SBA'S SIZE STANDARDS METHODOLOGY

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INTRODUCTION

This document describes the U. S. Small Business Administration's (SBA or Agency) methodology for establishing, reviewing, or adjusting its small business size standards pursuant to the Small Business Act (the Act) and related legislative guidelines. Under the Act (Pub. L. 85-536, as amended), the SBA's Administrator (the Administrator) has authority to establish small business size standards for Federal Government programs. This document provides a detailed description of the SBA's revised size standards methodology.

In establishing size standards, the Act and its legislative history highlight three important considerations. First, size standards should vary from industry to industry to account for differences among industries. Second, a small business concern cannot be dominant in its field of operation, nationally. Third, the policy decisions of the Agency should assist small businesses as a means of encouraging and strengthening their competitive position in the economy. These three considerations serve as the principal basis for the SBA's size standards methodology for establishing, reviewing, or modifying small business size standards.

The SBA's size standards methodology examines the structural characteristics of an industry as a basis to assess industry differences and the overall degree of competitiveness of an industry and of firms within the industry. As described more fully later in this document, industry structure is examined by analyzing four primary factors – average firm size, degree of competition within an industry, start-up costs and entry barriers, and distribution of firms by size. To assess the ability of small businesses to compete for Federal contracting opportunities under the current size standards, as the fifth primary factor, SBA also examines, for each industry, the small business share in Federal contract dollars relative to the small business share in total industry's receipts, and small business share of Federal contracts relative to their prevalence in the population of firms that are willing, able and ready to bid on and perform Federal contracts. When necessary, SBA also considers other secondary factors as they are relevant to the industries and the interests of small businesses, including technological change, competition among industries, industry growth trends, and impacts of size standards revisions on small businesses. While SBA's determination to revise a size standard is largely driven by the results from the analysis of relevant data available, SBA will also consider the current economic conditions, the Agency's policy decisions and priorities relating to small businesses, impacts on small businesses, and comments on proposed rules. When SBA's proposed or revised size standards deviate from the analytical results based on these factors, the Agency will provide a detailed explanation in the proposed and final rulemakings.

SBA conducts a detailed statistical analysis of data on the primary factors and secondary factors, if necessary, to establish, review, or modify a size standard for a specific industry, as defined under the latest North American Industry Classification System (NAICS). In this revised methodology, SBA continues to employ a "percentile" approach to evaluate industry factors and derive the size standard supported by those factors. Specifically, SBA ranks each industry within a group of industries with the same measure of size standards (i.e., average annual receipts or number of employees) in terms of both the value of each industry factor and the existing size standard and computes the 20^{th} percentile and 80^{th} percentile values for the industry factor and existing size standards for the group. SBA then evaluates each industry by comparing its value for each industry factor to the 20^{th} percentile and 80^{th} percentile values for the corresponding

factor for industries sharing the same type of size standard and assigns a size standard for that industry for that factor based on its position in the rankings.

As explained later in this document, SBA evaluates two disparity ratios as measures of the Federal contracting factor. The first disparity ratio is computed as the ratio between the small business share of contracts (utilization ratio) and the proportion of small businesses in total population of firms that are ready, willing, and able to bid on and perform Federal contracts (availability ratio). The second disparity ratio is computed as the ratio between the small business share in Federal contract obligations (utilization ratio) and the small business share in total industry's receipts (availability ratio).. A separate size standard is computed for each disparity ratio and the average of the two size standards from two disparity ratios yields the size standard for the Federal contracting factor. The overall size standard for an industry is then obtained by averaging all size standards supported by each primary factor.

In addition to reviewing all size standards and adjusting them, as necessary, every five years based on the analysis of industry and Federal contracting factors in accordance with the Small Business Jobs Act of 2010 ("Jobs Act") (Pub. L. 111-240, 124 Stat. 2504, September 27, 2010), SBA also periodically adjusts all monetary based standards for inflation. In accordance with SBA's regulations (13 CFR § 121.102(c)) and rulemaking (67 FR 3041; January 23, 2002), an adjustment to size standards for inflation is made at least once every five years. In response to higher than normal rates of inflation, some past inflation adjustments have been made on more frequent intervals. For example, in response to ongoing higher than normal inflation, SBA issued an out-of-cycle inflation adjustment to monetary based size standards on November 17, 2022 (87 FR 69118). SBA also updates its size standards, also every five years, to adopt the Office of Management and Budget's (OMB) quinquennial NAICS revisions to its table of small business size standards. Effective October 1, 2022, SBA adopted the OMB's 2022 NAICS revisions (86 FR 72277; December 21, 2021) for its table of small business size standards (87 FR 59240; September 29, 2022).

OVERVIEW OF SBA'S SIZE STANDARDS METHODOLOGY

In keeping with the Act's statutory language and legislative history, SBA's size standards methodology entails examining industry characteristics and the differences among various industries. The remainder of this document describes the SBA's approach to analyzing industry structure and Federal market conditions and a detailed methodology for establishing, evaluating, or modifying size standards. SBA has always followed the industry structure approach to assessing differences among industries. However, the specifics of SBA's size standards methodology have evolved over the years with the availability of new and richer industry and Federal procurement data and staff research leading to improved analyses of industry structure and Federal market environment. SBA employes a percentile approach to assessing the industry structure. In the "percentile" approach, SBA ranks each industry among all industries with the same measure of size standards using each of the four industry factors. The four industry factors are average firm size, average assets size as proxy for startup costs and entry barriers, the four-firm ratio as a measure of industry competition, and the Gini coefficient to account for distribution of firms by size. Specifically, to be detailed below, the size standard for an industry for a specific factor will be derived based on where the factor of that industry falls relative to other industries sharing the same measure of size standards. If an industry ranks high for a

specific factor relative to most other industries, all else remaining the same, a size standard assigned to that industry will be higher than that for most industries. Conversely, if an industry ranks low for a specific factor relative to most industries in the group, a lower size standard will be assigned to that industry. As the fifth primary factor, SBA also examines small business participation in Federal contracting under the current size standards using the disparity ratio approach. Under this approach, SBA computes two disparity ratios. The first disparity ratio is computed in terms of the small business share of Federal contracts relative to the proportion of small firms in the total population of firms that are able, willing, and ready to bid on and perform Federal contracts. The second disparity ratio is computed in terms of the small business share of Federal contract obligations relative to their share of industry's receipts The size standards for each industry and Federal contracting factor are then averaged to obtain the overall size standard for a specific industry in question.

Statutory Authority

Authority for the Administrator to establish small business size standards for Federal Government programs is the Small Business Act (the Act) (Public Law 85-536, as amended). Congress has periodically modified the Act but has not provided specific values for size standards for Federal Government purposes, other than previously for agricultural enterprises. With respect to general directions on how SBA should establish small business size standards for industries, the Act provides the following:

§ 3 (a) (1) For the purposes of this Act, a small-business concern, including but not limited to enterprises that are engaged in the business of production of food and fiber, ranching and raising of livestock, aquaculture, and all other farming and agricultural related industries, shall be deemed to be one which is independently owned and operated and which is not dominant in its field of operation.

(2) ESTABLISHMENT OF SIZE STANDARDS. –

(A) IN GENERAL. – In addition to the criteria specified in paragraph (1), the Administrator may specify detailed definitions or standards by which a business concern may be determined to be a small business concern for the purposes of this Act or any other Act.

(B) ADDITIONAL CRITERIA. – The standards described in paragraph (1) may utilize number of employees, dollar volume of business, net worth, net income, a combination thereof, or other appropriate factors.

(C) REQUIREMENTS. – Unless specifically authorized by statute, no Federal department or agency (including the Administration when acting pursuant to subparagraph (A)) may prescribe a size standard for categorizing a business concern as a small business concern, unless such proposed size standard --

(i) is proposed after an opportunity for public notice and comment;

(ii) provides for determining --

(I) the size of a manufacturing concern as measured by the manufacturing concern's average employment based upon employment during each of the manufacturing concern's pay periods for the preceding 24 months;

(II) the size of a business concern providing services on the basis of the annual average gross receipts of the business concern over a period of not less than 5 years;

(III) the size of other business concerns on the basis of data over a period of not less than 3 years; or

(IV) other appropriate factors; and

(iii) is approved by the Administrator.

(3) VARIATION BY INDUSTRY AND CONSIDERATION OF OTHER FACTORS.—When establishing or approving any size standard pursuant to paragraph (2), the Administrator shall ensure that the size standard varies from industry to industry to the extent necessary to reflect the differing characteristics of the various industries and consider other factors deemed to be relevant by the Administrator**.**

(6) PROPOSED RULEMAKING. —In conducting rulemaking to revise, modify or establish size standards pursuant to this section, the Administrator shall consider, and address, and make publicly available as part of the notice of proposed rulemaking and notice of final rule each of the following:

(A) a detailed description of the industry for which the new size standard is proposed;

(B) an analysis of the competitive environment for that industry;

(C) the approach the Administrator used to develop the proposed standard including the source of all data used to develop the proposed rulemaking; and

(D) the anticipated effect of the proposed rulemaking on the industry, including the number of concerns not currently considered small that would be considered small under the proposed rulemaking and the number of concerns currently considered small that would be deemed other than small under the proposed rulemaking.

(7) COMMON SIZE STANDARDS.—In carrying out this subsection, the Administrator may establish or approve a single size standard for a grouping of four-digit North American Industry Classification System codes only if the Administrator makes publicly available, not later than the date on which such size standard is established or approved, a justification demonstrating that such size standard is appropriate for each individual industry classification included in the grouping.

(8) NUMBER OF SIZE STANDARDS. —The Administrator shall not limit the number of size standards established pursuant to paragraph (2) and shall assign the appropriate size standard to each North American Industry Classification System Code.

Paragraph 3(a)(1) of the Act defines a small business concern to be one which is independently owned and operated and not dominant in its field of operation. As discussed below under the legislative history, SBA's determination of whether a business concern is dominant in its field of operation is based on an entire industry at the national level. Under section 1831 of the National Defense Authorization Act for Fiscal Year 2017 ("NDAA 2017") (Pub. L. 114-328; December 23, 2016), Congress amended paragraph 3(a)(1) of the Act authorizing the Administrator to establish size standards for agricultural enterprises in the same manner as for other industries. The amendment also subjects size standards for agricultural enterprises to the rolling review procedures established under section 1344(a) of the Small Business Jobs Act of 2010. Historically, the size standards for most agricultural industries were established by statute.

Paragraphs 3(a)(2)(A) and 3(a)(2)(B) give the Administrator the flexibility to establish size standards using a broad range of criteria, depending on what the Administrator determines will serve the interests of small businesses the best. Paragraph 3(a)(2)(C) refers to the establishment of size standards by Federal agencies (including SBA) and paragraph 3(a)(3) provides that the Administrator shall vary the size standard from industry to industry to reflect differing characteristics of the various industries and consider other relevant factors when establishing a size standard. This authorizes the Administrator to consider, in addition to industry data, other relevant factors, such as current economic conditions, impacts size standards changes would have on small businesses, and public comments when determining size standards. For example, in response to the weak economic conditions in the aftermath of the 2007-2009 Great Recession during the first five-year comprehensive review of size standards and impacts lowering size standards would have had on small businesses in that environment, SBA generally decided to not lower size standards where the data supported lowering them. In a few cases, however, SBA lowered size standards where the largest and potentially dominant firms would qualify as small. Similarly, in the recently completed second five-year review of size standards, SBA adopted a similar policy of not lowering size standards in response to the COVID-19 pandemic and its impacts on small businesses and the overall economy. In response to public comments, SBA adjusted its proposed changes to size standards for the Forest Fire Suppression and Fuel Management Services exceptions under NAICS 115310, Support Activities for Forestry.

The requirements for conducting rulemaking to establish, revise or modify size standards are stated in paragraph 3(a)(6). The requirements for establishing a common size standard by grouping industries at the four-digit North American Industry Classification System (NAICS) level are provided in paragraph 3(a)(7). Finally, paragraph 3(a)(8) directs the Administrator not to limit the number of size standards and assign the appropriate size standard for each NAICS industry.

Along with the above broad statutory requirements, the Act also directs the Agency to encourage competition and to ensure that a fair proportion of total Federal purchases, contracts,

and property sales be placed with small business enterprises (section 2(a)). Congress went on to state that "the preservation and expansion of such competition is basic not only to the economic well-being but to the security of this Nation." 15 U.S.C. § 631(a).

Legislative History

The above statutory language provides the Administrator with broad discretion in establishing, reviewing, or revising size standards. Reading the legislative history of the Act provides a better understanding of Congress' intent in the Act. The requirement that a small business concern be "independently owned and operated" requires SBA to define the size of a firm together with its affiliates when calculating its size.[1] Therefore, SBA must consider not only the size of a firm but also the size of all of its affiliates (both domestic and foreign) when establishing, reviewing, or revising size standards and when determining its small business eligibility for Federal Government programs

The Banking and Currency Committee recognized the "impossibility of attempting to write into law a rigid definition of small business."[2] Therefore, section 3 of the bill defines a small business concern in a flexible and realistic manner. The Committee did this "because it has become universally recognized that it is utterly impossible to define small business rigidly in terms of number of employees, amount of capitalization, or dollar volume of business."

In 1957, the House Committee on Banking and Currency addressed how to characterize a small business and stated that "no single definition may be expected to meet all requirements." Recognition of varying situations motivated the Committee in drafting the present Small Business Act to depart from rigid standards and leave the definition of small business to administrative determination.[3] That same report explains that the origins of the present statutory requirement that the Agency vary the size standards from industry to industry where number of employees is used as the criteria was the result of the Agency's then existing flat 500-employee rule for all government contracts.

In September 2010, Congress passed the Jobs Act ("Jobs Act") (Pub. L. 111–240, 124 Stat. 2504; September 27, 2010), requiring SBA to review all size standards every five years and make necessary adjustments to reflect current industry and market conditions. Specifically, the Jobs Act requires SBA to conduct a detailed review of not less than one-third of the size standards during the 18-month period beginning on the date of enactment of this Act and during every 18-month period thereafter, which shall include holding not less than two public forums located in different geographic regions of the United States.

In accordance with section 1661 for the National Defense Authorization Act of Fiscal Year 2013 ("NDAA 2013") (Pub. L. 112-239; Jan. 2, 2013), SBA has relaxed the limitation on the number of small business size standards. Specifically, section 1661 of NDAA 2013 states

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[1] *See* Hearings on H.R. 4090 and H.R. 5141 before the Committee on Banking and Currency of the U.S. House of Representatives, 83rd Congress, 1st Session (1953), page 17.

[2] *See* House Report No. 494, 83rd Congress, 1st Session (1953), page 20.

[3] *See* House Report No. 555, 85th Congress, 1st Session, page 6.

"SBA cannot limit the number of size standards, and shall assign the appropriate size standard to each industry identified by NAICS."

Under section 1831 of the National Defense Authorization Act for Fiscal Year 2017 (NDAA 2017) (Pub. L. 114-328; December 23, 2016), Congress amended paragraph 3(a)(1) of the Act authorizing the Administrator to establish size standards for agricultural enterprises in the same manner as for other industries. The amendment also subjects size standards for agricultural enterprises to the rolling review procedures established under section 1344(a) of the Jobs Act. Historically, the size standards for most agricultural industries were established by statute.

The Small Business Runway Extension Act of 2018 (SBREA) (Pub. L. 115–324; December 17, 2018) amended section 3(a)(2)(C)(ii)(II) of the Small Business Act, 15 U.S.C. 632(a)(2)(C)(ii)(II), to modify the requirements for proposed small business size standards prescribed by an agency without separate statutory authority to issue size standards. Specifically, the SBREA changed the averaging period for calculating average annual gross receipts for size standards of services firms from three years to five years.

Section 863 of the National Defense Authorization Act for Fiscal Year 2021 (NDAA 2021) (Pub. L. 116–283; January 1, 2021) changed the averaging period for SBA's employee based size standards from 12 months to 24 months. Section 863 of the NDAA 2021 amended two provisions of section 3(a)(2) of the Small Business Act, which sets forth requirements for an agency that would prescribe a proposed size standard. First, the NDAA 2021 provides that those requirements also apply to the SBA when the agency acts pursuant to the authority in section 3(a)(2)(A) for SBA to specify small business definitions or size standards. Second, the NDAA 2021 amended section 3(a)(2)(C)(ii)(I) such that a proposed size standard for a manufacturing concern must provide for determining the size of the concern based on the employment during each of the concern's pay periods for the preceding 24 months. Previously, the statute specified the use of a 12-month period.

Regulatory History

Current small business size standards evolved from a limited number of general size standards for broad industry groups or sectors to a larger number of specific size standards based on individual industries. This transition was recognition that different industries had different characteristics, and thus warranted appropriate industry specific size standards. Many of today's size standards continue at levels established right after the SBA's inception, except that receipts based size standards have been increased for inflation over the years.

Over the years, SBA has adopted a broad range of size standards – manufacturing industry standards ranged from 250 employees to 1,500 employees; other industry size standards ranged from $0.10 million to $47 million in average annual receipts. SBA establishes its size standards for industries using the latest NAICS industry definitions, developed by the Office of Management and Budget (OMB) in collaboration with U.S. Census Bureau, other U.S. Federal Statistical Agencies, and Statistical Agencies of Canada and Mexico. NAICS replaced the Standard Industrial Classification (SIC) system, effective January 1, 1997. SBA adopted NAICS as the basis for its table of size standards, effective October 1, 2000 (65 FR 30836; May 15,

2000). OMB modifies or updates NAICS every five years and SBA adopts the NAICS updates for its table of size standards, effective October 1 of the same year. SBA has opted to use October 1 because that is the start of the Federal Government's fiscal year.

The 500-employee size standard for Federal contracting predates SBA; it was used by the Reconstruction Finance Corporation and the earlier Small War Plants Corporation, which was a World War II Government contracting agency channeling Federal contracts to small manufacturers. In 1957, the House Committee on Banking and Currency observed that "the standard of 500 or less employees originated in World War II with several variations. For the want of a better definition, the 500-employee rule generally gained acceptance in the Government, although in many instances there was considerable reluctance by many Government officials and members of Congress to accept such a rigid formula." (*See* Senate Report No. 555, 85th Congress, 1st Session, page 6.)

SBA adopted 500 emp1oyees as the size standard for manufacturing industries at its 1953 inception; it has remained a size standard for many industries until today and had long been considered the "anchor" size standard for employee based size standards. In 1959, SBA's size regulations distinguished between manufacturing and financial industries. Specifically, the Agency adopted 250-employee, 500-employee, and 1,000-employee size standards for its financial assistance programs, but maintained the 500-employee size standard for Federal contracting programs.

Generally, the Agency has used annual receipts as the measure of size standards for nonmanufacturing industries. Soon after its inception, SBA created size standards for nonmanufacturing based on annual receipts rather than employees. In 1954, SBA established $1 million in average annual receipts as the size standard for nonmanufacturing industries. Receipts based size standards were established subsequently for other industries. They varied between $0.30 million and $1 million for retail trade and services industries, between $2 million and $5 million for wholesale trade industries, and $5 million for construction industries. SBA has periodically increased all receipts based size standards for inflation. With the periodic inflation adjustments, the most common receipts based size standard of $1 million has increased to $9 million today. The $1 million level and its inflation-adjusted equivalents had long been considered the "anchor" size standard for industries with receipts based size standards.

By 1963, SBA receipts based size standards were as follows: $1 million for retail trade industries; $1 million for services industries; $5 million for wholesale trade industries; and $7.5 million for construction industries. SBA continued using two sets of size standards for manufacturing industries – 250 employees to 1,000 employees for SBA financial programs, but basically 500 employees for Federal contracting programs.

From 1963 to 1975, many manufacturing size standards were increased from 500 employees to 750 employees or 1,000 employees. Similarly, some services industries, such as engineering and janitorial services were broken into separate industries, with size standards of $5 million and $3 million, respectively.

In 1975, SBA adopted a general increase to its monetary based size standards for inflation (40 FR 32824; August 5, 1975). As a result, the new size standards were $2 million for

retail trade and services industries, $12 million for general construction, and $5 million for specialty trade construction. Employee based standards remained unchanged.

After a series of public notices in the *Federal Register* from 1980 to 1983 with an intent to comprehensively revise its size standards,[4] the Agency adopted in a final rule a detailed list of size standards for industries as defined under the SIC system (49 FR 5024; February 9, 1984). Generally speaking, the size standards framework the Agency followed until the first five-year comprehensive size standards review under the Jobs Act was put in place in 1984.

In 1984, to simplify procurement procedures, SBA adopted a single size standard of 500 employees for all wholesale trade industries, for both procurement and SBA financial programs (49 FR 5024; February 9, 1984). Before that, the wholesale trade industries had a 500-employee size standard for Federal procurement and three levels of receipts based standards ($9.5 million, $14.5 million, and $22 million) for SBA's financial programs. In 1986, SBA amended its size standards for the wholesale trade industries from 500 employees to 100 employees for all SBA financial programs (51 FR 25189; July 11, 1986), while it retained 500-employee size standard for Federal procurement.

In 1992, SBA proposed, along with an inflation adjustment, a reduction in the number of size standard levels from more than forty different levels to nine receipts based size standards and five employee based size standards (57 FR 62515; December 31, 1992). SBA withdrew the proposed rule on February 19, 1993 (58 FR 9131) and re-published it on September 2, 1993 (58 FR 46573). Although public comments overwhelmingly accepted the fixed size standards approach, the proposed levels seemed arbitrary and produced large variations in changes to standards. SBA believed it could not justify such large variations, and therefore, limited the final rule to adjusting the then existing receipts based size standards for inflation (59 FR 16513; April 7, 1994).

