Mandate-based Health Care Reform and Business Activity: Evidence from Massachusetts

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This paper examines the effect of mandate-based health care reform on new, existing, and all-aged businesses by using Massachusetts health care reform in a quasi-experimental framework. As of April 12, 2006, firms with eleven or more employees were required to offer health insurance or pay a fine, while firms with less than eleven employees were exempt. Using the Dun and Bradstreet data and a difference-in-differences methodology augmented by a border approach, we find both new and existing businesses do adjust their employment around the cutoff but not enough to affect the overall business environment.

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1. Introduction

Mandate-based health care reform, particularly related to the federal Affordable Care Act (ACA), has been one of the most hotly debated public policy issues in recent memory. Discussion regarding the merits of mandate-based health care reform often weighs the benefits of expanded coverage with the costs, particularly related to how potentially detrimental such reform is to business and job creation. While the previous literature has focused on the benefits of expanding coverage in the United States (Currie and Gruber, 1996; Finkelstein, 2007; Finkelstein et. al., 2012), this paper sheds light on the costs associated with such policy and in particular, its effect on new business start-ups, existing business survival rates, and their respective employment decisions.

Although, the federal ACA has garnered much attention, it is challenging to study because all states are affected concurrently making it difficult to estimate what would have happened absent the program. However, Massachusetts provides a unique opportunity to investigate the impact of mandate-based health care costs on business creation, business survival, and job creation because it only affects one state, as the surrounding areas did not adopt similar policies. Additionally, the Massachusetts reform can offer insight into the impact of the national health care reform because many of the key features of the Massachusetts legislation were used as a model for national reform.

Massachusetts passed reform on April 12, 2006 with the purpose of expanding access to health care for its residents.[1] The reform affected businesses differentially depending on size. Establishments with 11 or more employees were required to provide a cafeteria-style health plan with the ability to use pretax earnings and to make a "reasonable" premium contribution to their

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[1] There were earlier attempts to institute the mandated-based health care reform however they were repealed due to economic and budgetary concerns as well as turnover of their political leaders. The uncertainly of its passing is often cited as support for plausible exogeneity.

employees' health care costs, while businesses with 10 or fewer employees were exempt from this requirement allowing employees to take responsibility and purchase insurance on the individual insurance market. In order to insure compliance the reform penalizes both employers and individuals, including: $295 "fair share" assessment if employers don't make a "fair and reasonable" premium contribution and a free-rider surcharge to firms that do not help contribute to employees' health insurance. Additionally, firms with 11 or more full-time employees that use at least $50,000 in free health care in one year may be responsible for 10 to 100 percent of the costs. Clearly all of these additional costs could affect incentives to hire additional workers as well as affect entrepreneurs' decisions to locate in Massachusetts. This paper studies the location and employment decisions of new businesses (businesses with one year or less in years of service), the survival or death rate of existing businesses (those with four or more years of service) and their employment decisions, as well as the total (all-aged) effect on all businesses for both employment and number of establishments.

Studying business location decisions poses a number of challenges because location/area attributes, in addition to the policy environment, play extremely vital roles in a business's decision of where to locate. Undoubtedly, many of these attributes are unobserved no matter the extensiveness of one's data set; therefore we utilize a difference-in-differences methodology in conjunction with a border approach, utilizing the features of the policy to further control for unobserved factors. Specifically, we study new, existing, and total establishment activity (number of firms and employment) along the Massachusetts state border (extending 1 and 10 miles away) before and after Massachusetts' health care reform. The differencing methodology helps to control for time-invariant and time-varying area characteristics that affect both the treatment and counterfactual areas the similarly.

By focusing at the border we minimize unobserved heterogeneous area changes between the treatment and counterfactual areas, which are so important in business decision.[2] Additionally, these adjacent counterfactual areas share local labor markets, customer bases, and natural advantages with the adjacent area in Massachusetts, making them an ideal comparison as they are close in geography and agglomeration economies; however after 2006 they differ in their employer mandate for health insurance. Because firms with 10 or less employees are exempt, we estimate the effect on these two groups of businesses separately, providing a "third level" of differencing. This type of analysis requires establishment data with very precise location information as well as information on the establishment's employment, age, and size which we attain using the Dun and Bradstreet Marketplace (D&B) data set. We measure both shorter-term (1 year) and longer-term (3 year) effects of the health care reform on these companies.[3]

In addition to providing new information on the business environment in Massachusetts, our study also allows policy makers to draw the best conclusions possible about the potential future effects of the Affordable Care Act. On October 30, 2013 President Obama stated "Your law was the model for the nation's law" when addressing Faneuil Hall in Boston, MA. This suggests our findings will provide insight on the potential effects of ACA on entrepreneurship in the United States. Furthermore, the results of this study are even more valuable considering national health care reform is essentially unprecedented in the United States and policy makers must rely on existing programs to learn about the potential impact of the ACA.

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[2] Due to how much unobserved heterogeneous area information the research is missing we prefer the border approach over propensity score matching or "synthetic border methodologies, which only utilize observed characteristics which may or may not be similar to these unobserved area characteristics.

[3] We don't analyze effects more than 3 years because we want to avoid any confounding effects of the ACA. See Kim (2015) for early labor supply effects of the ACA.

We find that mandate-based health care reform distorts incentives for both new and existing businesses around the policy employment cutoff causing firms near the limit to employ just enough workers to stay below the cutoff. Specifically, our results suggest that Massachusetts initially (1 year after the reform) experienced a reduction of 0.4 percent in new establishments with 11-24 employees. However, in the longer term (3 years after the reform), we find a decrease of 0.2% for businesses with 11-24 employees and an increase of 1.4 percent in new businesses with 1-10 employees, suggesting that the law does distort decisions around the cutoff by incentivizing firms to hire fewer workers and open as smaller businesses. We also find the same pattern with the change in employment: there is a decrease of 2.7 percent in the shorter term for new business employment in firms with 11-24 employees and an increase in the longer term of employment of 2.4 percent at businesses with 0-10 employees for new and total establishments, as well as a decrease of 1.9% for establishments with 11-24 employees. However, when studying new firms with 11 or more employees (not just firms near the cutoff with 11 to 24 employees), there seems to be little evidence of adverse effects on new firms. This likely suggests that the law change does not negatively effects large firms that will never be near the cutoff and who are likely to offer health care benefits to their employees and instead the law change only affects new businesses that were already planning to be relatively small.

Our analysis on existing businesses shows existing firms around the employment cutoff are similarly affected but are slightly less sensitive to the policy than new firms. One explanation for why existing firms may be less sensitive to the policy is that many existing firms already provided health care for their employees or that the additional costs from the reform were not sufficient to dissuade existing firms from hiring employees above the cutoff or force existing firms to relocate. Additionally, despite the adverse effect around the employment cutoff

the business environment overall (all ages and sizes) in Massachusetts does not seem to be affected. Robustness checks indicate no anticipatory effects of the law change, however they do find pre-term positive trends for establishments and employment in Massachusetts before the law change.

The rest of the paper will be structured with the second section describing the Massachusetts health care reform and existing literature. The third discusses data and methodology. The fourth section presents the results and robustness checks and is followed by a brief conclusion.

