe definition. Moreover, given different views about an appropriate universe, there is no single availability measure that is likely to satisfy all stakeholders.

In order to construct disparity ratio estimates for more narrowly as well as more broadly defined universes of businesses, we recommend that CAWBO make use of two sources for measuring availability: the Central Contractor Registration for 2004 and the 2002 Survey of Business Owners. CAWBO should evaluate both sources on data quality to the extent feasible, refine each source as appropriate for comparison with a utilization measure that is based on contract awards over $25,000, and examine the distribution of eligible contractors and businesses by size and the likely effects on availability estimates of extreme values.

The CCR, as of October 1, 2003, is supposed to contain government-wide information about all current vendors and prospective bidders on federal prime contracts and grants, including small businesses certified by the SBA as eligible for various preferential contracting programs. Annual updating is required to maintain active status in the file; the required information includes 3-year average revenues and number of employees, as well as status as a small business and type of ownership (woman-owned, veteran-owned, etc.). At present, the CCR includes about 351,000 active vendors (see www.ccr.gov).

Use of the CCR data would provide availability measures for a limited universe of firms—those that have actually won federal prime contracts or are interested in bidding on them. Careful evaluation should be conducted of the quality of the registry data—for example, matching the CCR with the SBA PRO-*Net* database on small businesses to look for missing, incomplete, or incorrect CCR records.

Careful evaluation should also be conducted to determine whether to include all or a subset of firms in the universe for measuring availability. Because the universe for measuring utilization is contracts over $25,000, it is possible that some very small businesses in the CCR should be excluded from the availability universe. That decision could be informed by matching the CCR for nonwomen-owned businesses with the FPDS data to determine the characteristics of successful vendors for contracts at or near the $25,000 threshold. For example, if firms with fewer than a certain number of employees or average revenues hardly ever win contracts in the range of, say, $25,000 to $50,000, then such firms should probably be excluded from the CCR data in calculating availability shares. In this and other instances of evaluation, the analysis should be conducted separately by industry group.

Results from the 2002 Survey of Business Owners will be available in 2005, so CAWBO could measure availability from that source as well. Use of the 2002 SBO data would provide availability measures for a broader universe of firms than those that are registered with the CCR. However, some kinds of firms in the SBO may not be serious prospects for seeking federal work because they are very small, lack specific technical capabilities, or for some other reason. The suggested analysis of CCR and FPDS data to determine characteristics of firms that win relatively small contracts could inform the decision of whether to exclude from the SBO firms that fall below some size threshold on the basis of number of employees or size of revenues. Comparing the characteristics of firms that register with the CCR with those of firms in the 2002 SBO could possibly suggest additional screening criteria to use—for example, it may be that in certain industries firms in certain areas of the country never or hardly ever register to bid.

We understand that SBA must respond in a timely fashion to the congressional mandate for estimates of disparity ratios for women-owned small businesses in federal contracting by industry. Thus, we do not anticipate that CAWBO would undertake the kinds of extensive and intensive analyses that would be appropriate for a longer term research agenda on disparities and discrimination in federal contracting (see Recommendation 4). However, we think that some analysis is warranted, such as that suggested using the CCR, to determine screening criteria in addition to size (e.g., age of business, geographic location) to use on the 2002 SBO data (and the CCR data). Doing so would permit disparity ratios to be calculated for

universes of women-owned small businesses that are closer to the judicially enunciated concept of "ready, willing, and able."

1-3 Types of Disparity Ratios

The preliminary CAWBO study calculated utilization shares in monetary terms (share of total prime contract dollars awarded), but it calculated availability shares in numeric terms (share of total firms with paid employees). This inconsistent approach has been used in many disparity studies, but it inappropriately mixes apples and oranges and should not be used.

We recommend that CAWBO calculate consistent disparity ratios of two main types. First, CAWBO should calculate monetary ratios as the women-owned small business share of federal prime contract dollars awarded for contracts over $25,000 divided by their share of total business receipts. CAWBO should also calculate numeric ratios as the women-owned small business share of the number of federal prime contract awards over $25,000 divided by their share of businesses. Separate ratios should be calculated for dollars awarded for contracts classified by size (e.g., $25,000 to $100,000, over $100,000). Point 1-6 below lays out how these variously derived ratios would be used to designate industries by their representation of women-owned small businesses in federal prime contracting.