In March 2004, SBA proposed to simplify and restructure size standards by establishing all size standards based on number of employees (69 FR 13130; March 19, 2004). For a number of industries, however, an employee based size standard could result in businesses with very high receipts but few employees to qualify as small. There were other skewed outcomes as well, and SBA, therefore, also proposed a maximum receipts size standard along with an employee size standard for certain industries. Public comments showed that for some industries the proposed employee based standards were either too low or did not serve as a suitable measure of business size. Rather than issuing a revised proposed rule with adjusted size standards, SBA decided to seek additional input from the public.

Accordingly, in December 2004, the Agency issued an Advance Notice of Proposed Rulemaking (ANPRM) (69 FR 70197; December 3, 2004). It sought comments on ten specific issues that the public had raised in response to the March 2004 proposed rule. SBA did not make further proposals, but only sought public comment on whether and how it should consider the following: 1) Approaches to simplification of size standards; 2) Calculation of number of

[4] These include: (1) Advance Notice, 45 FR 15442; March 10, 1980; (2) Notice of Public Hearings, 45 FR 23704; April 8, 1980; (3) Public Notice, 45 FR 59587; September 10, 1980; (4) Second Advance Notice, 47 FR 18992; May 3, 1982; (5) Proposed rule, 48 FR 20560; May 6, 1983.

employees; 3) Use of receipts based size standards; 4) Designation of size standards for Federal procurements; 5) Establishment of size standards solely for Federal procurement; 6) Establishment of tiered size standards; 7) Simplification of small business status and affiliation with other businesses; 8) Joint ventures and small business eligibility; 9) Grandfathering of currently eligible small businesses; and 10) Impact of SBA size standards on the regulations of other Federal agencies. SBA received several thousand comments on these issues, but no consensus.

In 2007, SBA began a comprehensive review of all size standards to determine whether the existing size standards were consistent with current data, and to revise them, when necessary. In addition, on September 27, 2010, the President of the United States signed the Small Business Jobs Act of 2010 (Jobs Act), Pub. L 111-240, 124 Stat. 2504, Sept. 27, 2010. The Jobs Act directs SBA to conduct, at least every five years, a detailed review of all size standards and to make appropriate adjustments to reflect market conditions. SBA completed the first five-year review of size standards in early 2016 and the second five-year review of size standards in early 2023. SBA will begin the next (third) five-year review in the near future. Of the 1,009 size standards SBA reviewed in the first five-year review of size standards, the Agency increased 621, decreased three (to exclude potentially dominant firms from being considered small), and retained 388 at their existing levels. Of the 388 standards that were retained, 214 were retained based on the results and 174 were retained based on SBA's policy decision of not lowering any size standard in light of the economic environment following the 2007-2009 Great Recession, even though the results might have supported lowering them.[5] Similarly, of the 1,037 size standards under NAICS 2017 reviewed in the second five-year review, SBA increased 436 and retained 601 size standards at their existing levels. Of the 601 size standards that were retained, 109 were retained based on the results and 492 were retained based on SBA's policy decision of not lowering any size standards in light of the distressed economic environment resulting from the COVID-19 pandemic, even though the results might have supported lowering them.[6]

SBA modified its method for calculating average annual receipts used to prescribe size standards for small businesses (84 FR 66561; December 5, 2019). Specifically, in accordance with the Small Business Runway Extension Act of 2018, SBA changed its regulations on the calculation of average annual receipts for all of SBA's receipts based size standards, and for other agencies' proposed receipts based size standards, from a three-year averaging period to a five-year averaging period, outside of the SBA Business Loan and Disaster Loan Programs.

In accordance with NDAA 2021, SBA adopted a 24-month average to calculate a business concern's number of employees for eligibility purposes in all of SBA's programs (87 FR 34094; June 6, 2022). SBA also permitted business concerns in its Business Loan, Disaster Loan, Surety Bond, and Small Business Investment Company (SBIC) Programs to use a

[5] For information on the number of size standard reviewed and revised by NAICS sector as part of the first five-year review of size standards, *see* Table 6 (page 18) in a SBA's "Report on the First Five-Year Comprehensive Review of Small Business Size Standards under the Small Business Jobs Act of 2010."

[6] For information on the number of size standard reviewed and revised by a group of NAICS sectors as part of the second five-year review of size standards, *see* Table 5 (page 19) in a SBA's "Report on the Second Five-Year Comprehensive Review of Small Business Size Standards under the Small Business Jobs Act of 2010."

five-year averaging period, in addition to the existing three-year averaging period, for the purposes of calculating average annual receipts.

Currently, the most prevalent size standards are $9 million in annual receipts for Retail Trade and Services, $45 million for General Construction, $19 million for Special Trade Construction, 100 employees to 250 employees for Wholesale Trade for all Federal programs except for Federal procurement where it is 500 employees under the nonmanufacturer rule, and 500 employees for manufacturing industries. Monetary based size standards range from $2.25 million in annual receipts for some Agricultural enterprises to $47 million in annual receipts for some Retail Trade and some services industries. Similarly, employee based standards range from 100 employees for Fuel Dealers to 1,500 employees for some Manufacturing, Telecommunications, and Transportation industries. With exceptions of wholesale and retail trade industries, uniform size standards are now in place for all SBA's programs. Wholesale and retail trade industries have a singular 500-employee size standard for Federal procurement purposes under the nonmanufacturer rule and industry-specific size standards that apply to SBA's financial and other non-procurement Federal programs.

Selection of Size Measure

SBA has primarily used two measures of business size for its size standards – receipts and number of employees. SBA generally prefers receipts as a measure of business size because it measures the value of total output of a business concern and can be easily verified using business tax returns and financial records. The Small Business Act provides that the size of manufacturing firms be based on the average number of employees over 24 months and size of services firms based on average annual receipts over five years.

Accordingly, SBA primarily uses the number of employees for manufacturing industries and average annual receipts for services industries. The 500-employee manufacturing size standard had been utilized by the Small War Plants Corporation, the Small Defense Plants Administration, and the Reconstruction Finance Agency prior to SBA's inception. Other size measures are applied to a few specific industries, such as average assets for certain financial institutions and output capacity for petroleum refiners.

The choice of a size measure for an industry depends on which measure best represents the magnitude of operations of a business concern. That is, the measure should indicate the level of real business activity generated by firms in the industry. Table 1, Industry Factors Supporting Employee vs. Receipts Based Size Measure, below summarizes a list of several industry factors SBA considers when selecting the number of employees or receipts as an appropriate measure for size standards.

For a limited number of industries or programs, SBA has established size measures based on other business characteristics, including average assets for certain financial institutions, total refining capacity for petroleum refiners, and tangible net worth and net income for the Small Business Investment Company (SBIC) program, and 7(a) and Certified Development Company (CDC/504) loan programs. These are summarized in Table 2, Production Capacity and Financial Size Measures.

SBA decided to apply, in addition to the industry based size standards, the net worth and net income measures to its SBIC program because investment companies evaluate businesses using these measures to decide whether or not to make an investment in them. The net worth and net income based alternative size standard also applies for SBA's 7(a) and CDC/504 loans as an alternative to industry based size standards.

Table 1

Industry Factors Supporting Employee vs. Receipts Based Size Measure

Industry factor	No. of employees	Receipts	Reason
Highly capital intensive (e.g., telecommunication and utilities)	✓		The level of production varies with employment levels and large receipts with fewer employees.
Low operational costs relative to receipts	✓		Large receipts amounts generated with low labor inputs.
Variation of firms within industry by stage of production or degree of vertical integration	✓		Firm's value added contribution to final value varies depending on structure of firm. Employment is more strongly correlated to value added than receipts.
Horizontally structured firms	✓		Varying receipts to employee relationships among firms.
Highly labor intensive		✓	Value of output varies with employment practices (such as increasing hours or using more full time workers) and receipts is more easily verifiable.
Ease of factor substitution		✓	Same value of output can be achieved by varying levels of labor and capital inputs.
Presence of subcontracting		✓	Same value of output is achieved with differing levels of outsourcing.
High proportion of part-time or seasonal employment		✓	Same level of output is achieved with differing employment practices.
Operation in multiple industries		✓	Receipts is a more homogenous measure than employment.
Highly capital intensive (e.g., telecommunication and utilities)	✓		The level of production varies with employment levels and large receipts with fewer employees.

Table 2
Production Capacity and Financial Size Measures

Category	Measure	Comment
Production capacity	Barrels/day of petroleum refining	Applied to petroleum refiners in combination with number of employees.
Financial measure	Total assets	Applied to most banking and other depository industries.
	Net worth Net income	Applied to the SBIC, 7(a), and CDC/504 programs as an alternate size standard to the industry size standards.

Assumptions

Several assumptions underpin the structure of SBA's small business size standards, which in turn drive the methodological framework the Agency applies in size standards analysis. These assumptions are as follows:

1. SBA establishes size standard by industry category. As stated in the Small Business Act, size standards shall differ to reflect industry differences. Based on the analysis of industry data and public feedback, SBA has determined that a single, one-size-fits-all size standard is inappropriate to define the small business segment of each and every industry. For purposes of size standards, SBA utilizes the latest NAICS of the United States as a basis for industry definitions. Except for a few exceptions where a size standard may be established for a specific activity within in an industry (usually referred to "exceptions" in the table of size standards), size standards are primarily defined at the six-digit NAICS industry level.

2. An industry's size standard is established at the national level. In other words, SBA's small business size standards do not vary by geography. For the following reasons, SBA does not consider geography as a factor when establishing, reviewing, or revising small business size standards.

    i. The statute defines a small business concern as the one which is independently owned and operated, and which is not dominant in its field of operation (15.U.S.C. 632 (a)(1)). SBA establishes an industry's size standard at the national level. Similarly, the determination of "not dominant in its field of operation" is also made at the national level.[7]

    ii. The statue provides that when establishing or approving any size standard, SBA shall ensure that the size standard varies from industry to industry to the extent necessary to reflect the differing characteristics of the various industries (15 U.S.C. 632(a)(3)). However, the statute does not require SBA to vary the size

[7] *See* 13 C.F 121.102(b).

standard from geography to geography to account for geographical differences in industrial characteristics.

iii. If SBA were to establish size standards that would vary geographically, the question would arise on selecting a proper unit of geography. There are various geographical units in the U.S., including regions, states, counties, metropolitan statistical areas (MSAs), and Congressional districts.[8] Whatever geographical unit SBA were to choose, SBA likely would need to vary each of the nearly 1,000 industry based size standards by geography. This could result in tens or even hundreds of thousands of size standards using geography-industry pairs. The public would then face the immense burden of reviewing, commenting on, and complying with those size standards.

iv. Another challenge with geographically varying size standards would be determining the applicable size standard when the vendor's location is different from the location of contract performance. Which size standard would be applicable in determining the small business status of the vendor? Should it be the size standard that applies to the area where the vendor is located, or should it be the size standard applicable to the location of contract performance? If vendor location, firms with multiple locations would either be subject to multiple size standards or a complex series to regulations to determine which location sets the size standard. If location of contract performance, the applicable size standard can be different from size standards that apply to different locations vendors come from.

v. Geographically varying size standards may inappropriately influence entrepreneurs' decisions on selecting business location. If size standards varied geographically, entrepreneurs would tend to be encouraged to move from places with lower size standards to places with higher size standards to get benefits of higher size standards. This may lead to potential disparities in entrepreneurship and business development among geographic regions. This might inadvertently suppress economic development in already-distressed regions as firms seek optimal locations based on regulatory compliance rather than economic forces.

vi. SBA determines the size standards based on special tabulations of business data from the Economic Census, which is compiled and reported nationally. The same level of details of Economic Census data is not available for smaller geographical units. SBA is required to set size standards that would exclude firms that are "dominant in their field of operation," and that criteria is set nationally. As a result, in large part, the size standards are higher than they would be if we were to look at smaller geographic areas because very few firms that are dominant locally are dominant nationally. Data limitations preclude an extensive analysis of businesses within specific industries on a geographical basis.

[8] There are four regions, 50 states, more than 3,000 counties, more than 380 MSAs, and 435 congressional districts.

vii. In Accordance with the statute, SBA uses the NAICS six-digit levels as bases for industry definitions for size standards. Accordingly, there are nearly 1,000 six-digit NAICS industry categories for which SBA establishes size standards which vary from industry to industry. Many in the contracting community feel that SBA's size standards are already too complex and need to be simplified. Varying size standards by geography, on top of varying them by industry, would make size standards even more complex, rendering them extremely difficult to review, manage, administer, and apply. Defining smaller geographical areas would add further complexity.

3. Generally, a single set of size standards applies to most SBA programs. For some programs, a "program-based" or an alternative size standard may be established. However, in most of these cases, the size standard is related to the size standard for the industry of most program participants, such as the Small Business Innovation Research (SBIR) size standard.

4. An industry's size standard will be determined from the analysis of industry and Federal contracting factors and will be bounded by a minimum and a maximum size standard. The starting point of the analysis will be the percentile distribution of each factor considered in the evaluation. A size standard above or below the current size standard will be selected within a range of predetermined minimum and maximum size standards, depending on the results of the analyses of relevant industry and Federal contracting data available. SBA's size standards will generally reflect sizes substantially higher than the typical firm size at the entry level in order to include businesses that are competitively disadvantaged due to their size or to include businesses that are small relative to the characteristics of all businesses within an industry. Size standards will also reflect business capabilities to be able to compete for and perform Federal contracts within an industry.

5. With a very few exceptions, each size standard shall have only one measure of size. That is, almost all industries will have either a number of employees or receipts based size standard, not both. In very limited cases, an additional measure of size related to production or capacity may be included with an employee or receipts measure. For example, the size standard for the petroleum industry includes a combination of the refining capacity and the number of employees.

6. A business is defined on an enterprise basis rather than at the establishment level or any other similar legally incorporated entity. Accordingly, the size of a business concern includes all establishments, subsidiaries and affiliates under its control (whether controlled through ownership or other relationships). Similarly, the size of a business concern owned or controlled by another concern includes the size of its parent company and all of its subsidiaries and affiliates.

7. This methodology explains how SBA generally establishes, reviews, or modifies small business size standards and what data sources and factors it evaluates in its size standards analysis. It serves as a general analytical basis in establishing, reviewing, or revising size standards. However, such considerations as the President's, Administrator's, or

Congressional priorities, programs and policy directives may require SBA to deviate from this framework when establishing or adjusting size standards. Additionally, the presence of unique characteristics or market conditions in specific industries may also warrant an adjustment to the methodology laid out in this document when reviewing or modifying the size standards for those industries.

Establishing Comparison Industry Groups

The goal of SBA's size standards review is to determine whether its existing small business size standards reflect the current industry structure and Federal market conditions and revise them, when the latest available data suggests that revisions are warranted. In the past, including the first five-year review of size standards under the Jobs Act, SBA compared the characteristics of each industry with the average characteristics of a group of industries associated with the "anchor" size standard. For example, in the first five-year review of size standards, $7 million (now $9 million due to the inflation adjustments in 2014, 2019, and 2022) was considered the "anchor" for receipts based size standards and 500 employees was considered the "anchor" for employee based size standards. If the characteristics of a specific industry under review were similar to the average characteristics of industries in the anchor group, SBA generally adopted the anchor size standard for that industry. If the specific industry's characteristics were significantly higher or lower than those for the anchor group, SBA assigned a size standard that was higher or lower than the anchor. To determine a size standard above or below the anchor size standard, SBA evaluated the characteristics of a second comparison group comprising industries with higher receipts based and employee based size standards. Using the anchor size standard and average size standard for the second comparison group, SBA computed a size standard for an industry's characteristic (factor) based on the industry's position for that factor relative to the average values of the same factor for industries in the anchor and second comparison groups.[9]

In response to public comments, section 3(a)(7) of the Act that limits the SBA's ability to create common size standards by grouping industries below the four-digit NAICS level, and its own review of the methodology, in the 2019 revised size standards methodology, SBA replaced the "anchor" approach used in the prior methodology with the "percentile" approach, as a basis of deriving a size standard for each industry factor for each industry.[10]

Under the "percentile" approach, for each factor, an industry is ranked and compared with the 20th percentile and 80th percentile values of that factor among the industries sharing the same measure of size standards (i.e., receipts or employees). Combining that result with the 20th percentile and 80th percentile values of size standards among the industries with the same measure of size standards, SBA computes a size standard supported by each industry factor for each industry. In the prior methodology (including the 2009 Methodology), comparison industry groups were predetermined independent of the data, while under the percentile approach in the

[9] For a detailed description of the "anchor" size standards approach, *see* the SBA's 2009 Size Standards Methodology White Paper ("2009 Methodology or Approach"), available at www.sba.gov/size.

[10] For a detailed justification for replacement of the "anchor" approach to size standards analysis with the "percentile" approach, *see* the SBA's 2019 Size Standards Methodology White Paper ("2019 Methodology or Approach"), available at www.sba.gov/size.

2019 Methodology they are established using the actual data. This procedure is illustrated in detail in the subsequent sections of this document.

Primary Factors

The primary factors that SBA evaluates in analyzing the economic characteristics defining the structure of an industry include average firm size, a proxy for start-up costs and entry barriers, a standard measure of industry competition, and distribution of firms by size (13 CFR § 121.102(a)). Besides industry structure, SBA also examines the impact of an existing size standard as well as the potential impact of a size standard revision on small business participation in Federal contracting as an additional primary evaluation factor when establishing or reviewing the size standards. SBA generally considers these five factors – average firm size, start-up costs and entry barriers, industry competition, size distribution of firms, and small business participation in Federal contracting – to be the most important elements in determining an industry's size standard.

Secondary Factors

Besides the primary factors listed above, SBA also considers, if necessary, a number of other factors that are relevant when deciding a size standard for a particular industry. These factors include, but are not limited to, technological changes, industry growth trends, SBA's financial assistance and other program factors, the presence of competing or similar products among industries, and unique activity within an industry.

Public Comments

Public comments on proposed size standard rules provide additional important information. These comments can supplement SBA's analysis of industry structure and Federal market conditions or the data it used, thereby enabling it to consider other relevant information, where appropriate, in the final decision on a size standard. SBA thoroughly reviews all public comments before making final decisions on proposed changes to size standards in the proposed rule.

Subsequent sections provide a detailed description of the analysis of these factors. An overview of SBA's size standards methodology is presented in an Appendix.

PRIMARY FACTORS DESCRIBING INDUSTRY STRUCTURE

Average Firm Size

SBA computes two measures of average firm size: simple average firm size and weighted average firm size. For industries with receipts based size standards, SBA calculates the simple average firm size in terms of receipts as follows:[11]

[11] For details on SBA's calculations of annual receipts, *see* 13 CFR § 121.104.

$$Simple\ average\ firm\ size\ (receipts) = \frac{Total\ receipts\ in\ an\ industry}{Total\ number\ of\ firms\ in\ that\ industry}$$

Similarly, for industries with employee based size standards, the simple average firm size is expressed in terms of the number of employees as follows:[12]

$$Simple\ average\ firm\ size\ (employees) = \frac{Total\ number\ of\ employees\ in\ an\ industry}{Total\ number\ of\ firms\ in\ that\ industry}$$

One limitation of simple average firm size is that it weighs all firms within an industry equally regardless of their size. To overcome this, SBA also calculates the weighted average firm size, which gives more weights to larger firms. For industries with receipts based size standards, SBA calculates the weighted average firm size in terms of receipts as follows:

$$= \sum_{i=1}^{n} Receipts\ of\ firm\ i\ in\ an\ industry\ x\left(\frac{Receipts\ of\ firm\ i\ in\ the\ industry}{Total\ receipts\ in\ the\ industry}\right)$$

$$= \sum_{i=1}^{n} (Receipts\ of\ firm\ i\ in\ an\ industry)\ x(Firm\ i's\ receipts\ share\ \ in\ the\ industry)$$

where n represents the total number of firms in the industry.

Similarly, for industries with employee based size standards, the weighted average firm size is expressed in terms of the number of employees as follows:

$$Weighted\ average\ firm\ size\ (employees)$$

$$= \sum_{i=1}^{n} Employees\ of\ firm\ i\ in\ an\ industry\ x\left(\frac{Employees\ of\ firm\ i\ in\ the\ industry}{Total\ employees\ in\ the\ industry}\right)$$

$$= \sum_{i=1}^{n} Employees\ of\ firm\ i\ in\ an\ industry\ x(Firm\ i's\ employee\ share\ in\ the\ industry)$$

SBA does not have access to data on individual firms to compute on its own the weighted average firm size using these formulas. SBA requested the U.S. Census Bureau to provide the estimates of the weighted average firm size as part of the 2017 Economic Census special tabulations.

The minimal efficient firm size (MES) is the level of production or output where firms in an industry are able to minimize their average cost of production and become competitive. Thus, conceptually, it would imply that an industry's size standard should be set such that firms that have not yet achieved a MES or become competitive would qualify as small and thus be eligible for Federal small business assistance, while firms that are already at MES or fully competitive

[12] For details on SBA's calculations of number of employees, *see* 13 CFR § 121.106.

would not qualify. According to Scherer and Ross (1990) and Bain (1954), the best proxy for MES is an engineering approach to measure economies of scale. When this approach is infeasible due to time and cost involved, Scherer and Ross (1990) recommend using the average size of the largest plants/firms that account for the top 50 percent of market share within the industry, as the best proxy for MES.[13] The authors further show that average firm size of the largest firms accounting for the top 50 percent of market is strongly correlated with overall average firm size. Accordingly, given the lack of data on actual MES by industry, SBA assumes that average firm size as a proxy of MES. Moreover, average firm size is commonly used in evaluating various aspects of industry structure (e.g., barriers of entry, exit, and turnover).[14]

Because firms often compete with each other across industry lines, it is reasonable to compare the average firm size of an industry relative to the average firm size of other industries and then to compute the size standard for the industry depending upon that comparison. If the average firm size of an industry is higher than the average firm size for most other industries, this would generally support a size standard higher than the size standards for other industries. Conversely, if the industry's average firm size is lower than that of most other industries, it would provide a basis to assign a lower size standard as compared to size standards for most other industries.

