Does Size Matter? The Real Effects of Subsidizing Small Firms[*]

Matthew Denes, Ran Duchin, and John Hackney

December 2020

Abstract

We employ a new empirical approach to identify the economic impact of small business subsidies in the U.S. Exploiting randomness in the timing of size standard increases across industries surrounding the 2010 Small Business Jobs Act, we show that they lead to lower shares of small businesses in industry establishments and employment. Consequently, business dynamism and growth rates of industry employment and wages decline, leading to an overall drop in employment in areas reliant on small businesses. The effects parallel shifts in small firms' access to government procurement and business loans. Overall, we provide causal estimates that small business subsidies support economic growth.

JEL Classification: E24, G38, H25, H57, L25

Keywords: government subsidies, small firms, employment, procurement

I. Introduction

A common perception is that government policies towards small firms play an important role in economic growth and job creation. This perception is popular among politicians of different political persuasions, small business advocates, and the business press.[1] The rationale behind these policies is twofold. First, small firms appear to contribute significantly to economic activity and aggregate employment, employing more than 60 million people, or roughly 47% of the private workforce, and created 1.6 million net jobs in 2019 alone.[2] Not surprisingly, the question of the importance of small firms has also attracted considerable attention from academic researchers (e.g., Hurst and Pugsley, 2011; Neumark, Wall, and Zhang, 2011; Haltiwanger, Jarmin, and Miranda, 2013). 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).

Despite the widespread use of policies targeting small firms, prior academic research offers limited causal evidence on their effects. Recent papers focus on developing economies. Banerjee and Duflo (2014), García-Santana and Pijoan-Mas (2014), Martin, Nataraj, and Harrison (2017), and Rotemberg (2019) find that eliminating preferential treatment of small firms in India led to higher profits, employment, and output. In this paper, we seek to provide novel causal estimates of the real economic effects of small business subsidies in the United States, where capital markets and legal systems are highly developed and less susceptible to frictions or corruption.

---

[1] As a recent example, see: "Where Trump and Biden Stand on Helping Small Businesses," available at: https://www.wsj.com/articles/where-trump-and-biden-stand-on-helping-small-businesses-11602667801.

[2] See the 2020 Small Business Profile, published by the Small Business Administration's (SBA) Office of Advocacy, which is available at: https://cdn.advocacy.sba.gov/wp-content/uploads/2020/06/04144224/2020-Small-Business-Economic-Profile-US.pdf.

A key empirical challenge is that government policies are nonrandom and can be the consequence, rather than the source, of economic developments. To address this challenge, we focus on a recent set of policy changes in the U.S. that introduced considerable increases in firms' 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 NAICS industry based on a firm's average annual revenue or number of employees. These standards represent the maximum size to be classified as a small business and qualify for federal government subsidies such as procurement contracts, grants, and loans set aside for small firms.

We identify the causal effects of small firm subsidies by exploiting random variation in the timing of size standard increases across industries around the Small Business Jobs Act of 2010. The Act requires the SBA to review the size standards of all industries every five years. The schedule of industries was set at the beginning of the review process. For administrative ease, the SBA simultaneously reviewed all six-digit NAICS industries within a two-digit NAICS sector.[3] Further, the SBA arbitrarily reviewed all revenue-based size standards before turning to employee-based size standards. These institutional features are based on regulatory filings and discussions with program administrators, and highlight that the timing of size standard reviews was not driven by economic fundamentals.[4] Accordingly, we show that the timing is uncorrelated with the likelihood of a size standard increase in an industry. Our empirical design focuses on industries with size standard increases to hold constant the change in an industry's small business size standard and identify its treatment effect through variation in the timing of its implementation.

Using this identification approach, we investigate the effects of changes in industry size standards, which determine firms' eligibility for small business subsidies, on industry composition

---

[3] Two-digit NAICS sectors include between 25 and 360 six-digit NAICS industries.
[4] For details, see: https://www.sba.gov/sites/default/files/2018-02/Report_on_the_First_5-Year_Comprehensive_Size_Standards_Review_1.pdf and https://www.govinfo.gov/content/pkg/FR-2008-05-27/pdf/E8-11763.pdf

and real economic activity by answering three research questions. First, how do size standard changes affect the share of establishments and employment of small firms relative to larger firms? Second, what are the implications for business dynamism, employment, and wages, across industries and local economies that vary in their reliance on small businesses? Third, how do the policy changes in small business size standards correspond to government programs that subsidize small firms such as federal procurement contracts and guaranteed credit?

We hand-collect data on small business size standard changes around the 2010 Small Business Jobs Act and find that they have increased in 525 industries and have not decreased in any industry. Of the 525 size standard increases, 263 were revenue-based (exceeding the rate of inflation) and 262 were employee-based. The average size standard has increased by nearly 130% based on firm revenue and by about 38% based on the number of employees. This trend implies that considerably larger firms have become eligible for small firm subsidies over the past decade.

In the first set of analyses, we investigate whether increases in small business size standards impact industry composition by crowding out the smallest firms. Using the Census Statistics on Small Businesses (SUSB), we find that following an increase in eligibility for small firm subsidies, the ratio of relatively smaller business establishments to the total number of establishments drops by 1.1 percentage points, compared to industries whose size standards will increase following a future review.[5] Similarly, the share of these small firms represented in overall industry employment shrinks by 0.5 percentage points when size standards increase. These estimates are highly statistically significant and represent a large drop of 2.0% to 3.3% relative to the sample means.

---

[5] The Census defines firm size based on number of employees. These analyses define small firms based on fewer than 20 employees. We obtain similar results using larger thresholds, including less than 100 and 500 employees.

We show that the changes in industry composition do not precede size standard changes, consistent with the parallel trends assumption. Further, the proportion of small business establishments and employment declines in the year following size standard increases, and the effects are persistent. These results mitigate concerns about confounding trends or reverse causality where changes in industry composition lead to changes in size standards.

Collectively, these results provide new causal evidence that changes in the government's classification of small businesses, which directly affect access to small business government subsidies, have a material effect on industry composition. The estimates suggest that classifying a growing number of larger firms as small businesses crowds out the smallest firms. They also bring attention to unintended consequences of altering size classification policies.

The real economic effects of crowding out small firms are theoretically unclear. Large firms are a cornerstone of the modern economy, dating to the onset of the industrial revolution. The concept of economies of scale was proposed by Adam Smith (1776) and subsequently echoed by notable economists such as Galbraith (1957), argued for the importance of large size and monopoly power. Alternatively, others, such as Schumacher (1973), argued strongly that "small is beautiful." In his classic works, Schumpeter (1912, 1942) maintains that the relative roles of small and large firms in technological change and production vary considerably over the business cycle. His theory argues that economic development is a continuous process of innovation and creative destruction, in which entrepreneurs and small businesses play a crucial role.

We evaluate these opposing views by studying the effects of expanding eligibility for small firm subsidies on the forces of creative destruction within an industry. Recent research suggests that business dynamism, which captures the process of firm birth, expansion, contraction, and death has been declining in the U.S. since 2000 (Decker et. al, 2014; Decker et. al, 2020). Using

4

the Census SUSB, we find that increases in size standards lead to fewer expansions and more contractions of relatively smaller firms. Following a size standard increase, small business expansions significantly decline by 4.4% and contractions substantially increase by 4.0%, both relative to the sample mean. Overall, the ratio of establishment births and expansions to establishment contractions and deaths, which we term *dynamism*, decreases by 5.1% for small firms. We also examine the industrywide effects of size standard increases. We show that industry expansions decline by 6.1% and contractions increase by 6.7% compared to the sample mean, in addition to considerable declines in industry dynamism.[6] This indicates that the reduction in activity by the smallest firms spillovers within an industry. Further, these findings suggest that crowding out smaller firms hampers creative destruction and are consistent with recent studies highlighting the decrease in U.S. business dynamism.

We next investigate the impact of size standard changes on labor markets. We find that size standard increases lead to a decline of 1.5% in employment growth and a drop of 1.2% in payroll growth using the Census SUSB. These estimates, however, can reflect the reallocation of labor to other industries rather than an adverse effect on employment and earnings. To investigate this possibility, we exploit detailed data on job-to-job flows and earnings across industries provided by the Census Longitudinal Employer-Household Dynamics (LEHD) program. We find that job losses following size standard increases lead to unemployment, rather than reallocation of labor to other sectors of the economy. These estimates are similar for industrywide job losses and stable jobs, highlighting that these effects are not driven by adjustments to the temporary workforce. We also examine wages for workers remaining in industries with size standard increases. We show that wages for both current and new employees significantly decline after

---

[6] These outcomes are available at the four-digit NAICS level. The magnitudes are estimated based on half of the industries within a 4-digit NAICS code experiencing a size standard increase.

eligibility for small firm subsidies increases. Taken together, these results highlight the adverse effects on labor markets when small firms are crowded out.

We extend the industry-level analyses by studying regional employment effects. This is motivated by the findings of Martin, Nataraj, and Harrison (2017), who find that Indian districts more exposed to subsidy reductions for small firms experienced higher employment and output growth. Further, studies on agglomeration economies highlights the synergistic benefits of co-location for productivity, investment, and employment growth (e.g., Greenstone, Hornbeck and Moretti, 2010; Dougal, Parsons and Titman, 2015), in addition to the role of small firms (Delgado, Porter, and Stern, 2010; Glaeser, Kerr, and Kerr, 2015). In these analyses, we exploit the variation in small business concentration across Metropolitan Statistical Areas (MSAs) to investigate the effect of changes in small business size standards on MSA employment. Following increases in size standards, we show that unemployment increases by 1.1 percentage points in MSAs with a greater concentration of small businesses prior to the change.

