SBA'S SIZE STANDARDS METHODOLOGY

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April 2019

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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 (Public Law 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 this 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. 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 employs 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 the

difference between the small business share in Federal contract dollars and the small business share in total industry's receipts to compute 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. The "percentile" approach is explained more fully on pages 29-30 and evaluation of the Federal contracting factor is described on pages 39-41 This represents a major change from an "anchor" approach (explained on pages 13-14) used in the previous methodology where the average characteristics of the industries in the anchor size standards groups (*i.e.*, industries with the $7 million receipts based size standard for industries with receipts based size standards and those with 500-employee size standard for industries with employee based size standards) were used to evaluate the characteristics of the individual industries. However, as discussed in detail on pages 43-45 of this document, both in terms of the direction and magnitude of changes to size standards, the impacts of the percentile approach would be minimal as compared to the anchor approach.

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 (the Jobs Act) (Public Law 111-240, 124 Stat. 2504, Sept. 27, 2010), SBA also periodically adjusts all monetary based standards for inflation. In accordance with SBA's regulations (13 CFR § 121.102(c)), 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. SBA also updates its size standards, also every five years, to adopt the Office of Management and Budget's quinquennial NAICS revisions to its table of small business size standards.

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 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. In response to the public comments on the "anchor" size standards approach applied in the previous methodology and recent amendments to the Act regarding the use of common size standards (*see* section 3(a)(7)) SBA is replacing the "anchor" approach used in the previous methodology with a "percentile" approach in this revised methodology. Under the "anchor" approach, SBA generally evaluated the characteristics of individual industries relative to the average characteristics of industries with the anchor size standard to other industries to determine whether they should have a higher or a lower size standard than the anchor. In the "percentile" approach, SBA will rank 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, industry competition, and 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 in terms of the small business share of Federal contracts relative to their share of industry's receipts. The size standards for each 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 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 12 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 4-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) (Public Law 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 use and establishment of size standards by other Federal agencies 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 during the latest 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, SBA lowered size standards where the largest and potentially dominant firms would qualify as small. In response to public comments, SBA adjusted its proposed changes to size standards for architectural/engineering and accounting size standards, as well as the information technology value added resellers "exception" to NAICS 541519 (Other Computer Related Services) and the environmental remediation "exception" to NAICS 562910 (Remediation Services).

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 4-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. These last two paragraphs were added after the publication of the previous size standards methodology. As a result, in this updated methodology SBA has abandoned the use of the "anchor" size standard approach and fixed number or "bands" of size standards.

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. In addition, Congress did not intend the phrase "is not dominant in its field of operations" to exclude firms that might dominate a geographic area. Rather, Congress intended to exclude firms that dominate an entire industry, nationally.[2] Congress also recognized that an extremely high percentage of business firms could properly be classified as small.[3]

The Banking and Currency Committee recognized the "impossibility of attempting to write into law a rigid definition of small business."[4] 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.[5] 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.

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

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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* Hearings on S. 982. *et al*. before the Committee on Banking and Currency of the U.S. Senate, 83rd Congress, 1st Session (1953), page 56.

[3] *See* comments of Representative Seely-Brown, Congressional Record-House, June 5. 1953, page 6141. Representative Seely-Brown observed that more than 95% of business establishments could be classified as small and Representative Springer at page 6155 of the same Congressional Record observed that 95.2% of the businesses employed less than 20 people, so that on the basis of employment small business would be truly small in size.

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

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

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 $38.5 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 for SBA's size standards on 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 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 inflation adjustment, the most common receipts based size standard of $1 million has increased to $7.5 million today. The $1 million level and its inflation-adjusted equivalent 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 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 special trade construction. Employee based standards remained unchanged.

After a series of public notices in the *Federal Register* from 1980 to 1983, the Agency adopted a detailed list of size standards for industries as defined under the SIC system. Generally speaking, the size standards framework the Agency followed until the recently completed comprehensive size standards review 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 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 standards for the wholesale trade industries from 500 employees to 100 employees for all SBA 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 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 10 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 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), 111 Pub. L. 240, 124 Stat. 2504, Sep. 27, 2010. The Jobs Act directs SBA to conduct, at least every five years, a detailed review of all size standards (except those for agricultural enterprises) and to make appropriate adjustments to reflect market conditions. SBA recently completed the first five-year comprehensive size standards review and will begin the next five-year review in the near future. Of 1,009 size standards reviewed in the prior review, SBA 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, even though the results might have supported lowering them. Section 1831 of NDAA 2017 requires SBA to include agricultural size standards in the five-year rolling review procedures established under the Jobs Act.

Currently, the most prevalent size standards are $7.5 million in annual receipts for Retail Trade and Services, $35.5 million for General Construction, $15 million for Special Trade Construction, 100 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 $0.75 million in annual receipts for most Agricultural enterprises (which were set by statute until the enactment of NDAA 2017) to $38.5 million in annual receipts for Facility Support Services. Similarly, employee based standards range from 100 employees for Heating Oil Dealers to 1,500 employees for some Manufacturing and Telecommunications industries. With very few exceptions, uniform size standards are now in place for all SBA's 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 number of employees and size of services firms based on average annual receipts.

Accordingly, SBA primarily uses the number of employees for manufacturing industries and average annual receipts for services industries.[6] 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 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), 7(a) and Certified Development Company (CDC) or 504 financial assistance programs. These are summarized in Table 2.

SBA decided to apply 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 size standard also applies for SBA's 7(a) and CDC/504 loans as an alternative to industry based size standards.

[6] Some have suggested using payroll as a measure of size for certain industries instead of receipts. For the evaluation of industry structure in size standards analysis, SBA uses such factors as the four-firm concentration ratio, distribution of firms by size, and the Gini coefficient. The Economic Census special tabulations include this information only for receipts and employees. For impact analysis of size standards changes as well as for review of size standards "exceptions", SBA uses the data from SAM and FPDS-NG, which do not have payroll information. Historically, SBA has never used payroll as a measure of a size standard. The statute specifically directs SBA to use the number of employees for manufacturing industries and average annual receipts (not payroll) for services industries. Further, payroll is strongly correlated with receipts. For example, for industries with receipts based size standards, based on the data from the 2012 Economic Census special tabulations, the correlation coefficient between payroll and receipts was 0.79, compared to 0.82 between payroll and employees. For these reasons, SBA prefers to use receipts instead of payroll.

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.

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, size standards are primarily defined at the 6-digit NAICS industry level.

2. An industry's size standard is established at the national level. Similarly, as explained elsewhere in this document, the determination of "not dominant in its field of operation" is also made at the national level. Data limitations preclude an extensive analysis of businesses within specific industries on a geographical basis. In addition, geographically based size standards may inappropriately influence decisions on business location.[7]

3. 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 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. For this revised methodology, however, there will not be a predetermined range of fixed size standard levels as in the previous methodology. 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.

[7] The statute requires SBA to vary size standards by industry, but not by geography. SBA uses the NAICS 6-digit levels as bases for industry definitions for size standards. Accordingly, there are more than 1,000 industry categories for which SBA establishes size standards. 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 would make size standards more complex, rendering them extremely difficult to review, manage, administer, and apply. Defining smaller geographical areas adds complexity. For these reasons, SBA does not consider geography as a factor in size standards analysis.

5. With 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, 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 recently completed comprehensive size standards review, $7 million (now $7.5 million due to the inflation adjustment in 2014) was considered the "anchor" for receipts based size standards and 500 employees was 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. For industries with receipts based standards, the second comparison group consisted of industries with size standards between $23 million and $35.5 million, with the weighted average size standard for the group equaling $29 million. For manufacturing industries and other industries with employee based size standards (except for Wholesale Trade and Retail Trade), the second comparison group included industries with a size standard of 1,000 employees or 1,500 employees, with the weight average size standard of 1,323 employees. 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.