Start-up Costs and Entry Barriers

Start-up costs and entry barriers reflect, among other things (such as regulatory barriers, intellectual property protection, economies of scale, brand identity and customer loyalty, product differentiation, *etc*.), the amount of capital requirements for physical plant and production equipment new firms must have to enter an industry and become competitive with existing firms.[15] High capital requirements can limit the number of potential entrants, particularly in capital-intensive industries such as manufacturing. If firms entering an industry under review have greater capital requirements than firms do in most other industries, all other factors remaining the same, this would be a basis for a higher size standard. Conversely, if the industry has smaller capital needs compared to most other industries, a lower size standard would be considered appropriate.

Given the lack of data on actual start-up costs and other measures of entry barriers (such as degree of product differentiation, intellectual property rights, advertising and marketing expenses, economies of scale, government policies and regulations, *etc*.), SBA uses average assets size as a proxy for the levels of capital needs for new businesses entering an industry.[16] SBA assumes that an industry with a significantly higher average assets size than most other

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[13] For discussion on the minimal firm size, *see* Sherer and Ross (1990, p. 120).

[14] *See* Caves (1998) and Martin (2002).

[15] For detailed discussion of these factors, *see* Porter (1998).

[16] Several studies have also used average assets size as a proxy for levels of capital requirements in analyzing industry structure, especially entry barriers (e.g., *see* Bain, 1956; Comanor and Wilson, 1967; and Guth, 1971). Comanor and Wilson (1967) recognize that this measure is likely to understate capital requirements. The book value of total assets will normally be less than their replacement cost, as a result of inflation in preceding years. This measure also fails to account for intangible assets such as information and knowledge advantage of incumbent firms. In the past, SBA used average non-payroll costs as a proxy for capital needs.

industries in the group is likely to have higher start-up costs, which in turn would support a size standard higher than that for most other industries.

SBA continues to explore other approaches and various data sources (including sales to assets from Risk Management Association and assets data from the Internal Revenue Service) in assessing start-up costs which may lead to a more robust assessment of this factor in deriving a size standard in the future. As with any change to the methodology, SBA will explicitly explain why and how it has incorporated a new approach into the methodology. SBA welcomes comment on alternative approaches to and/or data sources for measuring start-up costs and entry barriers when establishing or evaluating industry size standards.

Industry Competition

A fundamental purpose of small business size standards is to support SBA's mission and programs to promote market competition. A prevailing method of analyzing industry competition is the measurement of concentration or market power to determine the extent to which a particular industry is dominated by a few large firms.

To determine the degree of concentration in an industry, SBA evaluates various standard measures of industry concentration, including the four-firm concentration ratio, the eight-firm ratio, Gini coefficient, and the Herfindahl-Hirschman index (HHI).[17],[18]

The oldest and most commonly used measure of industry concentration is the *K*-firm concentration ratio, defined as the cumulative share of total industry receipts (or other dimension of size) obtained by the leading (largest) *K* firms within an industry. More formally, the *K*-firm concentration ratio (CRK) is defined as (Curry and George, 1983; Bikker and Haaf, 2002):

$$CRK = \sum_{i=1}^{K} s_i$$

where s_i $(market\ share) = \frac{Total\ receipts\ of\ firm\ i\ in\ an\ industry}{Industry's\ total\ receipts}$

i = 1, 2,…, K largest firms in the industry such that $s_1 > s_2 > \ldots > s_K$.

SBA has generally used the four-firm concentration ratio or the cumulative share of total industry receipts of the four biggest firms as a measure of industry competition when establishing or reviewing its size standards, including the recently completed comprehensive size standards reviews. The four-firm concentration ratio is the most commonly used concentration measure for judging the degree of industry competition (Lipczynski, Wilson and Goddard, 2005). Using the notations from the above formula, the four-firm concentration ratio (CR4) is defined as:

$CR4 = \sum_{i=1}^{4} s_i$, where $s_1 > s_2 > s_3 > s_4$.

[17] These measures are widely applied in measuring industry concentration. For example, *see* Pulaz and Kume (2013) and Ye, Lu and Jiang (2009).

[18] Decker and Williams (2023) examine the four-firm concentration ratio, eight-firm concentration ratio, and HHI of the U.S. industries at the four-digit, five-digit, and six-digit NAICS levels.

In addition to CR4, in preparing this revised methodology, SBA also evaluated the appropriateness of the 8-firm concentration ratio (CR8) and HHI as additional or alternative measures of industry concentration.[19] CR8 is the same concept as CR4, except that it represents the cumulative market share of the eight largest firms, instead of four. CR8 can provide additional information on the difference in concentration across industries or change in an industry's concentration over time, even if CR4 shows no difference or no change. Based on the SBA's analysis of the data from the 2017 Economic Census tabulation, CR4, CR8, and HHI estimates for individual industries are found to be strongly correlated to each other, yielding similar conclusions regarding industry concentration. Additionally, CR4 is more widely used than CR8 in the literature in measuring industry concentration. Therefore, SBA has decided to continue applying the four-firm concentration ratio as a measure of market competition.

Using the four-firm concentration ratio SBA compares the degree of concentration within an industry to the degree of concentration of the other industries with the same measure of size standards. If a significantly higher share of economic activity within an industry is concentrated among the four largest firms compared to most other industries, all else being equal, SBA would set a size standard that is relatively higher than for most other industries. Conversely, if the market share of the four largest firms in an industry is appreciably lower than the similar share for most other industries, the industry will be assigned a size standard that is lower than those for most other industries.

Size Distribution of Firms and Gini Coefficient

SBA examines the shares of industry total receipts accounted for by firms of different receipts and employment sizes in an industry. This is an additional factor SBA considers in assessing competition within an industry besides CR4.[20] If the preponderance of an industry's economic activity is attributable to several small firms, this generally indicates that small businesses are competitive in that industry and would support adopting a smaller size standard. A higher size standard would be supported for an industry in which the distribution of firms indicates that most of the economic activity is concentrated among few large firms.

Concentration among firms, like concentration of income among households, is a measure of inequality of distribution. The usual practice in measuring inequality of distribution is to arrange the firms (or groups of firms) in order of increasing size and express inequality in terms of percentages: for example, "*X"* percentage of firms hold "*Y"* percentage of total receipts (or other dimensions of size such as employees or assets) in an industry. This comparison is

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[19] $CR8 = \sum_{i=1}^{8} s_i$, where $s_1 > s_2 > \ldots > s_8$. The Herfindahl-Hirschman index (HHI) is computed as follows (Curry and George, 1983; Rhoades, 1993; Bikker and Haaf, 2002; Zhang and Hansz, 2022):

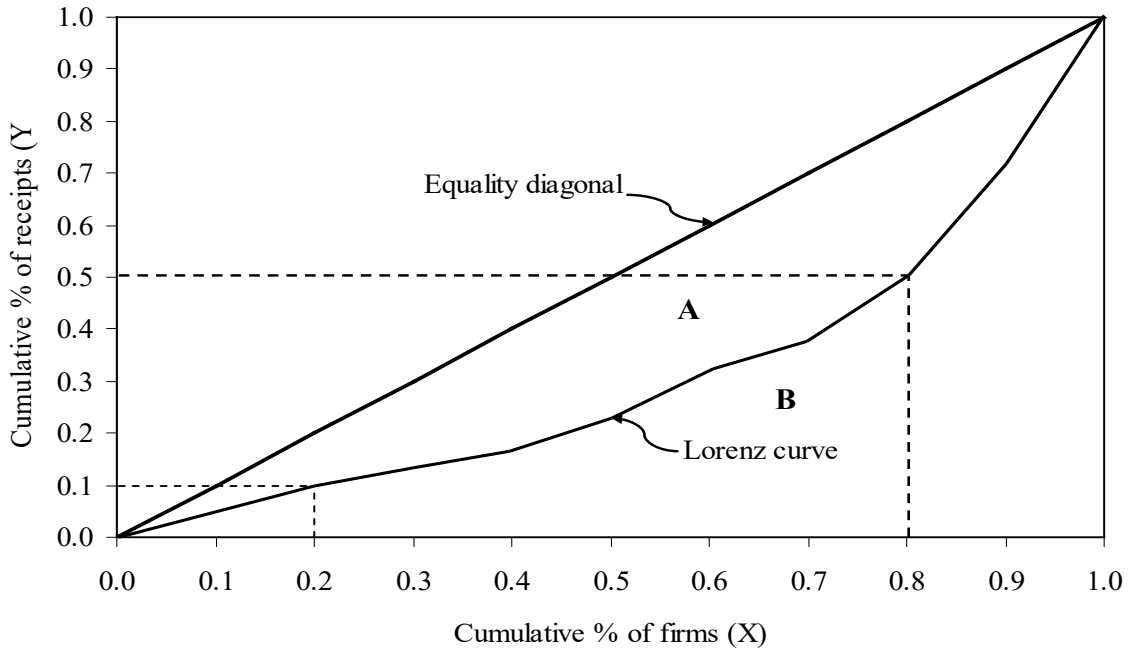
$HHI = \sum_{i=1}^{n} s_i^2$ where $s_i = \frac{Total\ receipts\ of\ firm\ i\ in\ an\ industry}{Industry's\ total\ receipts} x100$

and i = 1, 2, 3, …, n denotes the total number of firms in an industry.

[20] The CR4 suffers from a limitation that it only focuses on the cumulative share of the four largest firms in the industry and it does not account for differences in concentration among the four largest firms and remaining firms. It ignores what happens at the low end of the distribution (Prince and Thurik, 1993). The distribution of firms by size addresses that limitation of CR4. The Gini coefficient has been commonly used in measuring income disparity, but recently it is also being used for analyzing industry structure (*see* Lu, 2016).

often made in terms of the Lorenz curve, where cumulative percentages of units (firms) are on the horizontal axis (x-axis) and percentages of receipts (or other measures of size) are on the vertical axis (y-axis), as shown in Figure 1, Lorenz Curve of Distribution of Firms by Size. In the figure, 80 percent of firms hold 50 percent of total receipts in an industry. A diagonal line y = x connecting the coordinates (0, 0) and (1, 1) represents perfect equality, because for every point on the line the "*X*" and "*Y*" percentages are equal.

Figure 1
Lorenz Curve of Distribution of Firms by Size



The ratio of the area between the diagonal and the Lorenz curve (Area A) to the total area below the diagonal (Area A + Area B) serves as a coefficient of inequality, known as the Gini coefficient. If receipts are distributed perfectly equally among all the firms in the industry, then the Lorenz curve and the line of perfect equality coincide (i.e., area A equals zero), and hence the Gini coefficient becomes zero. If all the receipts are attributed to one firm, the Lorenz curve would pass through the points (0, 0), (1, 0) and (1, 1), and Area B would equal to zero, producing the value of Gini coefficient equal to one. Accordingly, the Gini coefficient values vary between zero and one, with zero implying perfect equality and one indicating perfect inequality. A higher Gini coefficient indicates greater concentration, suggesting that a few firms hold a significant share of the market, while a lower coefficient suggests a more evenly distributed market share.

There are several statistical formulas/methods for calculating the Gini coefficient. The following basic definition, in terms of Figure 1, provides a starting point for these formulas/methods.

$$Gini\ coefficient(G) = \frac{Area\ A}{(Area\ A + Area\ B)} = \frac{Area\ A}{0.5} = 2 \cdot Area\ A = 1 - 2 \cdot Area\ B$$

Note that since the total area of the box in Figure 1 is 1.0, the area below the diagonal (Area A + Area B) is half of that or 0.5. One common approach to estimating G is to estimate the value for "2·Area B" in the formula and subtract it from 1. For this revised methodology, among the various methods out there, SBA estimates the Gini coefficient using the following trapezoidal formula that uses the distribution of deciles (i.e., total intervals, n = 10) for all firms within an industry ranked by receipt size of each firm.[21]

$$G = 1 - 2 \cdot Area\ B = 1 - 2 \cdot \sum_{k=1}^{10} \frac{1}{2}(x_k - x_{k-1}) \cdot (y_k - y_{k-1})$$

$$\text{Thus,} \qquad G = 1 - \sum_{k=1}^{10} (x_k - x_{k-1}) \cdot (y_k - y_{k-1}).$$

Which in turn is equivalent to

$$G = \left(\sum_{k=1}^{10} x_{k-1} \cdot y_k\right) - \left(\sum_{k=1}^{10} x_k \cdot y_{k-1}\right).$$

where

G = Gini coefficient

x_k = Cumulative percentage of firms at the kth decile

x_k = Cumulative percentage of receipts at the kth decile

x and y vary from 0 to 1, that means $x_0 = y_0 = 0$; $x_{10} = y_{10} = 1$

Given the data confidentiality issue, SBA does not have access to information on individual firms to compute the Gini coefficient on its own. Therefore, for the 2017 Economic Census special tabulation, SBA requested the U.S. Census Bureau to provide the estimates of the Gini Coefficient using the above formula.

SBA compares the degree of inequality of distribution for an industry under review with other industries with the same type of size standards. If an industry shows a higher degree of inequality of distribution (hence a higher Gini coefficient) compared to most other industries in the group this would, all else being equal, warrant a size standard that is higher than the size standards assigned to most other industries. Conversely, an industry with lower degree of inequality (i.e., a lower Gini coefficient) than most others will be assigned a lower size standard relative to others.[22]

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[21] *See* Shryock , Henry S., Jacob S. Siegel, and Associates (1980). *The Methods and Materials of Demography,* 4th Printing, U.S. Department of Commerce, page 178.

[22] It should be noted that industries with similar receipts and Gini coefficients can have very different distributions as the Lorenz curves can have different shapes and yet still yield the same Gini coefficient. Despite this limitation, several studies have used the Lorenz curve and Gini coefficient in analyzing industry concentration (e.g., *see* Guth, 1971; White, 1982; Reichardt, 1975; Yeats, 1973; Fedderke and Szalontai, 2009; Dimic and Paunovic, 2019; Tanusondjaja, Dunn and Miari, 2021; Ukav, 2017; Tseebe, 2021).

FEDERAL CONTRACTING FACTOR

Besides the industry factors discussed above, for industries averaging $20 million dollars or more in total Federal contract dollars annually, SBA considers Federal contracting as one of the primary factors when establishing, reviewing, or revising size standards. Historically, the Federal Government has been concerned with the extent to which small businesses have received their "fair share" of Federal Government procurement dollars.[23, 24] Under the 2019 Methodology or Approach, SBA justifies considering a size standard higher than the current size standard if small businesses in an industry are found to have not received a "fair share" of Federal contracts. Currently, a "fair share" is assessed in terms of the small business share of Federal contract dollars in an industry relative to the small business share of that industry's total receipts. Specifically, if the small business share of an industry total receipts exceeds the small business share of total Federal contract dollars by ten percentage points or more, SBA determines that small businesses are underrepresented in the Federal marketplace under the current size standard and a justification would exist to increase that industry's current size standard. If that difference is less than ten percentage points, SBA considers that small businesses are represented well in the Federal market and the current size standard is considered adequate with respect to the Federal contracting factor.

Small businesses face several barriers when trying to obtain a "fair share" of Federal contracts, such as lack of knowledge about or disinterest in government contracting, difficulties with Federal certifications, smaller size, reduced capacities and resources, limited government and business networks, and other unfavorable social, policy, and regulatory environments. Furthermore, government agencies are prone to bundle contracts, purchase from larger firms, and procure from industries outside of sectors in which small businesses tend to concentrate. Consequently, small businesses may obtain a lower number and dollar value of Federal contracts relative to the proportion of the number of small businesses that are available in the marketplace to bid on and perform contract work.

The small business share of industry's total receipts can be considered a proxy for what portion of Federal contracts could be performed by small business. Similarly, the small business share of Federal contract dollars can be considered a proxy for the actual utilization of small business to perform those contracts. The difference between the small business share of Federal

[23] The Business Opportunity Development Act of 1988 (Pub. L. 100-656 (November 15, 1988), Section 502) established a goal of at least 20 percent of overall prime Federal procurement contract dollars to be awarded to small businesses. That goal was raised to 23 percent in 1997 as part of the Small Business Reauthorization Act of 1997 (Pub. L. 105–135 (December 7, 1997), Section 603).

[24] To provide greater contracting opportunities for small and disadvantaged businesses to win Federal contracts the Federal Government has designed and implemented various contracting and business development programs. These include small business set-aside, Women-Owned Small Business (WOSB), Economically Disadvantaged Women-Owned Business (EDWOSB), Historically Underutilized Business Zones (HUBZone), 8(a) Business Development (8(a) BD)), and Service-Disabled Veteran-Owned Small Business (SDVOSB) programs. One of the functions of these programs is to set aside Federal contracts to qualified small businesses, including those participating in above socio-economic programs.

contract dollars (i.e., small business utilization (U)) and small business share of industry receipts (i.e., small business availability (A)) yields a current measure of disparity as follows:

$$Small\ Business\ Utilization\ (U)\left(\frac{Contract\ obligations\ to\ small\ businesses}{Total\ contract\ obligations}\right)$$

$$-Small\ Business\ Availability\ (A)\left(\frac{Amount\ of\ receipts\ to\ small\ firms}{Total\ industry\ receipts}\right)$$

The 2019 Approach to measuring the Federal contracting factor does not capture other important aspects of Federal procurement that may indicate the degree in which small businesses have received a "fair share" of Federal contracts. These include: 1) the number of contracts awarded to small businesses relative to total contracts, and 2) the number of small businesses winning Federal contracts relative to total firms. To account for these important measures of small business representation in the Federal market, in this revised methodology, SBA is replacing the 2019 Approach to measuring small business participation in the Federal market with the disparity ratio approach.

In this revised methodology, SBA employs the disparity ratio approach to estimate underrepresentation (or overrepresentation) of small businesses in Federal procurement. A disparity ratio measures the degree to which firms of a given type (e.g., small businesses) are represented in Federal contracting in proportion to their prevalence in the economy at large. In addition to what is currently being measured for fair share in Federal contracting, which is the small business share of contract dollars relative to the small business share of industry receipts, under the disparity ratio approach, SBA will also consider the small business share of the number of contracts awarded in proportion to the small business share of "ready, willing, and able" firms that are available to bid on or perform Federal contracts.[25] SBA has found that in some industries, small businesses can receive a disproportionately low share of contracting dollars even though they receive a relatively large number of contracts because of the low average contract value, while in other industries, the total contract dollars obligated to small businesses may be significant, but a relatively small number of small firms are receiving contracts.[26] The disparity ratio is a widely used measure of equality in Federal contracting. SBA has either conducted or commissioned studies using the disparity ratio approach to measure success of

[25] Prior studies involving disparities in Federal contracting (*see* Footnotes 27, 28, 29, and 30) have used both a broader and narrower definition of "willing, ready' and able" firms to bid on and perform Federal contracts. Under a broader definition, the population of "willing, ready, and able" firms is defined as those with paid employees operating in the United States. Under a narrower definition, the population of "willing, ready, and able" firms is defined as those firms that are registered in SAM. Here, SBA is adopting the narrower definition of the population of "willing, ready, and able" firms to bid on and perform Federal contracts. SBA also considered the broader definition, but it was not adopted (*see* Footnote 32).

[26] For example, in NAICS 561210 (Facility Support Services), small businesses accounted for just 15.5 percent of total contract dollars, but they accounted for 76.6 percent of total contracts. On the other hand, in NAICS 541614 (Process, Physical Distribution and Logistics Consulting Services), small businesses accounted for 54.2 percent of total contract dollars, but they accounted for just 1.3 percent of total contracts.

industries in which WOSBs may receive their "fair share" of Federal contracts.[27, 28, 29] Similarly, the Minority Business Development Authority (MBDA) within the U.S Department of Commerce commissioned a study to assess the extent to which minority business enterprises (MBEs) have access to the range of local, state, and Federal contracting opportunities. [30] That study reviewed more than 100 publicly available disparity studies and reports involving MBEs.

The disparity ratio involves calculating the ratio of small business share of Federal contracts (i.e., a proxy for a utilization ratio (U)) to the small business share of industry receipts (i.e., proxy of an availability ratio (A)), rather than computing the differences between the two shares under the 2019 Methodology. In the revised methodology, the factor to evaluate small business representation in Federal contracts is derived as a ratio of two ratios (U/A) rather than computing the difference between the two ratios (U−A) as follows:

$$Disparity\ ratio = \frac{Utilization\ ratio\ (U)}{Availability\ ratio\ (A)}$$

If the disparity ratio is equal to 1.0, then there is no disparity (or there is parity) and small businesses are said to have been awarded Federal contracts in the same proportion as their representation in the industry. If the ratio is greater than 1.0 or parity, then small businesses are overrepresented among successful Federal contractors relative to their share of "ready, willing, and able" businesses that are available to bid on or perform Federal contracts. If the ratio is less than 1.0, then there is an adverse disparity and small businesses are underrepresented as government contractors relative to their share of "ready, willing, and able" businesses that are available to bid on or perform contracts.

To calculate disparity ratio measures, SBA is using two measures of small business utilization in Federal procurement (i.e., utilization ratio): 1) the number of contracts to small businesses relative to total contracts, and 2) the dollar obligations of contracts to small businesses relative to total dollar obligations. Similarly, SBA is using two measures of small business prevalence in the population of firms that are ready, willing, and able to bid on or perform Federal contracts (i.e., availability ratio): 1) the number of small firms relative to total firms that have registered as potential bidders for Federal contracts, and 2) small business receipts relative to total industry receipts. Formulas to derive these utilization and availability ratios and resultant disparity ratios are provided below.

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[27] National Research Council, Division of Behavioral and Social Sciences and Education, Committee on National Statistics, Steering Committee for the Workshop on Women-Owned Small Businesses in Federal Contracting. (2005). Analyzing Information on Women-Owned Small Businesses in Federal Contracting. Washington, DC: National Academies Press.