In the last set of analyses, we provide micro-level evidence on the impact of changes in small business subsidies on product market demand and the supply of capital. First, we examine the implications of the increases in small business size standards for government procurement contracts. We use contract-level data to investigate the allocation by the U.S. federal government of contracts to small firms, which are uniquely identified. Our estimates indicate that an average of 20.1% of contract volume is set aside for eligible small firms, representing an average annual amount of $90.9 billion. We find that after an industry's size standard increases, the percent of small business contracts flowing to firms that were previously classified as small businesses declines by 5.6 percentage points. Conversely, the percent of such contracts flowing to firms that become newly classified as small increases by 1.4 percentage points. Overall, we find that the total

amount allocated to firms designated as "small" does not change, indicating that previously small and newly small firms compete for the same set of resources following size standard increases. These estimates provide direct evidence that following size standard increases, government product demand shifts to newly eligible, larger firms.

Second, we examine the provision of small business loans using loan-level data from the SBA's 7(a) loan program, which is the SBA's primary program for providing financial assistance to small businesses. Prior work highlights that SBA guaranteed loans reduce credit constraints (Brown and Earle, 2017). Unlike procurement contracts, which can be allocated to larger firms reclassified as small businesses, the criteria for SBA loans typically restrict those larger firms from obtaining new loans. Specifically, the "credit elsewhere" provision states that loan applicants must not be able to acquire credit elsewhere at "reasonable" terms, and must have exhausted all other forms of financing in order to be eligible. Accordingly, we expect that increases in size standards that crowd out small firms will lead to an overall decline in credit provision to small businesses. Consistent with this hypothesis, we find that the number of loans guaranteed by the SBA decreases by 13.0% and the total volume of loans falls by 15.6% following a size standard increase.

Overall, this paper provides causal evidence that expanding the classification of small businesses compresses the share of small firms in an industry, leading to adverse effects on business dynamism, as well as industry and regional employment. It contributes to the literature on the effects of government policies targeting firms, which typically include subsidies, tax credits, and grants, often with the goal of stimulating economic growth and innovation (Bloom, Van Reenen, and Williams, 2019). Recent studies focus on the effects of investment subsidies. Zwick and Mahon (2017) and Criscuolo et al. (2019) find that investment subsidies increase investment and local employment. Howell (2017) shows that R&D grants improve patenting and subsequent

financing. Dechezleprêtre et al. (2020) find that R&D tax credits increase firm innovation with positive spillovers for technologically related firms. Our paper adds to this literature by focusing on policies that target small firms. As such, it is also related to recent work that studies the Paycheck Protection Program (PPP), which provided government-guaranteed loans to small firms during the COVID-19 pandemic (Chetty et al., 2020; Granja et al., 2020).

II. Subsidizing Small Firms in the United States

II.A. *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 (SBA). Among its responsibilities, the SBA sets the definitions of small businesses, which are referred to as size standards. These eligibility requirements determine which firms can access certain federal subsidies for small businesses, including set-asides of procurement contracts and guaranteed credit.

Size standards for small businesses are typically based on a firm's annual receipts (revenue) or number of employees. The SBA sets the standards using six-digit North American Industry Classification System (NAICS) codes; hence, they vary substantially by industry. Revenue size standards mostly apply to goods-based firms, whereas employee size standards apply to service-based firms.[7] The size of a business includes all its subsidiaries and affiliates.

---

[7] 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.

The determination of size standards plays a critical role in the allocation of government subsidies to small firms. For example, the federal government aims to set aside 23% of federal procurement contracts for small businesses.[8] Accordingly, we find that 17.3% to 22.6% of contracts in a particular year flow to firms designated as small during our sample period. This represents a substantial proportion of government spending and accounts for an annual average of $91.7 billion in our sample of contracts. As another example, size standards also determine eligibility for SBA-guaranteed loans provided through a nationwide network of participating lenders via the 7(a) loan program. This program provides credit to small businesses that are unable to obtain credit elsewhere at reasonable terms. Eligible small businesses benefit from longer-maturity loans and interest rates that are capped at a fixed spread above prime. Additionally, SBA lenders will not deny an SBA loan simply for lack of collateral. During our sample period, the SBA guaranteed an average of $12.3 billion annually in loans to small businesses.

II.B. *Changes in Firm Eligibility: The Small Business Jobs Act of 2010*

In 2010, the Unites States Congress passed the Small Business Jobs Act, which requires the SBA to conduct a review of no less than one-third of all industry small business size standards every 18 months, with a review of all standards to be completed at least once every five years. Prior to this requirement, the SBA reviewed size standards on an ad hoc basis and occasionally adjusted for inflation those based on firm revenue.[9] To facilitate the mandatory review due to the Act, the SBA released a schedule of reviews by two-digit NAICS sectors in advance.[10] The purpose of the

---

[8] See https://www.sba.gov/federal-contracting/contracting-assistance-programs for additional details.
[9] Digler (2020) provides a history of size standards in the U.S.
[10] 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).

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) would only be eligible for a size standard change if their two-digit NAICS sector was under review.

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 2002 to 2017, of which 491 industries have size standards based on revenue and 692 industries have size standards based on the number of employees.[11]

Table 1 describes the changes in size standards surrounding the Small Business Jobs Act of 2010. Since the SBA periodically adjusted revenue standards for inflation, we restrict attention to changes of at least 25%. To focus on the effects of the legislation, we drop industries with size standard changes that exceeded the 25% threshold prior to the Act. Following the Act, there have been 525 size standard increases.[12] The SBA is considerably less likely to decrease size standards and there have been only three such cases during the sample period. Figure 1 highlights the substantial increase in revenue and employee size standards following the Jobs Act. Revenue size standards nearly doubled from an average of $10.3 million in 2009 to $19.5 million in 2017. The average employee standard rose from 554 employees in 2009 to 770 employees in 2017. Since the SBA uses a fixed number of size categories for revenue and employee size standards, there can be marked jumps throughout the sample period.

---

[11] We drop industries with size standards based on assets or various types of output, such as megawatt hours or barrels of petroleum. Also, three industries switch from revenue to employee size standards from 2002 to 2017.

[12] The SBA finalized Sectors 44, 45, 72, and 81 shortly after the Small Business Jobs Act passed on September 23, 2010. We obtain similar results if we omit these sectors from our analyses.

II.C. *Empirical Design*

We use quasi-random variation in the timing of size standard reviews to identify the real effects of small business subsidies. Following the passage of the Small Business Jobs Act of 2010, the SBA determined the order for reviewing all size standards. Several key features of this review process support that the order is not related to economic fundamentals. First, the SBA predetermined the complete review schedule at the beginning of the review process. Second, the SBA arbitrarily reviewed all revenue-based size standards before reviewing employee-based size standards. Third, the SBA based the schedule on two-digit NAICS sectors for administrative ease, while size standards are set by six-digit NAICS codes.[13] These institutional features of the SBA's review highlight that the ordering of sector reviews were not driven by economic factors. We also confirmed these features with program administrators at the SBA.

We empirically investigate if the announcement, proposal, and finalization dates of size standard reviews are related to the likelihood of a size standard increase. We define *Date announced* as the order of industry reviews based on the date when the review process is announced in the Code of Federal Regulations. We similarly define *Date proposed* and *Date finalized*, which are also gathered from the CFR. The sample includes all industries at the six-digit NAICS code reviewed after the Small Business Jobs Act of 2010. Column 1 of Table A.2 shows that the likelihood of a size standard increase is not associated with the ordering of review announcements across sectors. The coefficient estimate is statistically insignificant, economically negligible, and the regression R-squared is virtually zero. Columns 2 and 3 show that there is no

---

[13] These features are based on 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).

correlation between the likelihood of a size standard increase and the proposal or finalization date, respectively. This suggests that the timing of the reviews is unrelated to size standard increases.

The empirical analyses focus on industries whose size standards increase surrounding the Small Business Jobs Act of 2010. This approach holds constant the change in an industry's small business size standard and identifies the treatment effect using variation in the timing of its implementation. We limit the sample to industries with size standard increases to alleviate concerns that the effects are driven by unobservable industry characteristics or trends correlated with the size standard changes.[14]

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

$$Y_{jt} = \alpha_j + \alpha_t + \beta \cdot Size\ increase_{j,t-1} + \varepsilon_{jt}, \tag{1}$$

where Y_{jt} is the outcome variable of interest for industry j in year t. $Size\ increase_{j,t-1}$ is an indicator variable that equals one when the size standard in industry j increases and zero prior to the increase. We lag this variable by one year since the CFR records size standards as of January 1 of each year, and, consequently, we observe size standards with a delay of up to one year. Industries in the baseline specifications are defined using the six-digit level of NAICS codes. Depending on data availability, we estimate several subsequent analyses in two- or four-digit NAICS sectors. In these cases, we estimate the effects of size standard increases based on the proportion of six-digit industries with size standard increases in each sector, and standardize the proportion to have a mean of zero and a standard deviation of one for ease of interpretation. We include industry fixed effects to capture time-invariant industry heterogeneity. We include year fixed effects to absorb nationwide time trends. Standard errors are clustered at the industry level.

---

[14] We find similar results if we include industries with no size standard changes.

We provide additional variable definitions in Table A.1. The coefficient of interest is β, which estimates the marginal effect of an increase in eligibility for small firm subsidies.