2. Massachusetts' Mandate-based Health Care Reform

In 2005, Massachusetts had the highest per capita health care spending of any state in the nation, with spending 30% higher than the national average, and over 8% of their population not covered by any type of health insurance.[4] As a result, in 2006, Massachusetts adopted An Act Providing Access to Affordable, Quality, Accountable Health Care, otherwise known as, the Massachusetts Health Care Reform Act (MHCRA). While the act introduced widespread reform throughout the Massachusetts health care market with aims to increase their insured population, the two biggest changes were the individual and firm mandates. The individual mandate required all adults to either pay a financial penalty or buy health insurance, however, households with income below 300% of the federal poverty line were eligible for subsidies to help pay for their coverage. In addition, Medicaid was expanded to cover more low income children and adults. The employer provision mandated all employers with at least 11 employees provide

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[4] The District of Columbia had the highest per-capita spending at $8,644, while Massachusetts spending was the highest of any state at $7,436 and the national average was $5,726. http://kff.org/other/state-indicator/health-spending-per-capita/. Authors calculation of 30% change from (7,436-5,726)/5,726.

coverage or else face a fine, while firms with 10 or less employees were exempt from the provision or contribution to employee health insurance.

The effects of MHCRA have been studied across many different outcomes including rates of uninsured (Kolstad and Kowalski, 2012; Long, 2008), adverse selection (Hackmann, Kolstad, and Kowalski, 2014), health care use and health (Kolstad and Kowalski, 2012; Miller, 2012), wage compensation (Kolstad and Kowalski, 2016), physician payments (Dunn and Shapiro, 2015) and financial distress (Mazumder and Miller, 2014). However, the focus of this paper is how the MHCRA affected business location decisions, including where new businesses/entrepreneurs locate, whether survival/death rates of existing firms are affected, and employment in both new and existing businesses. The MHCRA mandated all businesses with 11 or more employees had to either pay a maximum per employee fine of $295 or offer a health insurance plan in which employees can buy into it with pre-tax dollars. They also have to contribute some of the costs of the health insurance premiums or pay a free rider surcharge.

The way the law is structured provides a natural experiment to compare the behavior of firms. Our methodology will compare businesses on either side of the Massachusetts border to business with less than 11 employees, those exempt from MHCRA mandates, and those with 11 or more employees which had to comply with the health insurance reform. We can test whether the MHCRA makes doing business in Massachusetts less attractive and results in businesses choosing to locate on the other side of the border, which allows them to retain access to the same labor pool and any natural advantages, while at the same time avoiding the expensive cost of providing health insurance to their employees (or paying a fine). In addition to providing new information on the entrepreneurship landscape in Massachusetts, this study also allows us to draw the best conclusions possible about the potential future effects of the ACA. On October 30,

2013 President Obama stated "Your law was the model for the nation's law" when addressing Faneuil Hall in Boston, MA. Suggesting that our findings from the Massachusetts health care reform will provide insight on the potential effects of ACA on entrepreneurship in the U.S. and is particularly helpful given national health care reform is essentially unprecedented and as a result, we must learn as much from existing programs to help shape our ideas of what the ACA will do for entrepreneurship in the U.S.

While there are many similarities between the Massachusetts Health Care Reform and the Affordable Care Act, including but not limited to the individual mandate, expansion of Medicaid, employer rules, state-based exchanges, and subsidies available to low income families, there are many key differences as well. The most relevant to our study is that the ACA only institutes requirements on employers with 50 or more employees, while the MHCA mandates all firms with 11 or more employees pay a fee or provide health insurance to its' employees. In addition, the MHCA only affected one state, which allowed entrepreneurs to avoid the policy by locating on the other side of the state border, while for the ACA companies cannot avoid the policy by locating in an alternate part of the United States. Other differences include but are not limited to the income requirement to be eligible for a subsidy to help pay for insurance, the Medicaid expansion policy, and the requirement of co-pays for preventative care services which was allowed by Mass Care Reform but not by ACA standards.

Massachusetts will have to make several changes to their existing health insurance program because some of the Affordable Care Act statutes either contradict or are inconsistent with the current regulations in place in Massachusetts. For example, the population eligible to receive a subsidy is less generous under the Massachusetts law compared to the national law. As a result, we use third quarter 2009 as our latest data because the results using any data after that

time period would be confounded by potential business decisions in response to the ACA implementation rather than just the MHCA.

3. Data and Empirical Methodology

3.1 Establishment Data

To separately study new and existing firms across different employment sizes, we need an establishment dataset that has information on the location, size and age of the business. Our source for establishment data comes from the Dun and Bradstreet (D&B) Marketplace database, which includes the ZIP code where the businesses reside, their employment, years of service, some information on their sales and their two-digit standard industrial code (SIC). New businesses are defined as having 1 year or less of service, while existing establishments are defined as having 4 or more years of service.

Because the law was adopted on April 12, 2006 with the latest effective date for several of the provisions being July 1, 2007, we use 2005 3rd quarter D&B as our pre-period data, and 2007 3rd quarter D&B data to get a sense of the immediate response to the policy and 2009 3rd quarter data for a more longer-term effect. Again, we stop at 2009 3rd quarter because uncertainty from the federal mandate-based health care program likely starts to affect entrepreneurs' decisions as early as 2010 and we do not want to confound our results. Additionally, as a robustness check we run the analysis before the policy in 2006 to test for pre-existing trends and use data from 2002 to 2005.

The border approach requires comparing two adjacent areas on opposite sides of the state border. Difficulty occurs because ZIP codes are often highly irregularly shaped and in some cases, such as large firms or schools, can be as small as a parcel of land. Although comparing

differently shaped areas is not necessarily a problem due to our methodology that differences over time, ideally these adjacent areas would be somewhat similarly shaped particularly with respect to their distance from the border. We use geographic information systems (GIS) software to create 1 and 10 mile buffer zones segments along the Massachusetts border.[5] The analysis for the 1 mile border area has the sharpest identification because we are comparing business activity that are most similar in levels and trends given that they are a mile away however, this introduces questions about whether these results are generalizable to the rest of the state. Therefore, we also study firms that are 10 miles on either side of the border, which provide a better understanding of how generalizable our results are to the rest of the state. For parsimony we present the 1 mile buffer zone results in the main tables and the 10 mile buffer zone results in appendix A.

The GIS process entails creating the buffer zones on each side of the Massachusetts border and then overlaying a 20-by-20 mile square grid to "cut" the 1 and 10 mile buffers. This process which can be seen in Figure 1 creates border-area pairs along the Massachusetts state border and creates pairs of "border areas" along the state line. We then assign the business activity in ZIP codes to the border areas that they intersect. In the case where a ZIP code intersects more than one border area on their respective side then we assign all the business activity to the border area with the greatest degree of overlap.[6] For more information on the creation of the border-area pairs, see Rohlin (2011) or Rohlin, Rosenthal, & Ross (2014).

3.2 Differencing Methodology at the Border

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[5] Our results are robust to alternative geographical specifications, including for instance matched ZIP codes, which are available upon request from the authors.

[6] We also tried assigning a proportional amount of the business activity to each border area, meaning if a ZIP code had 10 businesses and was 40% in one border area and 60% in another then we would assume a uniform distribution of businesses and assign 4 businesses and 6 businesses to their respective border areas. Our findings are robust to this approach and are available from the authors upon request.

To identify the causal effect of Massachusetts' mandate-based health care reform on businesses we need to overcome a number of estimation concerns including accounting for observed and unobserved time-varying and time-invariant area characteristics, determining the optimal counterfactual areas, and accounting for other business-related state policies that simultaneously occurred with the health care policy.

