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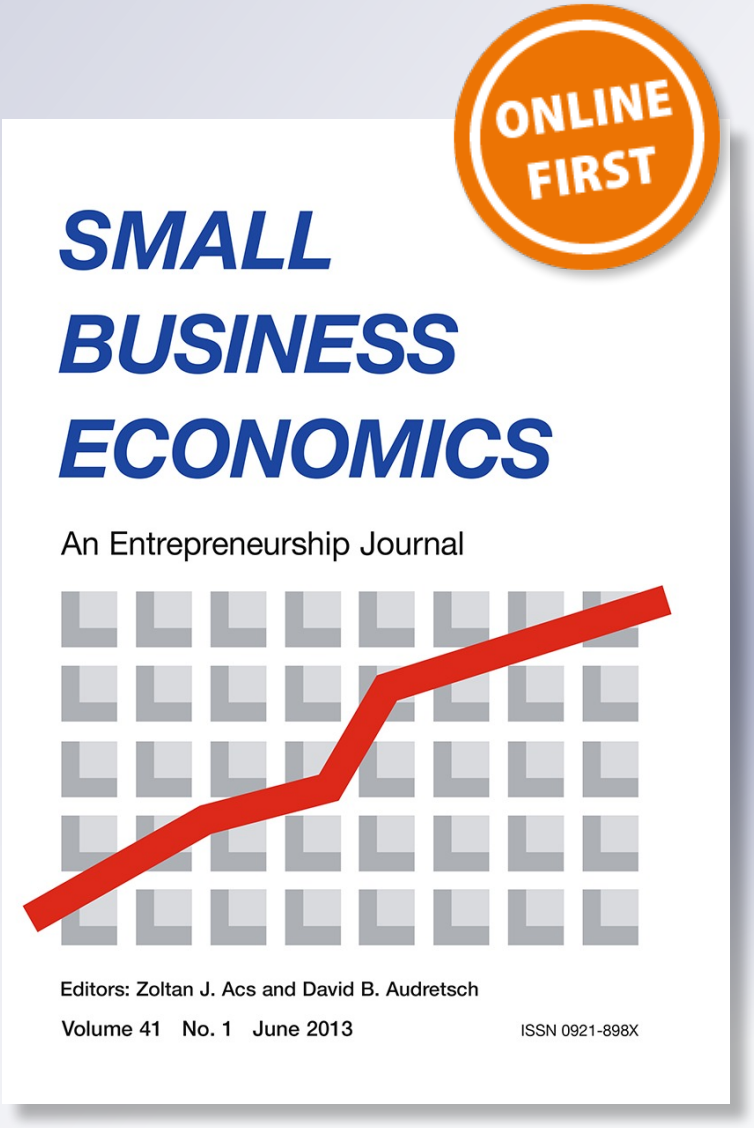

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Abstract In this article, we examine how the level of regulation affects the size distribution of businesses. To the extent that regulation functions as a fixed cost, it should lead to larger firm size. However, regulations may also lead to smaller establishments with firms outsourcing regulated activities or staying small to take advantage of state exemptions for small businesses from regulations. We empirically examine the relationship between the size distribution of establishments and the level of regulation using state- and industry-level panel data from 1992 to 2004. Our results suggest that regulation decreases the proportion of zero employee and 1–4 employee establishments. The proportion of establishments in the 5–9 employee range generally increases with the level of regulation. Thus, regulation appears to operate as a fixed cost causing establishments to be larger.

Keywords Regulation · Firm size · Establishments · Small business · Entrepreneurship

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1 Introduction

The issue of how regulation impacts business has been widely studied. However, this literature tends to examine how regulation affects the overall business climate and the number of business firms. Much less attention has been paid to the issue of how regulation impacts the relative size of businesses. Some literature argues that regulations are a fixed cost and therefore lead to larger firms using a standard neo-classical theory of the firm logic. However, there are also reasons to believe higher regulatory burdens may reduce the size of firms. First, in line with the reasoning of Coase (1937), firms can choose their own boundaries and may choose to outsource activities to avoid having to comply with or be subject to regulation, causing what would have been one firm to break into multiple firms. Additionally, many regulations have specific exemptions for very small businesses because of the financial hardships these rules may create. As examples, the Occupational Safety and Health Act (OSHA) has a partial exemption for companies with ten or fewer employees regarding the need to keep injury and illness records, while the title I provision of the Americans with Disabilities Act (ADA) does not apply to companies with fewer than 15 employees. When small businesses are exempted from regulations, some firms may choose to remain (or

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become) smaller to avoid the regulations applied to larger firms.

Given these conflicting predictions, this ultimately becomes an empirical question. In this article, we estimate the impact of state-level regulatory burdens on the size distribution of businesses within the state using panel data on the employment size of establishments and the level of regulation for the years 1992 through 2004.[1] It is important to be clear that the question we address in this article is not whether regulation impacts the total number of establishments, but rather how regulation expenditure affects firm's size structure. This question is important given the previous literature. It is not entirely clear whether higher regulatory costs would make it advantageous for firms to remain small in an effort to avoid or lower total costs, or increase their size to take advantage of economies of scale.

In a preview to our empirical methodology and findings, we employ a panel fixed effects model, estimated using seemingly unrelated regression (SUR) methodology. We find that states with higher levels of regulation have a significantly lower proportion of the two smallest categories of establishment size, those with zero employees and those with 1–4 employees, and correspondingly the proportion of 5–9 employee establishments is higher. Even when looking only at larger establishment categories, a similar trend emerges in that the proportion is shifted toward the larger sizes. The implication of our results is that the regulatory system may inefficiently influence the scale of firms and that this cost should be added to any sort of cost-benefit analysis of the general merits of economic regulation.[2]

The rest of the article is structured as follows: Section 2 provides a background and literature review on the issues of regulation and establishment size. Section 3 addresses the data and empirical specifications; Sect. 4 provides robustness checks, and the final section offers concluding remarks.

[1] The US Census of Statistics on US Businesses defines an establishment as "A single physical location where business is conducted or where services or industrial operations are performed." The definition is different from a firm that may consist of several establishments. By using establishment data, we are accounting for every business in the state.

[2] For a similar argument about the (lack) of merits of anti-trust enforcement, see Crandall and Winston (2003).