[28] Reardon, E., Nicosia, N., and Moore, N. Y. (2007). The Utilization of Women-Owned Small Businesses in Federal Contracting. Report Prepared for the U.S. Small Business Administration. Santa Monica, CA: RAND Corporation.

[29] Optimal Solution Group (2021). Women-Owned Small Business NAICS Analysis: Final Report. Report Prepared for the U.S. Small Business Administration. College Park, MD: Optimal Solution Group, LLC.

[30] Premier Quantitative Consulting, Inc (2016). Barriers and Factors Affecting Minority Business Enterprises: A Review of Existing Disparity Studies. Report prepared for the Minority Business Development Authority, the U.S. Department of Commerce. Orlando, FL: Premier Quantitative Consulting, Inc.

Utilization ratios

The first utilization ratio measures the ratio of the number of contracts awarded to small businesses in an industry divided by the total number of contracts awarded in that industry.[31] The number of contracts is obtained from the FPDS-NG/SAM data for fiscal years 2020-2022.

$$Utilization\ ratio\ (Method\ 1) = \frac{Number\ of\ contracts\ to\ small\ businesses}{Total\ number\ of\ contracts}$$

The second utilization ratio is defined as the ratio of contract obligations awarded to small businesses in an industry to total contract obligations in that industry. Contract obligations are based on data from FPDS-NG/SAM for fiscal years 2020-2022.

$$Utilization\ ratio\ (Method\ 2) = \frac{Contract\ obligations\ to\ small\ businesses}{Total\ contract\ obligations}$$

Availability ratios [32, 33]

The first availability is defined as a ratio of the number of small firms to the total number of firms in the industry (NAICS code) in which population of "ready, willing and able" firms is all firms that have registered as potential bidders for Federal contracts. The number of "ready, willing and able" firms is estimated from SAM.gov for fiscal years 2020-2022.

$$Availability\ ratio\ (Method\ 1) = \frac{Number\ of\ small\ firms}{Total\ number\ of\ firms}$$

The second availability ratio is defined as the ratio of industry receipts accounted for small businesses in an industry to the total receipts in that industry. The receipts data are

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[31] Contracts awarded include all actions with dollars obligated, not only the actions with modification number = 0 or IDV PIID is null. The contracts or IDVs were included if the amount of dollars obligated to the vehicle was different than zero. The amount of dollars was accumulated to the unique ID of the vehicle.

[32] As the third alternative of the availability ratio, SBA also considered the ratio of the number of small firms in an industry to the total number of firms in that industry from the Economic Census data. Use of Economic Census data would provide availability measures for a broader universe of firms than those that are registered in SAM as potential bidders on Federal work. However, SBA did not select this measure of availability ratio as combining it with either utilization ratios resulted in disparity ratios that were either "materially below parity" or "substantially below parity" for the vast majority of industries. The reason for this finding is that, based on the Economic Census data, the vast proportions of businesses are classified as small, thereby yielding very high availability ratios as compared to the utilization ratios.

[33] As the fourth alternative of the availability ratio, SBA also considered the ratio of the industry receipts accounted for by small firms in an industry to the total receipts in that industry based on SAM data. SBA did not select this measure of availability ratio as combining it with either utilization ratios resulted in the disparity ratios that were either "close to or at parity" or "significantly above parity" for the vast majority of industries. One reason for this finding is that the availability shares for small businesses are systematically smaller because of the very large gross receipts of a small number of very large firms. Another problem is that the receipts data in SAM are not broken down by industry when a firm operates in multiple industries. Rather, same enterprise-level receipts (i.e., combined receipts from all industries) are populated for each industry.

obtained from the special tabulations of the 2017 Economic Census, Census of Agriculture and County Business Patterns.

$$Availability\ ratio\ (Method\ 2) = \frac{Amount\ of\ receipts\ to\ small\ firms}{Total\ receipts}$$

Disparity ratios

Here, SBA computes the disparity ratio, for each NAICS industry averaging $20 million or more in total contracts annually, in two ways: (1) the ratio based on number of contracts in which the population of "ready, willing, and able" firms is all firms that have registered as potential bidders for Federal contracts, and (2) the ratio based on contract obligations in which the proxy for the population of "ready, willing, and able" firms is total receipts in industry.

$$Disparity\ ratio\ (Method\ 1) = \frac{Utilization\ ratio\ (Method\ 1)}{Availability\ ratio\ (Method\ 1)}$$

$$= \left(\frac{Number\ of\ contracts\ to\ SBs}{Total\ number\ of\ contracts}\right) \div \left(\frac{Number\ of\ small\ firms}{Total\ number\ of\ firms}\right)$$

$$Disparity\ ratio\ (Method\ 2) = \frac{Utilization\ ratio\ (Method\ 2)}{Availability\ ratio\ (Method\ 2)}$$

$$= \left(\frac{Contract\ obligations\ to\ SBs}{Total\ contract\ obligations}\right) \div \left(\frac{Amount\ of\ receipts\ to\ small\ firms}{Total\ receipts}\right)$$

Following the literature in disparity analysis [34] ,small businesses are said to be "materially underrepresented" in industries in which the disparity ratio is between 0.5 and 0.8 and "substantially underrepresented" in industries in which the disparity ratio is less than 0.5. If the disparity ratio for an industry is less than 0.8 ("materially below parity" or "substantially below parity"), SBA considers the current size standard for that industry as inadequate, thereby warranting an upward adjustment of the current size standard. If the disparity ratio for an industry is 0.8 or higher ("close to or at parity" or "substantially above parity"), small businesses are said to be represented well in the Federal market, SBA considers that the current size standard for that industry as adequate. Table 3, Disparity Ratio Thresholds and Size Standards Adjustment, show the key disparity ratio thresholds, description of those values, and size standards adjustment rule.

[34] Optimal Solution Group (2021). Women-Owned Small Business NAICS Analysis: Final Report. Report Prepared for the U.S. Small Business Administration. College Park, MD: Optimal Solution Group, LLC.

Table 3
Disparity Ratio Thresholds and Size Standards Adjustment

Disparity ratio from	Disparity ratio to	Description of value	Size standards adjustment rule
0	< 0.5	Small businesses are "substantially below parity"	Increase the current size standard
0.5	< 0.8	Small businesses are "materially below parity"	Increase the current size standard
0.8	< 1.2	Small businesses are "close to or at parity"	Maintain the current size standard
>=1.2		Small businesses are "substantially above parity"	Maintain the current size standard

Power Analysis

It is possible that conclusions regarding the small business underrepresentation might be statistically unreliable or unstable in terms of the number of observations (i.e., number of contracts) available to compute the disparity ratios. To address this issue, SBA conducted power analyses to determine which industry's disparity ratios are statistically stable and unstable. The approach used here corresponds to the one that was implemented in the latest WOSB study[35], which used the one proportion test of the utilization ratio. This approach to the power analyses examines the disparity ratios as the outcome and determines the extent to which the utilization ratio needs to change so the disparity ratio equals to 0.8 or 0.5, assuming the availability ratio is constant.

As stated above, SBA classifies the disparity ratios as: materially below parity when the small business disparity ratio is between 0.5 and less than 0.8 and substantially below parity when the small business disparity ratio is less than 0.5. The power analyses assess the disparity ratios' statistical reliability or stability relative to the two default thresholds: 0.5 and 0.8. Thus, the power analyses provide inferences for stability of the disparity ratio to being materially below parity or substantially below parity.

To achieve a high level of reliability of the results, it is necessary to have an adequate number of observations. It is critical to gather enough observations for each six-digit NAICS industry that yield stable disparity ratio results at a five percent significance level, around the assumption that the disparity ratios equal to 0.8 or 0.5.[36] For the test, SBA assumes that the difference between the estimated utilization ratio and the assumption under the critical thresholds of the disparity ratios equals the margin of error € of the 95 percent confidence interval of the

[35] Optimal Solution Group (2021). Women-Owned Small Business NAICS Analysis: Final Report. Report Prepared for the U.S. Small Business Administration. College Park, MD: Optimal Solution Group, LLC.

[36] If DR = U/A = then U=Threshold*A, where threshold can be 0.8 or 0.5, and A is assumed constant.

utilization ratio[37], and uses the Z-statistic formula to obtain the number of observations (in this case, number of contracts) needed to have a stable result.[38] If the critical number of observations calculated is smaller than the number of observations in the dataset used by SBA, then the results are considered stable, and unstable if the opposite occurs.[39]

In general, if a test produces unstable results under both null hypotheses for a specific six-digit NAICS industry, then SBA would maintain the current size standard. If the test is stable relative to the disparity threshold of 0.8 or 0.5, then the size standard would be adjusted, following Table 9 (see page 49 below). SBA has decided to include the power analyses results in the methodology to monitor the changes of these results overtime. However, for now, because there is a very small number of industries with unstable results, the application of the adjustment to size standards for the Federal contracting factor will occur using Table 9 with no considerations to the results from the power analyses.

DATA SOURCES AND ESTIMATION

Industry Data

The primary source of data SBA uses to examine industry characteristics is a special tabulation of the latest Economic Census from the U.S. Census Bureau.[40] The tabulation based on the 2017 Economic Census is the latest available, which SBA will use for evaluating industry characteristics for the forthcoming, third five-year comprehensive size standards review.[41] The 2017 Economic Census special tabulation contains information for different levels of NAICS categories on average and median firm size in terms of both receipts and employment, total receipts generated by the four and eight largest firms, the Herfindahl-Hirschman Index (HHI), the Gini coefficient, and size distributions of firms by various receipts and employment size groupings.

The first limitation of the Economic Census special tabulation is that the employees and receipts figures are not fully displayed for some size classes due to disclosure prohibitions,

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[37] This assumption is crucial because it creates a normal approximated confidence interval for a binomial proportion and permits to solve for the number of observations needed to make the confidence interval reliable.

[38] $Z = \frac{U-0.8*A}{\sqrt{.8*A(1-0.8*A)/n}} \Rightarrow n_{0.8,stable} = \left(\frac{Z_{0.025} \times \sqrt{0.8*A(1-0.8*A)}}{E\ (margin\ of\ error)}\right)^2 = \left(\frac{1.96 \times \sqrt{0.8*A(1-0.8*A)}}{U-0.8*A}\right)^2$

$Z = \frac{U-0.5*A}{\sqrt{.5*A(1-0.5*A)/n}} \Rightarrow n_{0.5,stable} = \left(\frac{Z_{0.025} \times \sqrt{0.5*A(1-0.5*A)}}{E\ (margin\ of\ error)}\right)^2 = \left(\frac{1.96 \times \sqrt{0.5*A(1-0.5*A)}}{U-0.5*A}\right)^2$

[39] $N_C \geq n_{0.8,stable}$: *Disparity ratio is stable relative to the disparity threshold of* 0.8.

$N_C < n_{0.8,stable}$: *Disparity ratio is unstable relative to the disparity threshold of* 0.8.

$N_C \geq n_{0.5,stable}$: *Disparity ratio is stable relative to the disparity threshold of* 0.5.

$N_C < n_{0.5,stable}$: *Disparity ratio is unstable relative to the disparity threshold of* 0.5.

where N_C is the number of available observations (i.e., number of contracts) available for each industry.

[40] The special tabulation is similar to the Enterprise Statistics, formerly published by the Census Bureau, except that the Economic Census data is limited to a business operation in its primary industry while the Enterprise Statistics also contained information on operations outside of the primary industry.

[41] The Economic Census is conducted every five years. However, there is a 4- to 5-year lag from the time Economic Census is completed to the receipt of special tabulation from the Census Bureau.

mostly at the 6-digit NAICS industry level. SBA estimates such missing values using the displayed data at the six-digit level and data at higher levels of industry aggregation, such as at the two- or three-digit NAICS level for which such figures are fully displayed.[42] For industries where SBA is not able to estimate missing values for some industry categories, SBA bases its analysis only on those industry factors for which information is complete.

The second limitation of the Economic Census tabulation relates to multi-establishment firms with establishments operating in different industries. While the Economic Census is establishment-based, the industry specific data in the special tabulation from the Census Bureau are firm-based. That is, if a firm has multiple establishments primarily operating in the same industry, their employment, payroll, and receipts data are aggregated and assigned to that firm in that industry. If an enterprise has multiple establishments operating in different industries, the enterprise will be counted as a firm in each of those different industries, and the employment, payroll, and receipts data in each industry will be the data of the establishment operating in the specific industry. Under SBA's regulations, in contrast to the treatment under the Economic Census, a firm's size for size standards purposes is based on total receipts or number of employees from all its establishments combined even if they operate in different industries.[43]

The third limitation of the Economic Census tabulation is that the Economic Census data excludes agricultural production industries in Subsectors 111 and 112, domestically scheduled airlines, railroads, U.S. Postal Service, mutual funds (except real estate investment trusts), religious grant operations, religious organizations, private households, public administration, and government.[44]

To evaluate industries in NAICS Sector 11 (Agriculture, Forestry, Fishing and Hunting) that are not covered by the Economic Census, SBA evaluates a similar special tabulation based on the 2017 Census of Agriculture from the National Agricultural Statistics Service (NASS).

Besides the Economic and Agricultural Census tabulations, SBA may also evaluate relevant industry data from other sources, especially for industries that are not covered by the Economic Census. These include the County Business Patterns published by the U.S. Census Bureau, the Longitudinal Business Database (LBD) from the Center for Economic Studies, Quarterly Census of Employment and Wages (QCEW, also known as ES-202 data), and the Business Employment Dynamics (BED) data from the U.S. Bureau of Labor Statistics. Similarly, to evaluate certain financial industries that have assets based size standards SBA examines the data from the BankFind Suite database of the Federal Depository Insurance Corporation (FDIC) and the Credit Union and Corporate Call Report data from the National

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[42] For example, because of disclosure restrictions, employee figures in certain cells of size distribution by employment size groups are given in ranges, such as <20, 20-99, 100-249, and so on. Employment values for these cells are estimated using the mid-values of these ranges (such as 10 for <20, 60 for 20-99, 175 for 100-249 and so on) and these values are adjusted such that final values are consistent with each industry's total and total for each size class at a higher level of industry aggregation.. Missing values for receipts in distribution of firms by receipts size are estimated using the employment shares and adjusting the estimated values for internal consistency.

[43] There is no solution to this discrepancy between how multi-establishment firms with establishments operating in different industries are treated in the Economic Census special tabulation and how SBA treats them in calculating firm size for size standards purposes. However, SBA does not expect this to be a serious problem as most firms either have a single establishment or have multiple establishments operating in the same industry.

[44] SBA does not establish size standards for Private Households, Public Administration, and other government entities.

Credit Union Administration. Finally, to evaluate the capacity component of the Petroleum Refiners (NAICS 324110) size standard, SBA evaluates the petroleum production data from the Energy Information Administration.

Assets Data

As stated above under "Start-up costs and entry barriers," because of the lack of data on actual start-up costs by industry, SBA uses average assets as a proxy for business start-up costs. For this, SBA combines the sales to total assets ratios by industry, obtained from the Risk Management Association's (RMA) Annual Statement Studies with the simple average receipts size by industry from the 2017 Economic Census (EC) tabulation to estimate the average assets size for each industry as follows:[45]

$$Average\ assets\ size = \frac{1}{(Sales/Total\ assets)_{RMA}}\ x\ (Average\ receipts\ size)_{EC}$$

$$= \left(\frac{Total\ assets}{Sales}\right)_{RMA} x(Average\ receipts\ size)_{EC}$$

The sales to total assets ratios that SBA uses to calculate average assets size are from the RMA's Annual Statement Studies for 2020-2022.[46]

System for Award Management (SAM)

SBA obtains from the System for Award Management (SAM) the latest data on Federal contractors, more specifically the data on each firm that wants to participate in the Federal procurement market, including size (i.e., number of employees and the average annual revenue), NAICS industry code(s), membership in SBA's contracting and business development programs, and organization type. With a few exceptions, a firm should register in SAM before participating in Federal contracting and has to update its SAM information annually. SBA uses the SAM data for evaluating the "exceptions" and size standards for industries that are not covered by any of the industry data sources mentioned above. The SAM data is also used to obtain the number of small firms and total population of firms that are ready, willing and able to bid on and perform Federal contracts for calculating the disparity ratios. One limitation of the SAM data is that information is self-reported and includes a large number of outliers and missing values. Another limitation is that the industry data from SAM is not consistent with the industry data from the Economic Census. Specifically, an industry's data from SAM includes all firms registered under that industry, including those for which that industry is not their primary activity, whereas the Economic Census data only include firms for which that industry is their primary activity.

[45] Please refer to the RMA website for further information on the RMA data. One limitation of the RMA data is that sales to assets ratios are not available for a considerable number of industries at the six-digit NAICS level. For those industries, SBA applies the sales to assets ratios at the four-digit NAICS level.

[46] SBA will update these data once the more recent data becomes available from RMA.

Federal Contracting Data

To determine the small business share of total number of Federal contracts and the small business share of total contract obligations, SBA uses the data from the U.S. General Service Administration's Federal Procurement Data System – Next Generation (FPDS-NG). The FPDS-NG data is also used for estimating the impacts of size standards revisions. The data contains a range of information on each Federal contract awarded, including name of the company receiving the contract and its small business status, value of the contract, and the NAICS industry code for the goods and service being procured. The FPDS-NG data is also used to evaluate size standards at the subindustry levels (usually referred to as "exceptions"), to evaluate industries for which the data is not available from other industry data sources, and to compute the utilization ratios (i.e., small business share of Federal contracts and contract obligations) for computing the disparity ratios. For the forthcoming third five-year size standards review, SBA will evaluate the FPDS-NG data for fiscal years 2020-2022, and this data will be updated when the more recent data becomes available.

The FPDS-NG data also includes employment and revenue information for each contractor. This information is time specific. For example, if a contractor was awarded a contract in fiscal year 2011, information about the number of employees and revenue will correspond to that moment in time. By combining the data from FPDS-NG and SAM, SBA obtains the latest available revenues and employees for each contractor.

The FPDS-NG data has several limitations as well. Because most information in FPDS-NG comes from SAM, the FPDS-NG data also suffers from the same problems that pertain to the SAM data, such as outliers, missing data, or missing or invalid NAICS codes. Additionally, the FPDS-NG has the following limitations:

1. FPDS-NG does not allow the user to identify supply contracts awarded to wholesalers and retailers and differentiate them from those awarded to manufacturers. The system does not include a flag for contracts awarded to nonmanufacturers. Firms providing products to Federal Government as nonmanufacturers generally identify themselves with one or more NAICS codes from Sectors 42 or 44-45 and are subject to the 500-employee nonmanufacturer size standard. Thus, revenues and employees information in FPDS-NG corresponds to nonmanufacturers supplying the products, but the NAICS code and dollars obligated under the contract correspond to the industry that manufactures the product. This distorts the relationship between the number of employees and revenues when evaluating the Federal contracting factor for size standards analysis.
2. For industries with "exception(s)" to size standards, the FPDS-NG data does not allow the user to determine whether the contracting officer applied the regular or "exception" size standard in classifying a contractor as "small" or "other than small." The data does not include a flag for use of the size standards exceptions.
3. The data needs to be converted from the previous NAICS industry codes to the most recent ones. The NAICS code applied to a specific award remains even though the NAICS code has changed or no longer exists. In some cases, contracting officers continue to use the outdated NAICS codes. These issues warrant a conversion of the data from the old NAICS codes to the most recent NAICS definitions that SBA is using for its size standards.

4. FPDS-NG does not contain information on parent-subsidiary relationships which would allow the user to accurately compute total annual revenue and number of employees for the vertically and horizontally integrated firms.
5. The FPDS-NG data is only limited to prime contracting and does not include information on subcontracting.
6. The FPDS-NG data only includes information on firms that were actually awarded Federal contracts, but not on those who submitted bids for contracts but did not win.
7. FDPS-NG data include outliers or extreme values for the number of employees, annual revenue, and value of contracts, as well as invalid or missing NAICS codes, necessitating data management and cleaning procedures.

SBA Loan Data

To determine the impact of size standards revisions on SBA's financial assistance, SBA analyzes its internal data on 7(a) Business Loan, CDC/504 Loan, and Economic Injury Disaster Loan (EIDL) programs. For the forthcoming comprehensive size standards review, SBA will use the loan data for fiscal years 2020-2022, updated with the availability of more recent data.

SELECTION OF SIZE STANDARDS

In accordance with the 2013 amendment to the Small Business Act (section 3(a)(8)) under section 1661 of NDAA 2013, in this revised methodology, SBA will continue to relax the limitation on the number of small business size standards. Specifically, section 1661 of NDAA 2013 states "SBA cannot limit the number of size standards, and shall assign the appropriate size standard to each industry identified by NAICS."

In this revised methodology, which will be used in the next review of size standards, SBA will continue to assign a separate size standard to each six-digit NAICS industry. However, to account for errors and limitations associated with various data SBA evaluates in the size standards analysis, SBA will continue to round the calculated size standard value for a receipts based size standard to the nearest $500,000, except for the calculated size standard in NAICS Subsectors 111 (Crop Production) and 112 (Animal Production and Aquaculture) which is rounded to the nearest $250,000. Similarly, the calculated value for an employee based size standard will be rounded to the nearest 50 employees for industries in manufacturing and other sectors (except Wholesale Trade and Retail Trade) and to the nearest 25 employees for industries in Wholesale Trade and Retail Trade. This rounding procedure will be applied both in calculating a size standard for each of the five primary factors and in calculating the overall size standard for the industry.

As a policy decision, SBA will continue to maintain the minimum and maximum levels for both receipts and employee based size standards.[47] Accordingly, SBA will not generally propose or adopt a size standard that is either below the minimum level or above the maximum, even though the calculations yield values below the minimum or above the maximum. The minimum size standard reflects the size an established small business should be to have adequate capabilities and resources to be able to compete for and perform Federal contracts (but does not account for small businesses that are newly formed or just starting operations). On the other hand, the maximum size standard represents the level above which businesses, if qualified as small, would outcompete much smaller businesses when accessing Federal assistance. SBA's minimum and maximum size standard levels are shown in Table 4, Minimum and Maximum Receipts and Employee Based Size Standards. These levels will be applied in calculating a size standard for each individual factor as well as in calculating the overall size standard for the industry.

