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ABSTRACT

How Big Is Small? The Economic Effects of Access to Small Business Subsidies*

Industry size standards that determine eligibility for small business subsidies have vastly increased over the past decade. We exploit quasi-random variation in the implementation of size standard increases to study the effects on small firms, subsidy allocation, and industry outcomes using Census Bureau microdata. Following size standard increases, revenues decline for an industry's smallest firms, and they are less likely to survive. We link these effects to a reallocation of government procurement contracts from smaller to larger firms. Consequently, industries become more concentrated and growth declines. These findings highlight the broad economic effects of changing eligibility for small business subsidies.

JEL Classification: E24, G38, H25, H57, L25
Keywords: government subsidies, small firms, procurement

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1 Introduction

A common perception is that government policies toward small firms play an important role in economic activity and growth. This perception is popular among politicians of different political persuasions, small business advocates, and the business press, leading to a proliferation of small business subsidy programs across the globe (Bai, Bernstein, Dev, and Lerner (2022)). The rationale behind this perception is twofold. First, small firms contribute significantly to economic activity, comprising 46% of aggregate employment and creating 1.2 million new firms annually in the United States.[1] Second, absent policy interventions, small firms could receive suboptimal allocation of resources. This might occur if, for example, technological spillovers are not internalized by entrepreneurs (Jones and Williams (1998)) or financial constraints prevent optimal capital allocation (Evans and Jovanovic (1989)).

In this paper, we provide novel causal estimates of the economic effects of access to a wide range of small business subsidies in the United States. We focus on a recent set of policy changes that expanded the eligibility for small business subsidies by increasing small business size standards. The Small Business Administration (SBA) determines small business size standards in each six-digit North American Industry Classification System (NAICS) industry based on a firm's average annual receipts or number of employees. These standards represent the maximum size to be classified as a small business and qualify for small business subsidies across a wide range of federal and state programs (see Appendix Table A.1). Figure 1 provides annual estimates of small business subsidies allocated through three leading federal programs governed by small business size standards, which comprise procurement set asides, small business lending, and regulatory cost

[1] See the 2023 Small Business Economic Profile published by the Small Business Administration's Office of Advocacy for the most recent statistics on employment and new firms, which is available at: https://advocacy.sba.gov/wp-content/uploads/2023/11/2023-Small-Business-Economic-Profile-US.pdf.

savings. On average, these three programs allocate $113.5 billion in small business subsidies each year, exceeding the total annual amount of bank credit extended to small businesses in 2022 ($93.7 billion).[2]

We aim to answer three research questions. First, how do changes in small business size standards affect firm revenue, particularly for the smallest firms in an industry? Second, what are the economic mechanisms at play? Specifically, do size standard changes impact the allocation of government procurement contracts, which are the largest federal subsidy? Third, what are the implications for firm survival and dynamics, as well as industry-wide concentration and growth?

To answer these questions, we hand-collect data on small business size standards from 2005 to 2017.[3] We find that size standards have increased in 533 industries and decreased in only three industries following the 2010 Small Business Jobs Act. Of the size standard increases, 268 were based on receipts (exceeding the rate of inflation) and 265 on the number of employees. The average size standard has increased by nearly 103% using firm receipts and almost 38% using the number of employees. This trend implies that considerably larger firms have become eligible for small firm subsidies over the past decade.

A key empirical challenge in estimating the economic effects of access to government subsidies is that changes in eligibility can be correlated with omitted economic indicators, or could be the consequence, rather than the source, of economic changes. We address these challenges by using administrative data from the U.S. Census Bureau's Longitudinal Business Database (LBD) and exploiting quasi-random variation in the timing of the implementation of size standard changes across industries following the Small Business Jobs Act of 2010. The empirical strategy relies on

[2] See the 2022 National Aggregate Report of Originations and Purchases for Small Business and Farm: https://www.ffiec.gov/craadweb/national.aspx, where small businesses are those with $1 million or less in revenue.
[3] The sample period is based on data availability and SBA program details. Sections 2.2 and 3 provide further information.

two key elements. First, the schedule of size standard reviews was preset, and the order of the reviews was not determined by existing or forward-looking economic fundamentals. Second, the SBA evaluated whether to change size standards based on predetermined, lagged economic factors, and a deterministic formula, largely eliminating concerns about contemporaneous correlated omitted variables. Moreover, the predetermined economic factors could not be easily observed by industry participants, mitigating concerns that firms anticipated the changes.[4] We provide supporting evidence that neither pre-existing economic indicators, nor forward-looking industry analyst forecasts, predict the ordering of the reviews. We also verify that the timing of the reviews is uncorrelated with the likelihood of an actual size standard change in an industry.

Our empirical design compares firms in industries that experience a size standard increase to firms in industries whose size standards will eventually increase, and that would have increased by the same amount (based on the predetermined factors that the SBA used) had they been evaluated earlier. This strategy holds constant the change in an industry's small business size standard to identify its treatment effect through quasi-random variation in the timing of its implementation, which was unrelated, by design, to economic trends at the time of the review. The use of microdata allows us to trace the effects on firms below and above the size standard threshold, including those that become newly eligible following the size standard increase. For robustness, we also provide estimates from specifications that consider all industries, including those whose size standards did not change throughout the sample period.

We begin the analyses by investigating whether increases in small business size standards affect the revenues of the smallest firms in an industry using data from the LBD. The baseline specifications focus on the smallest firms to mitigate the confounding effects of potential size

[4] The SBA receives a special tabulation of the Economic Census. The publicly-released Economic Census statistics contain different variables and are released with a lag of two to three years.

manipulation by firms close to the size standard threshold. The smallest firms are defined as those below 50% of their industry size standard in the year before the size standard increases. We include firm fixed effects to account for time-invariant firm heterogeneity and year fixed effects to absorb macroeconomic trends.

We find that the revenues of the smallest firms drop by 3.4% following an increase in the industry's size standard. This estimate is relative to the smallest firms in industries whose size standards will eventually increase and would have increased by the exact same amount if they were reviewed earlier. We show that the declines in firm revenues do not precede size standard increases, begin in the year of the increase, and persist for multiple years. We also show that the effects hold across different definitions of an industry's smallest firms, different subperiods or subsamples, and in alternative specifications including estimators that consider potential biases due to heterogeneous treatment effects (Callaway and Sant'Anna (2021) and Wooldridge (2021)), a stacked regression, and a Poisson regression. Moreover, the results continue to hold in the full sample, which includes firms in industries that did not experience a size standard increase.

We also evaluate how changes in size standards affect the smallest firms relative to larger firms in the same industry and year in a triple-difference specification that includes industry-by-year fixed effects. We find that the smallest firms' revenues decline by 9.2% following a size standard increase relative to other firms in the same industry and year, while the revenues of larger firms that become newly eligible for small business subsidies rise by 15.6% following an increase in the size standard. These estimates imply a reallocation of subsidies from the smallest firms to larger firms, and they mitigate concerns about confounding time-varying shocks at the industry level.

Collectively, the estimates provide novel causal evidence that changes in the government's classification of small businesses, which affect access to small business subsidies, have a material effect on the revenues of the smallest firms in an industry. They indicate that classifying a growing number of larger firms as small businesses negatively impacts the smallest firms and benefits larger firms that become newly eligible for small business subsidies. We note that these estimates do not speak to the welfare implications or optimal level of those subsidies or the standards determining access to them.

To study the economic mechanisms underlying the effects, we provide micro-level evidence using a large government subsidy program. In particular, we study the reallocation of government procurement contracts to larger firms by matching contract-level data from USAspending.gov to the LBD. Our focus on government procurement is motivated by the estimates in Figure 1, which show that procurement contracts account for a large portion of small business subsidies each year. An average of 20.3% of contract volume is set aside for eligible small firms, representing an average annual amount of $98.6 billion.

We examine the change in contracts awarded to firms using a similar triple-difference specification that focuses the analysis within an industry-year. We find that after an industry's size standard increases, the smallest firms experience a 15.6% decline in government procurement contracts relative to other firms in the same industry and year. Conversely, the amount of procurement contracts flowing to larger firms that become newly eligible for small business subsidies increases by 31.1%. Importantly, the total amount of procurement contracts in an industry does not change following increases in small business size standards. As such, the reallocation of government contracts to newly eligible, larger firms appears to be at the expense of the smallest firms in the industry.

We further show that the decline in revenues of the smallest firms following size standard increases is concentrated in industries more reliant on government procurement contracts. The estimates suggest that the decline in revenues is 5.2% higher in industries in the top quartile of government contracts relative to those in the bottom quartile. Combined, these findings provide a tight link between the shift in firm-level revenue and the reallocation of government subsidies from the smallest to larger firms following increases in small business size standards, complementing recent work highlighting the importance of procurement contracts for small firms (Barrot and Nanda (2020) and Hvide and Meling (2023)).

Next, we study the economic effects of small business size standard increases on firm-level survival and firm dynamics measured by entry of new firms and exit of existing firms. We find that the smallest firms are about 0.5 percentage points more likely to exit following a size standard increase relative to newly eligible larger firms in the same industry and year. This estimate represents a sizeable 3.5% increase relative to the sample standard deviation and is significant at the 1% level. At the industry level, exits among the smallest firms increase by 15.5%. Overall, we find that industry-wide firm exits rise by 12.7%, while new firm creation is unchanged. The results highlight that the rise in firm exits is driven by the smallest firms. It also suggests that the decline in the revenues of the smallest firms following size standard increases is substantial enough to impact their survival, with negative consequences across the industry. These findings are connected to recent research on declining business dynamism in the United States over the past 20 years (Decker et al. (2014) and Decker et al. (2020)).

The last set of analyses studies the impact of size standard changes on industry concentration and growth. Rising industrial concentration has been a recent focus of extensive academic and political attention (e.g., Peltzman (2014), Autor et al. (2017), Grullon, Larkin, and

Michaely (2019), Covarrubias, Gutiérrez, and Philippon (2019), and Barkai (2020)). We examine these effects using the market share of an industry's largest firms. Across different thresholds of concentration, we find that there is a 9.8 to 14.2 percentage point rise in the probability of an industry becoming more concentrated following size standard increases. The results suggest that the effects of expanding access to small business subsidies on the smallest firms' revenues and survival rates contribute to increases in industry concentration.

We also find that size standard increases lead to declines in industry growth. We consider annual measures of industry-level revenue growth, employment growth, and wage growth. Following size standard increases, revenue growth rates decline by two percentage points, or 13.3% relative to the sample standard deviation. Employment and wage growth rates drop by similar magnitudes. Taken together, the industry-level results highlight the adverse effects of size standard increases on firm dynamics, industry concentration, and industry-level growth rates.

Overall, we contribute to the literature on the economic effects of government policies targeting small firms, often with the goal of stimulating economic growth and innovation (Bloom, Van Reenen, and Williams (2019)). Prior work examines various government programs, including R&D grants (Howell (2017)), directed loans (Brown and Earle (2017)), investor tax credits (Denes et al. (2023)), timely payments for government contractors (Barrot and Nanda (2020)), and the interaction between government programs and private investors (Bai, Bernstein, Dev, and Lerner (2022)).[5] We contribute to this research by studying changes in small business eligibility criteria that simultaneously affect a large number of government programs. Our estimates provide the net

[5] Related papers study the role of private investors, such as angel investors (Kerr, Lerner, and Schoar (2014) and Lindsey and Stein (2020)), venture capitalists (Puri and Zarutskie (2012)), and banks (Robb and Robinson (2014)), as well as accelerators (Fehder and Hochberg (2015)), in facilitating economic growth.

economic effect of expanding eligibility requirements for small business subsidies across the different programs.