III. Data

We use data from several sources to study the real effects of changes in access to small firm subsidies. We collect data on industry-level establishments and employment from the Statistics of U.S. Businesses (SUSB), which is provided by the Census Bureau. This dataset details establishments and employment by firm size and industry at the six-digit level of NAICS codes.[15] The SUSB is a comprehensive summary of the economy and covers all U.S. establishments with paid employees. We also construct measures of creative destruction, which we refer to as business dynamism, using the SUSB employment data.

We study job flows and earnings using data available from the Longitudinal Employer-Household Dynamics (LEHD) program at the Census Bureau. The LEHD's Job-to-Job Flows (J2J) data allow us to examine labor reallocation by tracing job losses to other industries or to unemployment. The LEHD's Quarterly Workforce Indicators (QWI) data provide detailed information on worker earnings. We use these data to evaluate the labor market effects arising from increases in eligibility for small firm subsidies.

We augment the industry-level data with unemployment data at the Metropolitan Statistical Area (MSA) level provided by the Bureau of Labor Statistics (BLS). We match the unemployment data to the County Business Patterns database from the Census Bureau, which details the breakdown of establishments by firm size and MSA. We use these data to measure regional exposures to changes in size standards. We also collect data on the following control variables for

---

[15] The Census Bureau adds noise to data in the SUSB to address disclosure concerns. We drop observations with high noise or when the data is withheld to avoid disclosing data for individual firms.

our regional analyses: *MSA population* from the American Community Survey provided by the Census Bureau, *MSA house price growth* from the Federal Housing Finance Agency, and *MSA GDP growth* from the Bureau of Economic Analysis (BEA).

We examine the effects of size standard increases on federal programs using detailed data on procurement contracts and SBA loans. We collect data on procurement contracts of the U.S. federal government from the USAspending.gov website, which include detailed contractual data on contract awards, terms and subsequent changes. Brogaard, Denes, and Duchin (2020) provide additional information about these data. We study credit supply by obtaining SBA loan data through a Freedom of Information Act (FOIA) request. The SBA loan data contain every loan guaranteed under the SBA's flagship 7(a) lending program during the sample period, including total loan amount, guaranteed amount, and six-digit NAICS industry codes. We supplement the SBA loan data with non-imputed employment from the National Establishment Time-Series (NETS) database.[16]

Table 2 provides summary statistics for the main variables in the analyses. At the industry-year level, size standards increase for nearly 21% of the industry-year observations. The average share of small firms in an industry is 56% based on establishments and just over 15% based on employment. The average annual percentages of establishment expansions and contractions are 13.6% and 12.7%, respectively. The average MSA unemployment rate is 6.6%. Table A.1 provides details on all variable definitions.

---

[16] We use non-imputed employment to address concerns about estimated NETS data (Crane and Decker (2020)).

IV. Results

IV.A. The *Crowding Out of Small Firms*

We begin by studying the impact of increases in small business size standards on the composition of firms within an industry. Size standards determine the eligibility for several federal subsidies in the United States, including procurement contracts and guaranteed loans. Since larger firms can claim government subsidies when the eligibility criteria are expanded, subsidies may be redirected away from relatively smaller firms, reducing their representation across industries.

Using data from the Census SUSB, we construct two measures of the share of small firms in an industry. *Small establishment ratio* is the total number of establishments of firms with fewer than 20 employees divided by the total number of establishments in an industry each year. Similarly, *Small employee ratio* is the total number of employees working at firms with fewer than 20 employees divided by the total number of employees in a given industry each year. We define small firms based on the number of employees because the SUSB defines firm size based on the number of employees. We focus on firms with fewer than 20 employees to study the effects of size standard increases on the smallest firms in each industry and to mitigate the confounding effects of size manipulation by firms close to the size standard threshold. However, in Table A.3 we show that we find similar effects using alternative size thresholds for small firms. On average, small businesses account for 56.0% of the total number of establishments in an industry and 15.3% of an industry's total number of employees, as reported in Table 2.

We investigate the crowding out of small firms using the difference-in-differences specification in equation (1). The empirical design compares industries with size standard increases to industries that will eventually experience a size standard increase, but are not yet up

for review. This identification strategy exploits the variation in the timing of size standard reviews to provide causal estimates of their effect on the composition of firms within an industry.

Table 3 reports the estimates of the effects of size standard increases on the share of small firms. In column 1, we find that the proportion of small firms in industry establishments drops by 1.6 percentage points following an increase in industry size standards, holding constant time-invariant unobserved industry heterogeneity. The effect is statistically significant at the 1% level and represents a decline of 2.9% relative to the sample mean. In column 2, we augment the regression model with year fixed effects and find that the proportion of small firms in industry establishments drops by 1.1 percentage points, corresponding to a decrease of 2.0% relative to the sample mean. This estimate is also statistically significant at the 1% level.

Columns 3 and 4 provide analogous estimates for the share of small businesses in total industry employment. We find that the ratio of small business employment to total industry employment drops by 0.5 to 0.9 percentage points following an increase in eligibility for small firm subsidies. These estimates represent a sizeable decline of 3.2% to 5.8% relative to the sample mean, and are statistically significant at the 5% level or better.

Table A.3 shows that the baseline estimates hold across different small business size thresholds. Since the SUSB only provides aggregate establishment and employment data across size bins, we cannot estimate firm-level regressions. Instead, we can evaluate the robustness of our findings by varying the threshold for small firms in an industry. In the analyses of *Small establishment* ratio, column 1 shows that the estimates do not change when we use a cutoff of 100 employees to define small firms. Column 2 shows that the effects are similar when we use a cutoff of 500 employees. In columns 3 and 4, we re-estimate the specifications for *Small employment ratio* with the 100- and 500-employee thresholds, respectively, and find that the effects remain

strong, negative, and highly statistically significant. These estimates provide additional evidence that increases in eligibility for small business subsidies crowd out small firms.

We investigate the dynamic treatment effects in Table A.4. We estimate dynamic regression specifications in a four-year window around the increase in size standards for an industry by including interaction terms for each year in this window. The year of the size standard increase is defined as the base year. Table A.4 provides two important results. First, changes in the ratio of small business establishment and employment in an industry do not precede size standard increases. Where the coefficients are statistically significant before the size standards increase, they are of the opposite sign and economically small. Second, both small business ratios decrease immediately following the size standard change, and the effects persist following the change. These findings are consistent with the parallel trends assumption for our identification strategy and mitigate concerns about reverse causality, a scenario where changes in the composition of firms in an industry lead to changes in its small business size standard.

Taken together, these results provide novel evidence on the causal effects of increasing the eligibility for small firm subsidies. When size classifications are loosened, larger firms become eligible for preferential treatment and can receive subsidies previously reserved for relatively smaller firms. We find evidence consistent with the crowding out of small firms – the representation of the smallest firms within an industry contracts following an increase in small business size standards. This finding also highlights the potential unintended consequences of business size policies.

IV.B. *Creative Destruction*

The real economic consequences of the crowding out of small firms are theoretically unclear. The role that small firms play in technological change and economic growth has been a subject of debate among economists for many years. On the one hand, large firms have been viewed as vital to the modern economy, echoed in the concepts of economies of scale and monopoly power (Adam Smith, 1776; Galbraith, 1957). On the other hand, others contend that small firms importantly differ from large firms and are crucial for economic growth. Schumpeter (1912, 1942) highlighted that innovative activity and creative destruction are driven by small firms and Schumacher (1973) coined that "small is beautiful."

To estimate the impact of size standard increases on creative destruction in an industry, we estimate difference-in-differences regressions akin to equation (1). Importantly, in these analyses, we define industries at the four-digit NAICS code based on the most granular data available from the SUSB.[17] We define *Size standard proportion* as the proportion of size standard increases within an industry-year. Table A.1 provides additional details on variable definitions.

Using the employment change data from the Census SUSB data, we form measures of creative destruction. *Expansions* is defined as the number of establishments that increase employment relative to the total number of establishments in the previous year. Similarly, *Contractions* is defined as the number of establishments that decrease employment relative to the total number of establishments. We also construct a more general measure, *Dynamism,* which is defined as the number of establishment births and expansions over the number of contractions and deaths. Table 2 shows that the average expansion rate of small firms is 13.6% and the average rate of small firm contractions is 12.7%.

---

[17] We follow a similar identification strategy and limit the sample to four-digit NAICS sectors in which at least one six-digit industry experienced a size standard increase during the sample period.

Table 4 provides the results. In Panel A, we report the estimates for measures of creative destruction at small firms. Column 1 shows that the proportion of small firm expansions significantly declines by 1.2 percentage points. To shed light on the economic magnitude of the effect, if size standards increase for half of the industries in a four-digit NAICS sector, small firms' expansion rates drops by 4.4% relative to the sample mean. The estimates in column 2 suggest that contraction rates increase by 3.9% compared to the sample mean for a similar increase in the *Size increase proportion*. Lastly, in column 3, we find that small firm dynamism falls by 10.9 percentage points. All the estimates are statistically significant at 1% level. These findings suggest that creative destruction at small firms is impeded when the eligibility for small business subsidies is loosened.

More importantly, panel B provides the industrywide results. We find that increases in size standards significantly reduce the rate of expansions (column 1) and increase the rate of contractions (column 2) in an industry. When size standards increase for half of the industries in a four-digit NAICS sector, the expansion rate drops by 6.1% and the contraction rate jumps by 6.7%, both relative to the sample mean. Column 3 shows that dynamism also declines at the industry level. These estimates are once again highly statistically significant at the 1% level. The industry results indicate that the fall in creative destruction spills over from small firms to the rest of an industry, consistent with the documented decline in U.S. in recent years ((Decker et. al, 2014; Decker et. al, forthcoming).