2 Background and literature review

To examine the impact of regulation on employment size in establishments, we bring together two broad areas of research in the economics literature. The first area examines the impact of regulation on economic activity. The literature on regulation has demonstrated that higher levels of regulation are negatively correlated with business activity, entrepreneurship and economic growth [see Ardagna and Lusardi (2008), Klapper et al. (2006) and van Stel et al. (2007)]. Niskanen (1968), Weingast et al. (1981) and Ekelund and Tollison (2001) argue that regulatory agencies seek to gain job security, power and prestige by providing more regulations and that new regulations are passed to benefit the special interest groups that dominate the political landscape. These special interest groups may represent firms within an industry attempting to have regulations enacted that lessen competition, or may be interest groups with 'public interest' concerns over issues such as the environment or land use policy, for example. In some cases it may be a combination of the two as in Yandle's (1983) "Baptists and Bootleggers" theory of special interest group activity. Djankov et al. (2002) find in a cross-country analysis that when the regulatory burden of entry into the market is higher, it reduces the number of firms that enter the market and does not improve the quality of private or public goods.

Similarly, Bjørnskov and Foss (2010) and Nystrom (2008), examining cross-country, data both find that higher levels of government intervention reduce entrepreneurial activity. Specifically, Hale et al. (2011) find that regulation, while intending to make us safer, become so burdensome and complex that it actually reduces safety. Sobel (2008) and van Stel et al. (2007), based on the theory of Baumol (1990), both argue that regulation doesn't lessen entrepreneurship, but redirects it into unproductive channels. At the state level, Campbell et al. (2008) find that states with less regulation and greater economic freedom experience more entrepreneurial ventures.

The second strand of literature examines transactions costs and sizes of firms. Turning to the impact of regulation on firm size, Klapper et al. (2006) and Bradford (2004) argue that regulation functions as a fixed cost and favors larger firms that can utilize economies of scale to cover the higher fixed cost. While Bradford (2004) is a theoretical analysis,

Klapper et al. (2006) provide empirical evidence that regulation functions as a fixed cost of entry and therefore leads to a larger optimal firm size to cover the higher fixed cost. Their evidence from European corporations supports their argument that firms entering the marketplace are indeed larger under higher levels of regulation.[3]

Lucas (1978) argues the size distribution of firms in an economy is based on the distributions of the talent of managers and that concerns over large firms gaining monopoly power are overstated. As real wages increase, working for someone else with greater managerial talent is more lucrative than making managerial decisions for a small firm. The growing size of firms is a function of a growing economy and wealth, which should be viewed as a desirable outcome. Thus, for Lucas industrialized nations that have competitive economies will have more large firms.

Nooteboom (1993) argues that small firms face higher transactions costs than large firms, which may make it more difficult to grow. Specifically, smaller firms have to take advantage of external networks to overcome higher transaction costs in areas of scope and learning. Small firms however have the advantage of greater flexibility and entrepreneurial drive. The key issue is one of threshold costs. Threshold costs exist for all sizes of transactions, but are higher on smaller transactions for consumers and producers.

The empirical literature addresses firm size and economic growth and firm size across countries. Pagano and Schivardi (2003) examine the distribution of the size of firms and aggregate growth. They use data from 18 European countries for 1994–1995 and find a positive and significant relationship between the average size of the firm and productivity growth.[4] Focusing on causality, they find that the relationship runs from size of firms to productivity. Thus, larger firms lead to faster productivity growth. These results hold for variations of the time, measure of firm size and number of countries in the sample. They conclude that larger firms' innovations are what generate faster rates of growth.

Henrekson and Johansson (1999) in an investigation of firm size distribution examine firms across 12 European countries for the years 1968–1993 with a focus on Sweden. They find evidence consistent with the existing literature that across Europe firm sizes are declining. However, in Sweden there are more large firms and fewer small firms than any of the other European countries in their sample. They argue that the structure of economic and political institutions can explain this difference in size distribution. Specifically, they find that small firms in Sweden do not grow and that the intermediate firms are declining. While not directly related to regulation they focus on policies related to taxes, credit markets, national pensions, and labor and wage regulations. Their conclusion is that these policies, when burdensome, as in the case of Sweden, keep small firms from growing and disproportionately favor large firms.

Loveman and Sengenberger (1991) using establishment data find that the six largest OECD countries have experienced a trend away from larger establishments, and this trend has continued into the 1990s. In contrast, Davis and Haltiwanger (1989) find a trend for larger US service establishments between the years 1963–1985. Davis and Henrekson (1999) note that the cross country trend is away from manufacturing and subsequently away from large enterprises to smaller enterprises. They find that Sweden's employment structure is unique in that it discourages self-employment, making it different from most Western countries. Using regression analysis, they highlight four findings for Sweden relative to the US manufacturing sector. Relative to the US, Sweden has higher employment in capital- and energy-intensive industries, experiences low employment in areas of manufacturing that experience rapid factor productivity, has higher employment in high wage industries and exhibits lower employment in manufacturing industries that have less stable employment.

Our goal is to bring together the literature on regulation and the literature on firm size to empirically exam how regulatory expenditure at the state level affects the size distribution of establishments. Currently, only a small subset of literature exists that addresses both firm size and regulation. Bradford (2004) conducts a comprehensive review of the economic consequences of offering regulatory exemptions to small firms. He notes that two federal statutes, the Regulatory Flexibility Act and the Small Business Regulatory Enforcement and Fairness Act, are charged with examining whether

[3] It should be noted that Klapper et al. (2006) examine only corporations, and they note that in Italy, which has a high regulatory climate, has numerous small firms.

[4] Similar to Klapper et al. (2006), Pagano and Schivardi (2003) find that Spain and Italy have proportionally more small firms than the other European countries they investigate.

small firms should face reduced enforcement or exemptions from regulation. Most of the exemptions are based upon the size of the firm as measured by sales, employment or assets. He argues it is not clear whether the reduced regulation for small firms, which has widespread support, is due to economic or political motivations.

Furthermore, he claims that not all reductions or exemptions for small firms are economically efficient. Large firms become dominant in heavily regulated fields, noting economies of scale favor large-scale transactions to lower regulatory costs. The empirical literature on regulation reports three major findings, according to Bradford (2004): (1) There exist economies of scale in compliance; (2) fixed costs of compliance are the main reason for the existence of economies of scale; (3) economies of scale are a long-run phenomenon.

Finally, there are studies that examine specific regulations and the effects on firm size. Thomas (1990) finds that the 1962 amendments to the Food and Drug Administration (FDA) regulations favored large firms over small firms. Small firms were no longer able to develop new drugs. The regulation created a comparative advantage for large firms in the pharmaceutical industry. Acemoglu and Angrist (1998) find that the American with Disabilities Act reduces employment of disabled individuals in medium-size firms and that larger firms are better able to accommodate the costs of disabled workers. Similarly, Gao et al. (2008) present empirical evidence that the Sarbanes-Oxley Act leads to firms remaining small to qualify for the Act's exemption. They argue that firms are remaining small not to preserve control of the firm, but to avoid having to comply with the regulation. They confirm prior findings that firms are also remaining private to avoid the costs associated with the regulation. Firms are actively reducing their investments to stay under the regulatory threshold. Firms remaining small and not growing can reduce the growth, employment and wealth creation in the economy.