Determinants of business location and employment decisions, such as local area characteristics can be organized into three types: time-invariant determinants, time-varying determinants that affect all areas the same and area-specific determinants that change over time. To control for these determinants, we utilize a difference-in-differences methodology, which has often been done in the policy evaluation literature, in conjunction with a border approach.[7] Specifically, we estimate changes in new and existing business activity before and after the adoption of the health care policy in Massachusetts and compare them to changes in counterfactual areas. This differencing methodology eliminates any time-invariant additively separable confounding determinants but not time-varying factors.

To minimize potential bias due to time-varying area characteristics as well as to aid us in choosing ideal counterfactual areas we employ a border approach which focuses the analysis to areas along the Massachusetts border. Comparing adjacent areas on opposite sides of the state border over relatively short distances (1 and 10 miles) maximizes the potential for time-varying factors to affect both the treatment and counterfactual areas which is accounted for by the differencing methodology. When studying business location decisions, the border approach is particularly helpful because it allows the treatment and counterfactual areas to have the same customer and labor markets which play vital roles in the decision of where firms locate. Due to

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[7] For examples of policy evaluation using border analysis see Dube, Lester, and Reich (2010) for minimum wage; Hanson and Rohlin (2012) for empowerment zone analysis; Rohlin, Rosenthal, and Ross (2014) for tax policy.

how localized business location determinants, their potential to change over time and their lack of observability by the research we prefer to focus on the border approach over other methodologies like synthetic borders and propensity score matching.

Additionally, another business determinant that is accounted for using this approach is area natural advantages which also have been known to affect business location decisions. The border approach also minimizes unobserved heterogeneous area-specific factors that only affect one side of the border-area pair by relying on the fact that the spatial correlation of area characteristics, such as changes in the robustness of the local economy, do not change as one moves across state lines. Lastly, if businesses were to "hop" over to the non-Mass side of the border then our counterfactual area are in effect being positively affected by the policy. We view this as a potential strength as it provides us with an upper bound estimate which can be helpful for policy recommendations.

We run the difference-in-differences regression provided in equation 1 where ΔY_{its} is the change (1 or 3 year) in business activity (number of new, existing, and total or all aged establishments or employment in those establishments) in border-area, s, in industry, i, in time period t. The parameter β_1 accounts for differences between border areas in Massachusetts and non-Massachusetts and controls for any time-invariant factors, while β_2 is an after time-period dummy variable (2007 and 2009 in shorter- and longer-term estimates, respectively) which accounts for any differences in time periods that affected both border-areas. The parameter, β_3, is the parameter of interest and measures the effect on businesses in Massachusetts after the reform. Finally, PairFE and IndFE indicate the regression includes border-area pair as well as 2-digit SIC fixed effects.

$$\Delta Y_{its} = \beta_1 (Mass)_s + \beta_2 (After)_t + \beta_3 (Mass \times After)_{it} + PairFE_p + IndFE_i + \varepsilon_{its}$$

(1)

Despite our approach there could be residual concerns over unobserved heterogeneous Massachusetts-specific time-varying factors confounding our estimates, therefore, we utilize a feature of the health care policy: it only applies to businesses with 11 or more businesses. By separately measuring the effect of the health care policy on businesses with less than 10 employees, who are not directly affected by the policy and on businesses with 11 or more employees, who are influenced by the policy, we can better account for any time-varying factors specific to Massachusetts.[8]

Additionally, separately studying businesses by employee size helps in addressing the concern of other state policies as long as they do not disparately affect businesses at the same size cutoff. Our research of other Massachusetts policies during this time period found only one other substantive business-related state policy. In 2006, Massachusetts voted to increase their minimum wage with a two year phase in period for a final new minimum wage of $8.00 with an effective date of January 1, 2008.[9] This minimum wage policy makes it difficult to separately identify the effect it has on entrepreneurs from the health care policy's impact however, because the minimum wage affects all businesses and does not have an employee cutoff similar to the health care policy. By analyzing the effect on businesses around the health care cutoff, we can account for the other Massachusetts policies that occurred at that time.[10]

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[8] Businesses with 10 or less employees in Massachusetts could be influenced by the policy if they hope to hire more employees in the future. The results later in the paper will shed some light on this.
[9] In 2006 Massachusetts had a minimum wage of $6.75, while the surrounding states had minimum wages of $7.40 in Connecticut, $5.15 in New Hampshire, $6.75 in New York, $6.75 in Rhode Island, and finally $7.25 in Vermont.
[10] There is evidence in the minimum wage literature that smaller businesses are particularly sensitive to minimum wage changes (see Rohlin 2011)

Lastly, difference-in-differences methodology relies on the assumption that both treatment and control areas are trending in similar ways. Although, we use the border approach to mitigate this concern, we explicitly test for trends by running our specification before the policy occurred, using 2002 and 2005 as our pre- and post-periods, respectively. Although there is some debate about the ideal level of clustering for standard errors in a border framework, we hope to avoid this debate and to be conservative by using state-pair clustering which produces larger standard errors than more disaggregated clustering.

4. Results

4.1 Establishments

The estimates of the effect of the Massachusetts health care reform on the number of new (Panel A), existing (Panel B), and all-aged establishments (Panel C) are shown in Table 1. The table shows estimates of the law change in the shorter term (2005-2007) in the first three columns and in the longer term (2005 -2009) in columns 4 to 6. Because the health care reform mandate is directly affecting businesses with 11 or more employees, the analysis is separately conducted to show the effects of the reform on businesses with 0-10 employees (exempt from the reform), and businesses with 11 or more employees (treated by the law change). However, due to the possibility of the reform being particularly costly to firms around the cutoff we separately analyze businesses with 11-24 employees and 11+ employees. Tables 1 through 6 focus the analysis on border areas that extend 1 mile into the interior while appendix tables A1 through A2 provide the corresponding results for border areas up to 10 miles into the interior. The 0 to 1 mile analysis provides the best areas in terms of identification by minimizing heterogeneous area-specific changes while the 0 to 10 mile analysis provides insight into how generalizable the

results are for the rest of Massachusetts. Results are consistent in pattern across border size, though we do find some of the effects dissipate over longer distances.[11]

The first three columns of Panel A in Table 1 display the estimates for the shorter-term (2005 to 2007) effect of the law change on the natural log transformation of the number of new (1 year or less years of service) establishments, meaning the coefficients can be interpreted as the percent change in establishments. To begin we look at the 1-10 employee businesses that are exempt from the health care reform but may be influenced by the policy if they hope to increase their employment size above 10 employees in the future. The negative estimate (of -0.024) for the *"MASS"* variable indicates that Massachusetts has less new businesses (establishment births) relative to neighboring areas on the other side of the state border, however it is not statistically different from zero. The statistically significant positive effect of 1.6% on "*AFTER*" shows that the business environment in both areas has improved in 2007 compared to 2005. The effect of the law change is the interaction between being in Massachusetts and being after the reform for firms with 1 to 10 employees. The effect is relatively small (-0.002) and statistically not different than zero suggesting that small new businesses were not strongly deterred from starting their business in Massachusetts immediately after the reform.