In sum, the expansion in eligibility for small firm subsidies substantially dampens creative destruction. These findings have two important implications. First, subsidizing small firms has nontrivial effects on economic growth. Second, expanding the set of firms eligible for small business subsidies produces unintended consequences for business dynamism.

IV.C. *Employment, Labor Reallocation, and Wages*

In this subsection, we investigate the labor market impact of increases in size standards. We ask the following three questions about the effect of eligibility for small firm subsidies on labor markets. First, do changes in size standards affect industry employment? Second, what is the impact on labor reallocation around size standard increases? Third, do wages adjust following changes in eligibility for small firm subsidies?

To evaluate the effect of size standard increases on industry labor markets, we use data from the Census SUSB. We construct two variables to measure industry-level labor market activity. We define *Employment* as the log change in the total number of employees in an industry and *Payroll* as the log change in the total wages in an industry.

Table 5 provides regression estimates on the effect of size standard increases on industry labor markets. Column 1 shows that employment growth declines by 1.5 percentage points after size standards increase. This estimate is statistically significant at the 1% level. In column 2, we find that payroll growth drops by 1.2 percentage points when the eligibility for small firm subsidies increases. These findings are consistent with the Schumpeterian view of small firms. They suggest that economic activity in labor markets slows following the crowding out of small firms due to size standard increases.

Next, we investigate the reallocation of labor following the decline in employment. We use data on job flows from the Census LEHD's Job-to-Job Flows. We define *Aggregate job losses* as the number of separations into persistent unemployment and *Stable job losses* as the number of separations from a stable job into persistent unemployment.[18] These data are available for two-digit NAICS codes.[19] Accordingly, we calculate *Size standard proportion* as the proportion of size

---

[18] Persistent unemployment is defined by the Census LEHD as no main job in two consecutive surveys.
[19] In the sample, each two-digit NAICS sector has at least one six-digit NAICS industry with a size standard increase.

standard increases within an industry-year. For interpretability, the outcomes are standardized to have a mean of zero and a standard deviation of one. Table A.1 provides additional details on variable definitions.

Panel A of Table 6 reports the effect of size standard increases on industry job losses. Column 1 shows that size standard increases trigger aggregate job losses that lead to persistent unemployment. An interquartile increase from the 25th percentile to the 75th percentile in the proportion of size standard increases leads to a 0.3 standard deviation increase in industrywide job losses. Column 2 suggests that a similar increase in the proportion of size standard increases leads to a 0.2 standard deviation increase in stable job losses. The estimates in columns 1 and 2 are statistically significant at the 5% level or better. Together, they suggest that job losses are not driven by adjustments to temporary workers; rather, size standard increases lead to a decline in full-time jobs in an industry.

Lastly, we examine the impact of size standard increases on wages. For this analysis, we use data on the Census LEHD's Quarterly Workforce Indicators. These data are available at the 4-digit NAICS level by state. As before, we aggregate the data to the 4-digit industry classification level. However, unlike the previous analyses, the unit of observation is an industry-state-year. Hence, we augment these specifications with state fixed effects to absorb time-invariant state heterogeneity. For interpretability, the outcomes are standardized to have a mean of zero and a standard deviation of one. Table A.1 provides additional details on variable definitions.

Panel B of Table 6 provides estimates of the effects of size standard increases on the earnings of current and new employees. Column 1 shows that earnings decline for an industry's current employees when size standards increase. An increase in size standards for half of the industries in a four-digit NAICS sector leads to a decline of 0.03 standard deviations in earnings.

Column 2 investigates the impact of standard increases in the earnings of new employees within an industry. The estimates suggest that an increase in size standards for half of the industries in a four-digit NAICS sector leads to a decline of 0.02 standard deviations in the earnings of new employees.

Overall, these results suggest that size standard increases lead to a contraction in labor markets. Displaced Employees cannot find new jobs immediately. The estimates also suggest that the earnings of current and new employees decline. These findings indicate that the crowding out of smaller firms has potential long-term negative consequences for labor market activity.

IV.D. *Agglomeration*

An extensive literature studies agglomeration economy, or the formation of geographic clusters of economic activity, and highlights the synergistic benefits from co-location (e.g., Glaeser and Gottlieb, 2009; Moretti, 2011). These spillovers extend to local productivity, investment, and employment growth (Greenstone, Hornbeck, and Moretti, 2010; Dougal, Parsons, and Titman, 2015; Glaeser, Kerr, and Kerr, 2015). If the distribution of small firms differs across local economies, then the impact of size standard changes might vary across regions in the United States.

We measure local labor market activity using *MSA unemployment rate*, defined as the annual unemployment rate in a Metropolitan Statistical Area (MSA). To account for local economic conditions, we include several control variables in the regression specifications: *MSA population* is the log of MSA-level population; *MSA house price growth* is the log change in MSA-level house prices; and *MSA GDP growth* is the growth rate of MSA GDP.

We measure regional exposure to changes in size standards using the number of industry establishments by firm size at the MSA level from the Census County Business Patterns data. First, we classify a business as small if it has fewer than 20 employees. Second, we calculate the within-industry proportion of local establishments classified as small in each MSA as of 2003, the starting year of the sample period for the MSA-level data. By calculating the concentration of small businesses in 2003, we mitigate concerns about the simultaneity of local small business concentration and changes in small business size standards. Third, we multiply this proportion by the corresponding industry's size standard increase indicator in year *t-1*. Finally, we sum the weighted industry size standard increases to the MSA level, and refer to this variable as *MSA exposure to size standard increases*. For ease of interpretation, we standardize this variable to have a mean of zero and a standard deviation of one. Intuitively, this measure assigns larger weights to MSAs that have a higher concentration of small firms operating in industries with size standard increases. Since the proportion of small businesses is measured as of 2003, and hence is time-invariant, the variation in *MSA exposure to size standard increases* over time arises from increases in small business size standards.

We estimate equation (1) at the MSA-year level and augment the specification with MSA and year fixed effects to control for time-invariant regional heterogeneity and aggregate macroeconomic trends. We report the results in Table 7. The estimates in column 1 suggest that a one standard deviation increase in an MSA's exposure to increases in size standards dampens local unemployment by 1.2 percentage points. This estimate is statistically significant at the 1% level and economically large, representing an 18.2% increase relative to the sample mean. Next, we incorporate covariates for local economic activity to examine whether the estimate is driven by regional economic conditions. Column 2 contains lagged MSA population, column 3 adds lagged

MSA house price growth, and column 4 includes MSA GDP growth. The estimates remain highly statistically significant and largely unchanged, ranging from 1.1 to 1.2 percentage points. These findings suggest that increasing size standards not only depresses employment at the industry level, but also spills over to regions with greater concentrations of small firms.

Taken together, these results provide causal evidence on the importance of subsidizing small firms. Exploiting variation in the timing of size standard increases, we find that expanding the eligibility criteria crowds out small firms. We also find declines in creative destruction and industry employment. These changes lead to persistent unemployment and lower wages for workers in affected industries. Lastly, local labor markets with a greater concentration of small firms experience higher unemployment.

V. *Impact on Federal Programs*

Size standards determine firms' eligibility for several small business federal subsidies in the United States. We focus on two of the largest programs that target small firms and use small business size standards: small business set-asides in federal procurement contracts initiated by the federal government and subsidized small business loans guaranteed by the SBA.

V.A. *Procurement Contracts*

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. From 2002 to 2017, the federal government purchased $284 billion to $510 billion from contractors, with 17.3% to 22.6% flowing

to small firms, as shown in Table A.5. Changes in small business size standards modify the set of firms qualifying for government procurement contracts as small businesses.

We use detailed data on procurement contracts to study the allocation of contracts across firms that were classified as small businesses before the expansion in eligibility criteria and firms that are newly classified as small businesses following the expansion in eligibility criteria. We can estimate these analyses at the firm level because the contracts data identifies small business contracts as such. As before, the sample only includes industries with a size standard increase. Furthermore, we focus on firms that received contracts before the size standards change. This allows us to examine the role of procurement contracts holding constant the set of firms receiving contracts. We define *Percent of contracts to always small firms* as the proportion of contracts awarded to firms classified as small before a size standard increase. Similarly, we define *Percent of contracts to newly small firms* as the proportion of contracts awarded to firms classified as small only after a size standard increase. Lastly, we construct *Contract amount to small firms* as the log of one plus the total dollar amount of contracts awarded to firms classified as small.

Table 8 examines the flow of contracts to small firms following increases in size standards following equation (1). In column 1, we find that the percent of contracts to firms that were previously classified as small declines by 5.6 percentage points. This estimate is statistically significant at the 1% level and represents a 13.9% drop relative to the sample mean. Next, we evaluate the allocation of contracts to firms that become small due to the increase in size standards. Column 2 shows that the percent of contracts flowing to newly classified small firms increases by 1.4 percentage points. This estimate is economically sizable and also statistically significant at the 1% level.

We note, however, that expanding the eligibility for small firm subsidies could increase the allocation of the contracts to small firms. According to this scenario, increases in size standards do not necessarily lead to the crowing of smaller firms out of procurement contracts. To assess this possibility, we estimate the impact of size standard changes on the overall allocation of contracts to small firms in an industry. Column 3 shows that the overall dollar amount of contracts awarded to small firms does not change following size standard increases. This result is evident by the statistically insignificant and economically tiny coefficient on *Size increase* in column 3.[20] This result suggests that the overall dollar amount of contract awards to small firms does not change, on average, following increases in size standards. Instead, newly eligible, larger firms compete with smaller firms for the same goods and services demanded by the federal government and, consequently, receive more contracts following size standards increases, at the expense of smaller firms.