While there is some overlap in these two areas of the literature, many of the papers are theoretical, such as Bradford (2004) and Nooteboom (1993). Other studies focus on specific regulations as in Acemoglu and Angrist (1998) and Gao et al. (2008). Henrekson and Johansson (1999) in their study come the closest to examining the issues of regulation and firm size as we present in this article, but their analysis is not empirical. Based on the previous literature, there are clearly mixed predictions about how the level of regulation impacts the size of businesses. Some papers argue that because regulatory compliance is a fixed cost it leads to larger firms, while there are also papers arguing that firms remain small to avoid regulatory costs. Ultimately, then, it is an empirical question, and we argue that examining this issue in an empirical fashion provides a unique analysis to these areas of economic literature. We now turn to a discussion of the data and methodology we employ to examine the impact of state-level regulation on the size structure of businesses in the United States.

3 Empirical specification and methodology

We begin our empirical analysis of how the level of state regulation impacts establishment size by examining data on the distribution of establishments, by employment category size, by state using data from the US Census Statistics on US Businesses. For each state, we calculate the percentage of total establishments falling into one of seven categories defined by the US Census: zero employees, 1–4 employees, 5–9 employees, 10–19 employees, 20–99 employees, 100–499 employees and greater than 500 employees.[5] We calculate these percentages for all establishments as well as the subcategories of manufacturing, wholesale and retail for each state. We examine establishments as opposed to firms with the idea that one firm may have many establishments and that regulation imposed upon the firm might in fact affect all the establishments associated with that firm. While we are interested in how regulation affects employment size in establishments, we recognize that particular sectors may face a more regulatory environment than others may. While not all encompassing, we focus on manufacturing, wholesale and retail as segments of the market that are large and represent the various stages of production.

[5] The US Census explains that firms with no employees, or nonemployer firms, are businesses that have no paid employees and are subject to federal income tax. These businesses are what are typically referred to as sole proprietorships. According to the US Census Statistics on US Businesses, these businesses make up the majority of businesses in the US, but only have information reported regarding their number and total receipts. Given that this employment category of businesses is so prevalent, and entrepreneurial, is another reason why examining businesses by the number of employees is relevant.

Our data are for the years 1992, 1996, 2000 and 2004, thus spanning a period of 16 years at 4-year intervals. These variables will be our dependent variables in the subsequent empirical analysis.

Our measure of state-level regulation is state-level expenditures on regulatory inspection and enforcement per capita taken from the US Census data on State and Local Government Finances for the years matching the years of the establishment size data listed above. There are alternative measures of regulation such as the Forbes Magazine ranking of the state regulatory climate, the number of rules passed, Mulligan and Shleifer (2005) use the total word "volume" of a state's statutes as a proxy for state regulation. Similarly, the number of pages added to the Federal Register has been used in several studies at the federal level. However, there are not a lot of good measures for state level regulatory burden. Following Campbell et al. (2010), we argue that the state direct expenditures are a good proxy for the regulatory environment firm's face. While more spending could mean more regulations or stricter enforcement of existing regulations either way, it reflects the regulatory environment in the state.[6] This variable as well as all other dollar-valued variables in our empirical analysis is adjusted for inflation to 2004 constant dollars using the Consumer Price Index (CPI) from the Bureau of Labor Statistics.

We include, as control variables, an array of state-level economic and demographic variables to account for differences across states that are traditionally used in empirical work examining business and entrepreneurial activity. In particular, in the specifications with controls we include each state's unemployment rate, population (in millions), real per capita personal income (in thousands) and the percentages of the state population who are over age 65, black, female, college graduates and the percent living in urban areas. Previous literature has found these factors to be correlated with the number and types of businesses that are present in a state because they impact both rates of entrepreneurship and consumer demand in the marketplace. As mentioned above, we also implicitly control for industrial structure in our models by estimating our models on each industry subset individually, and controlling for industry in all of our models that pool the data. Descriptions, descriptive statistics and sources for all of our variables can be found in "Appendix 1."

Our panel data model includes both year and state fixed effects. Year fixed effects will control for any factors that are specific to that year but are common across all states, while state fixed effects will control for any factors that are specific to each state but stay constant through time in determining the employment sizes of establishments. For example, if Hawaii simply has more small establishments because of some unobserved (or unmeasured) characteristic, the fixed effect for that state would account for this difference. Specifically, our models are:

$$\%\ \text{Establishments zero Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (1)$$

$$\%\ \text{Establishments } 1-4 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (2)$$

$$\%\ \text{Establishments } 5-9 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (3)$$

$$\%\ \text{Establishments } 10-19 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (4)$$

$$\%\ \text{Establishments } 20-99 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (5)$$

$$\%\ \text{Establishments } 100-499 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (6)$$

$$\%\ \text{Establishments } > 500 \text{ Employees}_{ikt} = \alpha + \beta(\text{Regulation}_{it}) + \gamma(X_{it}) + \lambda(\text{Year}_t) + \theta(\text{State}_i) + \varepsilon_{it} \quad (7)$$

where % Establishments Y Employees$_{ikt}$ is the percentage (times 100) of establishments with the

[6] According to the US Census *Classification Manual* example activities included in this spending are "[i]nspection of plans, permits, construction, or installations related to buildings, housing, plumbing, electrical systems, gas, air conditioning, boilers, elevators, electric power plant sites, nuclear facilities, weights and measures, etc.; regulation of financial institutions, taxicabs, public service corporations, insurance companies, private utilities (telephone, electric, etc.), and other corporations; licensing, examination, and regulation of professional occupations, including health-related ones like doctors, nurses, barbers, beauticians, etc.; inspection and regulation or working conditions and occupational hazards" (US Census Bureau 2011). Revenue from the regulation of licensing or permits is not included in this data.

indicated range of employees in state i at time t, in industry k, Regulation_{it} is the level of spending on regulatory enforcement and inspection in state i at time t, X_{it} is a matrix of the control variables outlined earlier for state i at time t, Year_t and State_i are the time and state fixed effects, respectively, and ε_{it} is the error term.