In response to the comments, section 3(a)(7) of the Act that limits the SBA's ability to create common size standards by grouping industries below the 4-digit NAICS level, and its own review of the methodology, SBA is replacing the "anchor" approach used in previous revised methodology with the "percentile" approach in this revised methodology, as a basis of deriving a size standard for each factor for each industry.

In the past, including the recent review of size standards, the anchor size standards applied to a large number of industries, making them a good reference point for evaluating size standards for individual industries. For example, at the start of the recent review of size standards, the $7 million anchor standard was the size standard for more than 70% of industries that had receipts based size standards. A similar proportion of industries with employee based size standards had the 500-employee anchor standard. However, when the characteristics of those industries were evaluated individually, for a large majority of them the results yielded a size standard different from the applicable anchor. Consequently, now just 24% industries with receipts based size standards and 22% of those with employee based size standards have the anchor size standards. The "anchor" approach would entail grouping industries from different NAICS sectors, thereby making it inconsistent with section 3(a)(7) of the Act.

Under the "percentile" approach, for each factor, an industry is ranked and compared with the 20^{th} percentile and 80^{th} 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 20^{th} percentile and 80^{th} 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 previous methodology, comparison industry groups were predetermined independent of the data, while in the revised 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 the 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:[8]

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

Similarly, for industries with employee based size standards, the simple average firm size is expressed in terms of the number of employees as follows:[9]

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

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:

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

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

Weighted average firm size (receipts)

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

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

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 2012 Economic Census special tabulations.

The minimal efficient firm size (MES) is the level of 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 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% of market share within the industry, as the best proxy for MES.[10] The authors further show that average firm size of the largest firms accounting for the top 50% 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).[11]

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

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

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, 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.[12] 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, advertising expenses, economies of scale, government policy, *etc*.), SBA uses average assets size as a proxy for the levels of capital needs for new businesses entering an industry.[13] SBA assumes that an industry with a significantly higher average assets size than most other 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

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

[13] 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.

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 4-firm concentration ratio, Gini coefficient, and the Herfindahl-Hirschman index (HHI).[14]

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):

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

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

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

SBA has generally used the 4-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 review. The 4-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 4-firm concentration ratio (CR4) is defined as:

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

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.[15] 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

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[14] These measures are widely applied in measuring industry concentration. For example, *see* Pulaz and Kume (2013).

[15] $CR8 = \sum_{i=1}^{8} s_i$, where $s_1 > s_2 > \ldots > s_8$. The Herfindahl-Hirschman index (HHI) is computed as follows (Curry and George, 1983):

$$HHI = \sum_{i=1}^{n} s_i^2$$

where $s_i\ (market\ share\ \%) = \dfrac{Total\ receipts\ of\ firm\ i\ in\ an\ industry}{Industry's\ total\ receipts} \times 100$

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

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 2012 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 4-firm concentration ratio as a measure of market competition.

Using the 4-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.

In the past, SBA generally did not consider the 4-firm concentration ratio as an important factor in size standards when its value was below 40%.[16] If an industry's 4-firm ratio was 40% or more, SBA used the average size of the four largest firms as a primary factor in determining a size standard for that industry.[17] In response to public comments as well as based on its own evaluation of industry factors, in this revised methodology, SBA is proposing to apply all values of the 4-firm ratios directly in the analysis, as opposed to using only 40% and above. The 40% rule generally applies only to about one-third of industries for which this information is available. According to the 2012 Economic Census special tabulation, about two-thirds of industries had a 4-firm ratio of less than 40%. For the same reason, SBA is also proposing to drop the average firm size of the four largest firms. Moreover, the four-firm average size is found to be highly correlated with the weighted average firm size.

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.[18] 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.

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[16] According to Martin (2002), the CR4 value of 40% is used as the cut-off point, meaning that a 40% or higher value would imply a concentrated (oligopolistic) industry and less than 40% would imply a competitive industry. Shepherd (1991) also notes that a market share over 40% indicates market dominance.

[17] Average size of four largest firms (*AVG4*) is computed as follows:

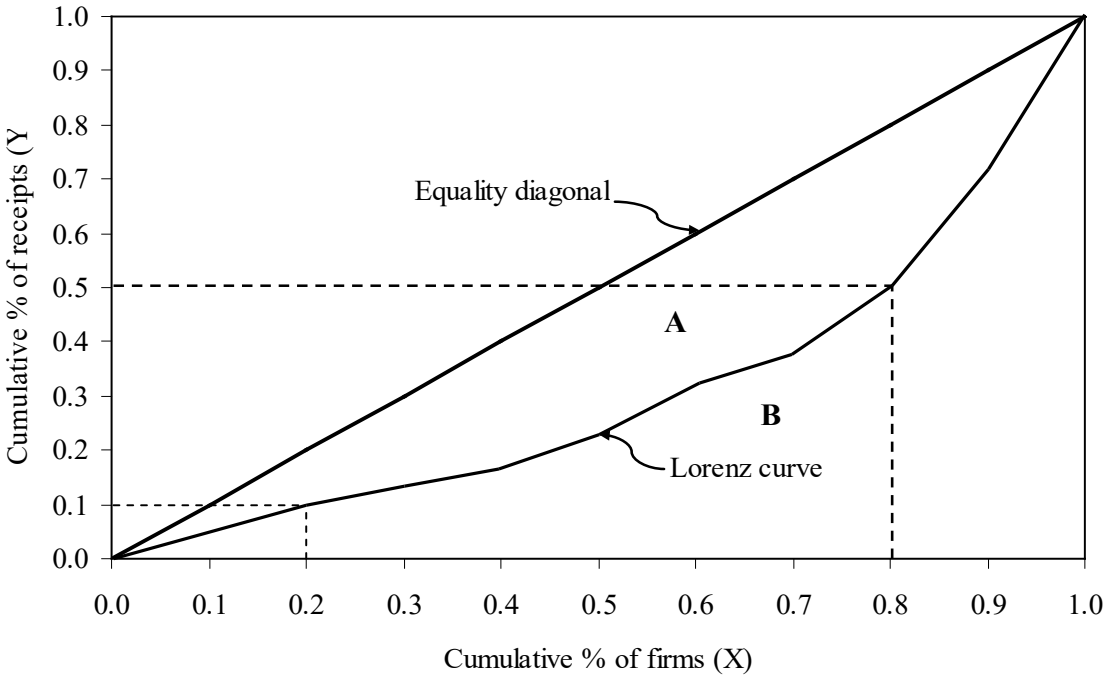
$$AVG4 = \frac{Total\ receipts\ (employees)\ of\ the\ biggest\ four\ firms\ in\ an\ industry}{4}$$

[18] 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. 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)).*

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 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. In the figure, 80% of firms hold 50% 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.

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.[19]

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

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

Which in turn is equivalent to

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

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 2012 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

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[19] *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.

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.[20]

FEDERAL CONTRACTING FACTOR

Besides industry factors described above, SBA also considers Federal contracting as one of the primary factors when establishing or reviewing size standards. The Small Business Act requires Federal government to ensure that small businesses receive a "fair share" of Federal contracts. The legislative history also discusses the importance of size standards in Federal contracting. To incorporate the Federal contracting factor in the size standards analysis, SBA evaluates small business participation in Federal contracting in terms of the share of total Federal contract dollars awarded to small businesses relative to the small business share of industry's total receipts.