Our paper also complements the literature that studies the role of small businesses in promoting economic growth, which the SBA describes as its primary strategic goal.[6] Early papers find that small firms facilitate faster job creation (Evans (1987) and Sutton (1997)). More recent studies, however, question these findings by highlighting measurement issues (Neumark, Wall, and Zhang (2011)) and emphasizing the more important role of firm age (Haltiwanger, Jarmin, and Miranda (2013)). Our results show that granting larger firms access to small firm subsidies negatively affects an industry's smallest firms and leads to declines in industry growth.

Lastly, our paper relates to recent papers that provide causal evidence on the effects of small business subsidies in developed and developing economies. Garicano, Lelarge, and Van Reenen (2016) use a structural estimation to study the effects of size-based thresholds for labor laws in France, and show that workers and large firms bear the regulatory costs. Banerjee and Duflo (2014) and Martin, Nataraj, and Harrison (2017) find that eliminating preferential treatment of small firms In India led to higher profits, employment, and output. We add to this literature by studying the effects of a recent series of expansions in eligibility for a broad range of small firm subsidies that cover a wide range of industries in the United States – a developed economy whose credit markets, political systems, and governance mechanisms differ considerably from those in India.

[6] SBA financial reports (available at https://www.sba.gov/document/report-agency-financial-report) consistently describe economic growth as their primary strategic goal.

2 Subsidizing Small Firms in the United States

This section provides the institutional details about federal government subsidies for small firms. We begin by describing the extent of small firm subsidies in the United States and how firm eligibility is determined (Section 2.1). Then, we explain changes in access to these subsidies following the Small Business Jobs Act of 2010 (Section 2.2).

2.1 Firm Eligibility for Federal Subsidies

In 1953, the United States Congress passed the Small Business Act to "aid, counsel, assist, and protect, insofar as is possible, the interests of small business concerns in order to preserve free competitive enterprise." This Act led to the creation of the Small Business Administration. Among its responsibilities, the SBA sets the definitions of small businesses, which are referred to as size standards. These size standards set the size threshold below which firms are eligible to access numerous federal subsidies for small businesses. They are also used by many U.S. states.

Figure 1 provides annual estimates of small business subsidies allocated by three leading federal programs: procurement contracts reserved for small firms, small business lending programs, and provisions to mitigate the effects of regulations on small businesses under the Regulatory Flexibility Act. On average, these three programs alone allocated $113.5 billion in annual small business subsidies from 2007 to 2017.[7]

The above estimates are conservative. Panel A of Appendix Table A.1 presents a more extensive list of federal programs and legislation that use size standards to determine eligibility. Panel B lists U.S. states with laws or regulations relying on the federal definition of a small business. Figure 2 provides a corresponding map of U.S. states, where the shading represents the

[7] The first year that the data are available for all programs is 2007.

number of state laws and regulations using federal size standards. Collectively, these estimates demonstrate the widespread use of small business size standards and their economic importance for small firms.

Size standards for small businesses are primarily based on a firm's annual receipts or number of employees.[8] The SBA sets the standards using six-digit NAICS codes, and standards vary substantially across industries. Receipts-based size standards mostly apply to goods-based firms, whereas employee-based size standards mostly apply to service-based firms. The size of a business includes all of its subsidiaries and affiliates.

Size standards govern the allocation of considerable amounts of government subsidies to small firms. For example, the federal government routinely aims to set aside 23% of federal procurement contracts for small businesses.[9] Accordingly, we find that 17.3% to 22.6% of procurement contracts in a given year flow to firms designated as small. This represents a substantial proportion of government spending and accounts for an annual average of $98.6 billion in our sample of contracts.

2.2 Changes in Firm Eligibility: The Small Business Jobs Act of 2010

In 2010, the United States Congress passed the Small Business Jobs Act, which requires the SBA to conduct a review of all industry small business size standards at least once every five years. Prior to this requirement, the SBA reviewed size standards on an ad hoc basis, and occasionally adjusted the receipts-based standards for inflation.[10] To facilitate the mandatory review due to the

[8] The amount of annual receipts is the three-year average of total income plus costs of goods sold. The number of employees is calculated as the average number of people employed, including full- and part-time workers, over the most recent 12 calendar months.
[9] See https://www.sba.gov/federal-contracting/contracting-assistance-programs for additional details.
[10] Digler (2020) provides a history of size standards in the U.S.

Act, the SBA released a schedule of reviews by two-digit NAICS sectors in advance.[11] The purpose of the predetermined review schedule was to divide the roughly 1,000 industries into manageable sections for potential size standard changes, while examining sectors in their entirety. Importantly, industries based on six-digit NAICS codes were only eligible for a size standard change if their two-digit NAICS sector was under review. Two-digit NAICS sectors include between 25 and 360 different six-digit NAICS industries.

The SBA uses up to five factors in determining whether to change the size standard for a particular industry. It derives three factors directly from the Economic Census, conducted every five years by the U.S. Census Bureau. These factors include an industry's average firm size, four-firm concentration ratio, and a Gini coefficient of firm size. The fourth factor is the average asset size, calculated using data from the Risk Management Association database and the Economic Census. The fifth factor captures an industry's reliance on federal contracting, defined as the difference between the proportion of industry receipts received by small firms and the proportion of federal procurement contract amounts awarded to small firms. The SBA only computes the federal contracting factor for industries with at least $100 million in annual procurement to small firms.

Next, we describe how the SBA uses the five factors to set an industry's size standard. For each of the five factors, the SBA determines thresholds for alternative size standards. Appendix Table A.2 reports the implied size standard for each factor based on the preset ranges. For example, if an industry under review uses receipts-based size standards and its average asset size is $2 million, its implied size standard would be $19 million based on this factor. To determine an

[11] The schedule is provided in 76 *Federal Register* 40140-40142, July 7, 2011, Digler (2020), and "A Report on the First Five-Year Comprehensive Review of Small Business Size Standards Under The Small Business Jobs Act of 2010" (available at https://www.sba.gov/document/support--comprehensive-review-size-standards).

industry's overall size standard, the SBA averages across the size standards implied by the different factors and rounds to the nearest size standard.[12]

We hand-collect data on small business size standards from the Code of Federal Regulations (CFR). Size standards are recorded as of January 1 of each year and correspond to industries defined at the six-digit level of the NAICS codes. The data include size standards for 1,180 industries from 2005 to 2017, of which 491 industries have size standards based on receipts and 692 industries have size standards based on the number of employees.[13]

Table 1 describes the changes in size standards surrounding the Small Business Jobs Act of 2010. Since the SBA periodically adjusted receipts-based size standards for inflation, we restrict attention to changes of at least 25% that cannot be attributed entirely to inflation adjustments. Following the Act, there have been 533 size standard increases. The SBA is considerably less likely to decrease size standards, and there have been only three such cases during the sample period.[14] Receipts-based size standards nearly doubled from an average of $10.3 million in 2009, the year before the Act passed, to $19.5 million in 2017. The average employee-based size standard rose from 554 employees in 2009 to 770 employees in 2017.

3 Data

We use data from several sources to study the effect of changes in access to small firm subsidies. First, we use administrative data from the LBD which is a longitudinally-consistent panel that

[12] During the sample period, there are eight receipts-based size standards (in millions of dollars): 5, 7, 10, 14, 19, 25.5, 30, and 35.5. There are also 10 employee-based size standards: 50, 100, 150, 200, 250, 500, 750, 1000, 1250, and 1500 employees.

[13] We drop industries whose size standards are based on variables we cannot observe, such as megawatt hours or barrels of petroleum. Also, we drop three industries that switch from receipts to employee size standards between 2005 and 2017.

[14] The SBA avoided lowering industry size standards because it would contradict its goal to help small businesses. See pages 14-15 of the SBA's report on the first size standards review under the Small Business Jobs Act of 2010 (https://www.sba.gov/sites/default/files/2018-02/Report_on_the_First_5-Year_Comprehensive_Size_Standards_Review_1.pdf).

covers all private, non-farm firms with paid employees in the United States. It combines information from the Census Bureau and the Internal Revenue Service (Jarmin and Miranda (2002)). Importantly, it allows us to trace each firm's eligibility for small business subsidies through time and determine whether it falls above or below its industry size standard in a particular year. We use data on firm revenues, which is based on annual tax returns (Haltiwanger et al. (2017)).[15] We also track firm-level survival and determine the number of firms entering and exiting an industry in a particular year. We calculate industry-level concentration using revenues and industry-level growth based on revenues, employment, and wages. We assign each firm to the industry of its largest establishment based on employment (Brown and Earle (2017)).

Second, we study the allocation of government procurement contracts following size standard increases using data from USAspending.gov. This website provides detailed contractual data on contract awards, terms, and subsequent changes for all federal contracts during our sample period. Brogaard, Denes, and Duchin (2021) provide additional information about these data. We match each contract to the LBD using County Business Patterns (CBP) data, which contain firm name and location. CBP data are available beginning in 2005.

Third, we hand-collect data to construct the five factors that the SBA uses in determining size standard changes. The three factors based on the Economic Census rely on a special tabulation that had been provided to the SBA, and was subsequently made available through the Code of Federal Regulations. We gather these factors for each industry. To construct the average asset size factor, we use data from the Risk Management Association database and the Economic Census.

[15] We drop observations with missing values of revenue. Decker et al. (2020) report that firm age, firm size, industry, and patterns of growth in the LBD with nonmissing revenue are similar to those in the overall LBD, mitigating concerns about sample selection.

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To calculate the federal contracting factor, we obtain information from USAspending.gov on federal procurement contract amounts and from the Economic Census on industry receipts.

Table 2 provides summary statistics for the main variables in the analyses at the firm level (Panel A) and the industry level (Panel B).[16] The sample begins in 2005 due to CBP data availability and ends in 2017 when the first round of size standard reviews concludes. Size standards increase in about 48% of the firm-year observations. The average annual revenue of firms is just over $2 million. For firms that receive government procurement contracts at some point over the sample period, the average annual contract award is $1.2 million. The eight-firm concentration ratio increases for 47% of industry-year observations on average. The mean of annual industry revenue growth is 2.2%.

4 Empirical Design

This section presents our identification strategy to study the economic effects of increases in size standards. A key empirical challenge is that changes in eligibility for government subsidies might be correlated with omitted measures of economic activity or can be the consequence, rather than the source, of changes at small firms or within an industry. Our empirical design addresses these challenges using two main institutional features of size standard changes. First, the SBA evaluates whether to modify size standards based on a deterministic formula that uses lagged, largely predetermined industry factors measured several years before the size standards are reviewed. This feature mitigates concerns about contemporaneous omitted variables and reverse causality. Furthermore, firms cannot easily observe these predetermined factors because the SBA obtains

[16] Due to disclosure rules, we are required to round the number of observations for all estimates based on Census Bureau data.

them through special tabulations from the Census Bureau, reducing concerns about anticipatory effects. Second, the SBA sets the schedule of industry reviews prior to the start of the process and assigns the schedule based on two-digit NAICS sectors for administrative ease, irrespective of six-digit NAICS industry conditions. Recall that each six-digit NAICS industry has its own size standard. Accordingly, the identification strategy exploits quasi-random variation in the *timing* of size standard reviews.