Because we are estimating seven regressions, one on the percentage of establishments in each employment size category, that are occurring simultaneously in a state at a given time, it is necessary to employ the Zellner (1962) methodology of Seeming Unrelated Regression (SUR), which improves the estimates by simultaneously estimating all seven specifications accounting for any correlation in the error terms across the equations. By estimating them as a system, we can also improve our estimates by imposing the knowledge (identity constraint) that since the percentages sum to 100 %, that any change in one employment category due to regulatory spending must be exactly offset by changes in other categories so that the total still sums to 100 % (that is, if it lowers the percentage in employment category A by 10 %, there is by definition a 10 % increase somewhere else because the data must sum to 100 %).[7]

We estimate the regressions both with and without the set of control variables (X), but always include the year and state fixed effects.[8] While we always estimate our models on each industry subset individually (manufacturing, wholesale and retail), we also estimate specifications on all establishments (not broken out by industry), as well as a pooled model where all industries are included and industry fixed effects are employed. In addition, we perform Durbin-Wu-Hausman tests [see Davidson and MacKinnon (1993)] for endogeneity of the regulatory spending variable, and these tests soundly rejected the regulation variable being endogenous.[9]

Counting our industry subset models, pooled models and those with and without controls, our initial estimation involves a total of 70 regression equations. For the sake of space constraints, we have chosen to present some representative full regressions and then present a table summarizing only the coefficients on our main variable of interest, state regulatory spending.

Table 1 shows one representative set of full regression results from our initial 70 regressions—the ones using the percentage distribution for all establishments in the state with the control variables included. Each column represents an individual regression equation using the indicated percentage of establishments in each employment size category as the dependent variable. So, for example, the first column of Table 1 shows how each of our independent variables impacts the percentage of establishments with zero employees, while the second column shows how each independent variable impacts the percentage of establishments with 1–4 employees and so forth. Examining the first column, regulatory enforcement expenditures has a statistically significant coefficient of −0.0090, implying that for each $1 increase in regulatory expenditures per capita, the percentage of establishments with zero employees decreases by 0.0090 % points. The range of the per capita regulatory expenditure variable across states is $7.21–$71.37, a difference of $64.16. So the predicted impact of moving from one extreme to the other in regulatory enforcement could be found by multiplying 64.16 by the coefficient estimate of −0.0090, which is 0.5774 or just over a one-half percentage point decrease in the number of establishments in the zero employee category. For reference and comparison, the mean across states of zero employee establishments is 10.661, so a one-half percentage point change is small but meaningful.

Continuing down the first column, we see that state population has a positive and statistically significant

[7] In our robustness section, we consider alternative models that employ standard panel fixed effects ordinary least squares (OLS) estimation, drop the sum to zero constraint, and also use log-odds transformations of our dependent variable, and the estimates are robust to these alternative specifications.

[8] Because the specifications without economic and demographic control variables produce similar results, we focus on presenting and discussing the results from the more fully specified models with control variables, but provide the estimates from the models without controls so readers can see the results are robust to excluding these variables.

[9] These tests were conducted using STATA, and the null hypothesis is that the OLS is a consistent estimator. The F-statistics for these tests ranged from 0.01 to 0.77, with P values ranging from 0.9163 to 0.3793, none close to standard levels of significance. In these tests, we used state demographic factors (real per capita personal income, percentage of population aged 65 and older, percentage of population black, percentage of population female and percentage with a college degree) as well as state and time fixed effects to instrument regulatory spending.

Table 1 Effects of regulation on establishment size: seemingly unrelated regression (SUR) estimates, all establishments

	Dependent variable: Percent of state establishments by employment size category						
	Employment size of establishment (all establishments)						
	0	1–4	5–9	10–19	20–99	100–499	500+
Independent variable							
Regulatory enforcement expenditures per capita	−0.0090*	−0.0156**	0.0118***	0.0052*	0.0051*	0.0038	−0.0013
	(0.0052)	(0.0078)	(0.0033)	(0.0028)	(0.0030)	(0.0024)	(0.0051)
Unemployment rate	0.0483	0.1871***	−0.0701***	−0.0820***	−0.0832***	0.0221	−0.0226
	(0.0421)	(0.0626)	(0.0265)	(0.0226)	(0.0246)	(0.0193)	(0.0416)
State population (millions)	0.1920***	0.3190***	0.1550***	−0.0851**	−0.0865**	−0.1760***	−0.0064
	(0.0659)	(0.0995)	(0.0417)	(0.0356)	(0.0387)	(0.0302)	(0.0654)
Real per capita personal income (thousands)	0.0498	−0.0424	0.0761***	0.0546***	0.0799***	0.0035	−0.1220***
	(0.0361)	(0.0543)	(0.0228)	(0.0194)	(0.0212)	(0.0165)	(0.0358)
Percent of population over age 65	−0.4795***	0.4271***	0.0137	0.0983*	0.1013	−0.1273**	−0.0311
	(0.1120)	(0.1587)	(0.0699)	(0.0590)	(0.0643)	(0.0510)	(0.1098)
Percent of population black	−0.1267*	0.3823***	−0.1852***	−0.0763*	−0.0169	−0.1265***	0.1499**
	(0.0740)	(0.1105)	(0.0467)	(0.0398)	(0.0433)	(0.0339)	(0.0733)
Percent of population female	0.4835***	0.3459***	0.2716***	−0.1027	−0.0636	0.0053	−0.9437***
	(0.1882)	(0.0855)	(0.1057)	(0.0816)	(0.0899)	(0.0815)	(0.1681)
Percent of population with college degree	0.1081***	0.0456	−0.0317	−0.0081	−0.0690***	−0.0078	−0.0372
	(0.0342)	(0.0515)	(0.0216)	(0.0184)	(0.0201)	(0.0157)	(0.0339)
Percent of population in urban areas	0.0049	0.0191***	−0.0122***	−0.0077***	−0.0061**	−0.0033*	0.0054
	(0.0043)	(0.0065)	(0.0027)	(0.0023)	(0.0025)	(0.0020)	(0.0042)
Constant	−9.2052	0.0000	6.8524	16.0583***	13.3336***	10.2832***	62.8176***
	(9.2886)	(0.0000)	(5.1451)	(3.915)	(4.3250)	(3.9962)	(8.1959)
Time fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	200	200	200	200	200	200	200
R^2	0.9600	0.9485	0.8863	0.8761	0.9439	0.9238	0.9800

Two-way fixed effects (time and state) panel estimated using seemingly unrelated regressions (SUR). Standard errors in parentheses. Statistical significance as follows: *** 1 %; ** 5 %; * 10 %

coefficient, implying that larger states have a higher percentage of establishments with zero employees. States with larger proportions of their population over 65 or black tend to have smaller percentages of establishments in the zero employee category, while those with larger proportions of their population female or college educated tend to have greater percentages of establishments in the zero employee category. We are not interested in the impacts of the control variables per se, so we simply note that we see nothing unusual in the estimated coefficients on these variables in our regressions and focus our discussion on the regulatory variable coefficients.