In general, if the share of Federal contract dollars awarded to small businesses in an industry is significantly smaller than the small business share of total industry's receipts, all else remaining the same, a justification would exist for considering a size standard higher than the current size standard. In cases where small business share of the Federal market is already appreciably high relative to the small business share of the overall market, SBA generally assumes that the existing size standard is adequate with respect to the Federal contracting factor. Based on the FPDS-NG data for FY 2015-2017, small business share of Federal contract dollars shows a wide variation by industry, ranging from a low of 0% to a high of 100%.

The disparity between the small business Federal market share and industrywide share may be attributed to a variety of reasons, including, but not limited to, extensive administrative and compliance requirements associated with Federal contracts, the different skill sets required for performing Federal contracts as compared to typical commercial work, the size and complexity of contracts, specific procurement needs of Federal agencies, and factors influencing the ability of small businesses to enter the Federal market and win contracts. These as well as other factors are likely to influence the type of firms that are able to compete for and win Federal contracts. Firms receiving Federal contracts within an industry are likely to possess different characteristics than the average characteristics for all firms in that industry. Comparing between the Federal market and industrywide shares attributed to small businesses, SBA incorporates Federal market conditions into size standards reviews and analyses.

[20] 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).

DATA SOURCES AND ESTIMATION

Industry Data

The primary source of data SBA uses to examine industry characteristics is a special tabulation of the Economic Census from the U.S. Census Bureau.[21] The tabulation based on the 2012 Economic Census is the latest available, which SBA will use for evaluating industry characteristics for the forthcoming five-year comprehensive size standards review. The 2012 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.

One 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, mostly at the 6-digit NAICS industry level. SBA estimates such missing values using the displayed data at the 6-digit level and data at higher levels of industry aggregation, such as at the 2- or 3-digit NAICS level for which such figures are fully displayed.[22] 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.

Another 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.[23]

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[21] 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. The Economic Census information is also available on https://www.census.gov/programs-surveys/economic-census.html.

[22] 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. Employees 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 adjusting these values 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.

[23] 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.

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 2012 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, and 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 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 Statistics on Depository Institutions (SDI) database of the Federal Depository Insurance Corporation (FDIC) data.

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 eStatement Studies with the simple average receipts size by industry from the 2012 Economic Census (EC) tabulation to estimate the average assets size for each industry as follows:[24]

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

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

The sales to total assets ratios that SBA uses to calculate average assets size are from the RMA's Annual eStatement Studies for 2015-2017.[25]

System for Award Management (SAM)

SBA obtains from the System for Award Management (SAM)[26] 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

[24] Please refer to the Risk Management Association's 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 6-digit NAICS level. For those industries, SBA applies the sales to assets ratios at the 4-digit NAICS level.

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

[26] If the reader is not able to directly access the link, either type the url in the address bar or go to the GSA website at www.gsa.gov and search on that website for "Systems and Services The Integrated Award Environment (IAE) Systems."

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. 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.

Federal Contracting Data

To determine the small business share of total Federal contracting dollars, 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. To determine the Federal contracting factor for the forthcoming size standards review, SBA will evaluate the FPDS-NG data for fiscal years 2015-2017.

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. 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 is 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.

SBA Loan Data

To determine the impact of size standards revisions on SBA's financial assistance, SBA analyzes its internal data on guaranteed loans. For the forthcoming comprehensive size standards review, SBA will use the loan data for fiscal years 2016-2018.

SELECTION OF SIZE STANDARDS

In the methodology applied to the recently completed comprehensive size standards review, SBA adopted a fixed number of size standards levels as part of its effort to simplify size standards. Specifically, for industries with a size standard in average annual receipts, SBA established eight levels of size standards: $5 million, $7 million, $10 million, $14 million, $19 million, $25.5 million, $30 million, and $35.5 million. With the 2014 inflationary adjustment, they are now at $5.5 million, $7.5 million, $10.5 million, $15 million, $20.5 million, $27.5 million, $32.5 million, and $38.5 million. However, there are still 16 different levels of receipts based size standards because of SBA's policy decision in the prior five-year review to not lower size standards even though the data supported lowering them for some industries.[27]

[27] In view of distressed economic conditions during the prior 5-year review of size standards, SBA, as a policy decision, had decided to not lower any size standards even if the data might have supported lowering them. During the period when SBA reviewed NAICS sectors with receipts based size standards, the unemployment rate was more than 7.5% and when it reviewed manufacturing and other sectors with employee based size standards the unemployment rate was more than 6.5%. Lowering size standards under such economic environment would not only have deprived many small businesses from Federal assistance when they needed such assistance the most but also would have run counter to numerous Congressional and Administration's initiatives and programs to create jobs and boost economic growth, including the American Recovery and Reinvestment Act of 2009 and the Small Business Jobs Act of 2010. In each proposed and final rule, SBA provided a justification for not lowering size standards even though data might have supported lowering them.

For the upcoming 5-year review initiated by the issuance of this methodology, the decision to raise, lower, or retain a size standard will primarily be driven by analytical results, with due considerations of public comments,

Similarly, for manufacturing and other industries with a size standard in terms of employees (except for Wholesale Trade and Retail Trade), SBA applied six standards: 250 employees, 500 employees 750 employees, 1,000 employees, 1,250 employees, and 1,500 employees. For wholesale and retail trade industries with an employee based size standard, SBA used four levels: 100 employees, 150 employees, 200 employees, and 250 employees. In its 2009 "Size Standards Methodology" White Paper, SBA had proposed reducing the minimum size standard for manufacturing industries from 500 employees to 250 employees and the maximum size standard from 1,500 employees to 1,000 employees. However, as discussed elsewhere in this document, in the comprehensive review of the manufacturing size standards, SBA retained both the minimum and maximum standards at 500 employees and 1,500 employees, respectively. Additionally, SBA established a new 1,250-employee size standard between 1,000 employees and 1,500 employees. Similarly, for employee size standards for the wholesale and retail trade industries, SBA used four of the five levels it proposed in the white paper. The lowest, 50-employee size standard proposed in the methodology was not applied.

In response to public comments to the 2009 methodology white paper, and the 2013 amendment to the Small Business Act (section 3(a)(8)) under Section 1661 for the National Defense Authorization Act of Fiscal Year 2013 (NDAA 2013) (P.L. 112-239, Jan. 2, 2013), in this revised methodology, SBA has relaxed 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 comprehensive size standards review, SBA is proposing to assign a separate size standard to each NAICS industry. However, to account for errors and limitations associated with various data SBA evaluates in the size standards analysis, SBA rounds the calculated size standard value for a receipts based size standard to the nearest $500,000, except for the calculated 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 is 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.[28] 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.

impacts of changes on the affected businesses, and other factors SBA considers important. All these decisions will be detailed in individual rulemakings. It will take several years to complete the five-year review of all size standards under the Small Business Jobs Act of 2010 during which the state of the economy may change. It is, therefore, not possible to state now in the methodology what impact, if any, the future economic environment would have on the SBA's policy decision regarding size standards.

[28] SBA may consider using different rounding values for receipts based size standards for agricultural industries and employee based size standards for the wholesale and retail trade industries.

As a policy decision, SBA will continue to maintain the minimum and maximum levels for both receipts and employee based size standards.[29] 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 3. 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 3

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)	$5 million	$40 million
Receipts based size standards for agricultural industries in NAICS Subsectors 111 and 112	$1 million	$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 $5 million and $40 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 of $5.5 million and the current maximum of $38.5 million, which are rounded for simplicity. 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 the same manner it establishes and reviews size standards for all other industries. However, the industry data seems to suggest that $5 million minimum and $40 million maximum size standards would be too high for agricultural industries.