An ideal experiment would randomly assign a size standard increase to one of two identical industries. We leverage the above institutional features to approximate this ideal setting as follows. In any given year *t*, we observe each industry's *implied* size standard increase based on its predetermined factors. Only some industries are actually reviewed in year *t*, and the others will be reviewed later according to a preset schedule unrelated to economic fundamentals. Our identification strategy compares the industries that are actually reviewed in year *t* and receive a size standard increase to the industries that would have received an increase in year *t* had they been reviewed (based on their predetermined factors), and receive the *exact* same *implied* increase later, when they are actually reviewed. Thus, the only difference in the treatment status of the industries stems from the quasi-exogenous timing of the reviews. As such, we construct a baseline sample of industries that experience size standard increases and would have received the same size standard increase if they were reviewed earlier.

To construct this sample, we use data on the five industry factors and the deterministic formula to evaluate whether an industry's size standard increase would have been exactly the same had it been reviewed earlier. We further mitigate concerns about simultaneous economic effects by restricting our attention to industries whose reviews use the 2007 Economic Census, which holds the underlying data source constant for all industries in the sample. Using the five factors

and the deterministic formula, we accurately predict 98% of the size standard increases for industries in our sample. The baseline sample has 339 industries, of which 159 have receipts-based size standards and 180 have employee-based standards.

We implement the identification strategy using the following difference-in-differences specification:

$$Y_{it} = \alpha_i + \alpha_j + \alpha_t + \beta \cdot Size\ increase_{jt} + \varepsilon_{it}, \quad (1)$$

where Y_{it} is the outcome variable of interest for firm *i* in year *t*. *Size increase* is an indicator variable equal to one when the size standard increases in industry *j*. We include firm fixed effects to capture time-invariant firm heterogeneity (α_i), industry fixed effects to account for differences across industries (α_j), and year fixed effects to absorb economy-wide time trends (α_t). We include industry fixed effects in addition to firm fixed effects because firms can change industries over the sample period. The standard errors are clustered at the industry level since size standards are determined at the industry level (Bertrand, Duflo, and Mullainathan (2004)). We provide detailed variable definitions in Appendix A. The coefficient of interest is β, which estimates the marginal effect of an increase in eligibility for small firm subsidies.

A key identifying assumption is that, in the absence of size standard increases, there would be parallel trends at firms in industries experiencing size standard increases relative to those without any changes. We use a dynamic difference-in-differences specification to test for parallel trends and to trace the timing of the effects (see Section 5.1).

Another important assumption is that the order of the SBA's size standard reviews is unrelated to industry characteristics or economic indicators, such as past growth and future prospects. We investigate the variation in the timing of the reviews by examining whether industry growth rates, procurement contract amounts, or forward-looking analyst forecasts predict the

announcement, proposal, or finalization dates of size standard reviews. We define *Date announced* as the order of industry reviews based on the date when the review process is announced. We define *Date proposed* and *Date finalized* analogously with respect to the dates when the SBA announces its recommendation and finalizes it, respectively.

Table 3 presents the results using the baseline sample that only includes industries with size standard increases, and that would have experienced exactly the same size standard increase had they been reviewed earlier. Panel A studies the relation between the order of the reviews and industry growth rates and government contracting. Industry growth is measured by employment growth, payroll growth, and establishment growth from the Census Bureau's Statistics of U.S. Businesses (SUSB). We measure cumulative growth rates from 2004 to 2009 to focus on the years immediately preceding the Small Business Jobs Act. Importantly, these data reflect the information available to administrators when determining the review schedule. Government contracting is measured based on the natural logarithm of dollar amounts of contracts awarded to small firms over the same period (2004 to 2009) using data from USAspending.gov.

Column 1 shows that the order of review announcements across sectors is not predicted by employment growth, payroll growth, establishment growth, or procurement contracts awarded to small firms. Columns 2 and 3 present similar results for the proposal and finalization dates, respectively. Across all three columns, the coefficient estimates on employment growth, payroll growth, establishment growth, and contracts received by small firms are economically small and statistically indistinguishable from zero. Panel B considers forward-looking analyst earnings per share (EPS) forecasts from Thomson Reuters I/B/E/S data, aggregated across all firms in each industry. Note that we do not observe forecasts for all industries, and the sample size is therefore smaller compared to Panel A. The analyses consider long-term forecasts, defined as the industry-

median three-to-five-year EPS forecasts in 2009. The estimates across columns 1 to 3 of Panel B show that the order of review announcement, proposal, and finalization dates is unrelated to long-term EPS forecasts. Together, the findings in Panels A and B show that the timing of the reviews is unrelated to pre-existing industry growth rates, procurement contracts, and industry forecasts.

In Panel C of Table 3, we investigate if the order of the reviews is related to the likelihood of an actual size standard increase. The sample includes all industries at the six-digit NAICS level that the SBA reviews surrounding the Small Business Jobs Act of 2010. Column 1 shows that the likelihood of a size standard increase is not associated with the order of review announcements across industries. The coefficient estimate is statistically insignificant, economically negligible, and the R-squared is almost zero. Columns 2 and 3 provide similar results for the proposal and finalization dates, respectively, and provide evidence that the timing of the reviews is unrelated to their outcomes. Collectively, the results show that the timing of the reviews is unrelated to the underlying economic factors that determine the SBA's decision to increase a size standard.

5 Effects on Firms

In this section, we study the effect of increases in small business size standards on firm revenue. Section 5.1 presents the baseline results for the smallest firms in an industry. Section 5.2 provides robustness tests. Section 5.3 examines the reallocation of activity within an industry following size standard increases.

5.1 Baseline Results

We begin by studying the impact of increases in small business size standards on revenue for the smallest firms in an industry. When size standards increase, larger firms become newly eligible

for government subsidies. On the one hand, the smallest firms might be negatively affected if newly small firms receive small business subsidies at the expense of the smallest firms. On the other hand, there might be no change in subsidies for the smallest firms if there is a concurrent expansion in total subsidies available. Beyond its direct impact on revenue, a reallocation of subsidies can also affect revenues indirectly through its effect on firms' investments and financing.

Using data from the LBD, we define *Ln(Revenue)* as the natural logarithm of a firm's revenue in a particular year.[17] We define the smallest firms as those below 50% of the size standard in their industry in the year before the size standard increases. This approach is motivated by two considerations. First, it mitigates concerns about possible confounding effects of potential size manipulation by firms just below the size standard threshold. Second, it focuses on those firms that might be relatively more vulnerable or dependent on government subsidies. Section 5.2 provides robustness tests that consider alternative definitions of an industry's smallest firms.

We investigate the effect on the smallest firms using the difference-in-differences specification in equation (1). The empirical design, as detailed in Section 4, compares the smallest firms in industries with a size standard increase to the smallest firms in industries whose size standards will eventually increase, and would have increased by the *same* amount had they been evaluated earlier. The sample starts in 2005 due to data availability and ends in 2017, which is the conclusion of the first round of size standard reviews (see Section 3 for additional details about the data).

Table 4 reports the estimates for the effect of size standard increases on the revenue of an industry's smallest firms. The variable of interest is *Size increase*, which equals one after a size standard increases in an industry. In column 1, we find that the revenue for the smallest firms

[17] Since there are very few zero values for revenue, we use the natural logarithm of revenue. Section 5.2 provides robustness tests using a Poisson specification.

declines by 3.4% following an increase in size standards.[18] This specification includes firm fixed effects to absorb time-invariant firm heterogeneity and year fixed effects to account for macroeconomic trends. The estimate is statistically significant at the 1% level and economically meaningful, representing a decrease of more than $70,000 on average in firm revenue for a particular year. Column 2 augments the specification to include industry fixed effects to capture time-invariant industry heterogeneity. We similarly find that the smallest firms' revenue drops by 3.3% when size standards increase. This estimate is also statistically significant at the 1% level.

Figure 3 provides the dynamic difference-in-differences estimates. We estimate dynamic regression specifications in a three-year window around the increase in industry size standards by including interaction terms for each year in this window. The year prior to the size standard increase is defined as the base year.[19] Consistent with the parallel trends assumption, we find that there are no changes in revenue prior to size standard increases. The figure also shows that revenue decreases immediately following the size standard increase, and the effects are persistent.

5.2 Robustness

We conduct several robustness tests of the effect of size standards on an industry's smallest firms. First, we evaluate alternative definitions of the smallest firms. Appendix Table A.3 shows the results. In column 1, we use a narrower measure relative to the baseline specification by defining the smallest firms as those below 25% of their industry size standard in the year before the increase. Accordingly, the sample size is smaller. Using the strictest specification with firm, industry, and year fixed effects, we find that there is a 3.2% drop in revenues for the smallest firms when size

[18] When the outcome is a natural logarithm, we report the exponentiated coefficient minus one in the text. The tables provide the raw coefficients.

[19] As noted in Baker, Larcker, and Wang (2022) and Borusyak, Jaravel, and Spiess (2024), staggered designs where all units are eventually treated must omit two relative time indicators due to collinearities. We therefore drop year $t+4$ in addition to the year before treatment.

standards increase, which is similar to the baseline estimate. Column 2 expands the definition of the smallest firms to include those below 75% of their industry size standard and continues to report an economically and statistically comparable estimate. A potential concern is that size standards vary substantially across industries. In columns 3 and 4, we use a fixed definition of the smallest firms based on a firm having less than 100 or 50 employees, respectively. We find that there is a 2.7% to 3.1% decline in firm revenue when size standards increase, which continues to be statistically significant at the 1% level.

Next, we evaluate the robustness of the results across different samples. The baseline specification only includes industries with a size standard increase, and whose increase would have been the *same* had they been evaluated earlier. In Panel A of Appendix Table A.4, we consider alternative samples of industries with size standard increases. Column 1 adjusts the sample to include all industries that would have experienced a size standard increase had they been evaluated earlier, regardless of whether the size standard increase would have been the same. Using this broader sample, we show that the revenue of an industry's smallest firms decreases by 4.4%. This estimate is economically similar to the baseline estimate, and it remains statistically significant at the 1% level.

Column 2 focuses on industries whose size standard reviews only use the three factors derived directly from the 2007 Economic Census (average firm size, four-firm concentration ratio, and a Gini coefficient of firm size), thus dropping industries whose size standards also rely on the average asset size and contract reliance factors. We show that the estimate remains statistically and economically comparable, despite the large reduction in sample size. Column 3 expands the sample to include all the industries that eventually have an increase regardless of whether there would have been an increase had the review occurred earlier. We find that the smallest firms'

revenue decreases by 5.4%, statistically significant at the 1% level. Column 4 broadens the sample to all industries, including those with size standard increases and those without any changes. The effect remains similar to the baseline estimate, suggesting that it is not driven by differences only among industries experiencing a size standard increase.