Our main concern in this analysis is to examine how the coefficient on regulatory expenditures changes as we move to the right across the columns. For example, while a $1 increase in per capita regulatory expenditures is associated with a reduction in the percentage of zero employee establishments by 0.0090, it is also associated with a reduction in the percentage of 1–4 employee establishments by 0.0156, which is again statistically significant and even larger in magnitude. The coefficient on regulatory expenditures becomes positive beginning with the percentage of 5–9 employee establishments, indicating that there is a shift in the size distribution of firms away from the two smallest categories of establishments and into relatively larger sized establishments. The estimates remain positive and statistically significant for 10–19 and 20–99 employee establishments and become insignificant for the two largest categories.

Table 2 presents the individual regression results from similar estimations where the manufacturing, wholesale, and retail industry percentages are separately calculated, and the data are pooled and the specifications include industry fixed effects. While we will present many estimates throughout the article, this model is the one we believe to be best specified and present the results in more detail. Again, we see negative estimates in the two smallest categories and positive coefficients beginning with establishments with more than five employees with regard to regulation. The estimated effects for the reduction in zero employee establishments are twice as large in magnitude as in the model in Table 1, and again statistically significant. The estimated increase in 5–9 employee establishments is also again statistically significant and of about the same magnitude as in the model in Table 1.

There is a clear reduction in the percentage of establishments with fewer than 4 employees and an increase in the larger categories—with the main increase being in the 5–9 employee category. What this implies is that states with bigger regulatory environments tend to make it more difficult for the smallest of businesses to open. Establishments must reach the 5–9 employee size to open and operate effectively given the higher levels of regulation. These results are consistent with the findings of Klapper et al. (2006), Bjørnskov and Foss (2010), and Davis and Henrekson (1999) discussed in the literature review, and are most consistent with the theory that regulatory compliance functions as a fixed cost such that firms must get larger to reach the economies of scale necessary to overcome the cost of regulatory compliance. The fact that the distribution is relatively shifted toward the 5–9 employee category, and the effects are not as large moving up in size, may suggest that while small businesses must be of a certain size threshold to be able to open under higher levels of regulation, they generally tend to remain under 10 employees perhaps to stay small enough to avoid some of the regulations for which firms with a small number of employees are exempt.

The robustness and consistency of these results is apparent in Table 3, which shows the results of all 70 regressions. To be clear, this summary table only presents the coefficients from the regulatory expenditure variable (row 1 in the regression results presented in Tables 1 and 2). Specifically, the row of results for the regulatory variable presented earlier in Table 1 is here in the top section of the first column of results (the column indicating there are both control variables and fixed effects included), under the section heading "All Establishments." These seven estimates beginning with −0.0090 through −0.0013 were the ones presented and discussed above, with the only difference being that we have transposed the rows into columns so as to be able to report more results. The similar results presented earlier in Table 2 are in the bottom section of the first column of results under the section "Manufacturing, Wholesale and Retail Establishments Pooled (with Industry Fixed Effects)."

The estimates from the first column are from specifications that all include the economic and demographic control variables, while the estimates in the second column are from specifications that exclude these controls but do still contain the state,

Table 2 Effects of regulation on establishment size: seemingly unrelated regression (SUR) estimates, pooled manufacturing, wholesale and retail establishments

	Dependent variable: Percent of state establishments by employment size category						
	Employment size of establishment (all establishments)						
	0	1–4	5–9	10–19	20–99	100–499	500+
Independent variable							
Regulatory enforcement expenditures per capita	−0.0185*	−0.0170	0.0181*	0.0012	0.0037	0.0052	0.0073
	(0.0097)	(0.0260)	(0.0093)	(0.0092)	(0.0159)	(0.0095)	(0.0258)
Unemployment rate	0.0652	0.0416	−0.0062	−0.1162	−0.1482	0.1011	0.0635
	(0.0772)	(0.2080)	(0.0747)	(0.0734)	(0.1273)	(0.0761)	(0.2060)
State population (millions)	0.2220*	0.6910**	0.0132	−0.0671	−0.2480	−0.2900**	−0.2960
	(0.1230)	(0.3300)	(0.1180)	(0.1160)	(0.2020)	(0.1210)	(0.3270)
Real per capita personal income (thousands)	−0.1744***	−0.0492	0.0078	0.0529	0.0523	0.1254*	0.0016
	(0.0670)	(0.1805)	(0.0647)	(0.0636)	(0.1104)	(0.0660)	(0.1787)
Percent of population over age 65	−0.0512	0.3269	0.1105	0.2524	−0.2934	−0.2784	−0.0665
	(0.1957)	(0.5272)	(0.1910)	(0.1878)	(0.3226)	(0.1928)	(0.5221)
Percent of population black	0.0379	0.3715	−0.0803	−0.0549	−0.0657	−0.1585	−0.0525
	(0.1363)	(0.3672)	(0.1318)	(0.1295)	(0.2247)	(0.1343)	(0.3637)
Percent of population female	0.1405	0.1665	−0.7138***	−0.6952***	0.5061***	0.2389**	0.3565
	(0.1055)	(0.2841)	(0.1685)	(0.1674)	(0.1739)	(0.1039)	(0.2814)
Percent of population with college degree	0.0475	0.0186	0.0646	0.0157	−0.1276	0.0541	−0.0735
	(0.0635)	(0.1711)	(0.0613)	(0.0603)	(0.1047)	(0.0626)	(0.1695)
Percent of population in urban areas	0.0129	0.0224	−0.0064	−0.0053	−0.0135	−0.0109*	−0.0121
	(0.0080)	(0.0215)	(0.0077)	(0.0076)	(0.0131)	(0.0078)	(0.0213)
Constant	0.0000	0.0000	52.6910***	47.3906***	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(6.9518)	(6.9490)	(0.0000)	(0.0000)	(0.0000)
Time fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	600	600	600	600	600	600	600
R^2	0.6423	0.5569	0.4235	0.6768	0.7342	0.5366	0.7499

Three-way fixed effects (time, state and industry) pooled panel estimated using seemingly unrelated regressions (SUR). Standard errors in parentheses. Statistical significance as follows: *** 1 %; ** 5 %; * 10 %

Table 3 Effects of regulation on establishment size: seemingly unrelated regression (SUR) estimates, summary of coefficients on regulatory variable