Accordingly, SBA proposes $1 million as the minimum size standard for industries in Subsector111 (Crop Production) and Subsector 112 (Animal Production and Aquaculture). A

[29] 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.

vast majority of agricultural industries currently have a $750,000 size standard, which was established by Congress in 2000 (Public Law 106-554, 114 Stat. 2763, Dec. 21, 2000). Considering inflation since then, that is equivalent to a little over $1 million today. Based on the evaluation of the data from the 2012 Census of Agriculture, SBA is proposing $5 million as the maximum size standard for agricultural industries in those two subsectors.[30]

Regarding employee based size standards for manufacturing and other industries (excluding Wholesale and Retail Trade), SBA's proposed minimum and maximum are the current minimum and maximum size standards among those industries. For employee based size standards for wholesale and retail trade industries, the proposed minimum and maximum values are the same as what SBA proposed in its 2009 methodology for them.[31]

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 4-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 3 above, SBA ranks industries both in terms each of the four industry factors and in terms of the existing size standard and computes the 20th percentile and 80th percentile values for both.[32] 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.[33]

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[30] NAICS 112112 (Cattle Feedlots) and NAICS 112310 (Chicken Egg Production) currently have a size standard of $7.5 million and $15 million, respectively, and will be subjected to the $5 million minimum and $40 million maximum size standards proposed for other industries.

[31] Current employee based size standards for the wholesale and retail trade industries range from 100 employees to 250 employees. As in the 2009 methodology, SBA is proposing a lower 50-employee level as the minimum employee size standard to account for differences among industries more accurately.

[32] 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% 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.

[33] The goal of the revised methodology is to ensure that it addresses the recent statutory changes to size standards (such as limitation on the number of size standards levels and use of common size standards under NDAA 2013 and establishment of agricultural size standards under NDAA 2017) and public comments to the previous methodology, while it doesn't result in radical changes to the existing size standards, especially by replacing the "anchor" approach with the "percentile" approach as a basis to evaluate industry characteristics. Our goal was to come up with the lower-end and upper-end percentile thresholds that would more or less mimic the results from the anchor approach. The results varied by industry factor as well as depending on whether the measure of size was receipts or the number of employees. While the 20th and 80th percentiles provided a better approximation in some cases, the 25th and 75th percentiles fared better in others. Thus, we ran all size standards calculations using both the 20th and 80th percentiles scenario and 25th and 75th percentiles scenario. Overall, the 20th and 80th percentiles produced better approximations of the size standards calculated from the anchor approach than the 25th and 75th percentiles. This led us to select the 20th and 80th percentiles.

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 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 4, below, shows the 20th percentile and 80th percentile values for average firm size (simple and weighted), average assets size, 4-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 5.[34]

Table 4

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)	4-firm concentration ratio (%)	Gini coefficient
Industries, excluding Subsectors 111 and 112					
20th percentile	0.83	19.42	0.34	7.9	0.686
80th percentile	7.52	830.65	5.22	42.4	0.834
Industries in Subsectors 111 and 112					
20th percentile	0.06	1.48	0.06	1.7	0.608
80th percentile	0.83	13.30	0.79	12.3	0.908

[34] Figures shown in these and subsequent tables are based on special tabulations of the 2012 Economic Census and Census of Agriculture, and RMA's eStatement Studies data for 2015-2017. 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 5
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	29.5	250.7	4.14	24.7	0.760
80th percentile	118.3	1,629.0	40.54	61.3	0.853
Industries in Sectors 42 and 44-45					
20th percentile	12.6	199.8	3.14	16.1	0.794
80th percentile	27.9	1,693.8	11.53	38.9	0.865

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 $7.5 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 $32.5 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 ($7.5 million)
$HSTD$ = 80th percentile of receipts based size standard ($32.5 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) value of size standards yields,

$$\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right]\times(32.5-7.5)+7.5=\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right]\times 25+7.5$$

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 ($32.5 million) and 20th percentile value ($7.5 million) of size standards yields an estimated change above or below the 20th percentile size standard. Adding this result to the $7.5 million size standard yields a specific size standard supported by that factor. This procedure is depicted graphically in Figure 2 as well as using some examples, below.

Receipts Size Standard Based on Average Firm Size

Simple Average Firm Size

A simple average firm size of $1.9 million in receipts would support a size standard of $11.5 million. In this example, X equals $1.9 million, P_{20} equals $0.83 million, and P_{80} equals $7.52 million. Substituting these values in the formula we get,

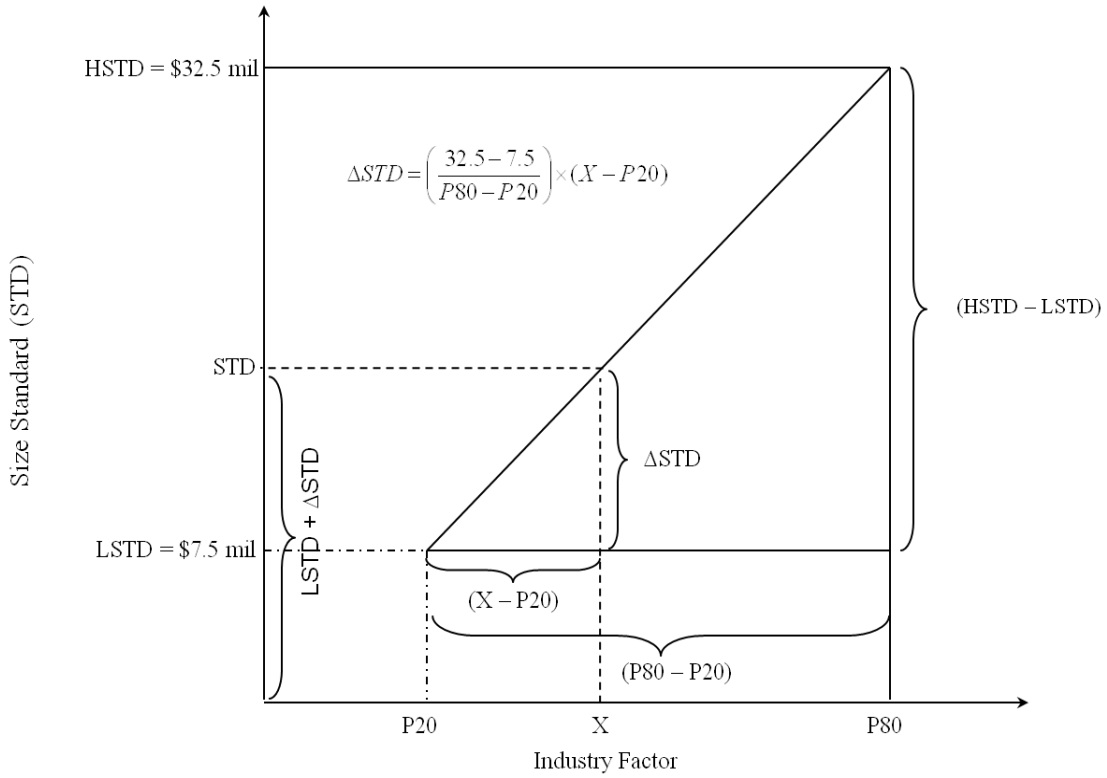
$$\left[\frac{(X-P_{20})}{(P_{80}-P_{20})}\right]\times 25+7.5$$

$$=\left[\frac{(1.9-0.83)}{(7.52-0.83)}\right]\times(32.5-7.5)+7.5=\left[\frac{1.07}{6.68}\right]\times 25+7.5=0.159\times 25+7.5$$

$$=\$11.47 \text{ million.}$$

Rounded to the nearest $500,000, the above result gives a size standard of $11.5 million.