Panel B of Appendix Table A.4 omits particular cohorts or years from the sample. Column 1 drops the first treatment cohort, which occurred in 2012, further increasing the time between the predetermined industry factors and treatment. We find that there is a 3.6% decline in the smallest firms' revenue following a size standard increase, statistically significant at the 5% level. Columns 2 and 3 drop treatment cohorts in 2013 and 2016, respectively, and show comparable estimates. Another potential concern is that the beginning of the sample period includes the financial crisis. In column 4, we show that the results are similar if we drop 2005 to 2008 from the sample.

Last, in Appendix Table A.5, we re-estimate the baseline specification using alternative estimators. A recent literature highlights potential issues with two-way fixed effects regressions when there are heterogenous treatment effects over time (de Chaisemartin and D'Haultfœuille (2020)). Column 1 uses the estimator developed by Callaway and Sant'Anna (2021) to address this issue. We find that there is a 3.9% drop in the smallest firms' revenue after a size standard increase. This is nearly the same as the baseline estimate, reducing potential concerns about biases due to heterogenous treatment effects. Column 2 uses the estimator proposed by Wooldridge (2021), also showing a statistically and economically similar estimate. Column 3 uses a stacked regression, which is a different approach for addressing heterogenous treatment effects. For the sample in this specification, we group each treatment cohort by comparing treated industries with those industries that eventually will be treated. We use a two-year window around size standard increases and include firm-by-cohort, industry-by-cohort, and year-by-cohort fixed effects. We

find that the effect remains quite similar to the baseline finding. Column 4 shows results from a Poisson regression. This allows us to include observations when revenue is zero. It also addresses the concern that revenue could be viewed as a count variable (Cohn, Liu, and Wardlaw (2022)). We continue to show that the estimate is statistically and economically similar.

5.3 Within-Industry Reallocation

The preceding section provides evidence that an industry's smallest firms are negatively impacted when size standards increase. The estimates are identified by comparing firms in an industry following a size standard increase with firms in an industry that will eventually have a size standard increase and would have had the same size standard increase had it occurred earlier. In this section, we evaluate the reallocation of economic activity *within an industry* as follows. First, we expand the sample to include all firms, rather than only the smallest firms. Second, we augment the specification with industry-by-year fixed effects. This allows us to hold constant time-varying industry heterogeneity, including variation in government subsidies, to estimate the change in firm revenues relative to other firms in the same industry during the same year.

Table 5 presents the results. In column 1, we define *Smallest* as an indicator variable equal to one if a firm is below 50% of the size standard in their industry in the year before the size standard increases. The key variable of interest is the interaction term *Size increase* x *Smallest*. The level effect of *Smallest* is absorbed by the firm fixed effects and *Size increase* is absorbed by the industry-by-year fixed effects. We find that the smallest firms' revenue significantly declines by 9.2% following a size standard increase compared to other firms in the same industry during the same year. This suggests that, when eligibility for small business subsidies is expanded, the revenues of the smallest firms in the industry shrink compared to their industry peers.

In column 2, we construct the indicator variable *Newly small*, which equals one if the firm's size was above the size standard in the year before the increase, and that size is below the size standard after the increase. This variable captures firms that become eligible for small business subsidies after the size standard increases. The coefficient on the interaction term *Size increase X Newly small* suggests that the revenues of newly small firms rise by 15.6% following a size standard increase, relative to other firms in the same industry and during the same year.

We conclude this analysis by constructing the indicator variable *Mid-small*, which equals one if a firm is between 50% and 100% of the size standard in their industry in the year before the increase. In column 3, we include the previous two interaction terms, in addition to *Size increase X Mid-small*. The reference group in this specification is large firms, whose pre-increase size was higher than the new size standard. The findings are twofold. First, there is no significant change in revenue at mid-small firms after the size standard increases. Second, there is a 7.7% decrease in the smallest firms' revenue and an 8.0% increase in newly small firm revenue following a size standard increase. Since the magnitude of the revenue increase for newly small firms is close to the revenue decrease for the smallest firms, this provides evidence that newly small firms benefit at the expense of the smallest firms in an industry when size standards rise.

Taken together, the results throughout this section provide novel evidence on the causal effects of increasing the eligibility for small firm subsidies in the United States. Following the increase in size cutoffs, larger firms become eligible for subsidies previously reserved for smaller firms. We find that an industry's smallest firms' revenue substantially declines following the implementation of size standard increases compared to the smallest firms in industries whose size standards will eventually increase once they are reviewed. We also show that revenue increases at firms newly eligible for government subsidies, and drops for the smallest firms relative to other firms in the same industry during the same year, suggesting the smallest firms are crowded out.

In the remainder of the analyses, we investigate the mechanisms through which the increases in small business size standards influence the smallest firms and the broader economic implications of the crowding out of the smallest firms. In particular, Section 6 provides micro-level evidence from the largest federal small business subsidy program: procurement contracts. Section 7 explores the impact of size standard increases on industry dynamics, concentration, and growth.

6 Procurement Contracts

Size standards determine firms' eligibility for a wide range of small business federal subsidies in the United States. In this section, we provide evidence from one of the largest programs that target small firms: small business set asides in federal procurement. Our focus on procurement contracts is motivated by Figure 1, which highlights that procurement set asides comprise the largest small business federal subsidy program in the United States. Section 6.1 evaluates the allocation of procurement contracts following size standard increases. Section 6.2 examines heterogeneity in contract reliance across industries.

6.1 Contract Allocation

The United States federal government commonly purchases goods and services from the private sector. To support small firms, policymakers set a goal of allocating 23% of the federal procurement budget to small firms based on size standards. Each year from 2005 to 2017, the federal government purchased $381 billion to $564 billion from contractors, with 17.3% to 22.6% flowing to small firms, as shown in Appendix Table A.6. Changes in small business size standards modify the set of firms that qualify for government procurement contracts as small businesses.

We use data on U.S. federal procurement contracts linked with the LBD, which are described in Section 3. We start by studying the allocation of contracts to firms following size standard increases. We define *Ln*(*1+Contracts amount*) as the natural logarithm of one plus the dollar value of procurement contracts awarded to a given firm in a particular year. The sample for these analyses includes firms that receive at least one contract during the sample period, which allows us to focus on changes in contract allocation among firms that are government contractors. Using equation (1), we estimate the effect of size standard increases on contract allocation for the same industries as in the baseline analysis. We include industry-by-year fixed effects to evaluate the change in contract allocation within an industry during a particular year, absorbing time-varying industry heterogeneity.

Table 6 provides the results on the shift in contract allocation following size standard increases. Column 1 examines how the allocation of contracts changes for an industry's smallest firms. We continue to define *Smallest* as those firms below 50% of the size standard in their industry in the year before the increase. Notably, this specification focuses on the effect for firms that were classified as small before the size standard changes. We find that contracts awarded to the smallest firms significantly decline by 15.6% after the size standard increase. Since the sample includes all firms receiving government contracts paired with industry-year fixed effects, this estimate is relative to other government contractors in the same industry during the same year. Column 2 focuses on firms that become eligible for small firm subsidies following the increase in size standards, indicated by the variable *Newly small*. We find that contracts awarded to newly small firms significantly increase by 31.1% compared to other firms in the same industry and year. Column 3 subsets the sample to only the smallest and newly small firms. We find that the smallest firms receive 27.2% fewer contracts in terms of dollar value relative to newly small firms when

the size standard increases. Combined, these results suggest that size standard increases reallocate contracts from the smallest firms in an industry to newly eligible larger firms, consistent with the revenue-based evidence on the crowding out of the smallest firms in Table 5.

Expanding access to small firm subsidies could also increase the total allocation of contracts to the smallest firms. A concurrent expansion of both subsidies and eligibility for subsidies would mitigate (or undo) any negative impact on the smallest firms in an industry. To assess this possibility, column 4 estimates the effect of size standard increases on the overall allocation of contracts in an industry. In this column, the unit of observation is an industry-year. Accordingly, we augment the specification to include industry and year fixed effects. We also aggregate contract amounts to the industry-year level and focus on the same industries as before. We find that there is no change in the overall allocation of contracts to an industry after size standards increase. The estimated coefficient for *Size increase* is statistically insignificant and economically small. This provides evidence that, following an expansion in access to small firm subsidies, newly eligible larger firms receive more contracts at the expense of the smallest firms.

6.2 Contract Reliance

Given the prominence of small business procurement subsidies and the results in the previous section, we re-estimate the baseline analyses of the smallest firms' revenues in specifications that consider the variation in contract reliance across industries. We conjecture that the impact of size standard increases on revenues would be stronger in industries more reliant on procurement contracts. To test this hypothesis, we construct the indicator variable *High contracts* that equals one if an industry is in the top quartile of contracts amount. We augment the baseline specification in equation (1) to include a measure of an industry's reliance on contracts and its interaction with *Size increase*.

Table 7 provides the results on the role of contract reliance in the effect on the smallest firms' revenue. We subset the sample to those industries in the top and bottom quartiles based on contract amounts. In column 1, we find that there is a 5.2% decrease in revenue for the smallest firms in those industries in the top quartile of contract reliance relative to those in the bottom quartile, which is statistically significant at the 5% level. This specification includes firm and year fixed effects. Column 2 augments the model to include industry fixed effects and shows that the effect is almost exactly the same.

Collectively, the analyses in this section provide direct, micro-level evidence that increases in industry size standards crowd out the smallest firms in the allocation of procurement contracts. Size standard increases reduce the flow of contracts to an industry's smallest firms and increase the volume of contracts to newly eligible firms. The total amount of contracts awarded to businesses designated as small does not change, suggesting that relatively smaller firms obtain a shrinking portion of procurement contracts following size standard increases. Further, the effects of size standard increases on the smallest firms' revenue are amplified in those industries that especially rely on contracts.

7 Aggregate Industry Effects

In this section, we investigate the economic consequences of increases in eligibility for small business subsidies. We conjecture that given the economic importance of small firms (Hurst and Pugsley (2011), Neumark, Wall, and Zhang (2011), Haltiwanger, Jarmin, and Miranda (2013)), the crowding out of the smallest firms might propagate to aggregate activity in an industry. Section 7.1 studies the effects of size standard increases on firm entry and exit rates. Section 7.2 evaluates

how they impact industry concentration. Lastly, Section 7.3 examines the effects of eligibility increases on industry growth.

7.1 Entry and Exit

We begin by evaluating the impact of increases in size standards on a firm's likelihood of exit. The unit of observation for these analyses is a firm-year. We define *Firm exit* as an indicator variable equal to one when a firm had positive employment in the previous year and zero employment in the current year.[20] We estimate equation (1) using the sample of industries with size standard increases and that would have received *exactly* the same size standard increase had they been reviewed earlier. We continue to define *Smallest* as those firms below 50% of the size standard in their industry in the year before the size standard increase. We only include the industry's smallest firms and firms that are newly small, defined as those whose size was above the size standard in the year before the increase, and that size is below the size standard after the increase. The specification includes industry-year fixed effects to absorb time-varying industry changes. Accordingly, this analysis compares the likelihood of firm exit among the smallest firms relative to newly small firms following size standard increases in an industry during a particular year.