Control variables?	Yes	No
Time and state fixed effects?	Yes	Yes
Employment size of establishment	Sample: All establishments	
0	−0.0090*	−0.0070
1–4	−0.0156**	−0.0230***
5–9	0.0118***	0.0118***
10–19	0.0052*	0.0061**
20–99	0.0051*	0.0064*
100–499	0.0038	0.0044*
500+	−0.0013	0.0014
	Sample: Manufacturing establishments	
0	−0.0167*	−0.0202**
1–4	−0.0212*	−0.0280**
5–9	0.0229**	0.0255**
10–19	−0.0091	−0.0108
20–99	0.0076	0.0157
100–499	0.0124*	0.0147**
500+	0.0040	0.0031
	Sample: Wholesale establishments	
0	−0.0344***	−0.0437***
1–4	−0.0206	−0.0173
5–9	0.0242***	0.0224***
10–19	0.0105	0.0157**
20–99	0.0075	0.0085
100–499	−0.0037	0.0037
500+	0.0165	0.0106
	Sample: Retail establishments	
0	−0.0063	−0.0046
1–4	−0.0105	−0.0172
5–9	0.0118**	0.0119**
10–19	0.0066	0.0074
20–99	−0.0077	−0.0036
100–499	0.0035	0.0044
500+	0.0026	0.0017
	Sample: Manufacturing, wholesale and retail establishments pooled (with industry fixed effects)	
0	−0.0185*	−0.0223**
1–4	−0.0170	−0.0204
5–9	0.0181*	0.0194**

Table 3 continued

	Sample: Manufacturing, wholesale and retail establishments pooled (with industry fixed effects)	
10–19	0.0012	0.0033
20–99	0.0037	0.0070
100–499	0.0052	0.0077
500+	0.0073	0.0052

Coefficient on the regulatory variable from separate subsample regressions using the indicated category and establishment size. All models estimated using seemingly unrelated regressions (SUR) with fixed effects for time, state and where needed, industry. Statistical significance as follows: *** 1 %; ** 5 %; * 10 %

time and, where necessary, industry fixed effects. The sections of the table from top to bottom present the results for models estimated on different industry samples. The top section is for models estimated using the percentages of all establishments in each state without regard to industry, the three middle sections contain the results from models performed individually on subsets of the largest three industry subcategories (manufacturing, wholesale and retail), while the bottom section is a pooled model that employs the data from the three middle sections in one large pooled specification with industry fixed effects.

Table 3 demonstrates that the pattern of coefficients on the regulatory expenditure variable remains unchanged, being negative for the two smallest establishment size categories and positive and significant for establishment size categories larger than 5 employees. The ones most often statistically significant, and therefore the strongest effects, appear to be the reductions in the percentage of zero employee establishments and the increase in the percentage of 5–9 employee establishments.

The coefficients for the major industries of manufacturing, wholesale and retail exhibit the same general patterns when examined individually. There is a statistically significant increase in the percentage of 5–9 employee establishments and the reduction in the two smallest size categories, although the effect in the retail sector is smaller and less statistically significant, perhaps suggesting that the negative impact of regulation on the smallest sized firms is strongest in manufacturing and wholesale trade.

It is clear from our regressions that the estimated impact of regulation on establishment size for each subsector and for all industries combined provides the same result. Increases in regulation spending reduce the percentage of small establishments and increase the proportion of larger establishments with the 5–9 category being the establishment size where the distribution shifts toward the most.

It is important to remember that in our analysis we are examining the *percentage* distribution of establishments by employment size—not the *number* of establishments. For instance, hypothetically if an increase in regulation expenditures resulted in 100 total fewer businesses in a state, with all subcategories of sizes falling but by different proportions, the percentage distribution of establishments across size categories would show some categories falling and some rising simply because the percentages have to sum to 100 %. We have done this intentionally because there is already a large amount of literature (discussed earlier) that examines how regulation affects the overall levels of business activity, and the gap in the literature is examining how regulation differentially impacts businesses of different sizes. Our results are consistent with the idea that higher levels of regulation reduce the total number of businesses, perhaps in all size categories, but that the effect is proportionally the largest in reducing businesses with fewer than 5 employees.

It is also worth noting that regulation can impact the size distribution of establishments in two ways: through an effect on the size of existing firms that are already in business and an effect on which new firms enter and which do not. While it seems logical that these two effects would likely work in the same direction, with our data we cannot separately estimate these two effects. Therefore, our results show the total impact of regulation on the size distribution of establishments, incorporating all of the channels through which changes may occur. In this sense, our

Table 4 Effects of regulation on firm size: seemingly unrelated regression (SUR) estimates, summary of coefficients on regulatory variable

Control variables?	Yes	No
Time and state fixed effects?	Yes	Yes
Employment size of firm	Sample: All firms	
0	−0.0108*	−0.0080
1–4	−0.0138*	−0.0211***
5–9	0.0135***	0.0137***
10–19	0.0060*	0.0066*
20–99	0.0041	0.0054*
100–499	0.0001	0.0013
500+	−0.0010	0.0023*
	Sample: Manufacturing firms	
0	−0.0157*	−0.0199**
1–4	−0.0191*	−0.0262**
5–9	0.0248**	0.0287**
10–19	−0.0071	−0.0081
20–99	0.0010	0.0049
100–499	0.0120**	0.0127**
500+	0.0042	0.0078
	Sample: Wholesale firms	
0	−0.0393***	−0.0491***
1–4	−0.0184	−0.0135
5–9	0.0296***	0.0286***
10–19	0.0067	0.0123*
20–99	0.0090	0.0119
100–499	0.0045	0.0060
500+	0.0079	0.0038
	Sample: Retail firms	
0	−0.0101	−0.0076
1–4	−0.0189	−0.0279*
5–9	0.0110*	0.0136*
10–19	0.0082	0.0091
20–99	−0.0058	−0.0003
100–499	0.0010	0.0021
500+	0.0147***	0.0110**
	Sample: Manufacturing, wholesale and retail firms pooled (with industry fixed effects)	
0	−0.0258***	−0.0261***
1–4	−0.0438*	−0.0249
5–9	0.0241***	0.0242***
10–19	0.0088	0.0051
20–99	0.0121	0.0067
100–499	0.0094	0.0071
500+	0.0152	0.0079

Coefficient on the regulatory variable from separate subsample regressions using the indicated category and firm size. All models estimated using seemingly unrelated regressions (SUR) with fixed effects for time, state and, where needed, industry. Statistical significance as follows: *** 1 %; ** 5 %; * 10 %

results do paint a clear picture of the overall impacts of larger regulatory systems in a state, although it remains unclear as to whether there are differences in the channels through which these total effects occur.