Figure 2. Calculating Receipts Based Size Standard Using Linear Interpolation



Weighted Average Firm Size

For an industry with a weighted average firm size of $15 million in receipts, all else being equal, $7.5 million would be a supportable size standard. As shown in Table 4, the 20th percentile (P_{20}) and 80th percentile (P_{80}) values of weighted average firm size are $19.42 million and $830.65 million, respectively. Thus, here, X equals $15 million. Substituting these values in the formula, we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 25 + 7.5 = \left[\frac{(15.0 - 19.42)}{(830.65 - 19.42)}\right] \times 25 + 7.5 = \left[\frac{-4.42}{811.23}\right] \times 25 + 7.5$$

$$= -.005 \times 25 + 7.5 = -0.14 + 7.5 = \$7.36 \text{ million.}$$

Rounded to the nearest $500,000, the $7.36 million calculated value becomes $7.5 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, based on the above examples, the average firm size data supports a $9.5 million (9.5= (11.5+7.5)/2) size standard.

Receipts Size Standard Based on Average Assets Size

If the average assets size of an industry under review is $1.1 million, the appropriate size standard for this factor would be $11.5 million. As shown in Table 4, the 20th percentile value of the factor is $0.34 million and 80th percentile value is $5.22 million.

Here, X = $1.1 million, P_{20} = $0.34 million, and P_{80} = $5.22 million. Plugging these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 25 + 7.5 = \left[\frac{(1.1 - 0.34)}{(5.22 - 0.34)}\right] \times 25 + 7.5 = \left[\frac{0.76}{4.88}\right] \times 25 + 7.5$$

$$= 0.16 \times 25 + 7.5 = 3.89 + 7.5 = \$11.39 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $11.5 million.

Receipts Size Standard Based on 4-Firm Concentration Ratio

If the four largest firms in an industry account for 45 percent of total industry receipts the appropriate size standard for this factor will be $34.5 million.

Here, X = 45%, P_{20} = 7.9%, and P_{80} = 42.4%. Substituting these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 25 + 7.5$$

$$= \left[\frac{(45 - 7.9)}{(42.4 - 7.9)}\right] \times 25 + 7.5$$

$$= \left[\frac{37.1}{34.5}\right] \times 25 + 7.5 = 1.075 \times 25 + 7.5 = 26.88 + 7.5 = \$34.38 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $34.5 million.

Receipts Size Standard Based on Gini Coefficient

If an industry's size distribution produces a Gini coefficient value of 0.67, its size standard for this factor would be $5 million. The 20th percentile of the estimated Gini coefficient value is 0.686 and the 80th percentile value is 0.834 (from Table 4 above).

Thus, for this example, $X = 0.67$, $P_{20} = 0.686$, and $P_{80} = 0.834$. Substituting these values in the formula we get,

$$\left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 25 + 7.5 = \left[\frac{(0.670 - 0.686)}{(0.834 - 0.686)}\right] \times 25 + 7.5 = \left[\frac{-0.016}{0.149}\right] \times 25 + 7.5$$

$$= -0.104 \times 25 + 7.5 = -2.60 + 7.5 = \$4.90 \text{ million.}$$

Rounded to the nearest $500,000, this gives a size standard of $5 million.

ESTIMATION OF RECEIPTS BASED SIZE STANDARDS FOR AGRICUTLURAL INDUSTRIES

Forty-six industries in Subsectors 111 and 112 currently have the same $750,000 receipts based size standard, which was established by Congress in 2000 (Public Law 106-554, 114 Stat. 2763, Dec. 21, 2000). Two industries in Subsector 112, namely NAICS 112112 (Cattle Feedlots) and NAICS 112310 (Chicken Egg Production) currently have a size standard of $7.5 million and $15 million, respectively. As stated elsewhere in this methodology, NDAA 2017 directed SBA to establish the size standards for those industries with the $750,000 size standard in the same manner that the Agency establishes the size standards for other industries and to include them in the 5-year rolling review under the Jobs Act. Accordingly, to establish new 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. 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 $1 million and $5 million as the minimum and maximum size standard levels, respectively, for agricultural industries with the $750,000 size standard, as opposed to $5 million as the minimum and $40 million as the maximum size standard levels for all other industries, including NAICS 112112 and NAICS 112310 (*see* Footnote 30). 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, NAICS 112112 and NAICS 112310.

SBA ranks all those industries in terms of each industry factor and obtains the 20th percentile an 80th percentile values for each factor. However, since those industries currently have the same $750,000 size standard, SBA cannot compute the 20th percentile and 80th percentile values from existing size standards as for other industries. With the $1 million minimum and $5 million maximum size standard levels and the calculated size standard being rounded to the nearest $250,000, SBA derives all possible size standards levels (*e.g.*, $1 million, $1.25 million, $1.5 million,…, $4.75 million, and $5 million). Based on these levels, SBA has

derived $1.75 million as the 20th percentile and $4.25 million as 80th percentile values of size standards for agricultural industries. Combining these results with the 20th percentile and 80th percentile values of industry factors, SBA computes a size standard for each factor for each of those industries using the same approach used to compute size standards for other industries.

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 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 500 employees and 1,250 employees, respectively. The linear interpolation procedure for deriving an employee based size standard is depicted in Figure 3.

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

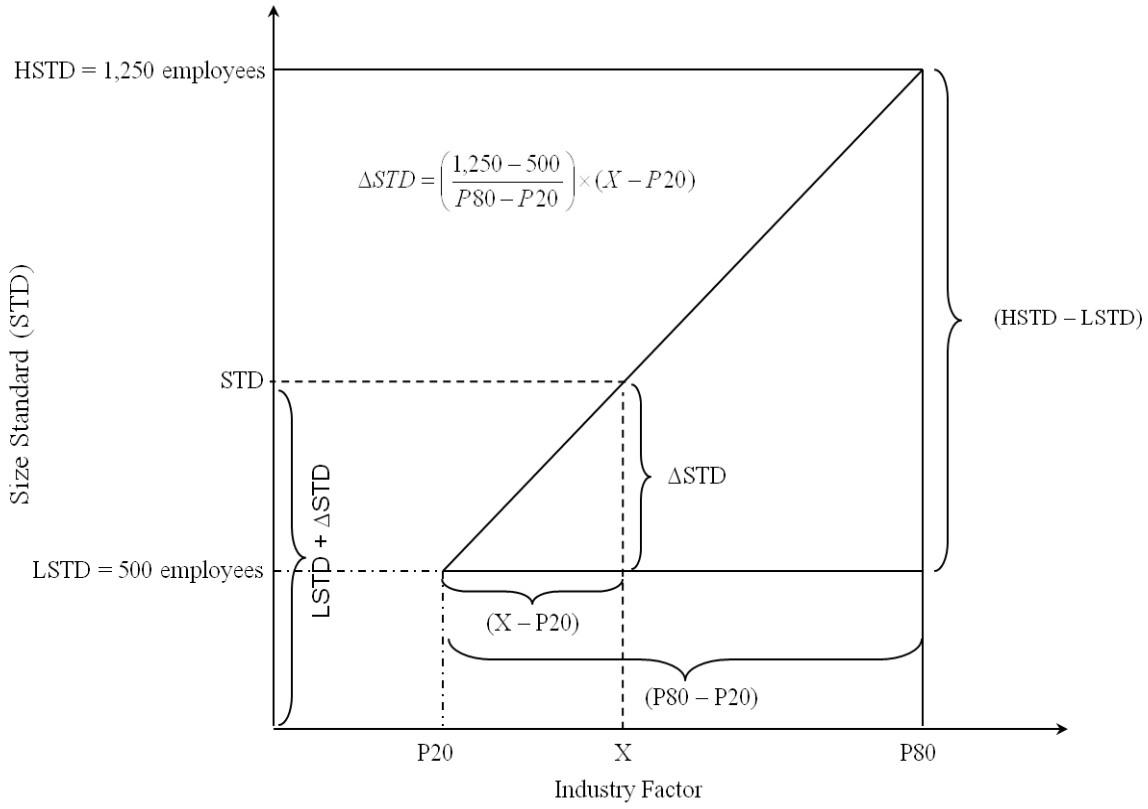
X = an industry's value for a given industry factor
P_{20} = 20th percentile value for the distribution of the industry factor
P_{80} = 80th percentile value for the distribution of the industry factor
$LSTD$ = 20th percentile of receipts based size standard (500 employees)
$HSTD$ = 80th percentile of receipts based size standard (1,250 employees)