Table 4
Minimum and Maximum Receipts and Employee Based Size Standards

Type of size standards	Minimum	Maximum
Receipts based size standards (excluding agricultural industries in NAICS Subsectors 111 and 112)	$8 million	$47 million
Receipts based size standards for agricultural industries in NAICS Subsectors 111 and 112 (excluding NAICS 112112 and NAICS 112310)	$2.25 million	$5.5 million
Employee based size standards for manufacturing and other industries (excluding Wholesale and Retail Trade)	250 employees	1,500 employees
Employee based size standards in Wholesale and Retail Trade	50 employees	250 employees

With respect to receipts based size standards, SBA is proposing $8 million and $47 million, respectively, as the minimum and maximum size standard levels (except for most agricultural industries in Subsectors 111 and 112). These levels reflect the current minimum and the current maximum of receipts based size standards. As stated earlier, section 1831 of NDAA 2017 amended the Small Business Act directing SBA to establish and review size standards for agricultural enterprises in Subsectors 111 and 112 in the same manner it establishes and reviews size standards for all other industries subject to receipts based size standards. However, the latest industry data from the 2017 Census of Agriculture continues to suggest that $8 million minimum and $47 million maximum size standard levels would be too high for

[47] Without the maximum caps, the calculated size standards would be extremely high for some industries, allowing very successful businesses with hundreds of millions in receipts or tens of thousands of employees to qualify as small for Federal assistance intended for small businesses. Similarly, in the absence of caps, the calculated size standards would be very small (in some cases even negative) for some industries such that businesses qualifying as small would not only lack capabilities to meet the Federal government small business procurement requirements, but also businesses graduating out of such small size standards would not have yet developed enough size to be competitive in the market and would still need federal support to grow and be competitive on their own. Such very high or very low size standards would not enable SBA to effectively fulfill its critical mission to serve and protect the interests of American small businesses.

agricultural industries in Subsector 111 and Subsector 112. Accordingly, SBA is proposing $2.25 million and $5.5 million, respectively, as the minimum and maximum size standard levels for agricultural industries in Subsectors 111 and 112 (excluding NAICS 112112 and NAICS 112310). These levels represent the current minimum and current maximum levels of size standards in Subsectors 111 and 112 (excluding NAICS 112112 and NAICS 112310).[48]

Regarding employee based size standards for manufacturing and other industries (excluding Wholesale and Retail Trade), SBA's proposed 250-employee minimum and 1,500-employee maximum are the current minimum and maximum size standards among those industries. For employee based size standards for Wholesale Trade and Retail Trade industries, the proposed minimum and maximum size standards levels are 50 employees and 250 employees, respectively. [49]

EVALUATION OF INDUSTRY FACTORS

As mentioned earlier, to assess the appropriateness of the current size standards SBA evaluates the structure of each industry in terms of four economic characteristics or factors, namely average firm size, average assets size as a proxy of start-up costs and entry barriers, the four-firm concentration ratio as a measure of industry competition, and size distribution of firms using the Gini coefficient. For each size standard type, as shown in Table 4 above, SBA ranks industries both in terms each of the four industry factors and in terms of the existing size standards and computes the 20th percentile and 80th percentile values for both.[50] SBA then evaluates each industry by comparing its value for each industry factor to the 20th percentile and 80th percentile values for the corresponding factor for industries under a particular type of size standard.

If the characteristics of an industry under review within a particular size standard type are similar to the average characteristics of industries within the same size standard type in the 20th percentile, SBA will consider adopting as an appropriate size standard for that industry the 20th percentile value of size standards for those industries. For each size standard type, if the industry's characteristics are similar to the average characteristics of industries in the 80th percentile, SBA will assign a size standard that corresponds to the 80th percentile in the size standard rankings of industries. A separate size standard is established for each factor based on the amount of differences between the factor value for an industry under a particular size

[48] NAICS 112112 (Cattle Feedlots) and NAICS 112310 (Chicken Egg Production) currently have a size standard of $22 million and $19 million, respectively, and will be subjected to the $8 million minimum and $47 million maximum size standards proposed for other industries with receipts based size standards.

[49] Current employee based size standards for the wholesale and retail trade industries range from 100 employees to 250 employees. However, as in the 2019 size standards methodology, SBA is proposing a lower 50-employee level as the minimum employee based size standard to account for differences among industries more accurately.

[50] A *percentile* is a measure used in statistics indicating the value below which a given percentage of observations in a group of observations fall. For example, the 20th percentile is the value below which 20 percent of the observations may be found. There are several methods for calculating the percentiles (*see* Hyndman and Fan, 1996). The percentile values presented here are based on Definition 2 in Hyndman and Fan (1996), which in SAS is implemented with the PCTLDEF = 5 option of percentile computations and is described as "empirical distribution function with averaging." For more details, *see* pages 39-41 in the SAS support guide and for an example, review this tutorial on calculating percentiles.

standard type and 20th percentile and 80th percentile values for the corresponding factor for all industries in the same type. Specifically, the actual level of the new size standard for each industry factor is derived by a linear interpolation using the 20th percentile and 80th percentile values of that factor and corresponding percentiles of size standards. Each calculated size standard will be bounded between the minimum and maximum size standards levels, as discussed before. As noted earlier, the calculated value for a receipts based size standard for each industry factor is rounded to the nearest $500,000 (except Subsectors 111 and 112) and to the nearest $250,000 for industries in Subsectors 111 and 112. Likewise, the calculated value for an employee based size standard is rounded to the nearest 50 employees for Manufacturing and industries in other sectors (except Wholesale and Retail Trade) and to the nearest 25 employees for employee based size standards for Wholesale Trade and Retail Trade.

Table 5, 20th and 80th Percentiles of Industry Factors for Receipts Based Size Standards, below, shows the 20th percentile and 80th percentile values for average firm size (simple and weighted), average assets size, four-firm concentration ratio, average receipts of the four largest firms, and Gini coefficient for industries with receipts based size standards. Similar results for employee based size standards are presented in Table 6, 20th and 80th Percentiles of Industry Factors for Employee Based Standards, below.[51] The 20th percentile and 80th percentile values of size standards for each size standards type are shown in Table 7, 20th and 80th Percentiles of Size Standards.

Table 5

20th and 80th Percentiles of Industry Factors for Receipts Based Size Standards

Industries/percentiles	Simple average receipts size ($ million)	Weighted average receipts size ($ million)	Average assets size ($ million)	Four-firm concentration ratio (%)	Gini coefficient
Industries, excluding Subsectors 111 and 112					
20th percentile	1.09	26.82	0.45	8.0	0.697
80th percentile	8.34	1,155.04	6.51	42.3	0.835
Industries in Subsectors 111 and 112					
20th percentile	0.09	1.41	0.08	2.1	0.591
80th percentile	0.91	16.94	0.95	14.9	0.921

[51] Figures shown in these and subsequent tables are based on special tabulations of the 2017 Economic Census and Census of Agriculture, and RMA's Statement Studies data for 2020-2022. They may change when SBA updates industry data or adopts a new analytical procedure. Such changes will be reflected in proposed or final rules.

Table 6
20th and 80th Percentiles of Industry Factors for Employee Based Standards

Industries/percentiles	Simple average firm size (no. of employees)	Weighted average firm size (no. of employees)	Average assets size ($ million)	Four-firm concentration ratio (%)	Gini coefficient
Manufacturing and other industries, excluding Sectors 42 and 44-45					
20th percentile	31.5	302.5	5.19	24.1	0.764
80th percentile	128.5	1,851.0	45.36	62.8	0.852
Industries in Sectors 42 and 44-45					
20th percentile	15.0	218.0	4.38	16.4	0.801
80th percentile	29.0	2.690.0	14.63	42.4	0.866

Table 7
20th and 80th Percentiles of Size Standards

Type of size standards	20th percentile	80th percentile
Receipts based size standards (excluding agricultural industries in NAICS Subsectors 111 and 112)	$13.5 million	$40 million
Receipts based size standards for agricultural industries in NAICS Subsectors 111 and 112 (excluding NAICS 112112 and NAICS 112310)	$2.5 million	$4 million
Employee based size standards for manufacturing and other industries (excluding Wholesale and Retail Trade)	600 employees	1,250 employees
Employee based size standards in Wholesale and Retail Trade	125 employees	200 employees

ESTIMATION OF RECEIPTS BASED SIZE STANDARDS FOR INDUSTRY FACTORS

An estimated size standard supported by each industry factor is derived by comparing its value for a specific industry to the 20th percentile and 80th percentile values for that factor. If an industry's value for a particular factor is near the 20th percentile value in the distribution, the supported size standard will be one that is close to the 20th percentile value of size standards for industries in the size standards group, which is $13.5 million. If a factor for an industry is close to the 80th percentile value of that factor, it would support a size standard that is close to the 80th percentile value in the distribution of size standards, which is $40 million. For a factor that is within, above, or below the 20-80 percentile range, the size standard is calculated using linear interpolation based on the 20th percentile and the 80th percentile values for that factor and the 20th percentile and 80th percentile values of size standards. The linear interpolation procedure is explained below, both mathematically and graphically.

Let X = an industry's value for a given industry factor
P_{20} = 20th percentile value for the distribution of the industry factor
P_{80} = 80th percentile value for the distribution of the industry factor
$LSTD$ = 20th percentile of receipts based size standard ($13.5 million)
$HSTD$ = 80th percentile of receipts based size standard ($40 million)

Using these notations, a size standard for each industry factor is computed as:

$$\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right] \times (HSTD - LSTD) + LSTD$$

Substituting the 20th percentile (LSTD) and 80th percentile (HSTD) values of size standards yields:

$$\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right] \times (40 - 13.5) + 13.5 = \left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right] \times 26.5 + 13.5$$

In this expression, the first term in the bracket is the difference between an industry's value for a particular factor and the 20th percentile value of that factor as a proportion of the difference between the 80th percentile value and 20th percentile value of the factor for industries in the same size standard group. Applying this proportion to the difference between the 80th percentile value ($40 million) and 20th percentile value ($13.5 million) of size standards yields an estimated change above or below the 20th percentile size standard. Adding this result to the $13.5 million size standard yields a specific size standard supported by that industry factor. This procedure is depicted graphically in Figure 2, Calculating Receipts Based Size Standard Using Linear Interpolation, as well as using industry factor values for NAICS 541990, below.

Receipts Size Standard Based on Average Firm Size

Simple Average Firm Size

A simple average firm size for NAICS 541990 is $0.967 million in receipts, which would support a size standard of $13 million. In this example, X equals $0.967 million, P_{20} equals $1.09 million, and P_{80} equals $8.34 million. Substituting these values in the formula we get,

$$\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right] \times (40.0 - 13.5) + 13.5$$

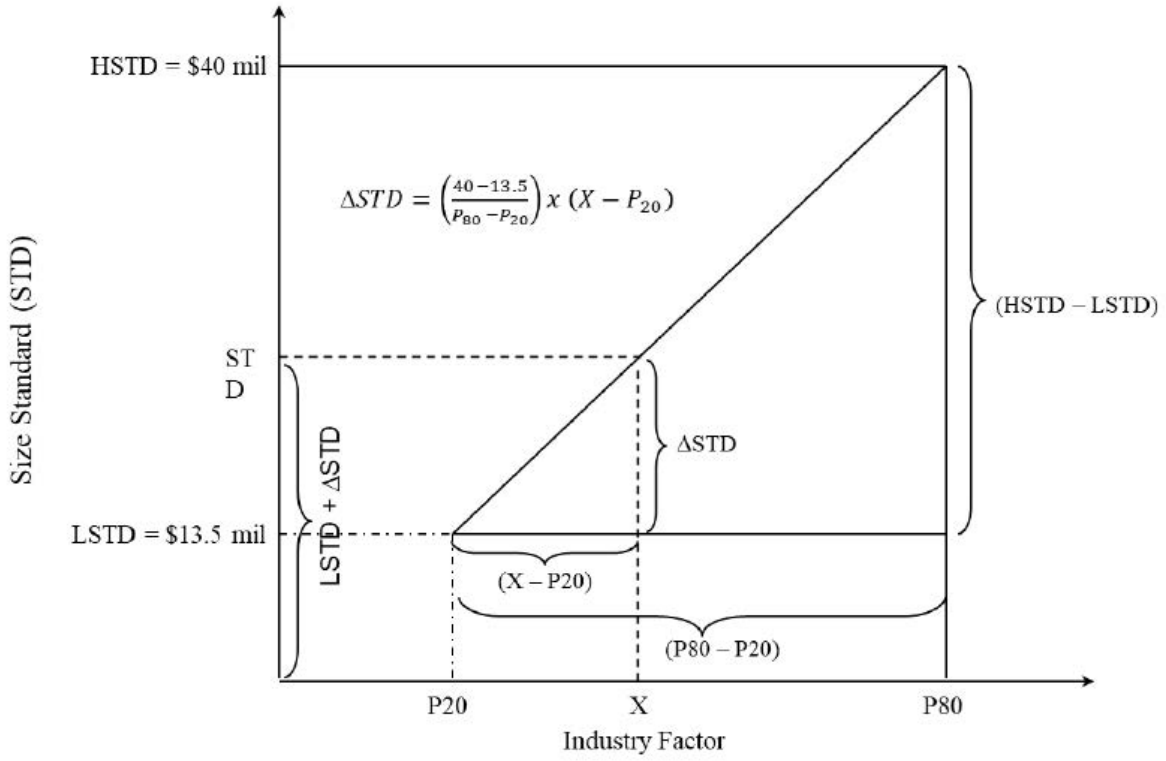
$$= \left[\frac{(0.967-1.09)}{(8.34-1.09)}\right] \times 26.5 + 13.5$$

$$= \left[\frac{-0.123}{7.25}\right] \times 26.5 + 13.5 = -0.017 \times 26.5 + 13.5$$

$$= \$13.05 \text{ million.}$$

Rounded to the nearest $500,000, the above result gives a size standard of $13 million.

Figure 2
Calculating Receipts Based Size Standard Using Linear Interpolation



$$STD = \left(\frac{(X-P_{20})}{(P_{80}-P_{20})}\right) \text{x } (HSTD - LSTD) + \text{LSTD}$$

$$= \left(\frac{(X-P_{20})}{(P_{80}-P_{20})}\right) \text{x } (40 - 13.5) + 13.5 = \Delta\text{STD} + 13.5$$

Weighted Average Firm Size

A weighted average firm size for NAICS 541990 is $63.263 million in receipts, which, all else being equal, would support a $14.5 million size standard. As shown in Table 5, the 20th percentile (P_{20}) and 80th percentile (P_{80}) values of weighted average firm size are $26.82 million and $1,155.04 million, respectively. Thus, here, X equals $63.263 million. Substituting these values in the formula, we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 26.5 + 13.5$$

$$= \left[\frac{(63.263 - 26.82)}{(1{,}155.04 - 26.82)}\right] \times 26.5 + 13.5$$

$$= \left[\frac{36.44}{1{,}128.22}\right] \times 26.5 + 13.5$$

$$= 0.032 \times 26.5 + 13.5 = 0.856 + 13.5 = \$14.36 \text{ million.}$$

Rounded to the nearest $500,000, the $14.36 million calculated value becomes $14.5 million.

The size standard supported by the average firm size is calculated as the average of the size standards supported by the simple average firm size and weighted average firm size, rounded again to the nearest $500,000. Accordingly, the average firm size data for NAICS 541990 supports a $14 million (14.0 = (13.0+14.5)/2) size standard.

Receipts Size Standard Based on Average Assets Size

The average assets size for NAICS 541990 is $0.363 million, and the supportable size standard for this factor would be $13 million. As shown in Table 5, the 20th percentile value of the factor is $0.45 million and 80th percentile value is $6.51 million.

Here, X = $0.363 million, P_{20} = $0.45 million, and P_{80} = $6.51 million. Plugging these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 26.5 + 13.5$$
$$= \left[\frac{(0.363 - 0.45)}{(6.51 - 0.45)}\right] \times 26.5 + 13.5$$
$$= \left[\frac{-0.09}{6.06}\right] \times 26.5 + 13.5$$
$$= -0.01 \times 26.5 + 13.5 = -0.38 + 13.5 = \$13.12 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $13 million.

Receipts Size Standard Based on Four-Firm Concentration Ratio

The four largest firms in NAICS 541990 account for 9 percent of total industry receipts and the appropriate size standard for this factor will be $14.5 million.

Here, X = 9%, P_{20} = 8.0%, and P_{80} = 42.3%. Substituting these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 26.5 + 13.5$$
$$= \left[\frac{(9.0 - 8.0)}{(42.3 - 8.0)}\right] \times 26.5 + 13.5$$
$$= \left[\frac{1.0}{34.3}\right] \times 26.5 + 13.5$$
$$= 0.029 \times 26.5 + 13.5 = 0.77 + 13.5 = \$14.27 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $14.5 million.

Receipts Size Standard Based on Gini Coefficient

NAICS 541990 has a Gini coefficient value of 0.769, which supports a size standard of $27.5 million. The 20th percentile value of the estimated Gini coefficient values is 0.697 and the 80th percentile value is 0.835 (from Table 5 above).

Thus, for this example, $X = 0.769$, $P_{20} = 0.697$, and $P_{80} = 0.835$. Substituting these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 26.5 + 13.5$$

$$= \left[\frac{(0.769 - 0.697)}{(0.835 - 0.697)}\right] \times 26.5 + 13.5$$

$$= \left[\frac{0.072}{0.138}\right] \times 26.5 + 13.5$$

$$= 0.522 \times 26.5 + 13.5 = 13.83 + 13.5 = \$27.33 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $27.5 million.

ESTIMATION OF RECEIPTS BASED SIZE STANDARDS FOR AGRICUTLURAL INDUSTRIES

As stated elsewhere in this methodology, NDAA 2017 directed SBA to establish the size standards for Agricultural industries, namely those in Subsectors 111 and 112, in the same manner that the Agency establishes the size standards for other industries and to include them in the five-year rolling review under the Jobs Act. Accordingly, to establish size standards for those industries, SBA evaluates those industries using the same industry and Federal contracting factors that it uses in evaluating characteristics of all other industries with receipts based size standards. However, the industry data reveals that firms in agricultural industries are much smaller than those in all other industries with receipts based size standards. Therefore, based on the data, SBA has established $2.25 million and $5.5 million as the minimum and maximum size standard levels, respectively, for agricultural industries, as opposed to $8 million as the minimum and $47 million as the maximum size standard levels for all other industries, including NAICS 112112 and NAICS 112310 (*see* Footnote 48). Similarly, as stated elsewhere in this document, SBA rounds a calculated size standard for agricultural industries to the nearest $250,000 instead of rounding it to the nearest $500,000 for other industries with receipts based size standards, including NAICS 112112 and NAICS 112310.

SBA ranks all those industries in terms of each industry factor and obtains the 20th percentile and 80th percentile values for each industry factor. SBA also computes the 20th percentile and 80th percentile value of size standards for Agricultural industries (excluding NAICS 112112 and NAICS 112310). As shown in Table 7 (above) the 20th percentile and 80th percentile values of size standards for Agricultural industries in Subsectors 111 and 112 (excluding NAICS 112112 and NAICS 112310) are $2.5 million and $4 million, respectively. Combining the 20th percentile and 80th percentile values of size standards with the 20th percentile

and 80th percentile values of industry factors, SBA computes a size standard for each industry factor for each of those industries using the same approach used to compute size standards for other industries with receipts based size standards.

ESTIMATION OF EMPLOYEE BASED SIZE STANDARDS FOR INDUSTRY FACTORS

Manufacturing and Other Industries Not in Wholesale and Retail Trade

Employee based size standards for the manufacturing and other industries (except Wholesale Trade and Retail Trade) with an employee based size standard are established in the same manner as receipts based standards, as described above. That is, a separate employee based size standard is established for each industry factor for each industry using the 20th percentile and the 80th percentile values of each industry factor and the 20th percentile and the 80th percentile values of employee based size standards for those industries. The 20th percentile and 80th percentile values of employee based size standards for manufacturing and industries in other sectors (excluding Wholesale Trade and Retail Trade) are 600 employees and 1,250 employees, respectively. The linear interpolation procedure for deriving an employee based size standard is depicted in Figure 3, Calculating Employee Based Size Standards Not in Wholesale and Retail Trade, below.