Table 8 provides the results. In column 1, we find that there is a 0.5 percentage point increase in the probability that a firm in the smallest group exits after a size standard increase. This estimate is economically meaningful, representing a 3.5% increase relative to the sample standard deviation.[21] It is also statistically significant at the 1% level. Column 2 augments the specification

[20] More precisely, a firm in the LBD is considered to have exited in a particular year if none of the establishments it owned in the previous year have positive employment.
[21] Mitton (2024) shows that scaling by the standard deviation overcomes potential issues with using the sample mean.

to include firm fixed effects. We show that there is a 0.6 percentage point rise in the likelihood that a firm in the smallest group exits following size standard increases, again statistically significant at the 1% level. Together with the results in Section 5.1 on the decline in the smallest firms' revenue, this highlights that an industry's smallest firms fare worse when access to government subsidies is extended to larger firms.

The next set of analyses explores the industry-wide effects on firm entry and exit following changes in size standards. The unit of observation is an industry-year pair. We define *Industry firm entry* as the number of new firms in an industry for a particular year.[22] Similarly, we construct *Industry firm exit* as the number of firms exiting an industry during a particular year. *Industry smallest firm exit* is the number of the smallest firms in an industry that exited in a particular year, where the smallest firms are defined as those below 50% of the size standard in their industry. *Industry small firm exit* is the number of small firms in an industry that exited during a particular year, where firms are defined as small if they are below the size standard. Since each outcome is a count variable, we use Poisson regressions (Cohn, Liu, and Wardlaw (2022)).

Table 9 provides the estimates. In column 1, we find that there is no change in firm entry rates at the industry level following size standard increases. This estimate is both economically small and statistically insignificant. Conversely, column 2 shows that firm exit rates within an industry significantly rise by 12.7% following size standard increases. Columns 3 and 4 focus on the number of *small* firms exiting an industry in a particular year. In column 3, we restrict attention to an industry's smallest firms, which are those below 50% of the size standard in their industry. We find that there is a 15.5% increase in exits among the smallest firms after the size standard increases. In column 4, we include all firms defined as small based on the prevailing size

[22] In the LBD, a new firm is one where the firm first appears in the year, and all of the establishments it owns in that year are new (i.e., they first appear in that year as well).

standard.[23] We find a 15.3% increase in exits for these firms. A comparison of the two columns suggests that increased firm exit is largely driven by an industry's smallest firms.

The findings in this section highlight that relaxing the eligibility requirements for small business subsidies impacts firm dynamics. Size standard increases are associated with a substantial increase in the number of firm exits, driven by the smallest firms in an industry. However, there is no effect on firm entry. Combined, this indicates that there is a contraction in the number of firms within an industry. It is also consistent with the documented decline in business dynamism in the U.S. in recent years (Decker et. al (2014) and Decker et. al (2020)).

7.2 Industry Concentration

We next examine the implications of increases in size standards for industry concentration. The previous evidence shows that expansion in the access to small business subsidies reduces revenues for an industry's smallest firms (Section 5.1) and increases their likelihood of exiting (Section 7.1). To better understand the implications for industrial organization, we ask whether there are changes in industry concentration after size standards increase. A key measure used by the Census Bureau for the dominance of large firms in a particular industry is the concentration ratio (CR). Using the LBD, we define *CR8* as an indicator variable equal to one if the market share in terms of revenue for the eight largest firms in an industry increases from the previous year to the current year. To capture activity across a wider range of firms, we similarly construct *CR20*, *CR50*, and *CR100* as indicator variables equal to one if the market share in terms of revenue for the 20, 50, and 100

[23] It is important to note that we cannot run similar analyses using the newly small firms because the sample size is too limited.

largest firms in an industry, respectively, increases for the current year compared to the previous year.

Table 10 shows the results of this analysis. In column 1, we find that the likelihood of an industry becoming more concentrated as measured using the market share of the eight largest firms jumps by 9.8 percentage points following size standards increases. This represents a 19.6% increase relative to the sample standard deviation and is statistically significant at the 1% level. Columns 2 to 4 evaluate the changes for *CR20*, *CR50*, and *CR100*, respectively. These specifications also show that industries become more concentrated following expansions in the eligibility for small business subsidies. The likelihood of a rise in industry concentration increases by 23.9% to 29% relative to the sample standard deviation and remains statistically significant at the same level.

Taken together, the results indicate that expanding access to small business subsidies to larger firms increases industry concentration. As size standards increase, the smallest firms' revenue and survival likelihood drop. This compresses the smallest firms and reduces their representation in the industry. Consequently, industries become more concentrated according to a broad range of concentration measures. These findings contribute to the long-standing debate over increasing industrial concentration in the United States (e.g., Peltzman (2014), Grullon, Larkin, and Michaely (2019), and Barkai (2020))), and suggest that policies surrounding small business subsidies may play an important role.

7.3 Industry Growth

In the final analysis, we investigate the effects of increases in size standards on industry growth. To evaluate these effects, we construct three measures of growth using the LBD. First, we define

Revenue growth as the percentage change in total revenue in an industry from the previous to the current year. Second, we construct *Employment growth* as the percentage change in the total number of employees in an industry from the previous to the current year. Last, we define *Payroll growth* as the percentage change in total payroll in an industry relative to the previous year. Due to extreme outliers, we winsorize all three variables at the 5% level in each tail.

Table 11 displays the estimates for the effects of size standard increases on industry growth. In column 1, the estimate shows that revenue growth declines by two percentage points after an increase in size standards. This estimate represents a sizeable decline of 13.3% relative to the sample standard deviation, and it is statistically significant at the 5% level. In column 2, we find that employment growth declines by 1.9 percentage points following size standard increases, or 20% relative to the sample standard deviation. Finally, column 3 shows that payroll growth drops by 1.3 percentage points following an increase in size standards, or 12.4% relative to the sample standard deviation. The findings highlight that industry growth in terms of revenue, employment, and payroll slows when larger firms can access subsidies previously reserved for smaller firms.

Overall, these results suggest that size standard increases lead to a reduction in industry growth. They are related to recent studies on the removal of preferential treatment for small firms. In France, Garicano, Lelarge, and Van Reenen (2016) use a size-based threshold to show that workers and large firms bear the regulatory costs of labor laws. Additionally, related work in India finds that removing preferential treatment led to increases in profits, employment, and output (Banerjee and Duflo (2014), García-Santana and Pijoan-Mas (2014), Martin, Nataraj, and Harrison (2017), and Rotemberg (2019)). The results suggest that the role of small business subsidies can vary across developing and developed economies, whose credit markets, political systems, regulatory environments, and governance mechanisms differ considerably.

7 Conclusion

Following the Small Business Jobs Act of 2010, the United States has considerably expanded the eligibility of larger firms for small business subsidies. In this paper, we assess the economic effects of the vast changes in access to government subsidies. We use microdata from the LBD to trace each firm's eligibility for small business subsidies through time. Our empirical strategy relies on two key elements. First, the schedule of size standard reviews was preset, and the order of the reviews was not determined by economic fundamentals. Second, the SBA evaluated whether to change size standards based on lagged, predetermined factors that were estimated several years before the size standard reviews. These features allow us to identify the treatment effects through quasi-random variation in the timing of the size standard increases, comparing firms in industries that experience a size standard increase to firms in industries whose size standards will eventually increase, and would have increased by the same amount had they been evaluated earlier.

The evidence shows that classifying larger firms as small businesses adversely affects the smallest firms, whose revenues decline considerably following size standard increases. Conversely, revenues rise for firms newly eligible for small business subsidies following size standard increases. Using data on government procurement contracts, we show that after an industry's size standard increases, the smallest firms in an industry receive fewer contracts, whereas the amount of procurement contracts awarded to larger firms that become newly eligible for small business subsidies increases. Since the contracts allocated to an industry do not change following changes in small business size standards, the reallocation of government contracts to newly eligible, larger firms, appears to come at the expense of smaller firms.

The negative effects of size standard increases on the smallest firms have significant implications for firm dynamics, industry concentration, and industry growth. First, we find that an

industry's smallest firms are significantly more likely to exit. As such, the decline in the revenues of the smallest firms following the size standard increase appears to impact their ability to survive. At the aggregate industry level, overall firm exits increase, whereas firm entry rates do not change, leading to an overall reduction in business dynamism. Second, industries are more likely to become concentrated when access to small firm subsidies expands. Third, industry-level revenue growth, employment growth, and wage growth drop when size standards increase.

These results have broad implications for the importance of subsidizing small firms. They provide causal estimates of the effects of introducing *changes* in firms' access to small business subsidies on firm dynamics and economic growth. We note, however, that while our paper assesses the economic impact of *changes* in access to small business subsidies, our findings do not speak to the optimal level of either those subsidies or the standards determining access to them. Further, the analyses do not consider government expenditures or the quality of the goods and services procured by the government. We leave these questions and welfare estimates to future research.

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Figure 1: U.S. Small Business Subsidies

This figure displays small business subsidies from the federal government in the United States from 2007 to 2017. The subsidies include procurement set asides, small business lending programs, and regulatory cost savings from the Regulatory Flexibility Act. The small business lending programs include the following SBA programs: 7(a) and 504 loans, Small Business Investment Company (SBIC) debentures, Dealer Floor Plan Financing Pilot Program, Microloan Program, and disaster loan assistance. The subsidies are inflation adjusted to billions of dollars in 2007.