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

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

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times (1{,}250 - 500) + 500 = \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 750 + 500$$

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



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

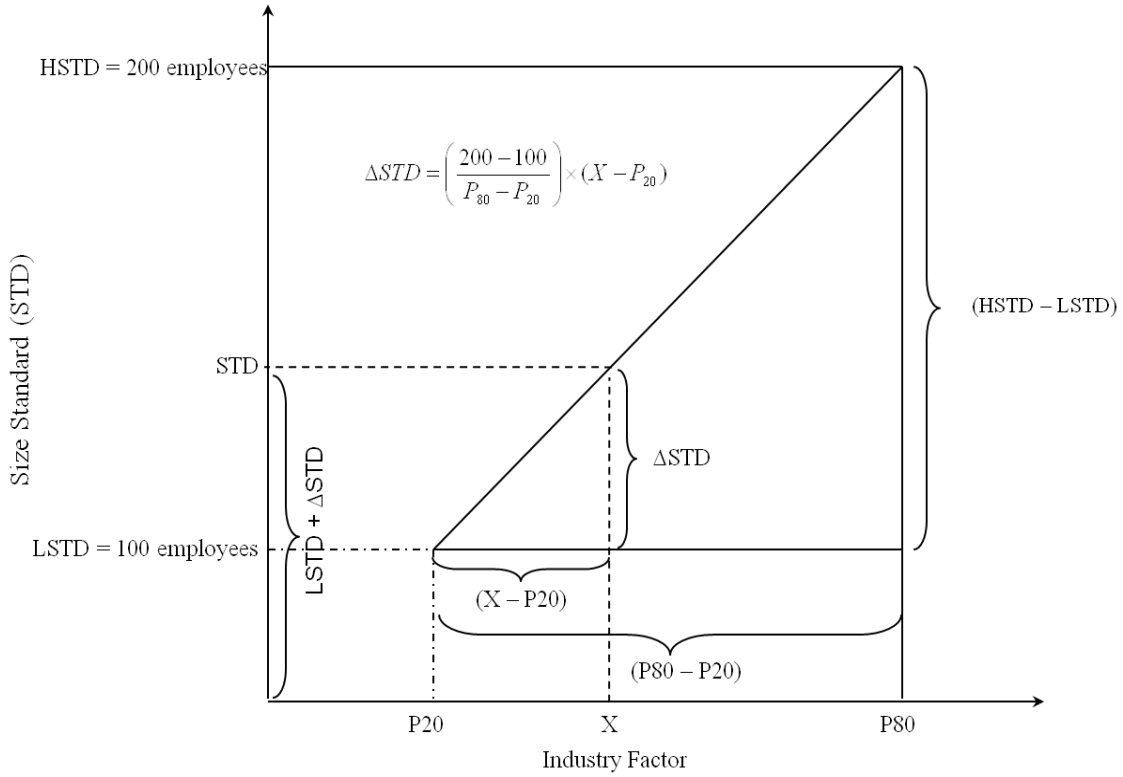
$$= \left(\frac{(X - P_{20})}{P_{80} - P_{20}}\right) \times (1{,}250 - 500) + 500 = \Delta STD + 500$$

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

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 100 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.

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



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

$$= \left(\frac{(X - P_{20})}{P_{80} - P_{20}}\right) \times (200 - 100) + 100 = \Delta STD + 100$$

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 receipts based size standard (100 employees)
$HSTD$ = 80th percentile of receipts based size standard (200 employees)

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

$$= \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times (200 - 100) + 100 = \left[\frac{(X - P_{20})}{(P_{80} - P_{20})}\right] \times 100 + 100$$

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

ADJUSTMENT TO SIZE STANDARDS BASED ON FEDERAL CONTRACTING FACTOR

For some relevant industries, SBA considers Federal contracting as one of the primary factors when establishing, reviewing, or revising size standards. To choose the industries in which to consider the Federal contracting factor, under the previous methodology, SBA evaluated Federal contracting factor for industries with $100 million or more in Federal contract dollars annually for the latest three fiscal years. However, the latest FPDS-NG data suggests that the $100 million threshold used in the previous methodology is too high, rendering the Federal contracting factor irrelevant for about 75% of industries (excluding wholesale trade and retail trade industries that are not used for Federal contracting purposes), including those for which the Federal contracting factor is significant (i.e., the small business share of industry's total receipts exceeding the small business share of industry's total contract dollars by 10% or more).[35] Thus, SBA determined that the threshold should be lowered. In this revised methodology, SBA generally evaluates the Federal contracting factor for industries with $20 million or more in Federal contract dollars annually for the latest three fiscal years.[36] Under the $20 million

[35] For example, NAICS 488330, Navigational Services to Shipping, averaging $94.1 million in Federal contract dollars annually with a Federal contracting factor of −24.2% (i.e., difference between the small business share of total Federal contract dollars in that industry (19.7%) and the small business share of industry's total receipts (43.8%)) would not be evaluated for the Federal contracting factor under the $100 million threshold. Similarly, NAICS 541940, Veterinary Services, with the average annual contract dollars of $73.4 million and the Federal contracting factor of −63.8% would also not be evaluated. Also excluded is NAICS 541890, Other Services Related to Advertising, that averages $79.1 million in contract dollars annually and has the Federal contracting factor of −41.0%. In total, excluding wholesale trade and retail trade industries, 55 industries averaging between $20 million and $100 million in contract dollars annually that have the Federal contracting factor of less than −10% would be excluded from the evaluation. That means, keeping the industry factors constant, majority of those industries would have lower size standards under the $100 million threshold than under the $20 million level.

[36] SBA tested with several lower thresholds, including $50 million, $25 million, $20 million and so on. The $20 million level was selected because it produced a reasonable trade-off between including industries where the Federal contracting factor was significant and excluding those where it was not significant. SBA also experimented with using the share of contract dollars in total receipts for the industry as a basis to identify industries for evaluation of Federal contracting factor. However, establishing a threshold by using that share alone turned out to be even harder. No matter what share threshold is selected (*e.g.*, 5%, 10%, 15%, and so on), several industries with hundreds of millions (in some cases billions) in contract dollars would be excluded and those with just a few million in contract dollars or less would be included under the share threshold. For example, NAICS 336111, Automobile Manufacturing, averaged $1,047.3 million in annual Federal contracts during fiscal years 2015-2017, which was less than 1% of total industry receipts. In comparison, NAICS code 221118, Other Electric Power Generation, averaged $3.2 million in annual federal contracts but this accounted for 6.9% of industry receipts. Thus, at the 5% share threshold, NAICS 336111 will be excluded even if it averaged more than $1 billion in contracts, while NAICS 221118 will be included even though it averaged less than $5 million. Another approach to selecting the dollar threshold would be to capture a certain percentage of either total contract dollars or total contract dollars awarded to small businesses and then to rank industries by the amount of total or small business contract dollars and to draw a line when that percentage is hit. In order to capture most industries for which the Federal contracting factor is significant, such a percentage would be very high. For example, a $100 million threshold already captures more than 97% of total contract dollars and nearly 95% of total dollars awarded to small businesses, even though it captures only 25% of industries. Similarly, the $20 million threshold results in evaluating the Federal contracting factor for industries that represent 99.5% of all contract dollars and nearly 99% of the contract dollars awarded to small businesses. Instead of such a rigid rule, SBA prefers to maintain some flexibility such that industries below the threshold may still be evaluated for the Federal contracting factor.

threshold, excluding wholesale trade and retail trade industries, 50% of all industries would be evaluated for the Federal contracting factor as compared to about 25% under the $100 million level. Most of the industries below the $20 million threshold already have the small business share in federal contracts that is higher than the small business share in total receipts, thereby making the Federal contracting factor not significant for those industries.[37] Moreover, the $20 million threshold resulted in evaluating the Federal contracting factor for industries that represent 99% of all contract dollars and 99% of the contract dollars awarded to small businesses. Thus, SBA determines that a size standard revision would not have a significant impact below that level of Federal contracting activity.