Collectively, these findings indicate that procurement contracts are an important channel through which increases in size standards impact small firms. Increases in size standards reduce the flow of contracts to firms classified as small prior to the size standard change, and increase the volume of contracts to newly qualifying firms. Overall, 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 set-asides following size standard increases.

V.B. *Credit Supply*

Small firms often face considerable frictions in raising capital. To alleviate these frictions, the federal government supports the supply of credit when these firms cannot obtain loans originated

---

[20] This specification includes all firms designated as small, including first-time contractors that enter the sample after size standard increases. Accordingly, this sample differs from the sample of contractors in columns 1 and 2.

in the marketplace. The SBA guarantees these loans and they are intermediated through banks. Importantly, size standards determine firm eligibility. The SBA guarantees a substantial amount of credit through its 7(a) program each year. In 2017, it guaranteed a total of $19.8 billion.

We use data on SBA loans received through a FOIA request. We merge the loan-level data with firm-level data from NETS to measure the number of employees at firms obtaining credit guarantees. We construct three variables to measure SBA loans. First, we define *Number of loans* as the number of loan guarantees in an industry-year. Second, we define *Total credit* as the log of one plus gross SBA loan amount in an industry. Lastly, *Guaranteed credit* is the log of one plus total guaranteed SBA loans in an industry.

This analysis differs from that of procurement contracts in two important ways. First, the SBA data only include firms that receive loans, and these firms predominantly enter the sample only once. The lack of repeat borrowing precludes an analysis similar to that of procurement contracts for firms always classified as small. Second, SBA loans carry a "credit elsewhere" eligibility requirement: applicants must not be able to acquire credit elsewhere at "reasonable" terms, and must have exhausted all other forms of financing in order to be eligible.[21] In practice, this requirement prevents larger firms from obtaining SBA loans even if they qualify according to the size standard. Based on SBA loans matched to the NETS data, the average (median) borrower has 9 (4) employees, suggesting that only the smallest firms utilize the SBA 7(a) credit program.

Table 9 reports the results for SBA-guaranteed credit. As before, the specifications follow equation (1). Column 1 examines the effect of a size standard increase on the number of guaranteed loans. Since the outcome is a count variable, we estimate this specification using a Poisson

---

[21] The Small Business Jobs Act implemented an alternative size standard for SBA loans. Businesses are eligible if "(i) the maximum tangible net worth of the applicant is not more than $15,000,000" and "(ii) the average net income after Federal income taxes (excluding any carry-over losses) of the applicant for the 2 full fiscal years before the date of the application is not more than $5,000,000."

model.[22] We find that an increase in size standards reduces the number of SBA-guaranteed loans to an industry by 13.0%. This estimate is economically large and statistically significant at the 1% level. We evaluate the effects on credit amounts in columns 2 and 3. Column 2 shows that total lending falls by 15.6% after size standard increases. We also show that the guaranteed portion of credit drops by 16.1% in column 3.[23] These estimates are also statistically significant at the 1% level. Overall, the results suggest a decline in the supply of government-guaranteed credit when size standards increase.

These estimates complement our findings in Section IV.A., which show that increases in eligibility for small firm subsidies crowd out the smallest firms in an industry. As the share of these firms drop following size standard increases, small business credit origination declines. Taken together, the results in this section suggest that changes in small business size standards have broad implications for federal programs that aim to subsidize small firms.

VI. *Conclusion*

Following the Small Business Jobs Act of 2010, the United States has considerably increased the number of firms eligible for small business subsidies. Exploiting randomness in the timing of the staggered implementation of size standard increases across industries, we provide first evidence on the causal effects of these policy changes. We find substantial effects on the composition of firm size across industries in the United States, with adverse consequences for the forces of creative destruction and labor markets.

The evidence shows that classifying a growing number of larger firms as small businesses adversely affects the smallest firms, whose share of industry establishments and employment

---

[22] We use a Poisson model to provide unbiased and consistent estimates (Cohn, Liu, and Wardlaw, 2020).
[23] Since the outcome is a natural logarithm in columns 2 and 3, we report the exponentiated coefficient minus one.

shrinks considerably. Moreover, the crowding out of the smallest firms has significant implications for real economic outcomes. In particular, size standard increases reduce expansions and amplify contractions, both for small firms and within an industry. The reclassification impacts labor markets through reductions in employment growth. These effects lead to unemployment for workers losing their job, rather than reallocation to other sectors, and lower wages for those remaining in affected industries. We also show that the effects are heightened in regions with a greater concentration of small firms and exposure to size standard increases.

Increasing eligibility for small firm subsidies has important implications for government programs targeting small businesses. We explore two such subsidies: federal government procurement and guarantees for small business loans. We find evidence suggesting that existing small firms lose contracts to companies that are newly classified as small businesses, and that relatively fewer businesses receive loan guarantees following size standard increases.

Our results have overarching implications for academic research and government policy. They provide causal estimates of the crucial role of subsidizing small businesses in economic growth and labor markets, operating both within industries and within agglomeration economies. Furthermore, they show that changes in government policies weakening the preferential treatment of small firms have significant adverse economic consequences. These findings are particularly important amid the adverse economic impact of the COVID-19 pandemic on small businesses and the ongoing debate surrounding the optimal government response to the crisis.

References

Banerjee, Abhijit V., and Esther Duflo, 2014, Do firms want to borrow more? Testing credit constraints using a directed lending program, *Review of Economic Studies*, 81(2): 572-607.

Barrot, Jean-Noël, Ramana Nanda, 2020, The employment effects of faster payment: Evidence from the federal Quickpay reform, *Journal of Finance*, 75(6): 3139-3173.

Bloom, Nicholas, Van Reenen, and Heidi Williams, 2019, A toolkit of policies to promote innovation, *Journal of Economic Perspectives*, 28(3): 3-24.

Brown, J. David, and John S. Earle, 2017, Finance and growth at the firm level: Evidence from SBA loans, *Journal of Finance*, 72(3): 1039-1080.

Chetty, Raj, John N. Friedman, Nathaniel Hendren, Michael Stepner, and the Opportunity Insights Team, 2020, How did COVID-19 and stabilization policies affect spending and employment? A new real-time economic tracker based on private sector data, *NBER working paper*.

Criscuolo, Chiara, Ralf Martin, Henry G. Overman, and John Van Reenen, Some causal effects of an industrial policy, *American Economic Review*, 109(1): 48-85.

Decker, Ryan A., John Haltiwanger, Ron S. Jarmin, and Javier Miranda, 2014, The role of entrepreneurship in US job creation and economic dynamism, *Journal of Economic Perspectives*, 28(3): 3-24.

Dechezleprêtre, Antoine, Elias Einiö, Ralf Martin, Kieu-Trang Nguyen, and John Van Reenen, 2020, Do tax incentives increase firm innovation? An RD Design for R&D, *Working paper*.

Delgado, Mercedes, Michael E. Porter, and Scott Stern, 2010, Clusters and entrepreneurship, *Journal of Economic Geography*, 10(4): 495-518.

Dougal, Casey, Christopher A. Parsons, and Sheridan Titman, 2015, Urban vibrancy and corporate growth, *Journal of Finance*, 70(1): 163-210.

Evans, David S., and Boyan Jovanovic, 1989, An estimated model of entrepreneurial choice under liquidity constraints, *Journal of Political Economy*, 97(4): 808-827.

Glaeser, Edward L., and Joshua D. Gottlieb, 2009, The wealth of cities: Agglomeration economies and spatial equilibrium in the United States, *Journal of Economic Literature*, 47(4), 983-1028.

Glaeser, Edward L., Sari Pekkala Kerr, and William R. Kerr, 2015, Entrepreneurship and urban growth: An empirical assessment with historical mines, *Review of Economics and Statistics*, 97(2): 498-520.

Granja, João, Christo Makridis, Constantine Yannelis, and Eric Zwick, 2020, Did the Paycheck Protection Program hit the target, *NBER working paper*.

Greenstone, Michael, Richard Hornbeck, and Enrico Moretti, 2010, Identifying agglomeration spillovers: Evidence from winners and losers of large plant openings, *Journal of Political Economy*, 118(3): 536-598.

Howell, Sabrina T., 2017, Financing innovation: Evidence from R&D grants, *American Economic Review*, 107(4): 1136-64.

Jones, Charles I., and John C. Williams, 1998, Measuring the social return to R&D, *Quarterly Journal of Economics*, 113(4): 1119-1135.

Kerr, William R., Josh Lerner, and Antoinette Schoar, 2014, The consequences of entrepreneurial finance: Evidence from angel financings, *Review of Financial Studies*, 27(1): 20-55.

Martin, Leslie A, Shanthi Nataraj, and Ann E. Harrision, 2017, *American Economic Review*, 107(2): 354-386.

Moretti, Enrico, 2011, Local labor markets. In Orley Ashenfelter and David Card (Eds.), Handbook of labor economics (Vol. 4B). Amsterdam: North Holland.

Puri, Manju, and Rebecca Zarutskie, 2012, On the life cycle dynamics of venture-capital-and non-venture-capital-financed firms, *Journal of Finance*, 67(6): 2247-2293.

Robb, Alicia M., and David T. Robinson, 2014, The capital structure decisions of new firms, *Review of Financial Studies*, 27(1): 153-179.

Rotemberg, Martin, 2019, Equilibrium effects of firm subsidies, *American Economic Review*, 109(10): 3475-3513.

Zwick, Eric, and James Mahon, 2017, Tax policy and heterogeneous investment behavior, *American Economic Review*, 107(1): 217-48.