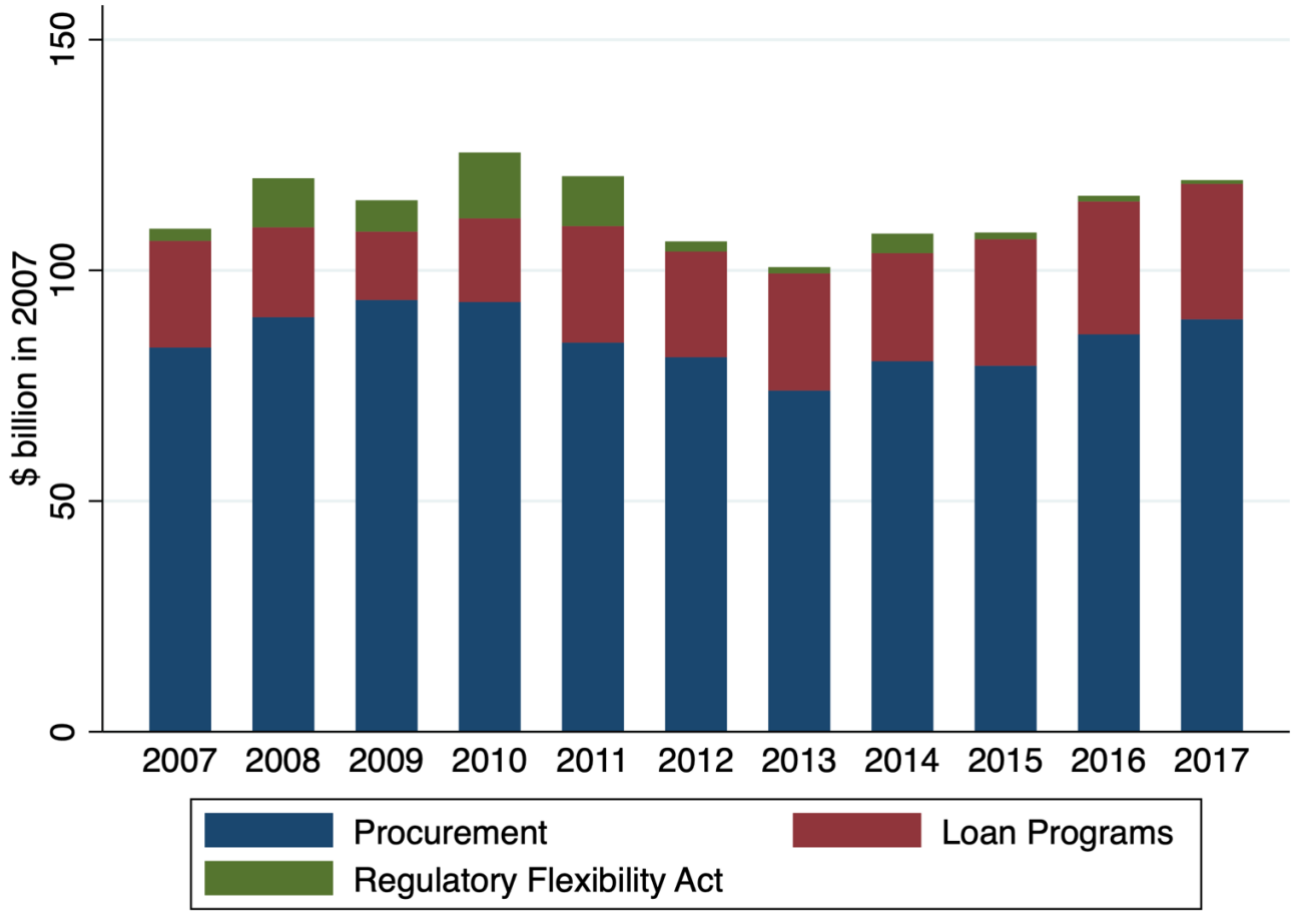

Figure 2: U.S. States using Size Standards

This figure provides a map of U.S. states using the federal definition of small business based on size standards. The blue shading represents the number of laws and regulations in a state that uses U.S. federal size standards. Darker shades represent a higher number of laws and regulations using this definition in a particular state. Those states with no shading do not have laws or regulations using U.S. federal size standards.

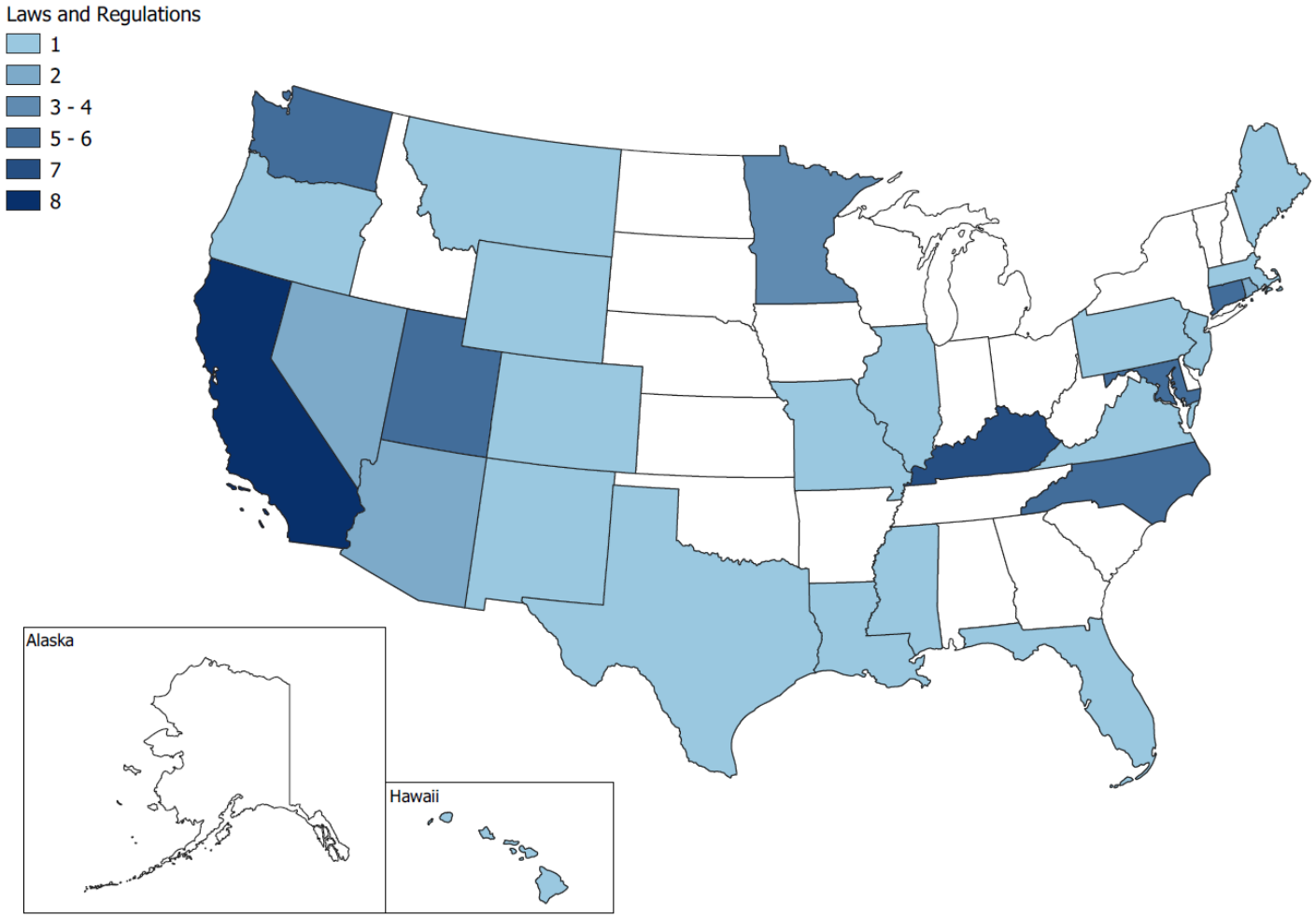

Figure 3: Dynamics for the Effect on Smallest Firms' Revenue

This figure provides the dynamics for the effect of size standard increases on the revenue of an industry's smallest firms. The plot provides the estimated coefficients, the associated 95% confidence intervals, and the pre- and post-treatment coefficient means. *Ln(Revenue)* is the natural logarithm of firm annual revenue. The smallest firms are defined as those below 50% of the size standard in their industry in the year before the increase. The year prior to the size standard increase is the base year.

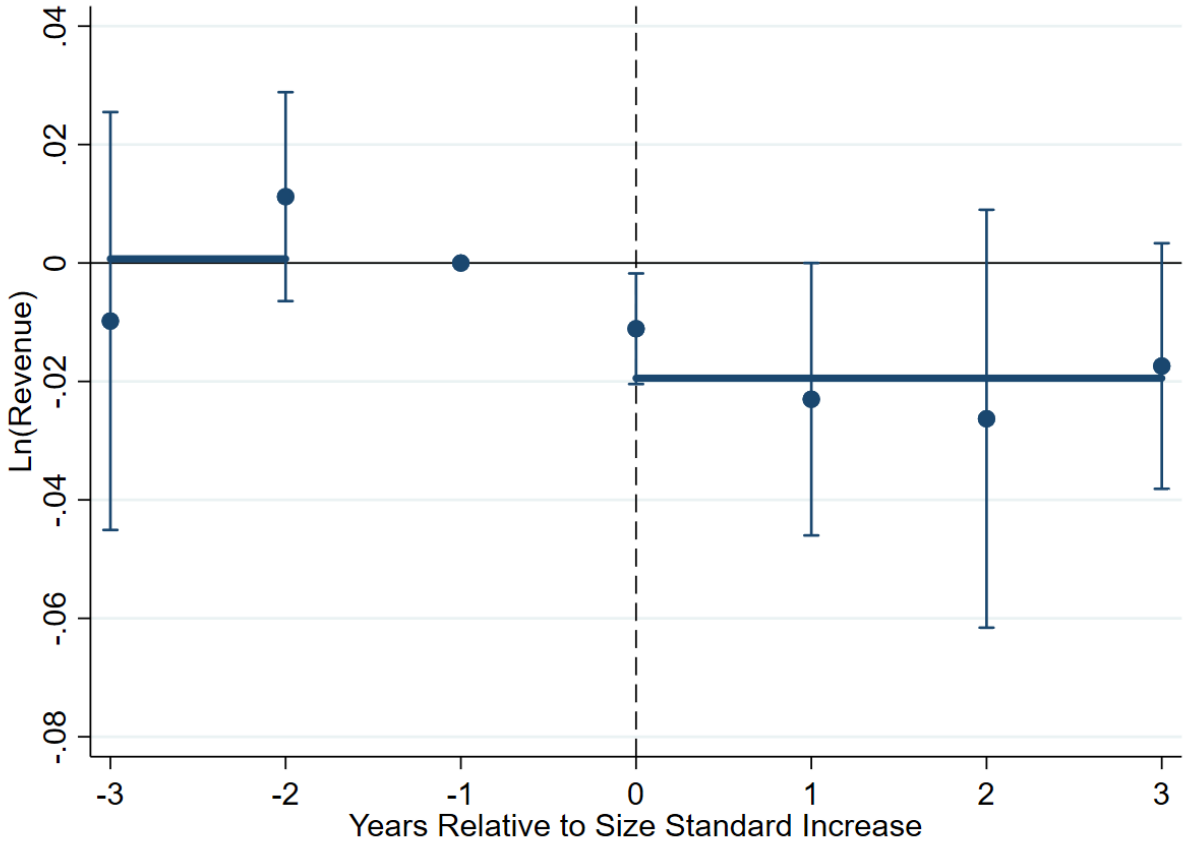

Table 1
Size Standards

This table provides the size standards to determine eligibility for small firm government subsidies in the United States from 2005 to 2017. *Average Receipts-based Size Standard* is annual average of the size standard based on receipts in millions of dollars. *Average Employee-based Size Standard* is annual average of the size standard based on the number of employees.

Year	Average Receipts-based Size Standard ($ million)	Average Employee-based Size Standard
2005	9.6	557
2006	9.6	557
2007	9.6	556
2008	10.4	554
2009	10.3	554
2010	12.3	553
2011	12.3	553
2012	14.3	559
2013	18.1	559
2014	19.6	557
2015	19.6	557
2016	19.5	770
2017	19.5	770

Table 2

Summary Statistics

This table details the summary statistics for the main variables used in the analyses. Panel A is at the firm level and Panel B is at the industry level. *Size increase* is an indicator variable equal to one when a size standard increases in an industry. *Revenue* is total annual revenue (thousands of dollars). *Firm exit* is an indicator variable equal to one when a firm had positive employment in the previous year and zero employment in the current year. *Total contracts* is the annual amount in dollars of government procurement contracts awarded to the firm. *Industry firm entry* is the number of new firms in an industry for a particular year. *Industry firm exit* is the number of firms exiting an industry for a particular year. *CR8*, *CR20*, *CR50*, and *CR100* are indicator variables equal to one if the market share of the eight, 20, 50, and 100 largest firms in an industry increases from the previous year to the current year, respectively. *Revenue growth*, *Employment growth*, and *Wage growth* are defined as the percentage growth of industry revenue, employment, and payroll from the previous to current year, respectively. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. This table reports results from disclosure release number CBDRB-FY24-0243.