Because NAICS codes in Wholesale Trade (Sector 42) and Retail Trade (Sector 44-45) do not apply to Federal procurement, SBA does not consider the Federal contracting factor for evaluating size standards industries in those sectors.

To determine if small businesses in an industry are receiving a fair share of Federal contracts, SBA computes the small business shares of Federal contracting dollars and industry total receipts as follows:

$$\textit{Small business share in Federal contracts} = \frac{\textit{Total Federal contracting dollars awarded to small businesses in an industry}}{\textit{Total Federal contracting dollars awarded under that industry}}$$

$$\textit{Small business share in industry total receipts} = \frac{\textit{Total industry's receipts attributable to small businesses in an industry}}{\textit{Total industry's receipts in that industry}}$$

All other factors being equal, if the share of Federal contracting dollars awarded to small businesses in an industry is significantly less than the small business share of that industry's total receipts, a justification would exist for considering a size standard higher than the current size standard. Conversely, if the small business share of Federal contracting activity is near or above the small business share in total industry receipts, this will support the current size standard.

In the previous methodology, SBA designated a size standard at one level higher than the existing current size standard for industries where the small business share of total Federal contract dollars was between 10 and 30 percentage points lower than the small business share of total industry receipts and at two levels higher than the existing size standard where that difference was more than 30 percentage points. When that difference was less than

[37] However, the $20 million threshold is a general guideline, not a rule, for identifying industries for evaluation of the Federal contracting factor. Depending upon such factors as the value of Federal contracting factor, the share of contract dollars in industry's total receipts, public comments and other unique circumstances, SBA might still evaluate the Federal contracting factor for industries below the $20 million threshold (although SBA did not deviate from the $100 million threshold in the prior review). In particular, if the Federal contracting factor is less than −30% or the share of contract dollars in industry receipts exceeds 50%, SBA will strongly consider evaluating the Federal contracting factor for an industry even if the industry is below the $20 million threshold.

10 percentage points or when the small business share of Federal contracts was more than the small business share of total industry receipts, SBA assumed that the existing size standard was appropriate with respect to the Federal contracting factor.

The above procedure worked well for the recently completed comprehensive size standards review where SBA used a limited number of size standards. With the limitation on the number of size standards relaxed in accordance with NDAA 2013, that procedure is no longer applicable. Accordingly, in this revised methodology, SBA proposes to increase the existing size standards by certain percentages when the small business share of total industry receipts exceeds the small business share of total Federal contract dollars by 10 or more percentage points. Proposed percentage increases generally reflect receipts and employee levels needed to bring the small business share of Federal contracts at par with the small business share of industry receipts. These proposed percentage increases are given in Table 6.

For example, let's assume that an industry with the current size standard of $7.5 million had an average of $50 million in Federal contracting dollars, of which 15% went to small businesses. Let's also assume that small businesses accounted for 40% of total receipts of that industry. Thus, in this case, the small business share of total Federal contract dollars is 25% less than the small business share of total industry receipts. According to the above rule, the new size standard for that industry would be set by multiplying $7.5 million by 1.3 and then by rounding the result to the nearest $500,000, yielding a size standard of $10 million.

Table 6

Proposed Adjustments to Size Standards Based on Federal Contracting Factor

Size standards	Percentage difference between the small business shares of total Federal contract dollars in an industry and of total industry receipts		
	> –10%	–10% to –30%	< – 30%
Receipts based standards			
< $15 million	No change	Increase 30%	Increase 60%
$15 million to < $25 million	No change	Increase 20%	Increase 40%
$25 million to < $40 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 $40 million ($5 million for industries in Subsectors 111 and 112) and 1,500 employees, respectively.

EVALUATION OF SIZE STANDARDS FOR SUB-INDUSTRY CATEGORIES OR "EXCEPTIONS"

The SBA's table of size standards contains 13 size standards for sub-industry categories below the 6-digit NAICS level, which are commonly referred to as "exceptions" and used

specifically for 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 6-digit NAICS industry level and therefore do not provide information on economic characteristics of firms at the sub-industry level. Thus, for reviewing or modifying size standards at the sub-industry 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 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 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 the both ends of the size distribution to prevent extreme observations from distorting the results. SBA also removes 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 for each exception, which are then combined with the 20^{th} percentile and 80^{th} percentile values for industry factors and size standards for industries with the same measure of size standards as the exception to calculate a new size standard for each industry factor for that exception. The federal contracting factor and a size standard supported by that factor for "exceptions" are computed in the same manner as for regular 6-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 a hypothetical industry and the corresponding receipt based size standard supported by each factor are summarized in Table 7.

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 $14.1 million. Rounded to the nearest $500,000, this becomes $14 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 7
An Example of Deriving the Composite Size Standard

Primary factor	Factor value	Size standard (STD) ($ million)	
1. Average firm size (AFS)[a]			9.5
1.1. Simple average firm size ($ mil.)	1.9	11.5	} 9.5
1.2. Weighted average firm size ($ mil.)	15.0	7.5	
2. Average assets size (AAS) ($ million)	1.1		11.5
3. Four-firm concentration ratio (CR4) (%)	45.0		34.5
4. Size distribution of firms (Gini coefficient) (GINI)	0.67		5.0
5. Federal contracting factor (CONTRACT)[b]	–25%		10.0
Average (composite) size standard (AVGSTD)			14.1

[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 components of the Federal contracting factor, rounded to the nearest $500,000.

As shown above in Table 7, 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.[38] However, if necessary, the methodology allows altering the weights for individual factors for certain industries.[39] 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

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 using the "anchor" approach and the "percentile" approach for all industries (except those in Sectors 42 and 44-45, and industries in Subsectors 111 and 112 that currently have the statutory $750,000 size standard)[40]. For receipts based size standards, the anchor group consisted of industries with

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

[39] $$AVGSTD = w_{AFS} \cdot STD_{AFS} + w_{AAS} \cdot STD_{AAS} + w_{CR4} \cdot STD_{CR4} + w_{GINI} \cdot STD_{GINI} + w_{CONTRACT}STD_{CONTRACT}$$
where ws are weights and $w_{AFS} + w_{AAS} + w_{CR4} + w_{GINI} + w_{CONTRACT} = 1.0$

[40] 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. Similarly, most industries in Subsectors 111 and 112 were also excluded because they are different from other industries and should be evaluated separately.

the $7.5 million size standard, and the higher size standard group included industries with the size standard of $25 million and higher, with the weighted average size standard of $33.2 million for the group. Similarly, for employee based size standards, the anchor group comprised industries with the 500-employee size standard, and higher size standard group comprised industries with size standard of 1,000 employees and above, with the weighted average size standard of 1,180 employees. These and 20th percentile and 80th percentile values for receipts and employee based size standards are shown, below, in Table 8.