Figure 1

Figure 2

Share of Establishments for Small Firms

Share of Employment for Small Firms
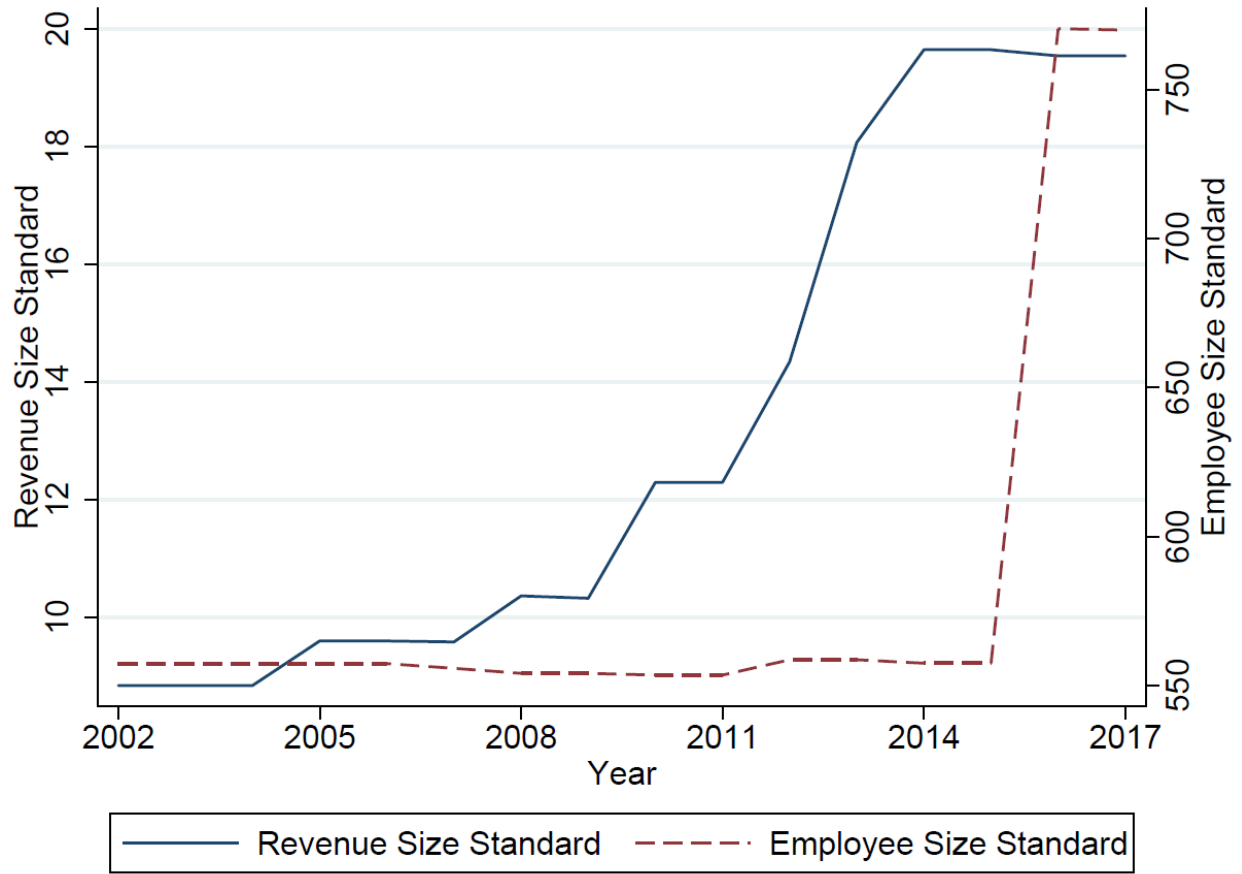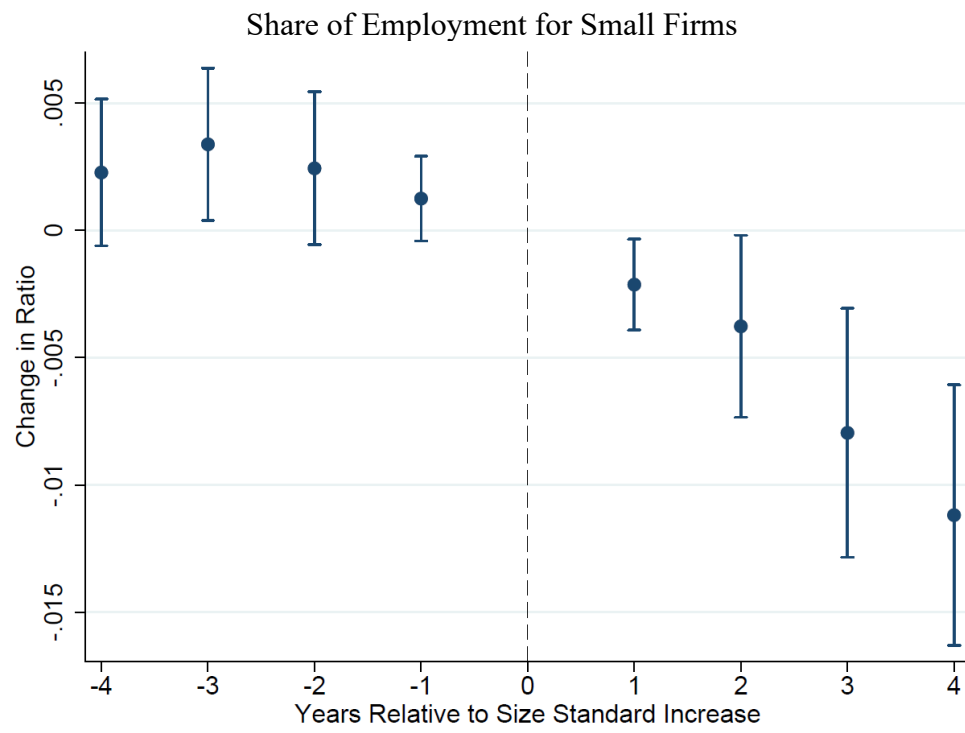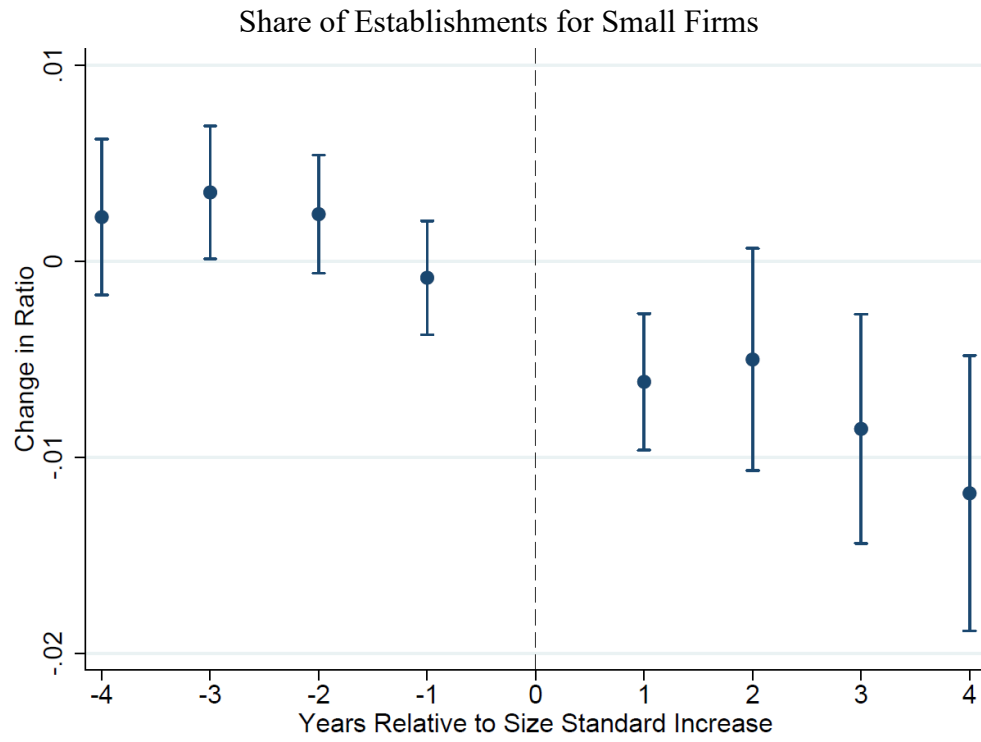
Table 1

Size Standards

This table provides summary statistics for size standard changes stemming from the Small Business Jobs Act of 2010. *Cumulative number of increases* is the cumulative number of size standard increases from 2002 to 2017. *Cumulative number of decreases* is the cumulative number of size standard decreases from 2002 to 2017. *Number of revenue standard increases* is the number of size standard increases based on firm revenue. *Average revenue standard* is the average revenue standard ($ million) for industries with a revenue size standard. *Number of employee standard increases* is the number of size standard increases based on firm employees. *Average employee standard* is the average employee standard for industries with an employee size standard.