Monetary ratios are critical to compute because the legislatively mandated goals for small business contracting are specified as percentages of contract dollars awarded, not percentages of contracts awarded. Moreover, dollar value is critical to business success, not awards per se. Because contracting agencies have discretion in determining how to package agency requirements (see Chapter 3), numbers of contracts may bear scant relationship to dollar value: one contract may be worth the sum of dozens or hundreds of smaller contracts.

The use of monetary ratios may well result in a reduction of the number of industries in which evidence of disparities is found in comparison with numeric ratios or inconsistently calculated ratios in which utilization is computed in monetary terms and availability in numeric terms. The reason is that women-owned businesses are a relatively small share of gross business receipts even as they are a relatively large share of businesses. However, concern about such a result should not influence the choice of an appropriate disparity ratio.

While not as useful as monetary ratios, numeric ratios can also add information. Because one contract may be modified many times over its course, we recommend that numeric ratios be calculated on the basis of initial contract awards. An advantage of numeric ratios is that they are

simple to understand. Also, the computation of statistical significance levels is more straightforward and requires fewer assumptions for numeric ratios than for monetary ratios. In addition, when thinking about possible discrimination in contract award decision making, numeric ratios have the advantage of comparing numbers of decisions.

We think it is important to calculate both monetary and numeric disparity ratios separately by size of contract award. Size categories could be $25,000 to $100,000 (contracts in this category are reserved for small businesses whenever possible), and $100,000 and over. Examination of the distribution of contract awards by size could inform the specification of additional categories as seems appropriate.

1-4 Industry Classification

The CAWBO preliminary study used 2-digit SIC categories for estimating industry-specific disparity ratios. The SIC system focused on manufacturing and had not changed in basic structure and concept for over 60 years. The NAICS represents a significant reorganization, redefinition, and differentiation of the SIC categories that provides a more coherent and detailed classification system for business activity. For example, the NAICS treats accommodation and food services as a separate sector, not included with retail trade as in the SIC. ***We recommend that CAWBO use NAICS codes for all of its estimates. The level of industry detail should be as disaggregated as the data will support. Thus, estimates could be developed for 3-digit NAICS subsectors and for 4-digit NAICS industry groups within subsectors to the extent that further disaggregation is substantively meaningful, statistically defensible, and feasible.***

Substantive meaning has to do with the heterogeneity within 3-digit subsectors (which are the rough equivalent of the 2-digit SIC categories for industry divisions used in the CAWBO study) and the consequent implications for federal contracting. For example, NAICS subsector 485 for transit and ground passenger transportation includes industry groups 4851 for urban transit systems, 4852 for interurban and rural bus transportation, 4853 for taxi and limousine service, 4854 for school and employee bus transportation, and 4855 for charter buses. The scale of operations for these groups varies widely (one person may run a taxi service, but a large enterprise is required to run a subway system), and analysis may determine that disparity ratios vary widely as well.

Statistical defensibility has to do with sample size calculations—how many sample cases must be available for estimates that are reliable at a specified level of precision, such as 95 percent. Although relevant administrative record data sources, such as the CCR and the FPDS, represent censuses, not samples like the SBO, it is still important to determine mini-

mum numbers of cases for categorization by industry and whether pooling of data among industries or over a period of several years is indicated. For doing this, statisticians often rely on a superpopulation argument—in this case, while the contracting data appear to be a population, they can be assumed to represent one of many theoretical possible outcomes of a process for a given industry group in a given time period.

Feasibility involves available resources for the effort. By the terms of the legislation, the SBA may call on any government agency for needed data, so, for example, the Census Bureau could perform precision calculations for the 2002 SBO and, working with CAWBO staff, identify heterogeneous 3-digit subsectors that may warrant separately calculated disparity ratios by 4-digit industry group.

1-5 Disparity Ratio Thresholds

The designation of specific values of disparity ratios to serve as thresholds for underrepresentation and substantial underrepresentation is ultimately arbitrary. Science cannot establish specific threshold values, which must be a matter of reasoned judgment. ***We conclude that CAWBO's decision to define the two thresholds as less than or equal to 0.80 for underrepresentation and less than or equal to 0.50 for substantial underrepresentation is a reasonable way to present its results.*** The threshold of 0.80 for underrepresentation (the contracting utilization share for women-owned small businesses in an industry is less than or equal to 80 percent of the corresponding availability share) follows past practice (see Chapters 2 and 4) and allows for errors in data and estimation that, with a higher threshold, might lead to an erroneous conclusion of disparity when there was in fact no disparity. The threshold of 0.50 for substantial underrepresentation appears sufficiently below 0.80 and sufficiently higher than zero to distinguish substantial from less substantial underrepresentation. Nonetheless, plausible arguments can be made for different values of these thresholds.