Table 8
Reference Size Standards under Anchor and Percentile Approaches

	Anchor Approach		Percentile Approach	
	Anchor level	Higher level	20th percentile	80th percentile
Receipts standard ($ million)	$7.5	$33.2	$7.5	$32.5
Employee standard (no. of employees)	500	1,180	500	1,250

Under the anchor approach, as described previously, we derived the average value of each industry factor for industries in the anchor groups as well as those in the higher size standard groups for both receipts based and employee based size standards. These results are provided in Table 9. In the percentile approach, the 20th percentile and 80th percentile values were computed for each industry factor. Those results are provided in Tables 4 and 5, above. However, for comparison, the results for the percentile approach are also shown in Table 9. As can be seen from the table, for most industry factors, the anchor values are comparable to the 20th percentile values and higher level values are comparable to the 80th percentile values.

Under the anchor approach, using the anchor size standard and average size standard for the higher size standard group, SBA computed a size standard for an industry's characteristic (factor) based on that industry's position for that factor relative to the average values of the same factor for industries in the anchor and higher size standard groups. Similarly, as explained previously, for the percentile approach, combining the factor value for an industry with the 20th percentile and 80th percentile values of size standards and industry factors among the industries, SBA computed a size standard supported by each industry factor for each industry. Under both of the approaches, to comply with section 3(a)(8) of the Act, each calculated receipts based size standard was rounded to the nearest $500,000 and each calculated employee based size standards was rounded to the nearest 50 employees. The anchor approach that the Agency used in the recent review of the size standards used a limited number of fixed size standards levels.

Table 9
Industry Factors under the Anchor and Percentile Approaches

	Anchor Approach		Percentile Approach	
	Anchor	Higher level	20th percentile	80th percentile
Industry factors for receipts based size standards, excluding Subsectors 111 and 112				
Simple average receipts size ($ million)	0.78	6.99	0.83	7.52
Weighted average receipts size ($ million)	18.10	685.87	19.42	830.65
Average assets size ($ million)	0.35	5.08	0.34	5.22
4-firm concentration ratio (%)	10.4	34.4	7.9	42.4
Gini coefficient	0.678	0.829	0.686	0.834
Industry factors for employee based size standards, excluding Sectors 42 and 44-45				
Simple average firm size (no. of employees)	33.4	96.8	29.5	118.3
Weighted average firm size (no. of employees)	232.2	1,371.3	250.7	1,629.0
Average assets size ($ million)	4.79	23.34	4.14	40.54
4-firm concentration ratio (%)	24.8	50.2	24.7	61.3
Gini coefficient	0.770	0.842	0.760	0.853

With respect to the Federal contracting factor, for each industry averaging $20 million or more in Federal contracts annually, SBA considered under both approaches the difference between the small business share of total industry receipts and that of Federal contract dollars. Specifically, the existing size standards would increase by certain percentages when the small business share of total industry receipts exceeds the small business share of total Federal contract dollars by 10 or more percentage points. Those percentage increases (shown in Table 6, above) to size standards generally reflect receipts and employee levels needed to bring the small business share of Federal contracts at par with the small business share of industry receipts.

The calculated size standards were quite similar between the two approaches when compared to the existing size standards, with size standards increasing for some industries and decreasing for others under both approaches. Most impacted sector was NAICS Sector 23 (Construction), with a majority of industries in the sector experiencing decreases to the current size standard affecting about 1% of all firms in that sector under both approaches. Other negatively impacted sectors under both approaches are Sector 31-33 (Manufacturing), Sector 48-49 (Transportation and Warehousing), and Sector 51(Information), affecting, respectively, 0.1%, 0.6%, and less than 0.1% of total firms in those sectors, with slightly higher impacts under the percentile approach. All other sectors would see moderate positive impacts under both approaches, impacting 0.1-0.2% of all firms in most of those sectors. Overall, the changes to size standards as the result of the changes in the methodology, if adopted, would have a very minimal impact on number of businesses that qualify as small. Excluding NAICS Sectors 42 and 44-45, and Subsectors 111 and 112, 97.75% of businesses would qualify as small under the calculated size standards obtained from the anchor approach vs. 97.70% under the percentile approach. That figure is also 97.73% under the current size standards.

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 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 $7 million to $14 million. If the analysis shows that the share of that industry's total small contract dollars awarded to businesses below the old, $7 million size standard decreased significantly under the revised size standard and most of those dollars went to the newly qualified businesses between $7 million and $14 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.[41] While there are millions of products and services in the market, there are about 1,100 6-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 2012 Economic Census data, there now exist 15 years of industry data covering four 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

[41] 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 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 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 1,500 employees in conjunction with barrels per calendar day of refining capacity as the size standard for the petroleum refining industry. Currently, refining capacity is 200,000 barrels per calendar day. 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. In 1992, SBA proposed eliminating the refining capacity component of the size standard for refiners and using the 1,500-employee size standard only. However, industry comments overwhelmingly favored retaining refining capacity as part of size standard for the petroleum refining industry. 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 refining size standard is necessary to account for affiliation involving entities not engaged in refining activity.

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 industries in the banking sector. 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 recently completed 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 2014 as the result of adjustment of all monetary based size standards for inflation (79 FR 33647 (June 12, 2014)).

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), and Certified Development Company (CDC/504) 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 standard for the SBIC program is at $19.5 million in net worth and $6.5 million in net income.

With the enactment of the Jobs Act in 2010, Congress established a new temporary 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 ("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), 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 2014, 2008, 2005, 2002, 1994, 1984, and 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 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:

$$\textit{Rate of inflation (\%)}$$

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

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

For the 2014 inflation adjustment, the first quarter of 2008 was used as the base period and the fourth quarter of 2013 was used as the ending period. When the rule was prepared, the chain-type price index for GDP was 98.5 for the first quarter of 2008 (base period) and 107.1 for

the fourth quarter of 2013 (end period). Based on these values, using the above formula, rate of inflation was estimated to be 8.73% between the two periods.

$$Rate\ of\ inflation = \left(\frac{GDP\ PPRICE\ INDEX_{End\ period}}{GDP\ PRICE\ INDEX_{Base\ periiod}} - 1 \right) \times 100 = \left(\frac{107.1}{98.5} - 1 \right) \times 100 = 8.73\%$$

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.

$$Adjusted\ size\ standard_{End\ period}$$
$$= Size\ standard_{Base\ period} + Size\ standard_{Base\ period} \times Rate\ of\ inflation$$

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 $14 million in annual receipts, based on the 8.73% inflation rate, its size standard will be $15 million after being adjusted for inflation. Using the above formula,

$$Adjusted\ size\ standard_{End\ period}$$
$$= Size\ standard_{Base\ period} + Size\ standard_{Base\ period} \times Rate\ of\ inflation$$
$$= 14{,}000{,}000 + 14{,}000{,}000 \times 8.73\%$$
$$= 14{,}000{,}000\ (1 + 0.0873)$$
$$= 14{,}000{,}000 \times 1.0873$$
$$= \$15{,}222{,}200$$

Rounded to the nearest $500,000, this becomes $15 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 four revisions to NAICS – NAICS 2002, NAICS 2007, NAICS 2012, and the latest NAICS 2017 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. Currently,

SBA is in the process of updating its size standards to adopt NAICS 2017 revisions (81 FR 52584 August 8, 2016)).

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)), and NAICS 2012 revisions (77 FR 49991 (August 20, 2012)). In all those updates, SBA received no adverse comments on using those guidelines, or on the resulting changes to the size standards. For the current proposed rule to adopt NAICS 2017, SBA has also generally followed same guidelines. Those guidelines are shown below in Table 10.

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.

Table 10

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.

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Dated: April 4, 2019
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APPENDIX

Overview of SBA's Size Standard Methodology