Year	Cumulative number of increases	Cumulative number of decreases	Number of revenue standard increases	Average revenue standard ($ million)	Number of employee standard increases	Average employee standard
2002	0	0	0	8.8	0	557
2003	0	0	0	8.8	0	557
2004	0	0	0	8.8	0	557
2005	0	0	0	9.6	0	557
2006	0	0	0	9.6	0	557
2007	0	0	0	9.6	0	556
2008	0	0	0	10.4	0	554
2009	0	0	0	10.3	0	554
2010	62	0	62	12.3	0	553
2011	62	0	0	12.3	0	553
2012	160	0	96	14.3	2	559
2013	262	0	102	18.1	0	559
2014	266	0	3	19.6	1	557
2015	266	0	0	19.6	0	557
2016	525	3	0	19.5	259	770
2017	525	3	0	19.5	0	770

Table 2
Summary Statistics

This table details the summary statistics for main variables used in the analysis. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Small establishment ratio* is the number of establishments for firms with less than 20 employees relative to the number of establishments in an industry. *Small employment ratio* is the number of employees at firms with less than 20 employees relative to the number of employees in an industry. *Expansions* is the number of establishments that increase employment relative to the total number of establishments in the previous year. *Contractions* is the number of establishments that decrease employment relative to the total number of establishments in the previous year. *Dynamism* is defined as the number of establishment births and expansions over the number of contractions and deaths. *Expansions*, *Contractions*, and *Dynamism* are defined for small firms with less than 20 employees and at the industry level. *Employment* is the log change in the total number of employees in an industry. *Payroll* is the log change in the total wages in an industry. *Aggregate job losses* is the number of separations into persistent unemployment. *Stable job losses* is the number of separations from a stable job into persistent unemployment. *Earnings for current employees* is the average earnings for all workers. *Earnings for new employees* is the average earnings for new workers. number of separations into a spell of full-quarter unemployment. The outcomes related to job losses and earnings are standardized by subtracting the sample mean and dividing by the standard deviation. *MSA unemployment rate* is the unemployment rate in an MSA. *MSA population* is the log of MSA population. *MSA house price growth* is the log change in MSA house prices. *MSA GDP growth* is the log change in MSA GDP. Table A.1 provides additional details on variable definitions.

Variable	Number of observations	Mean	Median	Minimum	Maximum	Standard deviation
Size increase	7,403	0.209	0.000	0.000	1.000	0.407
Small establishment ratio	7,403	0.560	0.566	0.003	1.000	0.218
Small employment ratio	7,003	0.153	0.107	0.000	0.868	0.143
Expansions (small firm)	1,458	0.136	0.137	0.000	0.361	0.049
Contractions (small firm)	1,458	0.127	0.128	0.000	0.301	0.047
Dynamism (small firm)	1,458	1.068	1.069	0.000	3.462	0.283
Expansions (industry)	1,458	0.289	0.280	0.027	0.613	0.082
Contractions (industry)	1,458	0.284	0.273	0.032	0.696	0.078
Dynamism (industry)	1,458	1.046	1.066	0.214	2.614	0.293
Employment	7,184	-0.003	0.003	-1.289	1.763	0.109
Payroll	7,184	0.024	0.030	-1.163	1.793	0.120
Aggregate Job Losses	1,216	0.000	-0.348	-1.188	2.623	1.000
Stable Job Losses	1,216	0.000	-0.366	-1.156	3.067	1.000
Earnings for Current Employees	152,428	0.000	-0.173	-1.292	86.849	1.000
Earnings for New Employees	152,428	0.000	-0.190	-1.449	72.236	1.000
MSA unemployment rate	4,364	0.066	0.059	0.020	0.289	0.028
MSA population	4,364	12.536	12.303	10.904	15.685	0.943
MSA house price growth	4,364	0.019	0.017	-0.605	0.346	0.069
MSA GDP growth	4,364	0.034	0.036	-0.439	0.425	0.053

Table 3
Crowding Out Small Firms

This table examines the effect of size standard increases on industry composition. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Small establishment ratio* is the number of establishments for firms with less than 20 employees relative to the total number of establishments in an industry. *Small employment ratio* is the number of employees at firms with less than 20 employees relative to the total number of employees in an industry. Industries are defined at the 6-digit NAICS code level. Table A.1 provides additional details on variable definitions. All models include industry fixed effects. Models 2 and 4 also include year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Establishment Ratio	Establishment Ratio	Small Employment Ratio	Small Employment Ratio
Model	(1)	(2)	(4)	(5)
Size increase	-0.016***	-0.011***	-0.009***	-0.005**
	(0.003)	(0.004)	(0.002)	(0.002)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	No	Yes	No	Yes
Observations	7,403	7,403	7,003	7,003
R-squared	0.963	0.963	0.967	0.967

Table 4
Creative Destruction

This table explores the role of size standard increases on creative destruction. Panel A provides estimates for small firms and Panel B details estimates for the total industry. *Size standard proportion* is the proportion of size standard increases within a particular industry-year. *Dynamism* is defined as the number of establishment births and expansions over the number of contractions and deaths. *Expansions* is the number of establishments that increase employment relative to the total number of establishments in the previous year. *Contractions* is the number of establishments that decrease employment relative to the total number of establishments in the previous year. Table A.1 provides additional details on variable definitions. Industries are defined at the 4-digit NAICS code level. 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.

Panel A: Small Firms

Dependent variable	Expansions	Contractions	Dynamism
Model	(2)	(3)	(1)
Size increase proportion	-0.012***	0.010***	-0.109***
	(0.003)	(0.002)	(0.027)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	1,458	1,458	1,458
R-squared	0.896	0.905	0.660

Panel B: Industry Dynamics

Dependent variable	Expansions	Contractions	Dynamism
Model	(2)	(3)	(1)
Size increase proportion	-0.035***	0.038***	-0.142***
	(0.008)	(0.008)	(0.040)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	1458	1458	1458
R-squared	0.762	0.724	0.566

Table 5

Labor Markets

This table studies the effect of size standard increases on industry labor markets. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Employment* is the log change in the total number of employees in an industry. *Payroll* is the log change in the total wages in an industry. Industries in this table are defined at the 6-digit NAICS code level. Table A.1 provides additional details on variable definitions. 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.

Dependent variable	Employment	Payroll
Model	(1)	(2)
Size increase	-0.015***	-0.012*
	(0.005)	(0.006)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	7,184	7,184
R-squared	0.088	0.098

Table 6
Job Losses and Earnings

This table examines the effect of size standard increases on job losses in Panel A and worker earnings in Panel B. *Size standard proportion* is the proportion of size standard increases within a particular industry-year. *Aggregate job losses* is the number of separations into persistent unemployment. *Stable job losses* is the number of separations from a stable job into persistent unemployment. *Earnings for current employees* is the average earnings for all workers. *Earnings for new employees* is the average earnings for new workers. number of separations into a spell of full-quarter unemployment. Industries are defined at the 2-digit NAICS code level in Panel A and the 4-digit NAICS code level in Panel B. The unit of observation is an industry-year in Panel A and an industry-state-year in Panel B. The outcomes in each panel are standardized by subtracting the sample mean and dividing by the standard deviation. All models include industry and year fixed effects in Panel A and all models include industry, year, and state fixed effects in Panel B. The specifications in Panel A are weighted by the number of industries at the 6-dight NAICS code level. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Panel A: Job Losses

Dependent variable	Aggregate Job Losses	Stable Job Losses
Model	(1)	(2)
Size increase proportion	0.505**	0.358**
	(0.194)	(0.161)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	1,216	1,216
R-squared	0.897	0.903

Panel B: Earnings

Dependent variable	Earnings for Current Employees	Earnings for New Employees
Model	(1)	(2)
Size increase proportion	-0.051*	-0.047**
	(0.027)	(0.021)
Industry fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	152,428	152,428
R-squared	0.336	0.411

Table 7
Agglomeration

This table studies the role of size standard increases on local unemployment. *MSA exposure to size standard increase* is the sum of size standard increases weighted by the 2003 proportion of an industry's establishments with less than 20 employees in an MSA. This variable is standardized by subtracting the sample mean and dividing by the standard deviation. *MSA unemployment rate* is the unemployment rate in an MSA. *MSA population* is the log of MSA population. *MSA house price growth* is the log change in MSA house prices. *MSA GDP growth* is the log change in MSA GDP. All models include MSA and year fixed effects. Standard errors are reported in parentheses and clustered at the MSA level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Unemployment Rate	Unemployment Rate	Unemployment Rate	Unemployment Rate
Model	(1)	(2)	(3)	(4)
MSA exposure to size standard increase	0.012***	0.011***	0.012***	0.011***
	(0.003)	(0.002)	(0.002)	(0.002)
MSA population		0.009*	0.006	0.006
		(0.005)	(0.004)	(0.004)
MSA house price growth			-0.074***	-0.068***
			(0.005)	(0.005)
MSA GDP growth				-0.029***
				(0.004)
MSA fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	4,364	4,364	4,364	4,364
R-squared	0.887	0.887	0.907	0.909

Table 8
Procurement Contracts

This table examines the role of procurement contracts in size standard increases. In this table, small firms are based on the designation of small businesses in the contracts data. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Percent of contracts to always small firms* is the proportion of contracts awarded to firms that are designated as small before a size standard increase. *Percent of contracts to newly small firms* is the proportion of contracts awarded to firms that are designated as small only after a size standard increase. *Contract amount to small firms* is the log of one plus the amount of contracts awarded to firms that are designated as small. The sample only includes industries with a size standard increase and firms that received contracts before the size standards change. 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.