Moving to the second column of Panel A of Table 1 examines the effect of the health care reform on employers (those with 11-24 employees) who must now offer health care benefits to their employees because of the reform. We find that being in Massachusetts after the health care reform deters new businesses from locating in that area with a decrease of 0.4%, statistically significant at the 5% level suggesting that businesses near the cutoff either do not locate in Massachusetts or chose to remain small by having few employees. To determine the extent of

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[11] Additionally, analysis of the 0 to 5 mile border areas produced similar results as the 0 to 1 and 0 to 10 analysis. Although these results are not shown in the paper they are available upon request.

this deterrent effect on firms above the employment cutoff, column 3 of Panel A shows the results for all firms with 11 or more employees. We find a smaller (-0.001) and insignificant effect for all firms with more than 11 employees, which may not be surprising considering that large businesses will likely never be under 11 employees and also highlights the importance of separately estimating the effect of the number of businesses with 11-24 employees.

Columns 4-6 of Panel A estimate the longer-term (2005 to 2009) effect of the Massachusetts health care reform on businesses by the same size classifications (1-10, 11-24, 11+) as the shorter-term classifications. We see that new businesses are purposely altering their decisions around the cutoff for mandated health insurance. In the longer term, there is a 1.4% increase (statistically significant at 5% level) in new establishments with 1-10 employees, while there is a decrease of 0.2% (also significant at 5% level) in new businesses with 11-24 employees. Again there is essentially no effect on new businesses when larger firms are considered. These results provide suggestive evidence that entrepreneurs are sensitive to the employment cutoff and purposefully hired less than 11 employees in response to the health care reform. Finding clearer firm response in the longer-term results compared to the shorter term could be due to confusion and uncertainty of new entrepreneurs about the policy's implications or indicate that entrepreneurs take time to adjust their location and employment decisions. Panel B examines the effects on existing businesses to measure whether the health care reform is affecting survival or death rates of businesses in Massachusetts. Overall, the interaction term in Panel B of Table 1 does not indicate the health care reform drove existing businesses out of the state or caused them to shutdown relative to the counterfactual areas regardless of employment size. We find a positive statistically significant effect of 2.3% for firms with 0-10 employees, in addition to finding almost zero estimates for 11-24 firms (0.005) and 11+ firms (0.009) both of

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which are imprecisely estimated. The longer-term findings support the idea that existing

businesses did not have disparate closure rates but are also sensitive to the employment cutoff.

They are likely less responsive than new firms because it is more costly to move existing and

established businesses to alternate locations.

Results shown in Panel C of Table 1 combine the business activity of new and existing

establishments to investigate the reform's effect on establishments for all businesses regardless

of their years of service. In general, because existing firms comprise a much larger percentage of

the overall number of firms the "all-aged" results tend to mimic the existing firm results

throughout the paper. We find essentially no effect of the health care reform on business activity

in the shorter term. In the longer term business activity increased by 2.9% for firms exempt

from the health care mandate without a corresponding loss in firms affected by the mandate (11+

employees). This reflects the increased business activity by firms with 10 or less employees for

both new and existing businesses. Overall, we find evidence of firms purposefully holding back

employment to stay under the employment cutoff, regardless of the age of the firm.

4.2 Employment

The effect of the Massachusetts health care reform on businesses in Massachusetts can

not only affect the extensive margin of whether or not a firm opens or closes but also the

intensive margin of the number of employees they hire. Table 2 estimates equation (1) using

natural log of employment as the dependent variable and is set up in a similar fashion as Table 1.

Panel A shows that there is a shorter-term decrease of 2.7% employees at new firms with

employees with 11 to 24 employees, statistically significant at the 5% level. In the longer term,

we find evidence that employment is bunching around the cutoff with an increase of 2.4% in

employment for exempt businesses (those with less than 11 employees) and a decrease of almost

2% for businesses with 11-24 employees, both statistically significant at the 5% level. Interestingly, employment at existing firms with less than 11 employees falls by 1.48 percent immediately following the policy but recovers with a 2.77 percent positive effect after three years. All aged firms also have a positive longer-term effect for firms below the cutoff. The employment results in Table 2 illustrate a similar pattern to the establishment results supporting the story that there is purposeful bunching around the cutoff for mandated health care provision.

Industry Results

Tables 1-2 provide results for all industries aggregated, however it is possible that certain industries are effected more than others which would be useful information to policymakers. For instance, a priori one could expect export industries, such as manufacturing, to respond differently than service industries which rely on a local customer and employment base. The percent changes in the number of establishments (Table 3) and employment (Table 4) in the following industries: manufacturing, retail, service, and wholesale. For parsimony, we only show the estimate for the interaction term between being in Massachusetts and after law change. Panel A of Table 3 again shows new establishments and we find an increase of 3.01 percent in number of firms in manufacturing with less than 11 employees, with the effect getting slightly larger in the long-run with both having statistical significance of at least the 10% level. It seems the loss of new businesses with 11 to 24 employees in the shorter-term are concentrated in the service, retail, and wholesale industries with losses of 3.79 percent, 4.97 percent and 13.6 percent respectively. The longer-term growth in firms with only 1 to 10 employees is driven by the manufacturing and service industries with growth rates of 3.9 percent and 11 percent respectively.

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The existing establishments results by industry suggest the bunching from existing firms are not from the retail, service or wholesale industries. Interestingly, the manufacturing industry with 1 to 10 employees is adversely affected by the health care reform in the shorter-term with an estimated loss of 4.37 percent. Potentially, manufacturing decided to leave Massachusetts because it exports products and not tied to a specific location or local customer base. The total results suggest that the service industry is particularly sensitive to the health care changes with a 7 percent loss of 11 to 24 employee firms in the shorter term. The longer term results show a growth in small sized service firms (1 to 10) of 13.2 percent and a loss of 12.7 percent of firms with 11 plus employees.

Table 4 shows the employment effects across industries and show firms were more responsive in their employment decisions than their decisions to stay in business. The evidence suggests that retail, wholesale and particularly the services industries changed their employment decisions due to the reform. This seems reasonable given the fact that these industries are the least likely to have provided health care benefits to their employees before the reform.

4.3 Placebo Test

A weakness of the difference-in-differences approach is the reliance on the assumption of similar pre-trends in the treated and counterfactual areas. Although the border approach attempts to use control areas that are trending most similarly, we can also explicitly test for this by estimating the effect of the reform before the law was enacted. Table 5 presents the placebo effects for establishments and employment between 2002 and 2005. The first three columns display the effect on firm location decisions while the last three columns show the effect on their employment decisions. Panel A provides evidence that Massachusetts was gaining new establishments with 0-24 employees prior to the law change compared to bordering areas. Some

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of this pre-trend may be explaining the increase in establishments and employment at firm with

0-10 employees. However, this strengthens our findings of decreased establishments and

employment at firms with 11-24 after the law change, meaning the true effect of the law change

is larger than the percent changes presented in Panel A of Tables 1 and 2 for establishments with

11-24 employees. The pre-trends show increases in these firms and employment, while after the

law change both firms and employment decreased in Massachusetts relative to the border areas.

None of the results are statistically significant for existing and total (all aged) establishments and

many are small in magnitude suggesting Massachusetts border areas were not trending

differently in the growth of existing firms compared to their adjacent control areas prior to the

reform.

4.4 Effects for 0-10 borders

Although the 0 to 1 mile border region offers treatment and control areas that are most

similar it leaves some uncertainty about areas further away from the border. Therefore, we

present the results for 0 to 10 mile border pairs with Table A1 and A2 showing the percent

change in the number of establishments and percent change in the employment in those firms.

Overall, the two tables show a consistent story with those from Table 1 in that we see a negative

effect on new establishments among treated firms with 11-24 employees in the shorter-term.