1-6 Clear Cases of Underrepresentation

Because almost any data source and measure of disparity will be subject to errors and because stakeholder views of appropriate disparity measures may differ according to their views on the usefulness and appropriateness of preferential contracting programs, it is unlikely that a single disparity measure will go unchallenged. ***We recommend that CAWBO identify industry groups for which more than one disparity measure finds underrepresentation using a disparity ratio of 0.80 or less. The disparity measures should employ as recent data as possible.***

Four types of measures that could satisfy these criteria are (1) monetary

and (2) numeric disparity ratios calculated for categories defined by size of initial contract award, using fiscal year 2002 FPDS contracting data for utilization shares and 2002 SBO data for availability shares; and (3) monetary and (4) numeric ratios calculated for categories defined by size of initial contract award, using fiscal year 2004 FPDS contracting data for utilization and 2004 CCR data for availability. All measures should be the final measures after any adjustments of the utilization and availability data (for example, excluding firms with revenues below a threshold or very large contracts) and after any pooling of data by years or industry.

The SBA could defensibly designate for a new preferential contracting program for women-owned small businesses industry groups that exhibit underrepresentation on all or most of this group of measures. In determining how to designate an industry group that exhibits underrepresentation on some but not all measures, greater weight should be given to monetary measures over numeric measures (see Point 1-3 above). Also, greater weight should be given to disparity ratios that are specific to the smaller size awards for which small firms could reasonably compete.

1-7 Cases for Further Analysis

With multiple measures, there will be industries that neither clearly underrepresent nor clearly overrepresent women-owned small businesses in federal contracting. ***We recommend that CAWBO single out industries for which a clear determination of representation is not easily made for further analysis and possible designation at a later date.***

1-8 Documentation and Evaluation

Clear, complete documentation and evaluation of data sources, methods, and the strengths and weaknesses of alternative measures are essential for credible analysis and to permit assessment and replication. Adequate documentation and evaluation are particularly important for analyses, such as the CAWBO study, that are intended to inform federal policies and practices that have economic consequences. ***The revised SBA study of women-owned small businesses in federal contracting should conform to scientific standards of evaluation, documentation, and reproducibility. All definitions should be clearly specified, the attributes and strengths and weaknesses of alternative data sources and alternative disparity measures should be clearly described, and the results of internal and external evaluations should be presented.*** Appropriate editorial techniques, such as putting technical material in appendixes and including an executive summary and listing of key findings, can be used to make the documentation accessible to nontechnical as well as technical readers.

RECOMMENDATION 2— PRODUCE MORE USEFUL REPORTS ON FEDERAL CONTRACTING

The General Services Administration, the Office of Management and Budget, and the Small Business Administration have worked with other federal agencies and private contractors to develop and improve several databases about contractors and contract actions on the Internet. These detailed databases, including the CCR and FPDS, not only support more efficient procurement and contract administration, but also have the potential to inform interested stakeholders and to support policy-relevant research on disparities, possible discrimination, and other facets of federal contracting. However, at present, only limited, cryptic reports are regularly produced from these databases (see Chapter 3).

The SBA Office of Advocacy has a program of regular reports and analyses on small businesses and their contributions to the economy and has worked to develop data files for such analysis (see, e.g., Armington, 2004; U.S. Small Business Administration, 1998, 2003). However, the SBA does not sponsor regular reports that would inform Congress, other interested parties, and the public about trends in federal contracting disaggregated by such characteristics as type and size of business, agency, and region. It annually publishes goals for the use of various types of small businesses in federal contracting, but it does not regularly publish tabulations or analyses related to contracting even though federal contracts are an important source of business for many small firms.

We recommend that the SBA work with the General Services Administration, other relevant agencies, and interested stakeholders to design and implement informative, regularly produced tables and analyses from the Federal Procurement Data System and the Central Contractor Registration on trends in federal contracting.