Dependent variable	to Always Small Firms	to Newly Small Firms	Contract Amount to Small Firms
Model	(1)	(2)	(3)
Size increase	-0.056***	0.014***	0.007
	(0.014)	(0.003)	(0.163)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	7,378	7,378	7,378
R-squared	0.586	0.250	0.745

Table 9

SBA Loans

This table explores the role of SBA loans in size standard increases. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Number of Loans* is the number of loans in an industry. *Total Credit* is the log of one plus the gross SBA loans in an industry. *Guaranteed Credit* is the log of one plus the guaranteed SBA loans in an industry. Industries are defined at the 6-digit NAICS code level. All models include industry and year fixed effects. Column 1 is estimated using a Poisson model, since the dependent variable of number of loans is a count variable. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Number of Loans	Total Credit	Guaranteed Credit
Model	(1)	(2)	(3)
Size increase	-0.130***	-0.170***	-0.176***
	(0.051)	(0.056)	(0.060)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	7,172	7,172	7,172
R-squared	0.914	0.722	0.707

Table A.1
Variable Definitions

Variable Name	Description	Source
Size increase	An indicator variable equaling one when the size standards increase for a particular industry.	Code of Federal Regulations
Size increase proportion	Proportion of size standard increases within a particular industry-year.	Code of Federal
MSA exposure to size standard increase	Sum of size standard increases weighted by the proportion of an industry's establishments with less than 20 employees in an MSA in 2003. This variable is standardized by subtracting the sample mean and dividing by the standard	Code of Federal Regulations and County Business Patterns (Census Bureau)
Small establishment ratio	Number of establishments for firms with less than 100 employees relative to the total number of establishments in an industry.	Statistics of U.S. Businesses (Census Bureau)
Small employment ratio	Number of employees at firms with less than 100 employees relative to the total number of employees in an industry.	Statistics of U.S. Businesses (Census Bureau)
Dynamism	Number of establishment births and expansions over the number of contractions and deaths.	Statistics of U.S. Businesses (Census Bureau)
Expansions	Number of establishments that increase employment relative to the total number of establishments in the previous year.	Statistics of U.S. Businesses (Census Bureau)
Contractions	Number of establishments that decrease employment relative to the total number of establishments in the previous year.	Statistics of U.S. Businesses (Census Bureau)
Employment	Log change in the total number of employees in an industry	Statistics of U.S. Businesses (Census Bureau)
Payroll	Log change in the total wages in an industry.	Statistics of U.S. Businesses (Census Bureau)
Aggregate job losses	Number of separations into persistent unemployment. This variable is standardized by subtracting the sample mean and dividing by the standard	Job-to-Job Flows (Census Bureau)
Stable job losses	Number of separations from a stable job into persistent unemployment. This variable is standardized by subtracting the sample mean and dividing by the standard deviation.	Job-to-Job Flows (Census Bureau)
Earnings for current employees	Average earnings for all workers. This variable is standardized by subtracting the sample mean and dividing by the standard deviation.	Quarterly Workforce Indicators (Census Bureau)
Earnings for new employees	Average earnings for new workers. This variable is standardized by subtracting the sample mean and dividing by the standard deviation.	Quarterly Workforce Indicators (Census Bureau)
MSA unemployment rate	Unemployment rate in an MSA.	Bureau of Labor Statistics
MSA population	Log of MSA population.	American Community Survey
MSA house price growth	Log change in MSA house prices.	Federal Housing Finance Agency
MSA GDP growth	Log change in MSA GDP.	Bureau of Economic Analysis
Percent of contracts to always small firms	Proportion of contracts awarded to firms that are designated as small before a size standard increase.	USASpending.gov
Percent of contracts to newly small firms	Proportion of contracts awarded to firms that are designated as small only after a size standard increase.	USASpending.gov
Contract amount to small firms	Log of one plus the amount of contracts awarded to firms that are designated as small.	USASpending.gov
Number of loans	Number of loans in an industry.	Small Business Administration
Total credit	Log of one plus the gross SBA loans in an industry.	Small Business Administration
Guaranteed credit	Log of one plus the guaranteed SBA loans in an industry.	Small Business Administration
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

Table A.2
Predictive Regression

This table examines the association between size standard increases and the order of industries reviewed by the Small Business Administration. *Size increase* is an indicator variable equaling one if the size standards increase for a particular industry. *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. Table A.1 provides additional details on variable definitions. Standard errors are reported in parentheses and clustered at the 2-digit industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Size increase	Size increase	Size increase
Model	(1)	(2)	(3)
Date announced	0.008		
	(0.014)		
Date proposed		0.003	
		(0.006)	
Date finalized			0.005
			(0.008)
Observations	1,016	1,016	1,016
R-squared	0.003	0.001	0.000

Table A.3
Robustness of Small Firm Threshold

This table evaluates the robustness of the baseline estimate to different thresholds for small firms. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Small establishment ratio* is the number of establishments for firms with less than the specified small firm threshold relative to the total number of establishments in an industry. Small employment ratio is the number of employees at firms with less than the specified small firm threshold relative to the total number of employees in an industry. Industries are defined at the 6-digit NAICS code level. Table A.1 provides additional details on variable definitions. All models include industry and year fixed effects. Models 2 and 4 also include year fixed effects. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Establishment Ratio	Establishment Ratio	Small Employment Ratio	Small Employment Ratio
Model	(1)	(2)	(3)	(4)
Size increase	-0.011***	-0.013***	-0.011***	-0.018***
	(0.004)	(0.004)	(0.004)	(0.005)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Small firm threshold	<100 employees	<500 employees	<100 employees	<500 employees
Observations	7,374	7,405	6,904	7,066
R-squared	0.960	0.943	0.961	0.946

Table A.4
Dynamics

This table provides dyanmics for the baseline estimates for the effect of size standard increases on the industry composition of small firms. *Size increase* is an indicator variable equaling one when the size standard increases for a particular industry. *Small establishment ratio* is the number of establishments for firms with less than 20 employees relative to the number of establishments in an industry. *Small employment ratio* is the number of employees at firms with less than 20 employees relative to the number of employees in an industry. Industries in this table are defined at the 6-digit NAICS code level. Table A.1 provides additional details on variable definitions. All models include industry and year fixed effects. The sample is a four-year window around a size standard increase. Standard errors are reported in parentheses and clustered at the industry level. ***, **, and * denote significance at 1%, 5%, and 10%, respectively.

Dependent variable	Small Establishment Ratio	Small Employment Ratio
Model	(1)	(2)
Size increase$_{t-4}$	0.002	0.002
	(0.002)	(0.001)
Size increase$_{t-3}$	0.004**	0.003**
	(0.002)	(0.001)
Size increase$_{t-2}$	0.002	0.002
	(0.002)	(0.002)
Size increase$_{t-1}$	-0.001	0.001
	(0.001)	(0.001)
Size increase$_{t+1}$	-0.006***	-0.002**
	(0.002)	(0.001)
Size increase$_{t+2}$	-0.005*	-0.004**
	(0.003)	(0.002)
Size increase$_{t+3}$	-0.009***	-0.008***
	(0.003)	(0.002)
Size increase$_{t+4}$	-0.012***	-0.011***
	(0.004)	(0.003)
Industry fixed effects	Yes	Yes
Observations	3,918	3,694
R-squared	0.981	0.978

Table A.5
Summary Statistics for Procurement Contracts

This table provides summary statistics for U.S. procurement contracts to small business. In this table, small firms are based on the designation of small businesses in the contracts data. *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. *Total contract amount* is the amount of contracts awarded in a particular year in millions of dollars. *Percent of small firms* is the proportion of contract amount awarded to small firms relative to *Total contract amount*.

Year	Contracts to Small Firms	Contract Amount to Small Firms	Contract Amount to All Firms	Percent to Small Firms
2002	413,627	54,239	283,826	19.1%
2003	751,725	64,473	338,828	19.0%
2004	1,118,404	66,242	355,005	18.7%
2005	1,455,640	78,129	380,672	20.5%
2006	2,138,570	82,515	454,945	18.1%
2007	2,096,819	89,171	463,303	19.2%
2008	2,033,379	97,714	564,435	17.3%
2009	1,624,359	100,605	519,327	19.4%
2010	1,658,929	125,444	554,870	22.6%
2011	1,561,575	102,702	524,779	19.6%
2012	1,398,217	99,576	541,919	18.4%
2013	1,158,509	89,215	427,005	20.9%
2014	1,401,936	99,404	454,644	21.9%
2015	1,863,621	97,220	436,954	22.2%
2016	2,054,976	106,971	489,467	21.9%
2017	2,155,032	113,202	510,436	22.2%

Table A.6
Summary Statistics for SBA Loans

The table provides summary statistics loans guaranteed by the Small Business Adminstation matched to non-imputed data on firm-level employees from NETS. *Average employees* is the average number of employees for firms receiving SBA loans. *Percent of number of loans to small firms* is the number of loans to firms with less than 20 employees relative to the total number of loans in a particular year. *Percent of total credit to small firms* is the total amount of loans to firms with less than 20 employees relative to the total amount of loans in a particular year. *Percent of guaranteed credit to small firms* is the guaranteed amount of loans to firms with less than 20 employees relative to the total guaranteed amount of loans in a particular year.

Year	Average Employees	Percent of Number of Loans to Small Firms	Percent of Total Credit to Small Firms	Percent of Guaranteed Credit to Small Firms
2002	8.88	88.55%	77.05%	77.29%
2003	7.98	90.18%	79.73%	79.77%
2004	8.22	89.85%	78.54%	78.47%
2005	7.69	90.64%	79.28%	78.68%
2006	7.30	91.21%	79.37%	78.63%
2007	7.26	91.49%	79.80%	79.11%
2008	8.26	89.28%	77.66%	77.05%
2009	9.74	85.91%	72.59%	72.21%
2010	10.53	83.97%	70.22%	69.82%
2011	10.44	83.61%	64.97%	64.25%
2012	10.49	84.16%	68.20%	67.46%
2013	10.38	84.95%	70.32%	69.64%
2014	9.63	86.03%	71.51%	70.92%
2015	9.55	85.62%	72.73%	72.19%
2016	9.63	85.91%	72.27%	71.64%
2017	8.80	87.97%	76.36%	75.86%