However, an important finding from Table A-1 is that the longer-term negative effect on firms

with 11-24 employees dissipates between 1 and 10 miles. In addition, the 1-10 positive effect is

still large in magnitude at 10 miles, however it is no longer statistically significant. The positive

effect on longer-term existing businesses and all-aged businesses with 0-10 employees also

dissipates with distance from the border. However, in the shorter-term there is a decrease in

existing establishments with 0-10 employees of 3.6%, which comes from the manufacturing

industry. Despite the fact that this negative effect dissipates in the longer-term this finding

suggests that existing small businesses either relocated or shut down shortly after the policy.

Moving to employment effects (Table A2), the decrease in shorter-term employment at

new firms with 11-24 employees increases with distance, suggesting these effects may be more

generalizable throughout the state rather than only true within 1 miles of the border. The

decrease of 2.7% within 1 mile actually grows to a decrease of 6.7% within 10 miles of the

border. However, the longer-term effects found within 1 mile of the border for new

establishments dissipate within 10 miles. The existing and all-aged firm effects also dissipate by

10 miles away from the border, with the exception of a near 16% decline in employment for all-

aged firms with 11 or more employees.[12]   Taken as a whole, the 0 to 10 mile border results find

similar but in some cases less precise patterns of bunching around the employment cutoff.

4.5 How Does this Movement Around the Cutoff Affect the Overall Business Environment?

The results presented so far suggest that the Massachusetts health care reform produced

bunching around the employment cutoff with increased new and existing establishments that

were considered to be small (0-10 employees) in the longer term while causing a shorter- and

longer- term decrease in the new businesses with 11-24 employees. This leads to questions about

whether Massachusetts overall business environment was affected by these distortions.

Therefore, Table 6 presents the results for percent change in firms (columns 1 to 3) and

employment (columns 4 to 6) when all-sized firms are pooled together in Massachusetts

compared to neighboring areas to determine the total effect on firms for new establishments

(panel A), existing establishments (panel B), and all-aged establishments (panel C). We present

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[12] Although, this results become statistically insignificant with state pair clustering this large negative coefficient is puzzling given the 0 to 1 mile border result of 0.29 percent and the fact that it is larger than the 11 to 24 employee effect suggesting that very large firms had substantial negative employment responses. Given the weak statistical significance, lack of robustness in related results, and the greater concern of heterogeneous effects in the 0 to 10 mile results we prefer to understate this result.

the shorter-term effects in columns 1 and 4, longer-term effects in columns 2 and 5, and the pre-term effects (2002 to 2005) effects in columns 3 and 6 for comparison.

Overall, there are no statistically significant interaction terms for new businesses.[13] For all-aged firms, Table 6 displays a slight negative effect in the percent change of establishments and no effect on employment overall. The existing establishment results suggest no overall effect (establishments) to a slight positive improvement (employment) in the business environment. This could be reflecting that many existing firms were already offering health insurance coverage and the law change did not deter them from moving or closing their business. However, this type of analysis suffers from bias resulting from other state policy changes. A specific policy to be worried about would be that Massachusetts also increased their minimum wage during this time period so these results are including the minimum wage effect. Nonetheless, our take away from this analysis is that there is not compelling evidence of an effect of the health care reform on the overall business environment.

5. Conclusion

To understand the full economic impact of the Massachusetts Healthcare Reform, it is important to not only weigh the benefits, such as increased insured population and increased health outcomes, but also consider potential costs, including those on entrepreneurship and the business environment in Massachusetts. The healthcare reform instituted near universal coverage by including an individual mandate and also mandating all businesses with more than eleven employees provide health insurance for their employees. This provides a unique quasi-

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[13] However, if the statistically insignificant point estimate for the employment effect in the pre-term of 14.7 percent is to be believed then there was large drop in new establishment employment.

experiment to investigate whether the business mandate decreased establishments and employment in Massachusetts, as opposing policy makers feared.

This paper measures the effect of Massachusetts healthcare reform on new, existing, and total entrepreneurship activity by using a difference-in-differences methodology augmented by a border approach, which allows us to control for time-invariant characteristics among other things. We find that the law change decreased new establishments and employment among firms with 11-24 employees for which the firm mandate was binding, and increased establishments and employment for businesses with 0-10 employees which were protected from the law change. We find this as evidence that the healthcare reform did distort the decisions of entrepreneurs by encouraging them to open smaller businesses with fewer employees than they likely otherwise would have. However, when considering total employment we do not find big decreases in establishments or employment as had once been feared.

This paper gives new evidence on the cost side of the Massachusetts healthcare reform to be considered with the previous literature that measured the benefits to the population of Massachusetts. In addition, as President Obama has repeatedly stated that the federal Affordable Care Act was modeled after Massachusetts healthcare reform, meaning that our paper gives insight into potential costs of the federal healthcare reform. Our paper provides suggestive and helpful evidence on the potential effects of healthcare reform on business activity in the United States.

References

Courtemanche, Charles and Daniela Zapata. 2014. "Does Universal Coverage Improve Health? The Massachusetts Experience." NBER Working Paper #17893.

Currie, Janet and Jonathan Gruber. 1996. "Health Insurance Eligibility, Utilization of Medical care, and Child Health." The Quarterly Journal of Economics, 111 (2):431-366.

Dube, Arindrajit, T. William Lester, and Michael Reich. "Minimum wage effects across state borders: Estimates using contiguous counties." The review of economics and statistics 92.4 (2010): 945-964.

Dunn, Abe and Adam Shapiro. 2015. "Physician Payments under Health Care Reform." Journal of Health Economics, 39: 89-105.

Finkelstein, Amy. 2007. "The Aggregate Effects of Health Insurance: Evidence from the Introduction of Medicare." The Quarterly Journal of Economics, 122(1); 1-37.

Finkelstein, Amy, Taubman, Sarah, Wright, Bill, Bernstein, Mira, Gruber, Jonathan, Newhouse, Joseph, Allen, Heidi, Baicker, Katherine, and the Oregon Health Study Group. 2012 "The Oregon Health Insurance Experiment: Evidence from the First year." The Quarterly Journal of Economics, 127(3): 1057-1106.

Hackmann, Martin, Kolstad, Jonathan, and Amanda Kowalski. 2014. "Adverse Selection and an Individual Mandate: When Theory Meets Practice," American Economic Review, 105(3): 1030-66.

Hanson, Andrew, Rohlin, Shawn. 2012. "Do spatially targeted redevelopment programs spillover?". Regional Science and Urban Economics 43, 86–100.

Kaiser Foundation, "Massachusetts Health Care Reform: Six Years Later" Available 5/1/12.

Kauffman Foundation, "State Indicators: Health-spending per capita," http://kff.org/other/state-indicator/health-spending-per-capita/.

Kim, Daeho. 2015."The Value of Health Insurance and Labor Supply: Evidence form the Affordable Care Act Dependent Coverage Mandate and Early Medicaid Expansion." Working paper.

Kolstad, Jonathon and Amanda Kowalski. 2012. "The Impact of Health Care Reform on Hospital and Preventive Care: Evidence from Massachusetts" Journal of Public Economics. December Vol. 96. 909-929.

Kolstad, Jonathon and Amanda Kowalski. 2016. "Mandate-Based Health Reform and the Labor Market: Evidence from the Massachusetts Reform" Journal of Health Economics 47: 81-106

Long, Sharon. 2008. "On the road to universal coverage: impacts of reform in Massachusetts at one year. Health Affairs, 27(4):270->>.