Using the similar notations used for receipts based size standards above,

X = an industry's value for a given industry factor
P_{20} = 20th percentile value for the distribution of the industry factor
P_{80} = 80th percentile value for the distribution of the industry factor
$LSTD$ = 20th percentile of employee based size standard (600 employees)
$HSTD$ = 80th percentile of employee based size standard (1,250 employees)

An employee size standard for each industry factor is computed as:

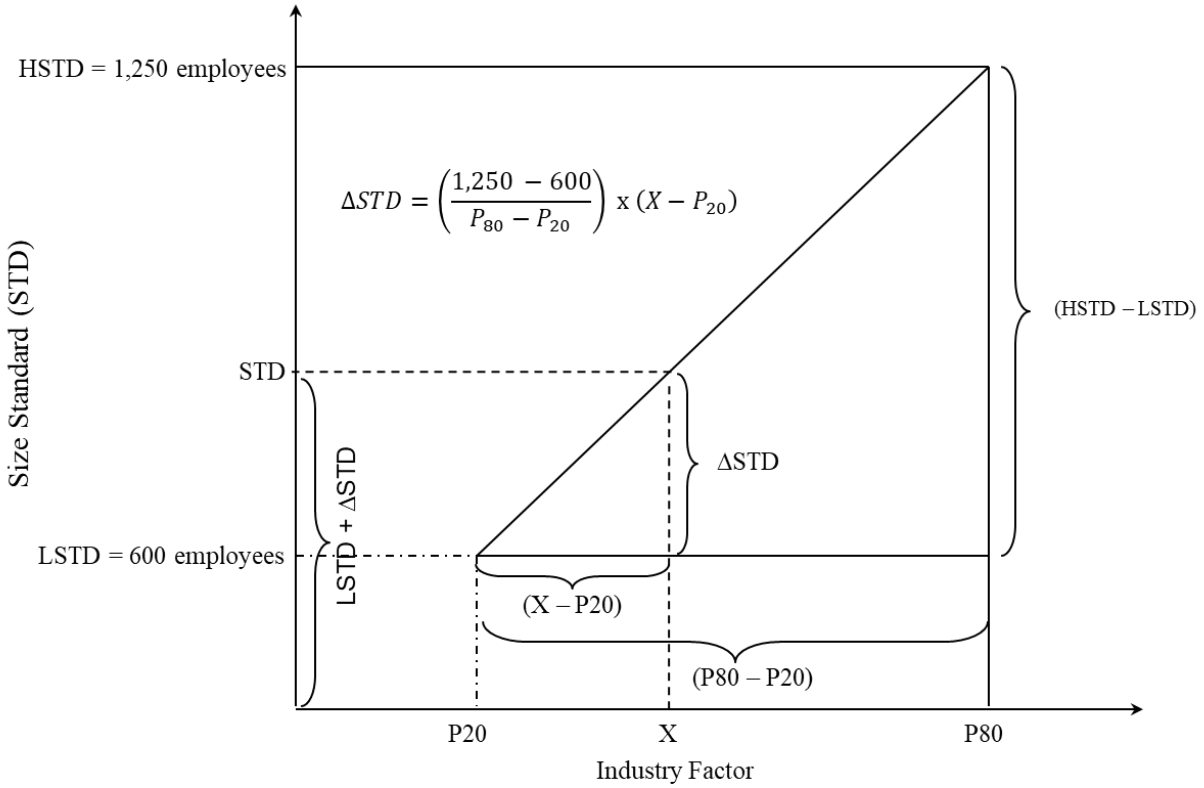
$$\left[\frac{(X-P_{80})}{(P_{80}-P_{20})}\right] \times (HSTD - LSTD) + LSTD$$

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times (1{,}250 - 600) + 600$$

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 650 + 600$$

The above formula yields an estimated size standard for each industry factor, which is then rounded to the nearest 50 employees between 250 employees (minimum) and 1,500 employees (maximum).

Figure 3
Calculating Employee Based Size Standards Not in Wholesale and Retail Trade



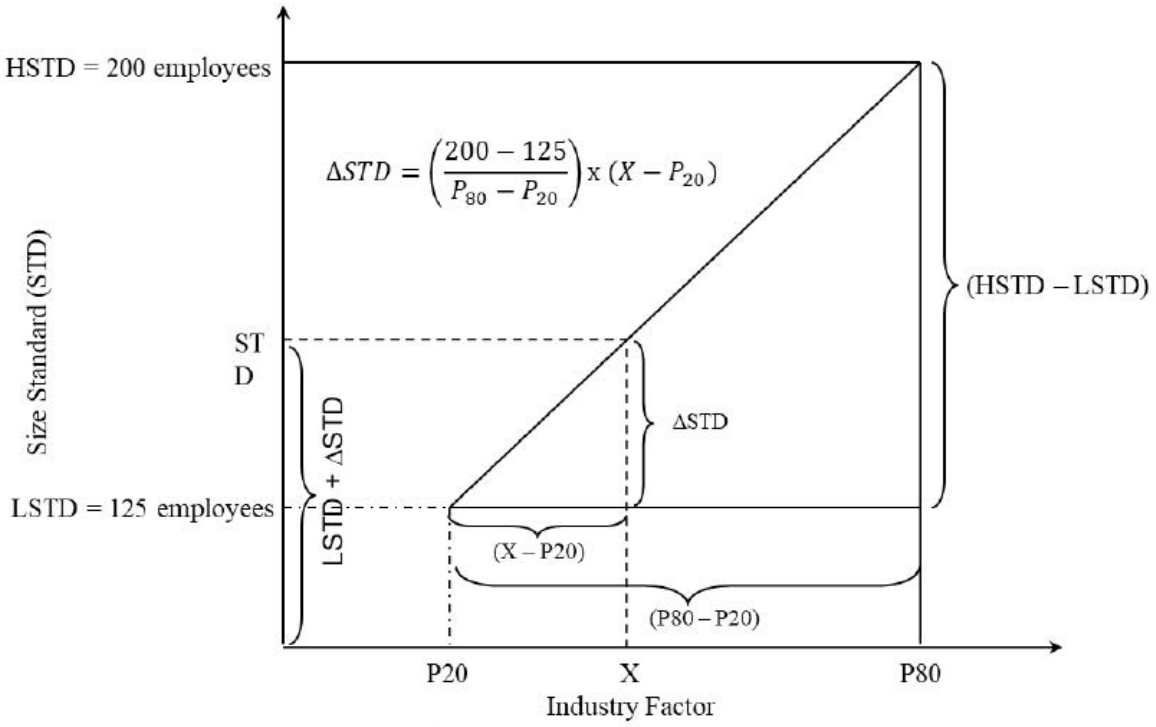
$$STD = \left(\frac{(X - P_{20})}{(P_{80} - P_{20})}\right) x\ (HSTD - LSTD) + LSTD$$

$$= \left(\frac{(X - P_{20})}{(P_{80} - P_{20})}\right) x\ (1{,}250 - 600) + 600 = \Delta STD + 600$$

Wholesale Trade and Retail Trade

Employee size standards for the wholesale and trade industries are also derived using a similar procedure described above for receipts and employee based size standards for other industries. Accordingly, a separate employee based size standard is computed for each industry factor for each industry using the 20th percentile and the 80th percentile values of each factor and the 20th percentile and the 80th percentile values of employee based size standards for those industries. The 20th percentile and 80th percentile values of employee based size standards for the wholesale trade and retail trade industries are 125 employees and 200 employees, respectively. The linear interpolation procedure for deriving a wholesale or retail trade employee based size standard is depicted in Figure 4, Calculating Employee Based Size Standards for Wholesale and Retail Trade, below.

Figure 4
Calculating Employee Based Size Standards for Wholesale and Retail Trade



$$STD = \left(\frac{(X - P_{20})}{(P_{80} - P_{20})}\right) \text{x } (HSTD - LSTD) + LSTD$$

$$= \left(\frac{(X-P_{20})}{(P_{80}-P_{20})}\right) \text{x } (200 - 125) + 125 = \Delta STD + 125$$

An employee based size standard for each industry factor for a wholesale or retail trade industry is computed as follows:

X = an industry's value for a given industry factor
P_{20} = 20th percentile value for the distribution of the industry factor
P_{80} = 80th percentile value for the distribution of the industry factor
$LSTD$ = 20th percentile of employee based size standard (125 employees)
$HSTD$ = 80th percentile of employee based size standard (200 employees)

Substituting the values in the formula we get,

$$\left[\frac{(X-P_{80})}{(P_{80}-P_{20})}\right] \times (HSTD - LSTD) + LSTD$$

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times (200 - 125) + 125$$

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 75 + 125$$

The above formula yields an estimated size standard for each industry factor, which is then rounded to the nearest 25 employees.

ADJUSTMENT TO SIZE STANDARDS BASED ON FEDERAL CONTRACTING FACTOR

As stated previously, the Federal contracting factor is one of the five primary factors that SBA evaluates in establishing, reviewing, or modifying a small business size standard. In this revised methodology, SBA is replacing the prior approach ("2019 Approach") to measuring the Federal contracting factor with the disparity ratio analysis.

2019 Approach

Under the 2019 Approach, for industries averaging $20 million or more in total Federal contract dollars annually, to determine how well small businesses are utilized in Federal procurement, SBA compares the small business share of total contract dollars in each industry with small business share of that industry's total receipts. If the small business share of an industry total receipts exceeds the small business share of total contract dollars by ten percentage points or more, SBA determines that small businesses are underrepresented in the Federal marketplace under the current size standard and a justification would exist to increase that industry's current size standard. If that difference is less than ten percentage points, SBA considers that small businesses under the current size standard are represented well in the Federal market and the current size standard is considered adequate with respect to the Federal contracting factor.

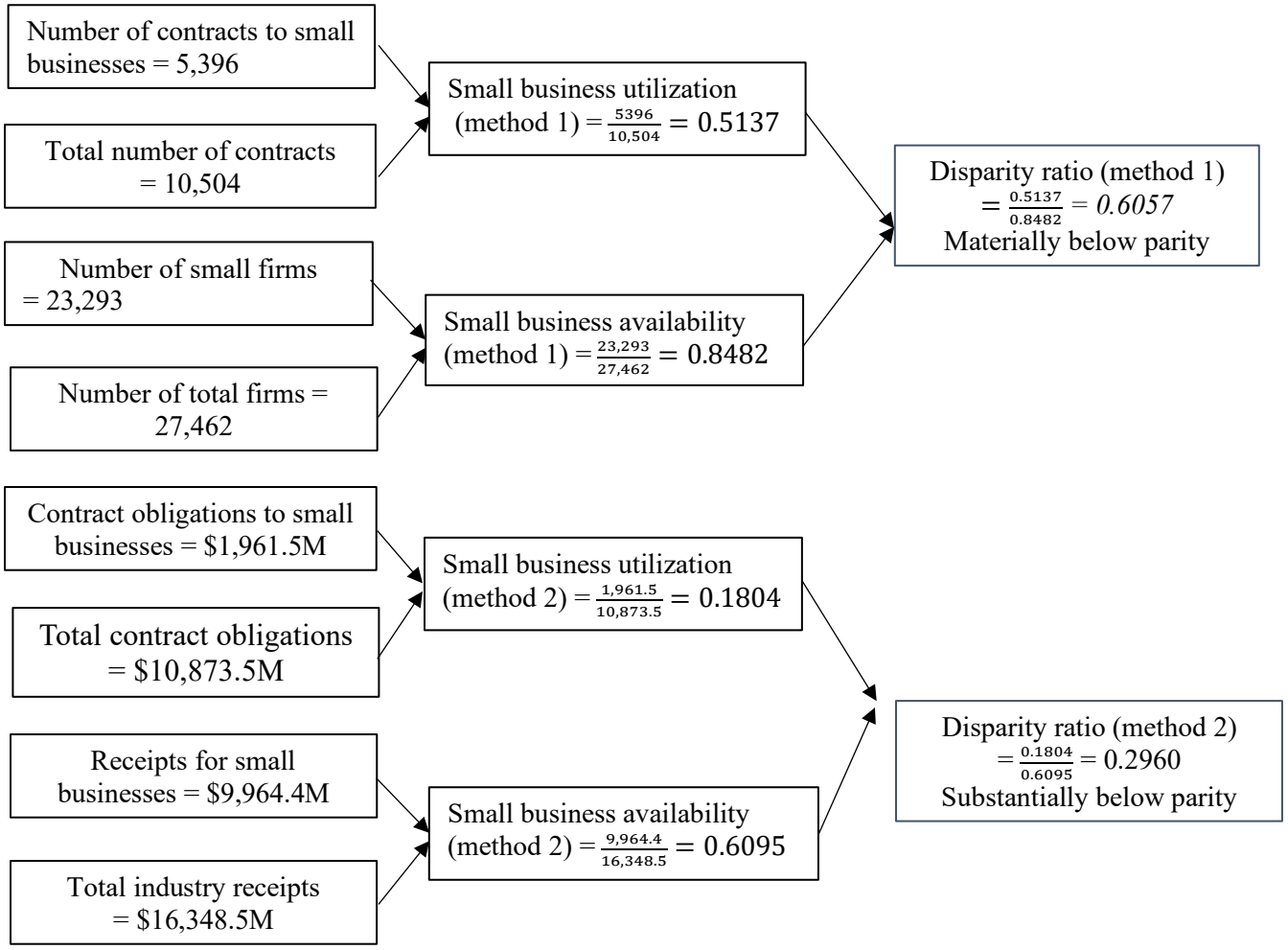
As discussed previously under the Federal Contracting Factor section, the 2019 Approach to measuring the Federal contracting factor does not capture other important aspects of Federal procurement that may indicate the degree in which small businesses are represented in the Federal procurement market. These include: 1) the number of contracts awarded to small businesses relative to total contracts, and 2) the number of small businesses winning Federal contracts relative to total firms. To account for these measures of small business representation in the Federal market, in the revised methodology, SBA is using the disparity ratio approach.

Disparity Ratio Approach

Under the disparity ratio approach, a disparity ratio is computed as the ratio between a measure of small business utilization in the Federal market and a measure of availability of small businesses relative to the population of total firms that are willing, ready, and able to bid on and perform Federal contracts. Small business utilization is measured in terms of the number and value of contracts awarded to small businesses. The small business availability is measured in terms of the number of small firms relative to the total population of potential bidders for Federal contracts and in terms of small business receipts relative to total receipts for an industry. Here, for each six-digit NAICS industry averaging $20 million or more in total Federal contract dollars annually, SBA is computing two disparity ratios: 1) utilization in terms of small business share

of number of contracts and availability in terms of the share of small businesses in the total population of potential bidders for Federal work, and 2) utilization in terms of small business share of contract obligations and availability in terms of small business share of total industry receipts.[52] Figure 5, Calculation of Disparity Ratios (NAICS 541990), illustrates the calculation of disparity ratios.

Figure 5
Calculation of Disparity Ratios (NAICS 541990)



Power Analysis

[52] Comparing the small business share of the number of contracts (numeric utilization ratio) with small business share of industry receipts (monetary availability ratio) and comparing the small business share of contract obligations (monetary utilization ratio) with the small business share of total population of potential bidders for Federal work (numerical availability ratio) would result in inconsistent disparity ratios (National Research Council (2005). Analyzing Information on Women-Owned Small Businesses in Federal Contracting. Washington, DC: The National Academies Press).

Under the power analyses, the stability of the results is measured against two thresholds: to be materially below parity (i.e., between 0.5 and less than 0.8) or substantially below parity (i.e., less than 0.5) for each of the two disparity calculation methods used. SBA conducted the power analyses for the one proportion test of the utilization ratio, following an approach similar to that used in the latest WOSB study[53]. Table 8, Summary of Power Analysis, below, shows the results of the power test conducted by SBA.

Table 7 indicates that, of the 394 industries averaging $20 million or more in Federal contract dollars annually, only one percent of industries under disparity ratio (method 1 – number of contracts) had unstable disparity ratio results. Of the 392 industries, three percent of industries under disparity ratio (method 2 – contract obligations) had unstable results. The rest were stable. The 'stable' results mean that SBA had enough observations to obtain results within a 95 percent level of confidence. The 'unstable' results mean that SBA did not have needed number of observations to obtain reliable outcomes. The results in Table 8 indicate that only a small number of industries are impacted by the power analyses, because of which SBA decided not to use the results from the power analyses as part of the decision on whether to change the size standards or not, based on the Federal contracting factor.

Table 8
Summary of Power Analysis

Small business representation	Type	Number of industries averaging $20 million or more in Federal contracts annually (excluding Sectors 42 and 44-45)	
		Disparity ratio – method 1 (number of contracts)	Disparity ratio – method 2 (contract obligations)
Unstable	Count	4	12
	%	1.0%	3.1%
Substantially below parity (disparity ratio < 0.5)	Count	112	81
	%	28.4%	20.7%
Materially below parity (disparity ratio < 0.8 and >= 0.5)	Count	111	46
	%	28.2%	11.7%
Close to or at parity (disparity ratio >= 0.8 and < 1.2)	Count	152	90
	%	38.6%	23.0%
Substantially above parity (disparity ratio >= 1.2)	Count	15	163
	%	3.8%	41.6%
Total	Count	394	392
	%	100%	100%

[53] Ibid, Appendix B: pp.31-33.

Adjustment to Size Standards

After evaluating the significance of calculated industry disparity ratios, SBA further determines the level of necessary adjustment to size standards in accordance with Table 9, Adjustment of Size Standards Based on Disparity Ratios, below. When the disparity ratio is less than 0.8, i.e., either materially or substantially below parity, the given size standard may be increased as low as 15 percent or as high as 60 percent. The level of adjustment is contingent upon 1) whether the ratio is materially (i.e., >= 0.5 to < 0.8) or substantially (i.e., < 0.5) below parity, and 2) the level of current size standards. As explained previously, adjusted receipts-based size standards are rounded to the nearest $500,000 (or nearest $250,000 for receipts-based size standards in Subsectors 111 and 112). Adjusted employee-based size standards are rounded to the nearest 50 employees (or nearest 25 employees for employee-based size standards in Sectors 42 and 44-45).

Table 9

Adjustment of Size Standards Based on Disparity Ratios

Size standards	Disparity ratio		
	>= 0.8	>=0.5 to < 0.8	< 0.5
Receipts based standards			
< $20 million	No change	Increase 30%	Increase 60%
$20 million to < $35 million	No change	Increase 20%	Increase 40%
$35 million to <= $47 million*	No change	Increase 15%	Increase 25%
Employee based standards			
< 500 employees	No change	Increase 30%	Increase 60%
500 to < 1,000 employees	No change	Increase 20%	Increase 40%
1,000 to <= 1,500 employees*	No change	Increase 15%	Increase 25%

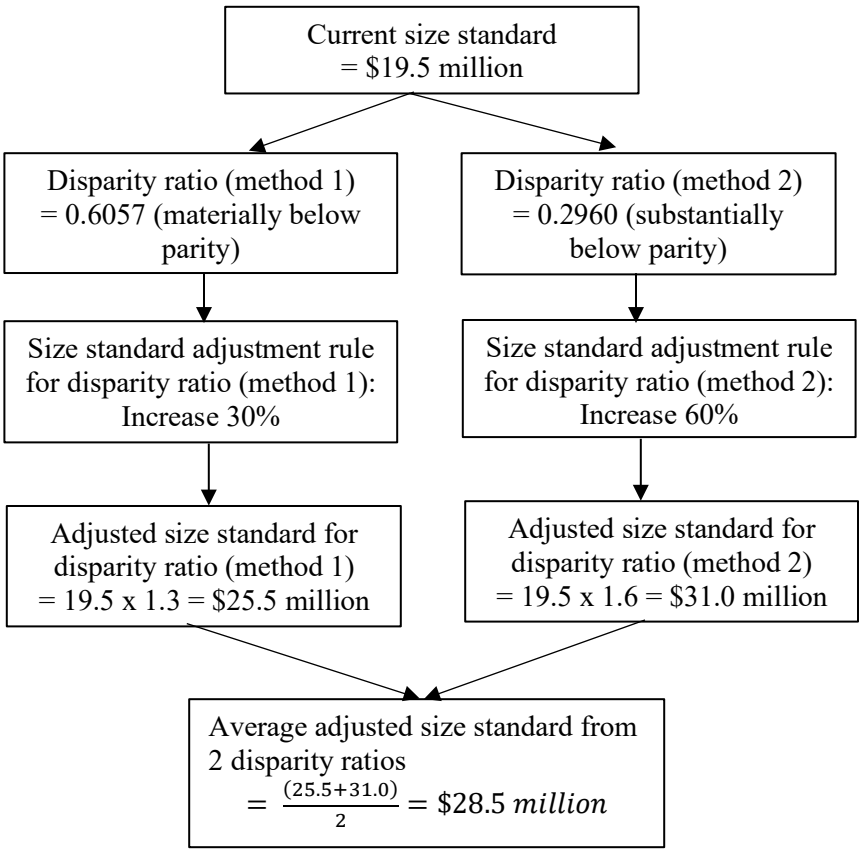
* Adjusted receipts and employee-based standards will be capped at $47 million ($5.5 million for industries in Subsectors 111 and 112) and 1,500 employees, respectively.

SBA derives a separate size standard for each of the two disparity ratios. The average of the two size standards is the size standard for the Federal contracting factor. The calculated results are appropriately rounded. Figure 6, Calculation of Size Standard Based on Disparity Ratios (NAICS 541990), illustrates the calculation of the size standard based on disparity ratios.

Impacts of Change

Based on the data from FPDS-NG for fiscal years 2020-2022, excluding industries in Sectors 42 and 44-45 that do not apply to procurement, there were 394 industries averaging $20 million or more in total Federal contract dollars annually. Table 10, Impact of Change from 2019 Method to Disparity Ratio Approach, below, shows the distribution of industries by the value of percentage difference between the small business shares of total Federal contract dollars in an industry and of total industry receipts under the 2019 Method and by the value of two disparity ratios under the revised approach.

Figure 6
Calculation of Size Standard Based on Disparity Ratios (NAICS 541990)



As shown in Table 10, there are 276-277 industries for which the difference between the small business shares of total Federal contract dollars in an industry and of total industry receipt is more than –ten percentage points, implying no change to size standards for those industries. There are 116-117 industries for which the difference between the small business shares of total Federal contract dollars in an industry and of total industry receipt is –ten percentage points or less, implying some increases to size standards for those industries. There are 159 industries under the disparity ratio (method 1 –number of contracts) and 254 industries under the disparity ratio (method 2 – contract obligations) for which the value of disparity ratio is 0.8 or higher, suggesting no changes to size standards for those industries. There are 225 industries under the disparity ratio (method 1) and 138 industries under the disparity ratio (method 2) for which the value of disparity ratio is less than 0.8, thereby implying some increases to size standards for those industries. Thus, these findings show that small business underrepresentation is greater when the disparity ratio was measured with respect to the number of contracts than contract obligations.