RECOMMENDATION 3— COLLECT DATA ON SUBCONTRACTING

A priority for the SBA in responding to the 2000 Small Business Reauthorization Act is to revise the CAWBO study of women-owned small businesses in federal contracting as recommended above. That study, given the limitations of available data, pertains to prime contracting. ***An important longer term agenda is for the SBA to work with appropriate agencies to develop data to assess the use of women-owned and other types of small businesses in subcontracting on federal prime contracts.*** Subcontracting is an important arena for small businesses to gain experience and a track

record that could enhance their capabilities to handle larger prime contracts, or to develop a substantial subcontracting business.

One way to obtain useful data on subcontracting could be to conduct periodic surveys of prime contractors about their use of subcontractors. Surveys of small businesses about their subcontracting experience could also be helpful. Such surveys could start with small businesses that are registered in the CCR, but they should also include other small businesses as well, as there is no registration requirement for firms that are interested in subcontracting but not also prime contracting.

Another way to obtain useful data on subcontracting is to explore the development of administrative records systems that could provide relevant information. Such data development could not happen quickly because of the need for extensive planning and testing prior to full implementation to minimize unnecessary record-keeping and ensure high-quality responses. Yet, in time, an investment in an appropriate administrative records system on subcontracting could have a large payoff in terms of improved understanding of the sizeable fraction of federal contracting dollars that accrue to subcontractors.

RECOMMENDATION 4— DEVELOP A RESEARCH AGENDA ON WOMEN-OWNED SMALL BUSINESS CONTRACTING

The steering committee found that almost all of the work to date on use of women-owned and other types of small businesses in federal contracting has been in response to court decisions or legislation about preferential contracting programs. Until recently, complete, detailed information on women-owned businesses and their contracting experience has not been available for analysis on a regular basis. Now that more useful information is available from such sources as the CCR, ***we recommend that the SBA proactively develop a research agenda for analyzing the role of women-owned and other types of small businesses in federal contracting. Research on subcontracting should be included as soon as feasible.***

The research agenda should identify issues of concern to policy makers, contracting agencies, small businesses, and other stakeholders and identify priorities for data collection and analysis. Academic researchers in the field should be involved in the design of the program. The program should include studies not only of disparities, but also of the many variables that may explain observed disparities, including the possible role of discrimination in various stages of the contracting process and, to the extent feasible, in the processes of small business formation and development. Relevant studies could include the following:

- Regular updating and refinement of basic disparity ratio calculations.
- Analysis of the relative success of women-owned small businesses compared with other small businesses in winning federal contracts, eliminating larger and publicly held companies (none of the latter is identified by the gender of shareholder owners).
- Investigation of business ownership patterns and how modifications to the definition of women-owned businesses (e.g., inclusion of businesses owned equally by men and women) affect analyses of disparities and discrimination.
- Capability analysis for women-owned small businesses similar to, but much more extensive than, the Department of Commerce study and what is likely feasible for the recommended revision of disparity ratio estimates (see Recommendation 1 above). Such analysis should be accompanied by comprehensive evaluation and documentation, outside review, and data collection, if possible, to obtain additional relevant information. For example, in addition to measures of size (number of employees and gross receipts), it would be useful to have measures of equipment and facilities, bonding and insurance, technical capabilities, and access to credit to consider as variables in statistical analysis using regression or matching methods.
- Development of performance measures, when feasible, that compare women-owned small business contractors and other contractors. For example, measures of on-time, undamaged delivery could probably be developed for mailing and shipping contracts. Such measures, together with contracting officials' perceptions about performance, could enter into analyses of the use of women-owned small businesses in federal contracting.
- Conduct of case studies of the contracting experience of women-owned small businesses in specific industries and contracting agencies, using field interviews of businesses, contracting agencies, and relevant trade associations augmented by survey and administrative records data. Case studies are important to further the development of theory-based statistical models for analysis of discrimination (see Chapter 5). In particular, as our limited case study of Defense Department contracting practices illustrated (see Chapter 3), the contracting process is highly dependent on the discretion of the acquisition team with regard to outreach, development of a particular procurement mechanism, and other key decisions. Case studies are an appropriate way to investigate possible discrimination by such gatekeepers.
- Use of case studies, surveys, and administrative records data to analyze the possible role of discrimination at various stages in the federal contracting process with state-of-the-art statistical methods.

Findings from case studies and statistical analyses could help the SBA not only refine a regular series of disparity ratios and contribute to analyses of various types of discrimination as possible explanations for observed disparities, but also refine its assistance and mentoring programs for small businesses and help contracting agencies improve their support for small business bidders and potential bidders.