Mazumder, Bhashkar and Sarah Miller. 2014. "The Effects of the Massachusetts Health Care Reform on Financial Distress". FRB of Chicago working paper 2014-01.

Miller, Sarah. 2012. "The Impact of the Massachusetts Health Care Reform on Health Care Use among Children". American Economic Review, 102(3):502-07.

Rohlin, Shawn. 2011. "State Minimum Wage Rates and Business Location: Evidence from a Border Approach," Journal of Urban Economics 69(1): 103-117.

Rohlin, Shawn, Stuart Rosenthal, and Amanda Ross. 2014. "Tax Avoidance and Business Location in a State Border Model," Journal of Urban Economics 83(1): 34-49

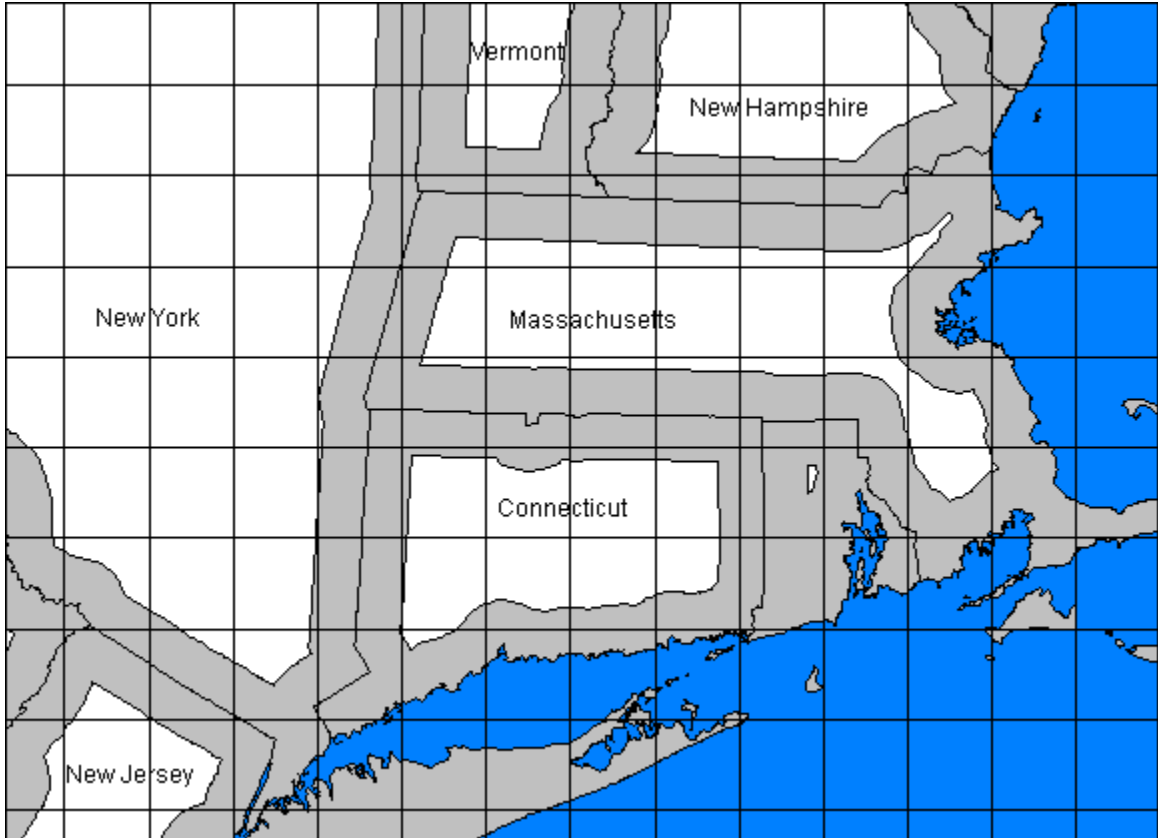Figure 1: Example of the Geographic Information Systems software.

TABLE 1- The Percent Change of Establishments in All Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Shorter term (2005 to 2007)			Longer term (2005 to 2009)		
	# of Employees			# of Employees		
	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	-0.00167	-0.00412*	-0.00141	0.0144**	-0.00200**	-0.000359
	(0.00554)	(0.00200)	(0.00128)	(0.00686)	(0.000945)	(0.00128)
AFTER	0.0157***	0.00327*	0.000707	0.0337***	0.000190	-0.00177
	(0.00508)	(0.00158)	(0.000871)	(0.0105)	(0.000876)	(0.00170)
MASS	-0.0235	0.000191	-0.00172	-0.0235	-8.43e-05	-0.00197
	(0.0189)	(0.000946)	(0.00210)	(0.0189)	(0.00104)	(0.00218)
Observations	7776	5516	6002	7680	5205	5459
Panel B: Existing Establishments						
MASS x AFTER	-0.00748	-0.000959	0.000963	0.0234**	0.00446	0.00898
	(0.00451)	(0.00243)	(0.00301)	(0.00966)	(0.00415)	(0.0138)
AFTER	-0.0244***	-0.000780	-0.00329	0.108***	0.0110***	0.0349***
	(0.00379)	(0.00160)	(0.00192)	(0.0101)	(0.00368)	(0.0104)
MASS	0.0435	-0.0133	-0.0130	0.0435	-0.0133	0.125
	(0.0843)	(0.0438)	(0.0546)	(0.0843)	(0.0438)	(0.150)
Observations	7776	7776	7776	7776	7776	7776
Panel C: All-Aged Establishments						
MASS x AFTER	-0.00695	-0.00160	0.000751	0.0286***	0.00373	0.00363
	(0.00532)	(0.00225)	(0.00280)	(0.0101)	(0.00418)	(0.00384)
AFTER	-0.0203***	-0.000260	-0.00313	0.109***	0.0110***	0.0112***
	(0.00359)	(0.00158)	(0.00188)	(0.0103)	(0.00369)	(0.00353)
MASS	0.0399	-0.0129	-0.0129	0.0399	-0.0129	-0.0129
	(0.0853)	(0.0438)	(0.0547)	(0.0853)	(0.0438)	(0.0547)
Observations	7776	7776	7776	7776	7776	7776

Notes:
a) Each estimate measures the percent change in establishments for a 0 to 1 mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

TABLE 2- The Percent Change in the Employment in All Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Shorter term (2005 to 2007)			Longer term (2005 to 2009)		
	# of Employees			# of Employees		
	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	-0.00330	-0.0268**	-0.00320	0.0242**	-0.0192***	-0.00320
	(0.00727)	(0.0101)	(0.0109)	(0.0110)	(0.00679)	(0.0120)
AFTER	0.0148**	0.0215**	-0.000249	0.0420***	0.00627	-0.0154
	(0.00560)	(0.00871)	(0.00778)	(0.0140)	(0.00577)	(0.0122)
MASS	-0.0303	0.00376	-0.0119	-0.0303	0.00208	-0.0137
	(0.0269)	(0.00521)	(0.0142)	(0.0269)	(0.00566)	(0.0145)
Observations	7776	5516	6002	7680	5205	5459
Panel B: Existing Establishments						
MASS x AFTER	-0.0148*	-0.00525	0.00224	0.0277**	0.0108	0.00898
	(0.00807)	(0.0102)	(0.0118)	(0.0130)	(0.0150)	(0.0138)
AFTER	-0.0293***	-0.000106	-0.0109	0.120***	0.0328***	0.0349***
	(0.00554)	(0.00555)	(0.00820)	(0.00909)	(0.00805)	(0.0104)
MASS	0.103	0.0781	0.125	0.103	0.0781	0.125
	(0.115)	(0.113)	(0.150)	(0.115)	(0.113)	(0.150)
Observations	7776	7776	7776	7776	7776	7776
Panel C: All-Aged Establishments						
MASS x AFTER	-0.0129	-0.00532	0.00296	0.0345**	0.00763	0.00850
	(0.00878)	(0.0100)	(0.0119)	(0.0133)	(0.0152)	(0.0128)
AFTER	-0.0278***	0.000731	-0.0111	0.120***	0.0336***	0.0350***
	(0.00575)	(0.00577)	(0.00817)	(0.00898)	(0.00836)	(0.0108)
MASS	0.0989	0.0804	0.125	0.0989	0.0804	0.125
	(0.116)	(0.112)	(0.150)	(0.116)	(0.112)	(0.150)
Observations	7776	7776	7776	7776	7776	7776