Panel A: Firm Level

Variable	Number of Observations	Mean	Standard Deviation
Size increase	6,243,000	0.482	0.500
Revenue	6,243,000	2,067	1,581
Firm Exit	6,243,000	0.021	0.144
Total Contracts	228,000	1,170,000	69,300,000

Panel B: Industry Level

Variable	Number of Observations	Mean	Standard Deviation
Industry Firm Entry	4,300	182	540
Industry Firm Exit	4,300	163	501
CR8	3,900	0.473	0.499
CR20	3,900	0.466	0.499
CR50	3,900	0.446	0.497
CR100	3,900	0.396	0.489
Revenue Growth	3,900	0.022	0.150
Employment Growth	3,900	-0.003	0.095
Payroll Growth	3,900	0.023	0.105

Table 3
The Timing of Size Standard Changes

This table provides estimates from predictive regressions that examine the timing of size standard reviews by the SBA. Panel A investigates the association between the timing of size standard reviews and industry-level growth rates in employment, payroll, and establishments, as well as average contract amount to small firms. Panel B explores the relationship between the timing of size standard reviews and long-term analyst forecasts for an industry. Panel C examines the correlation between the timing of size standard reviews and the likelihood of size standard increases. *Date announced* is the order of industries reviewed based on the date when the review process is announced in the Code of Federal Regulations. *Date proposed* is the order of industries reviewed based on the date that the size standard increases are proposed in the Code of Federal Regulation. *Date finalized* is the order of industries reviewed based on the date that the size standard increases are finalized in the Code of Federal Regulation. *Employment growth (SUSB)*, *Payroll growth (SUSB)*, and *Establishment growth (SUSB)* are the industry growth rates using the SUSB of each variable (in percent), measured from 2004 to 2009. *Ln(Contract amount)* is the natural logarithm of average contract amount awarded to small firms from 2004 to 2009. *Long-term EPS* is the median three-to-five-year analyst earnings per share (EPS) projection. *Size increase* is an indicator variable that equals one if the size standard increases in an industry. Appendix A provides all variable definitions. Standard errors are reported in parentheses and clustered at the two-digit industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Panel A: Timing

	Date Announced	Date Proposed	Date Finalized
	(1)	(2)	(3)
Employment growth (SUSB)	0.006	0.014	0.004
	(0.008)	(0.020)	(0.013)
Payroll growth (SUSB)	-0.009	-0.0195	-0.0139
	(0.007)	(0.015)	(0.011)
Establishment growth (SUSB)	-0.005	-0.0109	-0.0047
	(0.004)	(0.009)	(0.006)
Ln(Contract amount)	0.007	0.0141	0.004
	(0.008)	(0.020)	(0.013)
Observations	337	337	337
R-squared	0.025	0.022	0.029

Panel B: Analyst Forecasts

	Date Announced	Date Proposed	Date Finalized
	(1)	(2)	(3)
Long-term EPS	0.005	0.013	0.009
	(0.005)	(0.012)	(0.009)
Observations	165	165	165
R-squared	0.003	0.003	0.003

Table 3 (continued)

Panel C: Size Standard Increases

	Size Increase		
	(1)	(2)	(3)
Date announced	0.014		
	(0.018)		
Date proposed		0.004	
		(0.008)	
Date finalized			0.003
			(0.011)
Observations	1,016	1,016	1,016
R-squared	0.003	0.001	0.000

Table 4

Smallest Firms' Revenues

This table provides the estimates for the effect of size standard increases on the revenue of an industry's smallest firms. *Ln(Revenue)* is the natural logarithm of firm annual revenue. The smallest firms are defined as those below 50% of the size standard in their industry in the year before the increase. *Size increase* is an indicator variable equal to one when a size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include firm and year fixed effects. Column 2 also includes industry fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(Revenue)	
	(1)	(2)
Size increase	-0.035***	-0.034***
	(0.009)	(0.009)
Firm fixed effects	Yes	Yes
Industry fixed effects	No	Yes
Year fixed effects	Yes	Yes
Observations	5,251,000	5,251,000
R-squared	0.885	0.885

Table 5
Within-Industry Revenues

This table evaluates the effect of size standard increases on the firms' revenue within an industry. *Ln(Revenue)* is the natural logarithm of firm annual revenue. *Smallest* is an indicator variable equal to one if a firm's size is below 50% of the size standard in their industry in the year before the increase. *Mid-small* is defined as an indicator variable equal to one if a firm's size is between 50% and 100% of the size standard in their industry in the year before the increase. *Newly small* is defined as an indicator variable equal to one if a firm's size is above the size standard in their industry in the year before the increase and that size is below the size standard after the increase. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include firm and industry-year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(Revenue)		
	(1)	(2)	(3)
Size increase X Smallest	-0.097***		-0.080***
	(0.011)		(0.011)
Size increase X Mid-small			0.011
			(0.012)
Size increase X Newly small		0.145***	0.077***
		(0.021)	(0.021)
Firm fixed effects	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes
Observations	6,209,000	6,209,000	6,209,000
R-squared	0.908	0.908	0.908

Table 6
Procurement Contracts

This table examines the effect of size standard increase on the allocation of procurement contracts. *Ln(1+Contracts amount)* is the natural logarithm of one plus annual procurement contracts in dollars. *Smallest* is defined as an indicator variable equal to one if a firm's size is below 50% of the size standard in their industry in the year before the increase. *Newly small* is defined as an indicator variable equal to one if a firm's size is above the size standard in their industry in the year before the increase and that size is below the size standard after the increase. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. The unit of observation is a firm-year in models 1 to 3 and an industry-year in model 4. Models 1 to 3 include those firms receiving at least one procurement contract during the sample period, where model 3 focuses on a subsample of the smallest and newly small firms. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. Models 1 to 3 include firm and industry-year fixed effects. Model 4 includes industry and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(1 + Contracts Amount)			
	(1)	(2)	(3)	(4)
Size increase X Smallest	-0.170**		-0.318**	
	(0.078)		(0.146)	
Size increase X Newly small		0.271**		
		(0.134)		
Size increase				0.093
				(0.094)
Firm fixed effects	Yes	Yes	Yes	No
Industry-year fixed effects	Yes	Yes	Yes	No
Industry fixed effects	No	No	No	Yes
Year fixed effects	No	No	No	Yes
Unit of Observation	Firm-year	Firm-year	Firm-year	Industry-year
Sample	All firms	All firms	Smallest and newly small firms	All firms
Observations	228,000	228,000	184,000	4,300
R-squared	0.560	0.560	0.545	0.884

Table 7

The Role of Contract Reliance

This table studies the role of contract reliance in the effect of size standard increases on the revenue of an industry's smallest firms. *Ln(Revenue)* is the natural logarithm of firm annual revenue. *Smallest* is an indicator variable equal to one if a firm's size is below 50% of the size standard in their industry in the year before the increase. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. *High contracts* is an indicator variable equal to one if an industry is in the top quartile of contracts amount. The sample for the specification in this table are those industries in the top and bottom quartiles based on contract amounts. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include firm and year fixed effects. Model 2 also includes industry fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(Revenue)	
	(1)	(2)
Size increase X High contract	-0.0530**	-0.0530**
	(0.023)	(0.023)
High Contract	-0.1063***	-0.1063***
	(0.023)	(0.023)
Size increase	-0.0026	-0.0025
	(0.017)	(0.017)
Firm fixed effects	Yes	Yes
Industry fixed effects	No	Yes
Year fixed effects	Yes	Yes
Observations	2,457,000	2,457,000
R-squared	0.890	0.890

Table 8
Firm Exits

This table evaluates the effect of size standard increases on firm exit. *Firm Exit* is an indicator variable equal to one when a firm had positive employment in the previous year and zero employment in the current year. *Smallest* is defined as those below 50% of the size standard in their industry in the year before the increase. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include industry-year fixed effects. Column 2 also includes firm fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Firm Exit	
	(1)	(2)
Size increase X Smallest	0.005***	0.006***
	(0.002)	(0.002)
Industry-year fixed effects	Yes	Yes
Firm fixed effects	No	Yes
Observations	5,792,000	5,792,000
R-squared	0.029	0.174

Table 9

Industry Entry and Exit

This table examines firm dynamics following increases in size standards. *Industry firm entry* is the number of new firms in an industry in a particular year. *Industry firm exit* is the number of firms exiting an industry during a particular year. *Industry smallest firm exit* is the number of the smallest firms in an industry that exited in a particular year, where the smallest firms are defined as those below 50% of the size standard in their industry. *Industry small firm exit* is the number of small firms in an industry that exited during a particular year, where firms are defined as small using the size standard. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest hundreds. All models include industry and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Industry Firm Entry	Industry Firm Exit	Industry Smallest Firm Exit	Industry Small Firm Exit
	(1)	(2)	(3)	(4)
Size increase	0.021	0.120***	0.144***	0.142***
	(0.042)	(0.031)	(0.032)	(0.033)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,300	4,300	4,300	4,300

Table 10
Industry Concentration

This table studies the effect of size standard increases on industry concentration. *CR8*, *CR20*, *CR50*, and *CR100* are indicator variables equal to one if the market share of the eight, 20, 50, and 100 largest firms in an industry increases from the previous year to the current year, respectively. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest hundreds. All models include industry and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	CR8	CR20	CR50	CR100
	(2)	(3)	(4)	(5)
Size increase	0.098***	0.129***	0.119***	0.142***
	(0.028)	(0.029)	(0.028)	(0.027)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	3,900	3,900	3,900	3,900
R-squared	0.082	0.106	0.163	0.242

Table 11

Industry Growth

This table estimates the effect of size standard increases on measures of industry growth. *Revenue growth*, *Employment growth*, and *Payroll growth* are defined as the percentage growth of industry revenue, employment, and payroll from the previous to current year, respectively. The outcomes are winsorized at the 5% level in each tail due to outliers. *Size increase* is an indicator variable equal to one when the size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include industry and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Revenue Growth	Employment Growth	Payroll Growth
	(1)	(2)	(3)
Size increase	-0.020**	-0.019***	-0.013**
	(0.008)	(0.006)	(0.006)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	3,900	3,900	3,900
R-squared	0.213	0.137	0.150

Appendix A
Variable Definitions

Variable Name	Description	Source
Size increase	An indicator variable equal to one when the size standard increases for a particular six-digit NAICS industry.	Code of Federal Regulations
Date announced	Order of industries reviewed based on the date when the review process is announced in the Code of Federal Regulations.	Code of Federal Regulations
Date proposed	Order of industries reviewed based on the date that the size standard increases are proposed in the Code of Federal Regulation.	Code of Federal Regulations
Date finalized	Order of industries reviewed based on the date that the size standard increases are finalized in the Code of Federal Regulation.	Code of Federal Regulations
Ln(Revenue)	Natural logarithm of firm annual revenue.	LBD (Census Bureau)
Smallest	An indicator variable equal to one if a firm's size is below 50% of the size standard in their industry in the year before the increase.	Code of Federal Regulations, LBD (Census Bureau)
Mid-small	An indicator variable equal to one if a firm's size is between 50% and 100% of the size standard in their industry in the year before the increase	Code of Federal Regulations, LBD (Census Bureau)
Newly small	An indicator variable equal to one if a firm's size is above the size standard in their industry in the year before the increase and that size is below the size standard after it increases.	Code of Federal Regulations, LBD (Census Bureau)
Ln(1+Contracts amount)	Natural logarithm of one plus annual procurement contracts.	USAspending.gov
High contract	An indicator variable equal to one if an industry is in the top quartile of contracts amount.	USAspending.gov
Firm exit	An indicator variable equal to one when a firm had positive employment in the previous year and zero employment in the current year.	LBD (Census Bureau)
Industry firm entry	Number of new firms in an industry in a particular year. A new firm is one where the firm first appears in the year, and all of the establishments it owns in that year are new (i.e., they first appear in that year as well).	LBD (Census Bureau)
Industry firm exit	Number of firms exiting an industry during a particular year. A firm in the LBD is considered to have exited in a particular year if none of the establishments it owned in the previous year have positive employment.	LBD (Census Bureau)