Table 10
Impact of Change from 2009 Method to Disparity Ratio Approach

	Number of industries averaging $20 million or more in Federal contracts annually (excluding Sectors 42 and 44-45)			
Disparity ratio	Percentage difference between the small business shares of total Federal contract dollars in an industry and of total industry receipts (2019 method)			Total
Disparity ratio (method 1 – no. of contracts)	> −10%	−10% to −30%	< − 30%	
< 0.5 (substantially below parity)	60	25	27	112
>= 0.5 to < 0.8 (materially below parity)	77	24	12	113
>= 0.8 to < 1.2 (close to or at parity)	125	18	11	154
>= 1.2 (substantially above parity)	15	0	0	15
Total	277	67	50	394
Disparity ratio (method 2 – contract obligations)	> −10%	−10% to −30%	< − 30%	Total
< 0.5 (substantially below parity)	7	37	44	88
>= 0.5 to < 0.8 (materially below parity)	20	24	6	50
>= 0.8 to < 1.2 (close to or at parity)	86	5	0	91
>= 1.2 (substantially above parity)	163	0	0	163
Total*	276	66	50	392

* No information exists for two NAICS codes under disparity ratio (method 2).

Table 11, Changes to Size Standards for the Federal Contracting Factor under Current Method and Disparity Ratio Approach, summarizes changes to size standards under the current method vis-à-vis the disparity ratio approach. Of the 392 industries that averaged $20 million or more in total Federal contract dollars and had information needed to compute the disparity ratio, there would be no change to size standards for 281 industries under the current method. Under the disparity ratio approach, 178 industries would see no change to their size standards. Under the 2019 Method, 111 (i.e., 54 + 57 = 111) industries would see some increases to size standards, as compared to 214 (i.e., 147 + 67 = 214) industries that would see some increases to size standards under the disparity ratio approach. Thus, the disparity ratio approach would lead to adjustments of size standards for more than 100 additional industries as compared to the 2019 Method.

Table 11
Changes to Size Standards for the Federal Contracting Factor under 2019 Method and Disparity Ratio Approach

	2019 method			
Disparity ratio approach	No change	Smaller increase (< 25%)	Larger increase (>= 25%)	Total
No change	174	2	2	178
Smaller increase (< 25%)	102	32	13	147
Larger increase (>= 25%)	5	20	42	67
Total*	281	54	57	392

* No information exists for two NAICS codes under disparity ratio (method 2).

EVALUATION OF SIZE STANDARDS FOR SUBINDUSTRY CATEGORIES OR "EXCEPTIONS"

The SBA's table of size standards contains 14 size standards for subindustry categories below the six-digit NAICS level, which are commonly referred to as "exceptions" and used specifically for Federal Government contracting purposes. As explained previously in the Data Sources and Estimation section, the data from the Census Bureau's tabulation are limited to the six-digit NAICS industry level and therefore do not provide information on economic characteristics of firms at the subindustry level. Thus, for reviewing or modifying size standards at the subindustry levels ("exceptions"), SBA evaluates data from FPDS-NG and SAM using a two-step procedure. First, using FPDS-NG, SBA identifies product service codes (PSCs) that correspond to specific "exceptions." SBA then identifies firms that have received Federal contracts under those PSCs and evaluates their receipts and employees data from SAM and FPDS-NG, after appropriate adjustments to address FPDS-NG and SAM data limitations, to derive the values for industry and Federal contracting factors.

However, the industry data thus developed from SAM and FPDS-NG are not consistent with the industry data from the Economic Census that SBA uses to evaluate industry characteristics. Specifically, while an industry's data from the Economic Census are limited to firms that are primarily engaged in that industry, the data from SAM and FPDS-NG includes all firms regardless of whether the industry is their primary industry. Additionally, the SAM and FPDS-NG data are known to include observations with extremely high receipts values relative to numbers of employees or very high employee values relative to receipts. To address these problems, when reviewing size standards under "exceptions" using the SAM and FPDS-NG data, SBA generally trims the data on firms on both ends of the size distribution to prevent extreme observations from distorting the results. SBA may also remove firms for which the data shows that Federal contracting under an exception being reviewed is clearly not their primary activity relative to their overall enterprise receipts. The resultant data are then used to calculate the industry factors and disparity ratios for the Federal contracting factor for each exception.

To ensure consistency, SBA also uses the FPDS-NG/SAM data to estimate the 20th percentile and 80th percentile values for industry factors for industries with the same measure of size standards as the exception. The results for each exception under each measure of size (i.e., receipts or employees) are then combined with the 20th percentile and 80th percentile values for

industry factors using the SAM and FPDS-NG data and the 20th percentile and 80th percentile values of size standards corresponding to the same measure of size to calculate a new size standard for each industry factor for that exception. The disparity ratios representing the Federal contracting factor and a size standard supported by that factor for "exceptions" are computed in the same manner as for regular six-digit NAICS industries, as described above.

DERIVATION OF COMPOSITE SIZE STANDARD AND WEIGHTING METHOD

The SBA methodology presented above results in five separate size standards based on evaluation of the five primary factors. The value for each of the five factors for NAICS 541990 and the corresponding receipt based size standard supported by each factor are summarized in Table 12, An Example of Deriving the Composite Size Standard (NAICS 541990), below.

Also shown in the table is the derivation of the composite size standard for the five primary factors. The simple average of five size standards based on each of the five factors is $19.6 million. Rounded to the nearest $500,000, this becomes $19.5 million. The simple average method weighs all factors equally. The composite size standard for employee based standards can also be derived in a similar fashion. SBA can assign different weights to some of these factors in response to its policy decisions and other considerations.

Table 12
An Example of Deriving the Composite Size Standard (NAICS 541990)

Primary factor	Factor value	Size standard (STD) ($ million)	
1. Average firm size (AFS)[a]			14.0
1.1. Simple average firm size ($ million)	0.967	13.0	} 14.0
1.2. Weighted average firm size ($ million)	63.263	14.5	
2. Average assets size (AAS) ($ million)	0.363		13.5
3. Four-firm concentration ratio (CR4) (%)	9.0		14.5
4. Size distribution of firms (Gini coefficient) (GINI)	0.767		27.5
5. Federal contracting factor (CONTRACT)[b]			28.5
5.1. Disparity ratio (number of contracts)	0.6057	25.5	} 28.5
5.2. Disparity ratio (contract obligations)	0.2960	31.0	
Average (composite) size standard (AVGSTD)			19.6

[a] Note that the size standard for average firm size is computed as an average of size standards supported by simple average firm size and weighted average firm size, rounded to the nearest $500,000.

[b] The size standard for the Federal contracting factor is derived as an average of size standards supported by each of the two disparity ratios, rounded to the nearest $500,000.

As shown above in Table 12, SBA evaluates five primary factors in establishing, reviewing, or modifying size standards. In the example provided, SBA is assigning the same weight to each of the five factors.[54] However, if necessary, the methodology allows altering the weights for individual factors for certain industries.[55] If SBA decides to alter these weights it will explain in the proposed rule how the various factors are weighed in devising a size standard for industries involved. While each factor is examined for every industry, the importance of each factor within each group may vary according to the characteristics of each industry. This method ensures consistency of approach while maintaining sufficient flexibility in establishing a size standard for each industry.

IMPACTS OF CHANGES IN THE METHODOLOGY

In this Revised Methodology, SBA is proposing two changes. The first change is to replace the 2019 Approach to account for the Federal contracting factor with the disparity ratio approach. Under the 2019 Approach SBA defines the Federal contracting factor in terms of the difference between the small business share of total contract obligations and the small business share of industry' receipts. If the small business share of an industry total receipts exceeds the small business share of total contract obligations by ten percentage points or more, all else being the same, SBA would increase that industry's current size standard by certain amount depending on the amount of that difference. If that difference is less than ten percentage points, SBA considers that the current size standard is sufficient with respect to the Federal contracting factor. Under the disparity ratio approach, SBA computes a disparity ratio as a ratio (instead of the difference) between the small business share of contract obligations and the small business share of industry receipts. SBA also computes a second disparity ratio as a ratio between small business share of the number of contracts and the share of small firms in the total population of firms that are willing, ready, and able to bid on and perform Federal contracts. If an industry's disparity ratio is less than 0.8, SBA would assume that small businesses are either materially underrepresented (i.e., the disparity ratio is 0.5 or greater and less than 0.8) or substantially underrepresented (i.e., the disparity ratio is less than 0.5) in the Federal market under that industry's current size standard and would increase the current size standard as per Table 8 (above). If an industry's disparity ratio is 0.8 or higher, small businesses are considered overrepresented (i.e., the disparity ratio is 0.8 or higher and less than 1.2) or substantially overrepresented (i.e., the disparity ratio is 1.2 or higher) in the Federal market in that industry under the current size standard, and the size standard is maintained at the current level.

The second proposed change is to replace the 20th percentile and 80th percentile values of industry factors for evaluating size standards at subindustry levels ("exceptions") from those calculated based on the Economic Census data with those calculated using the FPDS-NG/SAM data.

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[54] $AVGSTD = \frac{[STD_{AFS}+STD_{AAS}+STD_{CR4}+STD_{GINI}+STD_{CONTRACT}]}{5}$
$= 0.2 \cdot STD_{AFS} + 0.2 \cdot STD_{AAS} + 0.2 \cdot STD_{CR4} + 0.2 \cdot STD_{GINI} + 0.2 \cdot STD_{CONTRACT}$

[55] $AVGSTD = w_{AFS} \cdot STD_{AFS} + w_{AAS} \cdot STD_{AAS} + w_{CR4} \cdot STD_{CR4} + w_{GINI} \cdot STD_{GINI} + w_{CONTRACT} \cdot STD_{CONTRACT}$
$where\ ws\ are\ weights\ such\ that\ w_{AFS} + w_{AAS} + w_{CR4} + w_{GINI} + w_{CONTRACT} =\rightleftarrows 1.0$

To determine how the changes in the size standards methodology would affect size standards across various industries and sectors, SBA derived the new size standards for all industries averaging 20 million or more in Federal contract dollars annually (excluding Sectors 42 and 44-45) using the 2019 approach and the disparity ratio approach of defining the Federal contracting factor.[56] These results are presented in Table 13, Changes to Overall Size Standards Due to the Change in Federal Contracting Factor.

Generally, as shown in Table 13, the new calculated size standards were quite similar between the 2019 Approach and the disparity ratio approach of determining the Federal contracting factor when compared to the existing size standards, with size standards increasing for some industries and decreasing for others under both approaches. For example, of 392 industries averaging $20 million or more in Federal contracting annually during fiscal years 2020-2022, 159 (159 = 131 + 28) or 40.5 percent of industries would see an increase to size standards under the 2019 Approach, as compared to 169 (169 = 142 + 27) or 43.1 percent of industries that would see an increase to size standards under the disparity ratio approach. Similarly, 169 (169 = 145 + 24) or 43.1 percent of industries under the 2019 Approach and 167 (167 = 143 + 24) or 42.6 percent of industries under the disparity ratio approach would see a decrease to size standards. Sixty four or 16.3 percent of industries under the 2019 Approach and 56 or 14.3 percent of industries under the disparity ratio approach would see no change to size standards. Thus, comparing the 2019 Approach and disparity ratio approach, slightly more industries would see an increase to size standards under the disparity ratio approach and slightly more industries would see no change to size standards under the 2019 Approach.

Most positively impacted sectors under both approaches included NAICS Sector 62 (Health Care and Social Assistance), Sector 54 (Professional, Scientific and Technical Services), and Sector 56 (Administrative and Support and Waste Management and Remediation Services), affecting, respectively, 0.3 percent, 0.1 percent, and 0.2 percent of total firms in those sectors. Most negatively impacted sector under both approaches was Sector 23 (Construction), with a majority of industries in the sector experiencing decreases to the current size standards, affecting about 0.3 percent of all firms in that sector under both approaches. Other negatively impacted sectors under both approaches were Sector 31-33 (manufacturing) and Sector 48-49, affecting, respectively, 0.1 percent and 0.4 percent of total firms in those sectors. Overall, the changes to size standards as the result of the changes in the methodology would have a very minimal impact on number of businesses that qualify as small. Excluding Sectors 42 and 44-45, 97.8 percent of businesses would qualify as small under the calculated size standards under both approaches. That figure is 97.78 percent under the current size standards.

As a result of replacing the 20th percentile and 80th percentile values of industry factors based on the Economic Census data with those based on FPDS-NG/SAM data, SBA expects the changes to size standards for "exceptions" to be less pronounced and more consistent in terms of comparing industry factors for each exception with 20th percentile and 80th percentile values of industry factors sharing the same measure of size standards (i.e., receipts or employees).

[56] For this part of the analysis, industries in Sectors 42 and 44-45 were excluded as NAICS codes in those sectors do not apply to Federal procurement.

Table 13
Changes to Overall Size Standards Due to the Change in Federal Contracting Factor

	Percentage difference between the small business shares of total Federal contract dollars in an industry and of total industry receipts (2019 method)					
Disparity ratio approach (new method)	Smaller decrease (< 0% & > – 25%)	Larger decrease (<= –25%)	No change	Smaller increase (> 0% & < 25%)	Larger increase (>= 25%)	Total
Smaller decrease (< 0% & > – 25%)	140	2	1	0	0	143
Larger decrease (<= –25%)	2	22	0	0	0	24
No change	3	0	50	3	0	56
Smaller increase (> 0% & < 25%)	0	0	13	126	3	142
Larger increase (>= 25%	0	0	0	2	25	27
Total*	145	24	64	131	28	392

*No information exists for two NAICS codes to calculate the disparity ratio using contract obligations even though they averaged more than $20 million in Federal contracts annually.

IMPACT OF PREVIOUS SIZE STANDARDS REVISIONS ON FEDERAL CONTRACTS TO SMALL BUSINESSES

On top of industry and Federal contracting factors discussed above, SBA also assesses the impacts of size standards revisions it made in the previous round of the comprehensive size standards review when making adjustments to size standards in the next round. Specifically, for each industry for which the size standard was revised, SBA evaluates the share of Federal contract dollars awarded to businesses that were small under the old size standard. If their share of Federal contract dollars decreased significantly under the revised size standard, SBA may consider proposing or adopting a size standard that is different from one supported by industry and Federal contracting factors. For example, let's consider a hypothetical industry whose size standard increased from $8 million to $16 million. If the analysis shows that the share of that industry's total small contract dollars awarded to businesses below the old, $8 million size standard decreased significantly under the revised size standard and most of those dollars went to the newly qualified businesses between $8 million and $16 million, SBA may consider maintaining, or in some cases even lowering, the current size standard even if the evaluation of the primary factors may suggest increasing the size standard for that industry. This is to ensure that revisions to size standards do not cause an adverse impact on businesses that were small under the old size standards.

SECONDARY FACTORS

In addition to the primary factors discussed above, there are other factors, which SBA may consider in deciding a size standard. As in the case of primary factors, not all of the secondary factors would be applicable in every industry, but each will be evaluated to see to what extent they are relevant. These factors will not by themselves have a direct impact on a size standard and thus are of secondary importance. SBA will consider these factors on a case-by-case basis when reviewing size standards. Five such factors are discussed next.

Technological Change

This factor can have an impact on the production process or productivity of labor and other inputs in an industry. It can result in fundamental shifts in the way firms operate and conduct business within an industry and can revolutionize the entire industry sector. If a change in a manufacturing industry is geared toward more automation, for example, fewer employees can produce the same amount of output. This may warrant adjusting that industry's size standard downward.

Competing or Similar Products or Services among Industries

This factor has to do with the way industries are defined under the NAICS. SBA uses NAICS as the basis of industry definitions for size standards purposes. NAICS is used both inside and outside the government as a uniform framework for classifying economic activities for the purpose of collecting establishment statistics on the nation's economy.

NAICS classifies establishments with similar production processes in the same industry. A market, on the other hand, is made up of a group of substitutable or competing products.[57] While there are millions of products and services in the market, there are about 1,000 six-digit NAICS categories encompassing them all. Thus, by adopting NAICS for size standards, SBA has implicitly determined that small business size standards should be defined according to production processes, not according to products or services. When firms operating in different industries compete to supply same products or services, SBA may use this factor in setting size standards that ensure a level playing field for small businesses to participate in the Federal market.

Industry Growth Trends

This factor would take into consideration the overall trends in a particular industry, such as changes over time in firm size, concentration, and size distributions of firms. Like the other secondary factors, growth trends would lack a definitive influence on an industry's size standard analysis. There is no unambiguous upward or downward influence it would have on setting size standards. Additionally, because of changes to industry definitions (e.g., SIC to NAICS and NAICS updates every five years) and resultant inconsistencies in industry data over time, inclusion of this factor in the size standard is limited. However, with the release of 2017 Economic Census data, there now exist 20 years of industry data covering five Economic Censuses under NAICS. This would allow SBA to evaluate changes in industry structure and their impacts on size standards.

Unique History in the Industry

Prior correspondences or public comments, changes in Federal procurement policies, Congressional directives, financial indicators or other relevant information is retained by SBA's Office of Size Standards for each industry. SBA will also evaluate and consider such historical information when establishing, reviewing, or revising a size standard. SBA also thoroughly evaluates all public feedback on its proposed rule before issuing the final rule.

Impacts on SBA and Other Programs

SBA also evaluates the impact of a size standard revision on its programs, including the volume of SBA guaranteed loans within an industry and the number and size of firms obtaining those loans. This is to assess whether the existing or revised size standard for a particular industry may be restricting access of financial assistance to firms in that industry. If the analysis shows that the proposed size standard based on the five primary factors (i.e., average firm size, average assets size, 4-firm concentration ratio, distribution of firms by size, and Federal contracting factor) results in a significant reduction in the small business assistance compared to the existing size standard, a size standard higher than a proposed level would be adopted. If

[57] Thus, while paper clips and bird cages are not competing products, they are produced in the same industry (NAICS 332618 "Fabricated Wire Products Manufacturing") due to the similarity of production process, i.e., bending metal wire. In contrast, containers for liquid food, such as fruit juices, come in a variety of types such as glass, plastic, paperboard and cans. Each of the four types of containers is produced in a different industry, but competes with each other for the juice container market because they are sufficiently substitutable so as to constitute a market.

small businesses are already receiving the adequate level of financial assistance through SBA's loan programs, or if small businesses receiving the SBA's financial assistance are much smaller than the proposed or existing size standard, consideration of this factor may not be warranted when determining the size standard.

ASSESSING DOMINANCE IN FIELD OF OPERATION

Section 3(a) of the Small Business Act defines a small business concern as one that is (1) independently owned and operated, (2) not dominant in its field of operation, and (3) within a specific small business definition or size standard established by the SBA Administrator. SBA considers as part of its evaluation of a size standard whether a business concern at a proposed or revised size standard would be considered dominant in its field of operation, nationally. Consistent with legislative history, this assessment generally considers the industry's market share of firms for the entire industry at the proposed or revised size standard at the national level, or other factors (such as distribution of firms by size, mergers and acquisitions) that may show whether an individual firm can or has a potential to exercise a major controlling influence on significant numbers of business concerns at a national level. If SBA analysis indicates a proposed or revised size standard would include a dominant firm, a lower size standard would be considered to exclude the dominant firm.

OTHER MEASURES OF SIZE STANDARDS

In limited situations, SBA selects a size standard measure that is unique to an industry. This generally occurs when the receipts or employee based measure does not adequately reflect the level of activity of firms within an industry. The selected size measure is a widely used measure of industry activity by industry analysts or by Federal statistical agencies. In addition, the availability of reliable industry data on the alternative size measure is also important. Below is a brief description of each of the three specific alternative measures of size standards that SBA is using today.

Barrels per Calendar Day Refining Capacity

Since 1955, for purposes of Government procurement, SBA has always used employees in conjunction with refining capacity as the size standard for the petroleum refining industry. Specifically, in 1955, the size standard for the petroleum refining industry was 1,000 employees combined with a refining capacity of 30,000 barrels per day (BPD), which was increased to 1,500 employees and 75,000 BPD in 1975. Refining capacity is considered to be a better indicator for measuring and comparing the operations of petroleum refiners than both the number of employees and receipts. Moreover, several other Federal agencies, such as the U.S. Department of Energy and Environmental Protection Agency, also use the refining capacity as a measure to differentiate one refiner from another. The employee component in the refining size standard is necessary to account for affiliation involving entities not engaged in refining activity.

In 1991, with an intent to simplify size standards, SBA proposed eliminating the refining capacity component of the size standard for petroleum refiners and using the 1,500-employee size standard only (56 FR 20382; May 3, 1991). However, industry comments to the proposal

overwhelmingly favored retaining refining capacity as part of the size standard for the petroleum refining industry and some comments recommending an increase. Accordingly, on January 7, 1992, SBA published a proposed rule increasing the refining capacity component of the size standard from 50,000 BPD to 75,000 BPD (57 FR 541). On May 1, 1992, SBA published a final rule adopting 75,000 BPD capacity and retaining the employee component of the size standard at 1,500 employees (57 FR 18808). In 2002, SBA published a proposed rule increasing the capacity component of the petroleum refiners size standard from 75,000 BPD to 155,000 BPD (67 FR 6437; February 12, 2002). However, in the final rule, SBA increased the refining capacity component of the size standard from 75,000 BPD to 125,000 barrels per calendar day (BPCD) and retained the employee component at 1,500 employees (68 FR 15047; March 28, 2003). In 2016, SBA increased the refining capacity component of the petroleum refining size standard to 200,000 BPCD and maintained the employee component at 1,500 employees (81 FR 4469; January 26, 2016).

For establishing a size standard based on refining capacity, SBA generally follows its standard approach to analyzing industry structure. For example, average firm size, distribution of firms by size, and concentration ratios, and Federal contracting participation are analyzed in terms of refining capacity. Depending on the availability of relevant data, starts up costs are also evaluated. In lieu of the percentile distribution as for the receipts and employee based standards, SBA focuses its analysis on changes in the industry structure since the previous adjustment to the size standard and the historic size of small business segment in the industry.