The important implication of our findings is that regulatory systems may have costly impacts beyond those normally recognized, in that they may inefficiently alter the scale of firms. A consideration of these costs should be included in any cost-benefit analyses of the general merits of economic regulation.

4 Robustness checks

In this section, we present some alternative specifications to check the robustness of our findings. We start with examining whether are results are dependent upon our use of data on "establishments" rather than "firms" (i.e., one firm may have many establishments, and data on both establishment and firm distributions are available). There is no a priori reason to select one or the other, as some regulations apply to each establishment (for example, ADA compliance, sign ordinances and environmental compliance), while others apply at the firm level (regulations that are structured based on the total number of employees such as, for example, the Patient Protection and Affordable Care Act, "Obamacare").

Table 4 shows the estimates for Eqs. 1–7 using the SUR model with firms instead of establishments. The results are consistent with our earlier findings reported in Table 3 with regard to all firms as well as the subsets of manufacturing, wholesale and retail, the one exception being that retail firms with 500+ employees are no longer significant. Thus, our results for the effects of regulation are the same for firms as they are establishments.

An alternative to the SUR methodology is to simply estimate each equation separately using standard ordinary least squares (OLS) panel two-way fixed effects estimation. In this framework, we can also see if the results change if we try alternative transformations of our dependent variable because we can no longer impose the cross-equation percentage sum constraint with each regression estimated independently.

Because our dependent variable, the percentage of establishments in a particular employment size category, is a percentage bounded between zero and 100, we also examine whether a frequently used transformation of a percentage variable that makes it continuous on a scale of negative infinity to positive infinity, the log odds ratio, produces similar results. This transformation is calculated as the natural log of the ratio $P/(1 - P)$, where P is the percentage of establishments in the employment category expressed on a 0.00–1.00 scale. The disadvantage of the specifications using the transformed percentages is that the coefficients cannot be as easily interpreted as the effect on the percentage of establishments in each employment category. However, given the truncated nature of our dependent variable specified in percentages, it is possible that the assumptions of the earlier models are not met, and by estimating the log odds transformation we can verify that the results are similar across the two methods of specifying the dependent variable. As we did earlier, all models are estimated both with and without the control variables to check for robustness.

Counting both the regularly specified dependent variable and the log odds models, there are a total of 140 regressions outlined above as robustness checks.[10] Appendix 2 shows the results of all of these regressions in summary form, showing only the coefficient estimate on regulatory spending.[11] The results from all mirror what we found previously in the SUR system models. The coefficients, even without being constrained, come very close to summing to zero across the size distribution, and the general pattern of significant negative effects at the two smallest size classes, with significant positive effects in the 5–9 category, remains robust. Even the less significant and smaller magnitude effects for the retail sector, when examined individually, remain robust.

[10] There are seven employment categories and from each one we estimate five equations 70 OLS (35 with and 35 without constraints) and 70 log odds ratio equations (35 with and without constraints).

[11] In Appendix 2, the first two results columns show the estimates using our dependent variable as specified in simple percentage, while the final two columns show the estimates using the log-odds transformation. There are two columns for each because we perform the regressions with and without the control variables included (although we always include the full list of fixed effects). All significance levels are computed based on robust, state-clustered, standard errors.

5 Conclusion

The article attempts to estimate how the level of state regulation expenditure impacts the size distribution of establishments and firms in US. If viewed from the traditional neoclassical theory of the firm approach, regulation functions as a fixed cost and therefore should lead to a reduction in the proportion of small businesses and an increase in the proportion of larger businesses as smaller ones simply cannot cover the fixed costs of regulatory compliance. Larger firms with economies of scale can more effectively compete in the marketplace given the higher fixed costs of operation. However, it is also possible that regulations may lead firms to outsource production, breaking production into several smaller firms, and regulatory exemptions for small businesses may lead them to stay smaller. Therefore, the impact of regulation on the size distribution of businesses is ultimately an empirical question.

Using seemingly unrelated regression (SUR) fixed effects panel estimation, we find that higher levels of spending on regulation at the state level result in a reduction in the proportion of zero and 1–4 employee establishments and an increase in the proportion of relatively larger establishments, particularly those in the 5–9 employee category. Thus, our results are most consistent with the idea that regulation does operate as a fixed cost, making it harder for the smallest establishments to compete in the marketplace. Higher regulatory expenditures therefore do appear to alter the scale of establishment and firm sizes away from entities with fewer than five employees.

While regulations generally increase the costs for all businesses, higher regulatory hurdles appear to disproportionately disadvantage the smallest of firm sizes, giving a relative cost advantage to larger establishments. Our results suggest that one additional cost of the regulatory system, often overlooked, is in its impact on the efficiency of firm structure. By inefficiently influencing firm size, regulatory systems create additional costs within the economic system. Any serious cost-benefit study of the merits of regulation need to account for the potential economic cost associated with inefficiencies introduced into the US value chain through regulations influencing the scale of existing firms.

Appendix 1

See Table 5.

Table 5 Definition, descriptive statistics and sources of variables

Variables	Description	Mean	Min	Max	Source
All establishments					
0	Percent of all establishments in a state with zero employees	10.661	7.68	16.98	US Census Statistics of US Business
1–4	Percent of all establishments in a state with 1–4 employees	38.010	33.45	44.68	US Census Statistics of US Business
5–9	Percent of all establishments in a state with 5–9 employees	14.995	12.76	16.32	US Census Statistics of US Business
10–19	Percent of all establishments in a state with 10–19 employees	9.394	7.37	10.75	US Census Statistics of US Business
20–99	Percent of all establishments in a state with 20–99 employees	9.671	6.93	12.03	US Census Statistics of US Business
100–499	Percent of all establishments in a state with 100–499 employees	4.526	3.11	5.99	US Census Statistics of US Business
500+	Percent of all establishments in a state with 500 or more employees	12.744	6.72	18.78	US Census Statistics of US Business