Appendix A (continued)

Variable Name	Description	Source
Industry smallest firm exit	The number of the smallest firms in an industry that exited in a particular year, where the smallest firms are defined as those below 50% of the size standard in their industry.	LBD (Census Bureau)
Industry small firm exit	The number of small firms in an industry that exited during a particular year, where firms are defined as small using the size standard.	LBD (Census Bureau)
CR8	An indicator variable equal to one if the market share based on revenue of the eight largest firms in an industry increases from the previous year to the current year.	LBD (Census Bureau)
CR20	An indicator variable equal to one if the market share based on revenue of the 20 largest firms in an industry increases from the previous year to the current year.	LBD (Census Bureau)
CR50	An indicator variable equal to one if the market share based on revenue of the 50 largest firms in an industry increases from the previous year to the current year.	LBD (Census Bureau)
CR100	An indicator variable equal to one if the market share based on revenue of the 100 largest firms in an industry increases from the previous year to the current year.	LBD (Census Bureau)
Revenue growth	Percentage growth of industry revenue from the previous to current year.	LBD (Census Bureau)
Employment growth	Percentage growth of industry employment from the previous to current year.	LBD (Census Bureau)
Payroll growth	Percentage growth of industry payroll from the previous to current year.	LBD (Census Bureau)

Table A.1
Federal and State Use of Size Standards

This table lists federal programs and legislation and U.S. states using size standards to define small businesses. Panel A highlights numerous federal programs and laws using size standards. Panel B includes states with legislation or regulations using federal size standard definitions.

Panel A: Federal Programs and Legislation

Program or Legislation Name	Subsidy Implementation
504/CDC Loans	Program
7(a) Loans	Program
COVID-19 Relief	Program
Economic Injury Disaster Loans (EIDL)	Program
Export Express Loans	Program
Export Working Loan Capital Program	Program
Federal and State Technology Partnership Program (FAST)	Program
International Trade Loan Program	Program
Microloan Program	Program
Revolving Loan Fund Program	Program
Small Business Investment Company (SBIC) Program	Program
Small Business Lending Fund	Program
State Trade Expansion Program (STEP)	Program
Surety Bonds	Program
Regulatory Flexibility Act	Legislation
Business Opportunity Development Reform Act	Legislation
Small Business Credit and Business Opportunity Enhancement Act	Legislation
Small Business Regulatory Enforcement Fairness Act	Legislation
Small Business Reauthorization Act	Legislation
Farm Security and Rural Investment Act	Legislation
American Recovery and Reinvestment Act	Legislation
Trade Facilitation and Trade Enforcement Act	Legislation
CARES Act	Legislation

Panel B: U.S. States

Arizona	Missouri
California	Montana
Colorado	Nevada
Connecticut	New Jersey
Florida	New Mexico
Hawaii	North Carolina
Illinois	Oregon
Kentucky	Pennsylvania
Louisiana	Rhode Island
Maine	Texas
Maryland	Utah
Massachusetts	Virginia
Minnesota	Washington
Mississippi	Wyoming

Table A.2

Industry Factors and Supported Size Standards

This table shows the values used by the SBA in determining the size standards supported by each industry factor. Panel A shows the values for receipts-based size standards. Panel B shows the results for employee-based size standards.

Panel A: Receipts-based Size Standards

Simple Average Firm Size ($ million)	Weighted Average Firm Size ($ million)	Average Asset Size ($ million)	Average Receipts of Largest Four Firms ($ million)	Gini Coefficient	Implied Size Standard ($ million)
< 1.34	< 25.81	< 0.85	< 180.0	< 0.736	5.0
1.34 to 1.87	25.81 to 33.56	0.85 to 1.07	180.0 to 353.2	0.736 to 0.746	7.0
1.88 to 2.61	33.57 to 44.41	1.08 to 1.37	353.3 to 595.7	0.747 to 0.759	10.0
2.62 to 3.57	44.42 to 58.35	1.38 to 1.76	595.8 to 907.5	0.760 to 0.777	14.0
3.58 to 4.79	58.36 to 76.18	1.77 to 2.26	907.6 to 1,305.8	0.778 to 0.799	19.0
4.80 to 5.96	76.19 to 93.22	2.27 to 2.74	1,305.9 to 1,686.9	0.800 to 0.821	25.5
5.97 to 7.01	93.23 to 108.71	2.75 to 3.16	1,687 to 2,033.1	0.822 to 0.839	30.0
≥ 7.02	≥ 108.72	≥ 3.17	> 2,033.2	≥ 0.840	35.5

Panel B: Employee-based Size Standards

Simple Average Firm Size (employees)	Weighted Average Firm Size (employees)	Average Asset Size ($ million)	Average Number of Employees of Largest Four Firms	Gini Coefficient	Implied Size Standard (employees)
< 63.9	< 364.5	< 11.1	< 1,383.3	< 0.772	500
63.9 to 89.6	364.5 to 449.5	11.1 to 20.2	1,383.3 to 1,615.9	0.772 to 0.784	750
89.7 to 115.5	449.6 to 534.5	20.3 to 29.5	1,616.0 to 1,848.6	0.785 to 0.797	1,000
115.6 to 141.3	534.6 to 619.6	29.6 to 38.8	1,848.7 to 2,081.3	0.798 to 0.810	1,250
≥ 141.4	≥ 619.7	≥ 38.9	≥ 2,081.4	≥ 0.811	1,500

Table A.3
Alternative Definitions of the Smallest Firms

This table provides the estimates for the effect of size standard increases on the revenue of the smallest firms using alternative definitions of the smallest firms. *Ln(Revenue)* is the natural logarithm of firm annual revenue. The smallest firms are defined as: those below 25% of the size standard in their industry in the year before the increase (column 1), those below 75% of the size standard in their industry in the year before the increase (column 2), less than 100 employees in the year before the increase (column 3), or less than 50 employees in the year before the increase (column 4). *Size increase* is an indicator variable equal to one when a size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include firm, industry, and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(Revenue)			
	(1)	(2)	(3)	(4)
Size increase	-0.033***	-0.035***	-0.032***	-0.027***
	(0.009)	(0.009)	(0.009)	(0.009)
Firm fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Definition of smallest firms	<25% of size standard	<75% of size standard	<100 employees	<50 employees
Observations	4,825,000	5,401,000	5,684,000	5,544,000
R-squared	0.872	0.891	0.896	0.889

Table A.4
Alternative Samples

This table shows the estimates for the effect of size standard increases on the revenue of the smallest firms using alternative samples. Panel A examines alternative industries and Panel B omits particular cohorts or years. *Ln(Revenue)* is the natural logarithm of firm annual revenue. The smallest firms are defined as those below 50% of the size standard in their industry in the year before the increase. *Size increase* is an indicator variable equal to one when a size standard increases in an industry. Appendix A provides all variable definitions. Due to disclosure requirements, observation counts are rounded to the nearest thousands. All models include firm, industry, and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

Panel A: Alternative industries

	Ln(Revenue)			
	(1)	(2)	(3)	(4)
Size increase	-0.045***	-0.029**	-0.056***	-0.028**
	(0.008)	(0.013)	(0.012)	(0.014)
Firm fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Sample	Industries with predicted size standard increases	Industries using 2007 Economic Census factors	Industries with size standard increases	All industries
Observations	6,167,000	485,000	10,750,000	29,910,000
R-squared	0.896	0.872	0.873	0.870

Table A.4 (continued)

Panel B: Omit particular cohorts or years

	Ln(Revenue)			
	(1)	(2)	(3)	(4)
Size increase	-0.037**	-0.042***	-0.040***	-0.041***
	(0.014)	(0.010)	(0.015)	(0.007)
Firm fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Sample	Drop industries treated in 2012	Drop industries treated in 2013	Drop industries treated in 2016	Drop 2005 to 2008
Observations	1,403,000	4,455,000	4,466,000	3,996,000
R-squared	0.907	0.903	0.901	0.910

Table A.5
Alternative Estimators

This table examines the effect of size standard increases on the revenue of the smallest firms using different estimators. Column 1 uses the Callaway and Sant'Anna (2021) estimator, column 2 uses the Wooldridge (2021) estimator, column 3 uses a stacked regression, and column 4 uses a Poisson regression. *Ln(Revenue)* is the natural logarithm of firm annual revenue. The smallest firms are defined as those below 50% of the size standard in their industry in the year before the increase. *Size increase* is an indicator variable equal to one when a size standard increases in an industry. Appendix A provides all variable definitions. All models include firm, industry, and year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively. The data presented in this table are approved for dissemination by the DRB (CBDRB-FY24-0243).

	Ln(Revenue)			
	(1)	(2)	(3)	(4)
Size increase	-0.040***	-0.037***	-0.0812***	-0.044***
	(0.002)	(0.002)	(0.014)	(0.011)
Firm fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Estimation Method	Callaway and Sant'Anna (2021)	Wooldridge (2021)	Stacked regression	Poisson
Observations	4,172,000	4,226,000	2,613,000	5,252,000

Table A.6

Summary Statistics for Procurement Contracts

This table provides summary statistics for U.S. procurement contracts to small businesses. In this table, small firms are based on the designation of small businesses in the contracts data, which also is based on size standards. *Number of contracts to small firms* is a count of the number of contracts awarded to small firms. *Contract amount to small firms* is the amount of contracts awarded to small firms in millions of dollars. *Contract amount to all firms* is the amount of contracts awarded to all firms in millions of dollars. *Percent of small firms* is the proportion of contract amount awarded to small firms relative to *Contract amount to all firms*.

Year	Number of Contracts to Small Firms	Contract Amount to Small Firms	Contract Amount to All Firms	Percent to Small Firms
2005	1,455,640	78,129	380,672	20.50%
2006	2,138,570	82,515	454,945	18.10%
2007	2,096,819	89,171	463,303	19.20%
2008	2,033,379	97,714	564,435	17.30%
2009	1,624,359	100,605	519,327	19.40%
2010	1,658,929	125,444	554,870	22.60%
2011	1,561,575	102,702	524,779	19.60%
2012	1,398,217	99,576	541,919	18.40%
2013	1,158,509	89,215	427,005	20.90%
2014	1,401,936	99,404	454,644	21.90%
2015	1,863,621	97,220	436,954	22.20%
2016	2,054,976	106,971	489,467	21.90%
2017	2,155,032	113,202	510,436	22.20%