Notes:
a) Each estimate measures the percent change in employment for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

TABLE 3- The Percent Change in Establishments Across Different Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Shorter term (2005 to 2007) # of Employees			Longer term (2005 to 2009) # of Employees		
Only MASS x AFTER coefficients are Presented	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
Manufacturing	0.0301*	-0.00637	-0.00704	0.0390**	-0.00383	-0.0195
	(0.0167)	(0.0113)	(0.00994)	(0.0171)	(0.0131)	(0.0143)
Retail	0.0115	-0.0497*	-0.0364	0.0475	-0.0194	-0.00592
	(0.0429)	(0.0291)	(0.0229)	(0.0506)	(0.0334)	(0.0336)
Service	0.0342	-0.0379*	-0.00324	0.110*	-0.0268	0.00229
	(0.0458)	(0.0211)	(0.0155)	(0.0564)	(0.0214)	(0.0146)
Wholesale	-0.188	-0.136*	0.0227	-0.0154	0.0505	0.173
	(0.158)	(0.0748)	(0.0391)	(0.150)	(0.0731)	(0.106)
Panel B: Existing Establishments						
Manufacturing	-0.0437*	-0.0107	-0.00774	-0.0166	-0.000216	0.00738
	(0.0236)	(0.0188)	(0.0231)	(0.0335)	(0.0200)	(0.0251)
Retail	-0.0103	0.0128	0.0128	-0.0302	0.0270	0.0103
	(0.0472)	(0.0432)	(0.0486)	(0.0578)	(0.0528)	(0.0568)
Service	-0.00194	-0.0505	-0.0558	0.0277	0.0163	0.0154
	(0.0439)	(0.0351)	(0.0368)	(0.0723)	(0.0372)	(0.0408)
Wholesale	-0.0326	0.00493	0.0262	-0.0570	-0.0179	-0.0900
	(0.0857)	(0.0873)	(0.0603)	(0.0936)	(0.0901)	(0.0718)
Panel C: All-Aged Establishments						
Manufacturing	-0.0279	-0.00929	-0.0204	0.0120	-0.0265	-0.0414
	(0.0224)	(0.0223)	(0.0276)	(0.0341)	(0.0215)	(0.0286)
Retail	0.0202	-0.0365	-0.0528	0.0511	-0.0764	-0.0803
	(0.0451)	(0.0461)	(0.0512)	(0.0764)	(0.0504)	(0.0602)
Service	0.00752	-0.0700*	-0.0653	0.132*	-0.0780	-0.127*
	(0.0363)	(0.0373)	(0.0396)	(0.0726)	(0.0465)	(0.0658)
Wholesale	0.0604	0.00784	-0.00267	0.128	-0.00953	-0.104
	(0.0650)	(0.0660)	(0.0568)	(0.0886)	(0.102)	(0.0902)

Notes:
a) Each estimate measures the percent change in establishments for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

TABLE 4- The Percent Change in Employment Across Different Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Shorter term (2005 to 2007) # of Employees			Longer term (2005 to 2009) # of Employees		
Only MASS x AFTER coefficients are Presented	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
Manufacturing	0.0539**	-0.0239	-0.0314	0.0685**	-0.00915	-0.119
	(0.0258)	(0.0424)	(0.0520)	(0.0275)	(0.0508)	(0.0777)
Retail	0.00184	-0.190*	-0.130	0.0960	-0.104	-0.0155
	(0.0669)	(0.105)	(0.0983)	(0.0843)	(0.112)	(0.126)
Service	0.0431	-0.210**	0.00943	0.138*	-0.201*	0.0585
	(0.0545)	(0.0902)	(0.0734)	(0.0691)	(0.115)	(0.0586)
Wholesale	-0.244	-0.474*	0.240	0.0713	0.177	0.736*
	(0.219)	(0.255)	(0.241)	(0.202)	(0.291)	(0.429)
Panel B: Existing Establishments						
Manufacturing	-0.0672*	-0.00813	-0.0325	-0.0175	0.0238	-0.000716
	(0.0373)	(0.0604)	(0.0711)	(0.0489)	(0.0598)	(0.0721)
Retail	-0.0121	-0.0103	0.00355	-0.0302	0.0163	-0.0154
	(0.0598)	(0.112)	(0.136)	(0.0742)	(0.141)	(0.151)
Service	0.0166	-0.160*	-0.143	0.0380	-0.00676	0.00101
	(0.0597)	(0.0866)	(0.104)	(0.0966)	(0.0855)	(0.0976)
Wholesale	-0.0658	0.141	0.0823	-0.106	-0.0704	-0.368*
	(0.111)	(0.194)	(0.155)	(0.149)	(0.243)	(0.199)
Panel C: All-Aged Establishments						
Manufacturing	-0.0456	-0.0170	-0.0682	0.0148	-0.0669	-0.152
	(0.0380)	(0.0735)	(0.0838)	(0.0564)	(0.0712)	(0.0968)
Retail	0.0390	-0.103	-0.139	0.0658	-0.234*	-0.211
	(0.0674)	(0.128)	(0.141)	(0.0954)	(0.124)	(0.150)
Service	0.0329	-0.210**	-0.198*	0.172*	-0.201*	-0.321**
	(0.0477)	(0.0902)	(0.101)	(0.0891)	(0.115)	(0.149)
Wholesale	0.0442	0.100	-0.0133	0.183	-0.0432	-0.389*
	(0.0854)	(0.192)	(0.162)	(0.114)	(0.265)	(0.216)

Notes:
a) Each estimate measures the percent change in employment for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