Table 5 continued

Variables	Description	Mean	Min	Max	Source
Manufacturing					
0	Percent of establishments in the manufacturing sector in a state with zero employees	7.303	4.18	15.63	US Census Statistics of US Business
1–4	Percent of establishments in the manufacturing sector in a state with 1–4 employees	27.771	19.07	40.17	US Census Statistics of US Business
5–9	Percent of establishments in the manufacturing sector in a state with 5–9 employees	15.951	11.98	21.19	US Census Statistics of US Business
10–19	Percent of establishments in the manufacturing sector in a state with 10–19 employees	13.183	8	16.12	US Census Statistics of US Business
20–99	Percent of establishments in the manufacturing sector in a state with 20–99 employees	16.919	8.18	22.32	US Census Statistics of US Business
100–499	Percent of establishments in the manufacturing sector in a state with 100–499 employees	6.899	2.05	10.9	US Census Statistics of US Business
500+	Percent of establishments in the manufacturing sector in a state with 500 or more employees	11.974	4.34	24.31	US Census Statistics of US Business
Wholesale					
0	Percent of establishments in the wholesale sector in a state with zero employees	7.140	3.73	14.63	US Census Statistics of US Business
1–4	Percent of establishments in the wholesale sector in a state with 1–4 employees	32.007	22.34	47.18	US Census Statistics of US Business
5–9	Percent of establishments in the wholesale sector in a state with 5–9 employees	14.777	10.98	18.17	US Census Statistics of US Business
10–19	Percent of establishments in the wholesale sector in a state with 10–19 employees	11.254	7.45	15.63	US Census Statistics of US Business
20–99	Percent of establishments in the wholesale sector in a state with 20–99 employees	14.050	7.7	22.41	US Census Statistics of US Business
100–499	Percent of establishments in the wholesale sector in a state with 100–499 employees	6.288	3.11	13.42	US Census Statistics of US Business
500+	Percent of establishments in the wholesale sector in a state with 500 or more employees	14.483	5.99	24.02	US Census Statistics of US Business
Retail sales					
0	Percent of establishments in the retail sales sector in a state with zero employees	8.034	5.41	14.04	US Census Statistics of US Business
1–4	Percent of establishments in the retail sales sector in a state with 1–4 employees	29.488	21.12	41.93	US Census Statistics of US Business

Table 5 continued

Variables	Description	Mean	Min	Max	Source
5–9	Percent of establishments in the retail sales sector in a state with 5–9 employees	15.029	11.81	19.08	US Census Statistics of US Business
10–19	Percent of establishments in the retail sales sector in a state with 10–19 employees	9.951	6.25	13.33	US Census Statistics of US Business
20–99	Percent of establishments in the retail sales sector in a state with 20–99 employees	10.161	5.62	16.64	US Census Statistics of US Business
100–499	Percent of establishments in the retail sales sector in a state with 100–499 employees	5.206	1.82	9.16	US Census Statistics of US Business
500+	Percent of establishments in the retail sales sector in a state with 500 or more employees	22.131	9.38	33.49	US Census Statistics of US Business
Regulatory expenditures	Real state expenditure per capita (2004 dollars) on regulation of private enterprise for the protection of the public and inspection of hazardous activities (excl. fire prevention, health, natural resources)	23.763	7.21	71.37	US Census State and Local Gov't Finances
Unemployment	Annual state unemployment rate	5.220	2.26	11.29	US Census Statistical Abstract of the US
Population	State population in millions—converted to millions for coefficient interpretation	5,465,061	463,519	3.58E+07	US Census Statistical Abstract of the US
Income	Real income per capita (2004 dollars)—converted to thousands for coefficient interpretation	29,450	19,602	45,508.2	US Census Statistical Abstract of the US
Pop65	Percent of the state population that is over 65 years of age	12.614	4.35	18.56	US Census Statistical Abstract of the US
Black	Percent of the state population that is black	10.114	0.3	37.06	US Census Statistical Abstract of the US
Female	Percent of the state population that is female	50.898	47.22	52.16	US Census Statistical Abstract of the US
College	Percent of the state population over the age of 25 with a bachelor's degree	23.330	12.8	36.7	US Census Statistical Abstract of the US
Urban	Percent of the state population that resides in an urban area	69.671	38.2	94.4	US Census Statistical Abstract of the US

Appendix 2

See Table 6.

Table 6 Effects of regulation on establishment size: two-way panel fixed effects estimates, summary of coefficients on regulatory variable

	Percentage models		Log odds ratio [ln(P/1 − P)] models	
Control variables?	Yes	No	Yes	No
Time and state fixed effects?	Yes	Yes	Yes	Yes
Employment size of establishment	Sample: All establishments			
0	−0.0085	−0.0068	−0.0008	−0.0007
1–4	−0.0146	−0.0225	−0.0006	−0.0009
5–9	0.0113**	0.0115**	0.0009**	0.0009**
10–19	0.0054	0.0064	0.0007	0.0008
20–99	0.0047	0.0063	0.0007	0.0008
100–499	0.0035	0.0041	0.0011	0.0012
500+	−0.0018	0.0012	−0.0002	0.0000
	Sample: Manufacturing establishments			
0	−0.0154*	−0.0199**	−0.0030**	−0.0040***
1–4	−0.0192	−0.0275	−0.0008	−0.0012
5–9	0.0232	0.0248	0.0017	0.0018
10–19	−0.0094	−0.0107	−0.0012	−0.0014
20–99	0.0074	0.0158	0.0008	0.0015
100–499	0.0116	0.0143	0.0027	0.0033
500+	0.0020	0.0032	−0.0009	−0.0007
	Sample: Wholesale establishments			
0	−0.0333*	−0.0434*	−0.0040**	−0.0053*
1–4	−0.0192	−0.0173	−0.0008	−0.0007
5–9	0.0246**	0.0219**	0.0021**	0.0020**
10–19	0.0100*	0.0141*	0.0014**	0.0018*
20–99	0.0074	0.0090	0.0006	0.0007
100–499	−0.0034	0.0041	0.0002	0.0016
500+	0.0140	0.0115	0.0010	0.0009
	Sample: Retail establishments			
0	−0.0058	−0.0039	−0.0006	−0.0004
1–4	−0.0104	−0.0169	−0.0004	−0.0008
5–9	0.0118*	0.0114*	0.0010*	0.0009*
10–19	0.0059	0.0065	0.0007	0.0006
20–99	−0.0073	−0.0035	−0.0006	−0.0005
100–499	0.0041	0.0048	0.0017	0.0019
500+	0.0016	0.0015	−0.0001	−0.0003

Table 6 continued

Sample: Manufacturing, wholesale and retail establishments pooled (with industry fixed effects)				
0	−0.0182**	−0.0224*	−0.0025**	−0.0032**
1–4	−0.0163	−0.0206	−0.0007	−0.0009
5–9	0.0199**	0.0194*	0.0016**	0.0016**
10–19	0.0022	0.0033	0.0003	0.0004
20–99	0.0025	0.0071	0.0003	0.0006
100–499	0.0041	0.0077	0.0015	0.0023
500+	0.0059	0.0054	0.0000	0.0000

Coefficient on the regulatory variable from separate subsample regressions using the indicated category and establishment size. Statistical significance (using state clustered robust standard errors) as follows: *** 1 %; ** 5 %; * 10 %

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