These types of analysis can thereby contribute to improvements in the contracting process that are valuable to taxpayers as well as to all businesses. A contracting process that discriminates against women-owned small businesses may discriminate against any business. Moreover, a contracting process that discriminates against certain bidders prevents the government from contracting at the lowest price and obtaining the best product because better qualified or lower priced firms are passed over in order to award contracts to the preferred firms. An examination of contracting with women-owned small businesses may thus improve fairness and efficiency for all.

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Appendix A

Workshop Agenda and Participants

AGENDA

Friday, April 30, 2004

Public Session

9:00 a.m.	Introductions/Review of Agenda and Charge: *Arleen Leibowitz*
9:15	Background from the SBA: *Eric Benderson, Associate General Counsel for Litigation, SBA*
10:00	SBA current methodology: *Andy White*
10:30	Panel questions and discussion: *Arleen Leibowitz*
11:00	Government set-asides in other areas: *R. Preston McAfee, Professor of Business Economics and Management, California Institute of Technology*
11:30	What case law says about discrimination/under-representation: *Robert Goldstein, Professor of Law, ULCA Law School*
12:30 p.m.	Lunch

1:30	The small business contracting process: *Linda Oliver, Deputy Director, Peg Meehan, Assistant Director, and Sharon Drago, Assistant Director (via phone), Office of the Secretary for Defense, Small and Disadvantaged Business Utilization*
2:30	Review of statistics issues in discrimination: *John Rolph, Chair, Committee on National Statistics*
3:00	Panel questions and discussion of potential analytic methodology: *Arleen Leibowitz*
5:30	Adjournment

PARTICIPANTS

Eric Benderson, U.S. Small Business Administration
William T. Bielby, University of California, Santa Barbara
Sharon Drago, Office of the Secretary for Defense, Small and Disadvantaged Business Utilization
Robert Goldstein, University of California, Los Angeles
Arleen Leibowitz, University of California, Los Angeles
Jonathan S. Leonard, University of California, Berkeley
R. Preston McAfee, California Institute of Technology
Peg Meehan, Office of the Secretary for Defense, Small and Disadvantaged Business Utilization
Linda Oliver, Office of the Secretary for Defense, Small and Disadvantaged Business Utilization
John E. Rolph, University of Southern California
Patricia A. Roos, Rutgers University-New Brunswick
Michael Siri, National Research Council
J.H. (Rip) Verkerke, University of Virginia
Andrew White, National Research Council

Appendix B

Biographical Sketches of Committee Members and Staff

ARLEEN LEIBOWITZ (*Chair*) is professor of public policy in the University of California, Los Angeles (UCLA) School of Public Affairs. She conducts research in health and labor economics with particular interest in investments in human capital and in health. She has examined the role of maternal education in investments in children, educational outcomes for children, the demand for child care, the effect of education on women's labor force participation, secular trends in women's labor supply, and the effect of maternity leave on new mothers' return to work. She has also worked extensively in health economics and policy, studying cost-sharing and children's health care use, birth rates, and expenditures for prescription and over-the-counter drugs. Her current work in health examines how public policies, such as Medicaid, and private policies, such as managed care, affect the amount and kind of health care obtained by children and by persons living with HIV. She heads the Evaluation Core of the UCLA Center for HIV Identification, Prevention, and Treatment Services and served as a member of the Committee on National Statistics from 2001 to 2004. She has a Ph.D. in economics from Columbia University.

WILLIAM T. BIELBY is professor of sociology at the University of Pennsylvania, and from 1977 through 2004 he was on the sociology faculty at the University of California, Santa Barbara. He served as president of the American Sociological Association from 2002 to 2003. His research interests include the economy and society, quantitative methods, organizations, gender, labor markets, and discrimination. In addition to being a contributor to numerous journals, including *Sociological Perspectives* and the *Ameri-*

can Sociological Review, he has testified and submitted expert reports in over 40 trials throughout the country dealing mostly with labor relations. He is currently doing research on the use of statistical evidence in class action employment discrimination litigation. He has an M.A. in economics and a Ph.D. in sociology from the University of Wisconsin.