Total Assets

In 1984, SBA established a size standard of $100 million in total assets for financial institutions (49 FR 40398; October 16, 1984). To establish that size standard, SBA analysis focused on the average assets size of banks and the distribution of banks by assets size. It also considered the number of bank branches at a particular size, as well as whether the bank had the capability for electronic fund transfers. The Agency also took into consideration the opinions of industry experts on what constitutes a small bank. The consensus view supported the SBA estimate of $100 million standard in total assets. As part of the first five-year comprehensive size standards review, in 2013, SBA increased the assets based size standard to $500 million (78 FR 37409; June 20, 2013). This was further increased to $550 million in total assets in 2014 as the result of adjustment of all monetary based size standards for inflation (79 FR 33647; June 12, 2014), to $600 million as the result of inflationary adjustment in 2019 (84 FR 34261; July 18, 2019), to $750 million as part of the second five-year review of size standards in 2022 (87 FR 18627; March 31, 2022), and to $850 million as part of the adjustment of monetary based size standards for inflation in 2022 (87 FR 69118; November 17, 2022).

Tangible Net Worth and Net Income

SBA does not apply tangible net worth and net worth as measures of business size for industry based size standards. However, participants to the SBA's Small Business Investment Company (SBIC), 7(a) Business loan, and Certified Development Company (CDC/504) loan programs can qualify as small business concerns under an alternate size standard that is based on tangible net worth and average net income, in addition to industry based size standards. SBA's decisions on the levels of size standards in terms of tangible net worth and net income generally

reflect the objectives of the program and characteristics of its intended beneficiaries. For example, to establish the tangible and net income based size standard, SBA generally examines the maximum level of investment to businesses by a SBIC licensee and the overall level of financing by all investors. The current alternative size standard for the SBIC program is at $24 million in tangible net worth and $8 million in net income.

With the enactment of the Jobs Act in 2010, Congress established a new interim alternative size standard of tangible net worth of not more than $15 million and net income of not more than $5 million for SBA's 7(a) and CDC/504 loan programs (also referred to as "Interim Rule"). The Jobs Act also provided that the Interim Rule would remain in effect for the 7(a) and CDC/504 loan programs until SBA has established a permanent tangible net worth and net income based size standard through rulemaking. SBA has not yet established such size standard and continues to apply the Interim Rule to define a small business concern for those programs, in addition to using the industry based size standards.

ADJUSTMENT TO MONETARY BASED SIZE STANDARDS FOR INFLATION

SBA makes adjustments to its monetary based size standards when necessary. In accordance with its regulations (13 CFR § 121.102(c) and 67 FR 3041; January 23, 2002), SBA assesses the impact of inflation on monetary based size standards at least once every five years. This assures the public that SBA monitors inflation and decides whether to adjust size standards at least that often, if not more frequently. Inflation adjustments are separate changes in addition to those made through an analysis of industry structure and Federal market conditions; they are intended to maintain the real value of a monetary based size standard until a more detailed size standards analysis may be conducted. SBA made adjustments to monetary size standards for inflation in 2022 (87 FR 69118; November 17, 2022), 2019 (84 FR 34261; July 18, 2019), 2014 (79 FR 33647; June 12, 2014), 2008 (73 FR 41237; July 18, 2008), 2005 (70 FR 72577; December 6, 2005), 2002 (67 FR 3041; January 23, 2002), 1994 (59 FR 16513; April 7, 1994), 1984 (49 FR 5024; February 9,1984), and 1975 (40 FR 32824; August 5, 1975).

To calculate an inflation adjustment, SBA follows the following steps:

1. Determine an inflation index to represent the change in monetary value from one period to the next. There are a number of inflation indexes that the Federal Government produces, but for all previous adjustments for inflation, SBA has opted to apply the chain-type price index for the Gross Domestic Product (GDP). The Bureau of Economic Analysis (BEA) publishes this index on a quarterly basis.

   For the 2014 inflation adjustment, SBA evaluated the various measures of inflation indexes for their appropriateness to use for adjusting its monetary based size standards for inflation. These include: the consumer price index, the producer price index, and the employment cost index from the Bureau of Labor Statistics (BLS); and the GDP chain-type price index and personal consumption expenditures (PCE) price index from BEA. SBA also examined the value added and gross output price indexes by industry from BEA. Of all these inflation indexes reviewed, SBA determined that, being the most comprehensive measure of price movements for the overall economy, the GDP price index is the most appropriate measure for adjusting its size standards for inflation. The SBA's interim rule on the 2014 inflation

adjustment provides a detailed discussion on each of the various measures of inflation (79 FR 33647; June 12, 2014).

2. Determine the base or starting period, which is usually the latest quarter for which GDP price index statistics were available at the time of previous inflation adjustment.

3. Determine the ending period, which is usually the latest quarter for which GDP price data are available at the time of current inflation adjustment.

4. Calculate the rate of inflation between base period and ending period as follows:

$$Rate\ of\ inflation\ (\%) = \left(\frac{GDP\ PRICE\ INDEX_{End\ period} - GDP\ PRICE\ INDEX_{Base\ period}}{GDP\ PRICE\ INDEX_{Base\ period}}\right) x\ 100$$

$$= \left(\frac{GDP\ PRICE\ INDEX_{End\ period}}{GDP\ PRICE\ INDEX_{Base\ period}} - 1\right)\ x\ 100$$

For the 2022 inflation adjustment, the fourth quarter of 2018 was used as the base period and the second quarter of 2022 was used as the ending period. When the rule was prepared, the chain-type price index for GDP was 111.191 for the fourth quarter of 2018 (base period) and 126.367 for the second quarter of 2022 (end period). Based on these values, using the above formula, rate of inflation was estimated to be 13.65 percent between the two periods.

$$Rate\ of\ inflation\ (\%) = \left(\frac{GDP\ PRICE\ INDEX_{End\ period}}{GDP\ PRICE\ INDEX_{Base\ period}} - 1\right)\ x\ 100$$

$$= \left(\frac{126.367}{111.191} - 1\right) = 13.65\%$$

5. Adjust the monetary based size standards using the estimated rate of inflation and round the results off based on what SBA has chosen as the predetermined level. Generally, and most recently, SBA rounded off the result to the nearest $500,000 (except for the agricultural industries for which the results were rounded to the nearest $250,000).

6. Calculate the adjusted size standard.

$$Adjusted\ size\ standard_{End\ period} = Size\ standard_{Base\ period} + Size\ standard_{Base\ period}\ x\ Rate\ of\ Inflation\ (\%)$$

The second term in the above formula is an increase in industry's size standard due to inflation. Adding this increase to the size standard at the base period (i.e., current size standard at the time of adjustment) gives a new size standard adjusted for inflation, which is, in most cases, higher than the current standard.

If an industry's current size standard is $30 million in annual receipts, based on the 13.65 percent inflation rate, its size standard will be $34 million after being adjusted for inflation. Using the above formula,

$$Adjusted\ size\ standard_{End\ period}$$
$$= Size\ standard_{Base\ period} + Size\ standard_{Base\ period}\ x\ Rate\ of\ Inflation\ (\%)$$
$$= 30{,}000{,}000 + 30{,}000{,}000\ x\ 13.65\% = 30{,}000{,}000\ (1 + 0.1365)$$
$$= 30{,}000{,}000\ x\ 1.1365$$
$$= 34{,}095{,}000$$

Rounded to the nearest $500,000, this becomes $34 million.

ADOPTION OF NAICS REVISIONS FOR SIZE STANDARDS

In 2000, SBA adopted NAICS 1997 industry definitions as a basis for its table of small business size standards, replacing the Standard Industrial Classification (SIC) (65 FR 30836; May 15, 2000). Since then, the Office of Management and Budget (OMB) has issued five revisions to NAICS – NAICS 2002 (66 FR 3826; January 16, 2001), NAICS 2007 (71 FR 28532; March 16, 2006), NAICS 2012 (76 FR 51240; August 17, 2011), NAICS 2017 (81 FR 52584; August 8, 2016), and the latest 2022 (86 FR 72277; December 21, 2021) revisions. To ensure that size standards are based on latest industry definitions, SBA updates its table of size standards following the release of a new NAICS revision from OMB.

When SBA proposed to replace SIC with NAICS 1997 as the basis of industry definitions for its table of small business size standards, it established a set of guidelines or rules to convert the size standards from industries under SIC to those under NAICS (64 FR 57188; October 22, 1999). The guidelines aimed to minimize the impact of applying a new industry classification system on SBA's size standards and on small businesses that qualified as small under the SIC based size standards. SBA received no negative comments against the proposed guidelines. SBA published the final rule on May 15, 2000 (65 FR 30386) (corrected on September 5, 2000 (65 FR 53533)) adopting the resulting table of size standards based on NAICS 1997, as proposed. To be consistent, SBA also applied the same guidelines when it updated its table of size standards to adopt NAICS 2002 (67 FR 52597; August 13, 2002), NAICS 2007 (72 FR 49639; August 29, 2007), NAICS 2012 (77 FR 49991; August 20, 2012), NAICS 2017 (82 FR 44886; September 27, 2017), and NAICS 2022 revisions (87 FR 59240; September 29, 2022). In all those updates, SBA received no adverse comments on using those guidelines, or on the resulting changes to the size standards. Those guidelines are shown below in Table 14, General Guidelines to Convert Size Standards from Old NAICS to New NAICS Industries.

Table 14

General Guidelines to Convert Size Standards from Old NAICS to New NAICS Industries

	If a new NAICS industry is composed of:	**The size standard for the new industry will be:**
1	A single old NAICS industry or part of a single old NAICS industry	The same size standard as for the old NAICS industry or part.
2	Two or more old NAICS industries; two or more parts of an old industry; parts of two or more old NAICS industries; or one or more old NAICS industries and part(s) of one or more old NAICS industries.	
	2a. they all have the same size standard	The same size standard as for the old NAICS industries or parts.
	2b. they all have the same size measure (e.g., receipts, employees, *etc*.) but do not all have the same size standard	The same size standard as for the old NAICS industry or part that most closely matches the economic activity described by the new NAICS industry, or The highest size standard among the old NAICS industries and part(s) that comprise the new NAICS industry, provided that the highest size standard does not include dominant or potentially dominant firms.
	2c. they have different size measures (i.e., for example, some are based on receipts and others on employees) and hence do not all have the same size standard	The same size standard as for the old NAICS industry or part that most closely matches the economic activity described by the new NAICS industry, or The highest size standard among the old NAICS industries and part(s) that comprise the new NAICS industry, provided that the highest size standard does not include dominant or potentially dominant firms. To apply this rule, SBA converts all size standards to a single measure (e.g., receipts, employees, *etc*.) using the size measure for the old NAICS industry or part(s) that most closely match the economic activity described by the new NAICS industry or using the size measure that applies to most of the old NAICS industries or parts comprising the new NAICS industry.

In addition to the above general guidelines, in cases where a new industry is formed by merging multiple industries or their parts with substantially different levels or different measures of size standards, SBA also examines the relevant latest industry and Federal procurement data to determine an appropriate size standard for the new industry.

REFERENCES

B. Curry and K. D. George (1983). Industrial Concentration: A Survey, *Journal of Industrial Economics*, Vol. 31, No. 3: 203-255.

S. Martin (2002). *Industrial Economics, Economic Analysis, and Policy*, Oxford: Blackwell Publishing Company.

J. S. Bain (1956). *Barriers to New Competition*, Cambridge: Harvard University Press.

F. M. Sherer and D. Ross (1990). *Industrial Market Structure and Economic Performance*, Houghton Mifflin Company.

W. G. Shepherd (1991). Market Dominance under U.S. Antitrust, *Review of Industrial Organization*, Vol. 6: 161-176.

M. E. Porter (1998). Competitive Strategy, New York: Free Press.

E. Pulaz and V. Kume (2013). Measuring Market Concentration of Construction Industry. Vlora Region Evidence, *European Scientific Journal*, Vol. 9, No. 32: 121-136.

J. Lipczynski, J. Wilson, and J. Goddard (2005). *Industrial Organization, Competition, Strategy, Policy*. Harlow: Prentice Hall.

P. Lu (2016). Study on the Moderate Diversification of Industrial Structure in Macao, *American Journal of Industrial and Business Management*, Vol. 6: 176-187.

M. Brown (1994). Using Gini-style Indices to Evaluate the Spatial Patterns of Health Practitioners: Theoretical Considerations and an Application Based on Alberta Data, *Social Science Medicine*, Vol. 38: 1243-1256.

L.A. Guth (1971). Advertising and Market Structure Revisited, *The Journal of Industrial Economics*, Vol. 19, No. 2: 179-198.

A. J. Yeats (1973). An Analysis of the Effect of Mergers on Banking Market Structure, *Journal of Money, Credit and Banking*, Vol. 5, No. 2: 623-636.

W. S. Comanor and T. A. Wilson (1967). Advertising Market Structure and Performance, *The Review of Economics and Statistics*, Vol. 49, No. 4: 423-440.

O. H. Reichardt (1975). Industrial Concentration and World War II: A Note on the Aircraft Industry, *The Business History Review*, Vol. 49, No. 4: 498-503.

A. P. White (1982). A Note on Market Structure Measures and the Characteristics of Markets They "Measure", *Southern Economic Journal*, Vol. 49, No. 2: 542-549.

S. Holmes and B. Gibson (2001). Definition of Small Business (Final Report Prepared for the Small Business Coalition in Australia), The University of New Castle.

J. Blum (1991). Financial Statement Analysis: An Alternative Tool for Establishing Size Standards, A MBA Internship Paper Submitted to Office of Size Standards.

R. J. Hyndman and Y. Fan (1996). Sample Quantiles in Statistical Packages, *The American Statistician*, Vol. 50, No. 4: 361-365.

F. M. Scherer and D. Ross (1990). *Industrial Market Structure and Economic Performance*, Houghton Mifflin Company.

F. M. Scherer et al (1975). The Economics of Multi-Plant Operation, An International Comparison Study, Harvard University Press.

J. S. Bain (1954). Economies of Scale, Concentration, and the Condition of Entry in Twenty Manufacturing Industries, *The American Economic Review*, Vol. 44, No. 1: 15-39.

G. R. Baldwin et al (1995). The Dynamics of Industrial Competition, A North American Perspective, Cambridge University Press.

R. E. Caves (1998). Industrial Organization and New Findings on the Turnover and Mobility of Firms, *Journal of Economic Literature*, Vol. 36, No. 4: 1947-1982.

S. A. Rhoades (1993). The Hirfindahl-Hirshman Index, *Federal Reserve Bulletin*, Vol. 79, No. 3: 188-189.

J.A. Bikker and K. Haff (2002). Measures of Competition and Concentration in the Banking Industry: A Review of the Literature, *Economic & Financial Modelling,* Vol. 9: 53-98.

Y. Zhang and J. A. Hansz (2022). Industry Concentration and U.S. REIT Returns, *Real Estate Economics*, Vol. 50: 247-267.

R. Decker and J. Williams (2023). A Note on Industry Concentration Measurement, the Board of Governors of the Federal Reserve System.

Y. Prince and R. Thurik (1993). Firm-size Distribution and Price-cost Margins in Dutch Manufacturing, *Small Business Economics*, Vol. 5: 173-186.

J. Fedderke and G. Szalontai (2009). Industry Concentration in South African Manufacturing Industry: Trends and Consequences, 1972–96, *Economic Modelling*, Vol. 26, No. 1: 241-250.

M. Dimic and S. Paunovic (2019). Concentration Measuring Techniques in Banking Sector-Lorenz Curve and Gini Coefficient, *Economic Analysis*, Vol. 52, No. 2: 137-151.

A. Tanusondjaja, S. Dunn, and C Miari (2021). Examining Manufacturer Concentration Metrics in Consumer Packaged Goods, *International Journal of Market Research*, Vol. 63, No. 4: 471–493.

I. Ukav (2017). Market Structures and Concentration Measuring Techniques, *Asian Journal of Agricultural Extension, Economics & Sociology*, Vol. 19, No. 4: 1-16.

A. Tsebe (2021). Competitiveness of the South African Steel Industry, *Journal of Economics and Finance*, Vol. 12, No. 6: 59-68.

K. Ye, W. Lu, and W. Jiang (2009). Concentration in the International Construction Market, *Construction Management and Economics*, Vol. 27: 1197-1207.

National Research Council, Division of Behavioral and Social Sciences and Education, Committee on National Statistics, Steering Committee for the Workshop on Women-Owned Small Businesses in Federal Contracting. (2005). Analyzing Information on Women-Owned Small Businesses in Federal Contracting. Washington, DC: National Academies Press.

E. Reardon, N. Nicosia, and N. Y. Moore (2007). The Utilization of Women-Owned Small Businesses in Federal Contracting. Report Prepared for the U.S. Small Business Administration. Santa Monica, CA: RAND Corporation.

Optimal Solution Group (2021). Women-Owned Small Business NAICS Analysis: Final Report. Report Prepared for the U.S. Small Business Administration. College Park, MD: Optimal Solution Group, LLC.

Premier Quantitative Consulting, Inc (2016). Barriers and Factors Affecting Minority Business Enterprises: A Review of Existing Disparity Studies. Report prepared for the Minority Business Development Authority, the U.S. Department of Commerce. Orlando, FL: Premier Quantitative Consulting, Inc.

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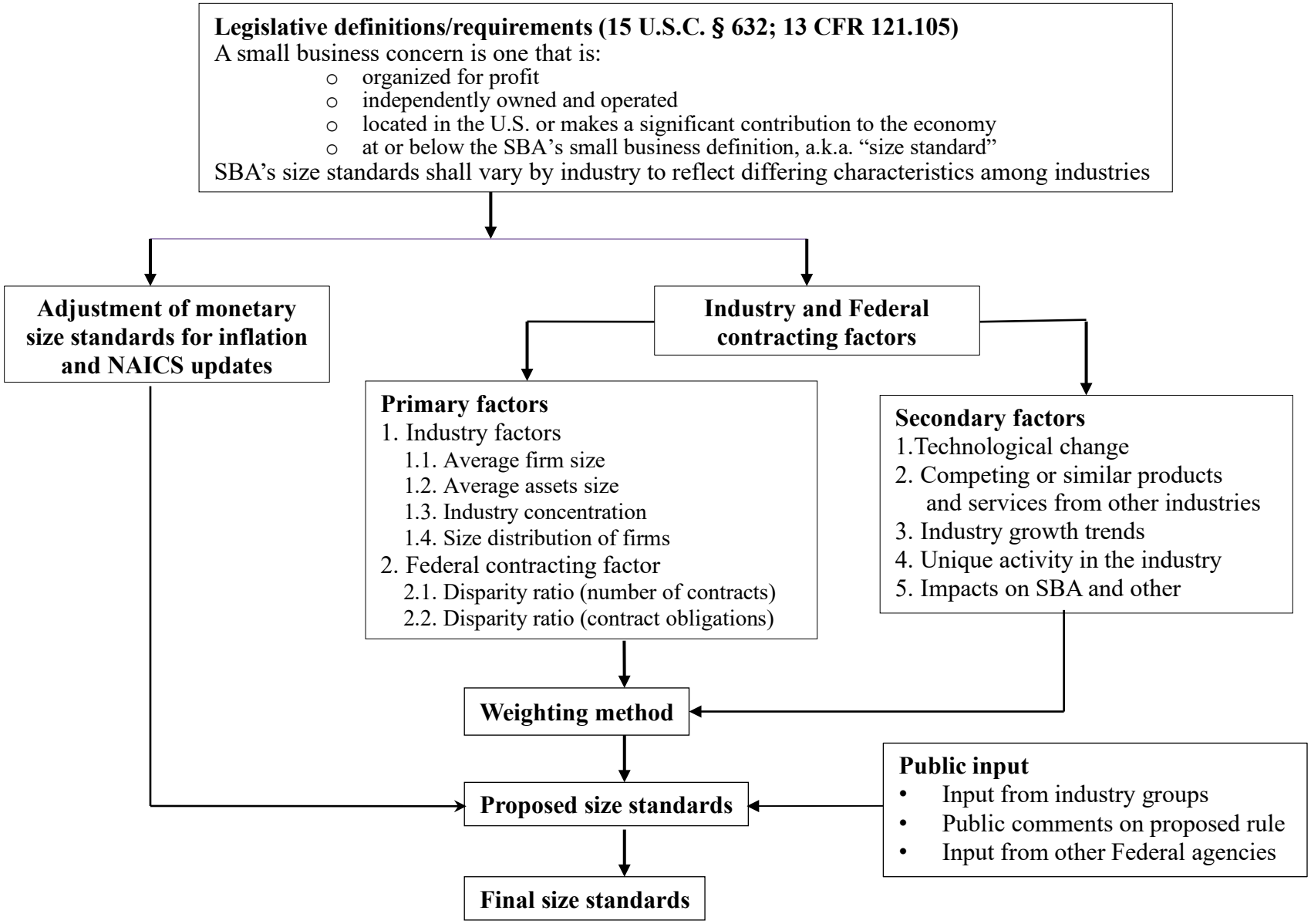
APPENDIX


Legislative definitions/requirements (15 U.S.C. § 632; 13 CFR 121.105)
A small business concern is one that is:
organized for profit
independently owned and operated
located in the U.S. or makes a significant contribution to the economy
at or below the SBA's small business definition, a.k.a. "size standard"
SBA's size standards shall vary by industry to reflect differing characteristics among industries
Adjustment of monetary size standards for inflation and NAICS updates
Industry and Federal contracting factors
Primary factors
1. Industry factors
1.1. Average firm size
1.2. Average assets size
1.3. Industry concentration
1.4. Size distribution of firms
2. Federal contracting factor
2.1. Disparity ratio (number of contracts)
2.2. Disparity ratio (contract obligations)
Secondary factors
1.Technological change
2. Competing or similar products and services from other industries
3. Industry growth trends
4. Unique activity in the industry
5. Impacts on SBA and other
Weighting method
Public input
Input from industry groups
Public comments on proposed rule
Input from other Federal agencies
Proposed size standards
Final size standards