CONSTANCE F. CITRO (*Study Director*) is director of the Committee on National Statistics. She is a former vice president and deputy director of Mathematica Policy Research, Inc., and was an American Statistical Association/National Science Foundation research fellow at the U.S. Census Bureau. For the committee, she has served as study director for numerous projects, including the Panel to Review the 2000 Census, the Panel on Estimates of Poverty for Small Geographic Areas, the Panel on Poverty and Family Assistance, the Panel to Evaluate the Survey of Income and Program Participation, the Panel to Evaluate Microsimulation Models for Social Welfare Programs, and the Panel on Decennial Census Methodology. Her research has focused on the quality and accessibility of large, complex microdata files, as well as analysis related to income and poverty measurement. She is a fellow of the American Statistical Association. She has a B.A. from the University of Rochester and M.A. and Ph.D. degrees in political science from Yale University.

JONATHAN S. LEONARD is the Quist professor of business ethics in the Haas School of Business at the University of California, Berkeley, as well as the current chair of the Haas Economic Analysis and Policy Group. He previously served on the President's Council of Economic Advisers and as a research associate at the National Bureau of Economic Research. His research interests include employee incentives, affirmative action, job creation, and workplace regulation, and he has published papers on these topics in numerous journals, including *Economic Policy* and the *Journal of Economic Perspectives*. He has M.A. and Ph.D. degrees in economics from Harvard University.

JOHN E. ROLPH is a professor in the Marshall School of Business at the University of Southern California and also holds appointments in the Department of Mathematics and the Law School. Previously he spent 24 years as a statistician at RAND, 12 of them as founding head of RAND's statistics group. His areas of expertise include empirical Bayes estimation and the application of statistics to public policy and the law. He is an elected member of the International Statistical Institute, a fellow of the American Statistical Association, a fellow of the Institute of Mathematical Statistics, and a national associate of the National Academies. He has served as a member and chair of the National Research Council's (NRC) Committee

on National Statistics and as a member of the NRC Committee on Law and Justice. In addition, he has served on several NRC panels, on topics including operational test design in defense systems, methods for assessing discrimination, assessing evaluation studies of bilingual education, and decennial census methodology. He currently chairs the NRC panel on assessing the feasibility, accuracy, and technical capability of a national ballistics imaging database. He has been editor of *Chance* magazine and has served in many other editorial capacities. He has a Ph.D. in statistics from the University of California, Berkeley.

PATRICIA A. ROOS is professor of sociology at Rutgers University-New Brunswick. Her current research interests include work, family, and community; the sociology of work; and gender. She has published extensively on gender and work, including two books: *Gender and Work: A Comparative Analysis of Industrial Societies* and (with Barbara Reskin) *Job Queues, Gender Queues: Explaining Women's Inroads into Male Occupations*. In 1998-1999, she served as vice president of the American Sociological Association. She also served two 3-year terms on the association's executive council. At Rutgers, she served as chair of the Sociology Department and dean of Social and Behavioral Sciences. She has been awarded grants from the National Science, Rockefeller, and Alfred P. Sloan Foundations, and has served on several professional editorial boards, advisory councils, and National Science Foundation (NSF) grant review panels. She has an M.A. from the University of California, Davis, and a Ph.D. from the University of California, Los Angeles, both in sociology.

J.H. (RIP) VERKERKE is professor of law at the University of Virginia School of Law and is director of the Program for Employment and Labor Law Studies. His areas of expertise include employment discrimination, sexual and racial harassment, disability discrimination and accommodation, the use of statistical evidence to prove discrimination, economic analysis of law, mediation and arbitration of employment disputes, and contract law. He has M.Phil. and J.D. degrees from Yale University.

ANDREW A. WHITE (*Study Director* through May 2004) is a senior consultant at StatTech, Inc. He consults with the National Academies, The Brookings Institution, federal agencies, and others on survey design, data research, development, and dissemination strategy, and a variety of other topics. A former Director of the Committee on National Statistics, he developed and provided oversight to over 35 studies on a diverse range of topics, and served as study director for projects on census methods, social science research in the U.S. Department of Agriculture, and new directions for health statistics. He is a former executive staff member, research staff chief,

and senior survey designer for the National Center for Health Statistics (NCHS). He has written numerous articles and technical reports and lectured on a wide variety of statistical and survey-related topics. He served as senior statistician for several national surveys including the National Health Interview Survey and the National Hispanic Health and Nutrition Examination Survey, and provided statistical advice to other countries through the NCHS international statistics program. He holds a B.A. in political science and M.P.H. and Ph.D. degrees in biostatistics from the University of Michigan.