TABLE 5- Robustness Check: The Percent Change in the Establishments and Employment in All Industries Before the Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Establishment Effects from 2002 to 2005			Employment Effects from 2002 to 2005		
	# of Employees			# of Employees		
	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	0.0106**	0.00366**	0.00272	0.0262***	0.0225**	0.0142
	(0.00442)	(0.00161)	(0.00201)	(0.00788)	(0.00946)	(0.0135)
AFTER	0.000246	-0.00390***	-0.00330*	-0.0124*	-0.0266***	-0.0196**
	(0.00329)	(0.00135)	(0.00161)	(0.00679)	(0.00814)	(0.00909)
MASS	-0.0341*	-0.00357*	-0.00439	-0.0566*	-0.0192	-0.0252
	(0.0188)	(0.00192)	(0.00268)	(0.0298)	(0.0116)	(0.0193)
Observations	7776	6146	6469	7776	6146	6469
Panel B: Existing Establishments						
MASS x AFTER	-0.000929	0.00172	0.000884	-0.00533	-0.00687	-0.0114
	(0.00399)	(0.00302)	(0.00260)	(0.00739)	(0.0136)	(0.0110)
AFTER	-0.00526*	-0.000225	9.78e-05	-0.0146**	-0.00187	-0.00104
	(0.00272)	(0.00203)	(0.00194)	(0.00550)	(0.00885)	(0.00877)
MASS	0.0445	-0.0151	-0.0139	0.109	0.0850	0.136
	(0.0841)	(0.0434)	(0.0546)	(0.114)	(0.112)	(0.148)
Observations	7776	7776	7776	7776	7776	7776
Panel C: All-Aged Establishments						
MASS x AFTER	-0.000424	0.00255	0.00149	-0.00469	-0.00346	-0.0112
	(0.00408)	(0.00296)	(0.00259)	(0.00765)	(0.0127)	(0.0104)
AFTER	-0.00319	-0.00156	-0.000983	-0.0135**	-0.00615	-0.00212
	(0.00270)	(0.00199)	(0.00186)	(0.00553)	(0.00790)	(0.00805)
MASS	0.0403	-0.0154	-0.0144	0.104	0.0839	0.136
	(0.0850)	(0.0436)	(0.0549)	(0.115)	(0.112)	(0.149)
Observations	7776	7776	7776	7776	7776	7776

Notes:
a) Each estimate measures the percent change in establishments or employment for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

TABLE 6- The Percent Change in Total (All Sizes) Establishments in All Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 1 Mile	Establishment Effects			Employment Effects		
	Time Period			Time Period		
	Shorter term (2005-2007)	Longer term (2005-2009)	Pre-term (2002-2005)	Shorter term (2005-2007)	Longer term (2005-2009)	Pre-term (2002-2005)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	-0.000191	-0.00682	0.0182	0.00229	0.00985	0.147
	(0.0107)	(0.0174)	(0.0119)	(0.0168)	(0.0376)	(0.127)
AFTER	0.0137*	0.0572***	-0.00651	0.00437	0.0546*	-0.131
	(0.00795)	(0.0199)	(0.0110)	(0.0122)	(0.0268)	(0.116)
MASS	-0.0340	-0.0357	-0.0944*	-0.0560	-0.0593	-0.362
	(0.0226)	(0.0229)	(0.0507)	(0.0400)	(0.0402)	(0.219)
Observations	6,723	6,723	6,885	6723	6088	6885
Panel B: Existing Establishments						
MASS x AFTER	0.000321	0.0303**	0.0298	-0.00386	0.0398*	-0.159
	(0.00823)	(0.0117)	(0.0250)	(0.0172)	(0.0231)	(0.346)
AFTER	-0.0309***	0.0990***	-0.0368	-0.0279**	0.0958***	-0.00263
	(0.00603)	(0.00839)	(0.0224)	(0.0112)	(0.0130)	(0.274)
MASS	0.0482	0.0482	-1.387	0.205	0.205	-10.75
	(0.106)	(0.106)	(1.403)	(0.179)	(0.179)	(10.12)
Observations	7,776	7,776	7,776	7776	7776	7776
Panel C: All-Aged Establishments						
MASS x AFTER	-0.00800	0.0273**	0.0471*	-0.00967	0.0338	-0.0310
	(0.00820)	(0.0113)	(0.0245)	(0.0237)	(0.0213)	(0.280)
AFTER	-0.0171***	0.111***	-0.0403	-0.0181	0.115***	-0.0935
	(0.00420)	(0.0116)	(0.0237)	(0.0134)	(0.0148)	(0.219)
MASS	0.0501	0.0501	-1.463	0.210	0.210	-11.03
	(0.107)	(0.107)	(1.445)	(0.180)	(0.180)	(10.27)
Observations	7,776	7,776	7,776	7776	7776	7776

Notes:
a) Each estimate measures the percent change in establishments or employment for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

APPENDIX TABLE 1- The Percent Change in the Number of Establishments in All Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 10 Mile	Shorter term (2005 to 2007)			Longer term (2005 to 2009)		
	# of Employees			# of Employees		
	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	0.0197	-0.0179**	-0.0132	0.0447	-0.00106	0.000667
	(0.0162)	(0.00784)	(0.00819)	(0.0358)	(0.00787)	(0.0108)
AFTER	0.0527***	0.00863	0.00257	0.125***	-0.00910	-0.0166
	(0.0134)	(0.00756)	(0.00764)	(0.0245)	(0.00695)	(0.0109)
MASS	0.0598	0.0153	0.0166	0.0660	0.0153	0.0163
	(0.0677)	(0.0106)	(0.0155)	(0.0696)	(0.0105)	(0.0153)
Observations	7580	5505	5734	7323	4981	5347
Panel B: Existing Establishments						
MASS x AFTER	-0.0357*	-0.00543	-0.0155	0.0165	0.0262	0.0147
	(0.0204)	(0.0172)	(0.0199)	(0.0414)	(0.0214)	(0.0249)
AFTER	-0.0278	-0.00561	-0.00272	0.170***	0.0138	0.0188
	(0.0199)	(0.0158)	(0.0193)	(0.0379)	(0.0183)	(0.0230)
MASS	0.413*	0.237*	0.298*	0.421*	0.230*	0.290*
	(0.218)	(0.135)	(0.163)	(0.222)	(0.135)	(0.162)
Observations	7956	7795	7795	7667	7747	7747
Panel C: All-Aged Establishments						
MASS x AFTER	0.0124	-0.0365	-0.0553	-0.0892	0.0164	-0.0360
	(0.0455)	(0.0297)	(0.0369)	(0.0691)	(0.0257)	(0.0531)
AFTER	-0.0661	0.0234	0.0357	0.284***	0.0216	0.0678
	(0.0439)	(0.0300)	(0.0378)	(0.0655)	(0.0244)	(0.0532)
MASS	0.418*	0.236	0.300*	0.434*	0.239*	0.308*
	(0.229)	(0.139)	(0.168)	(0.231)	(0.137)	(0.165)
Observations	7649	7791	7775	7436	7790	7898

Notes:
a) Each estimate measures the percent change in establishments for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.

APPENDIX TABLE 2- The Percent Change in the Number of Employment in All Industries from Massachusetts Healthcare Reform using Difference-and-Difference Estimation.

Border: 0 to 10 Mile	Shorter term (2005 to 2007)			Longer term (2005 to 2009)		
	# of Employees			# of Employees		
	1 to 10	11 to 24	11+	1 to 10	11 to 24	11+
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: New Establishments						
MASS x AFTER	0.0245	-0.0672**	-0.0536	0.0595	-0.00869	-0.00760
	(0.0193)	(0.0263)	(0.0323)	(0.0442)	(0.0282)	(0.0444)
AFTER	0.0539***	0.0324	0.00461	0.144***	-0.0267	-0.0667
	(0.0148)	(0.0258)	(0.0251)	(0.0311)	(0.0218)	(0.0405)
MASS	0.0914	0.0614*	0.0711	0.0984	0.0621*	0.0705
	(0.0903)	(0.0329)	(0.0571)	(0.0925)	(0.0329)	(0.0561)
Observations	7580	5505	5734	7323	4981	5347
Panel B: Existing Establishments						
MASS x AFTER	-0.0470	-0.0218	-0.0691	-0.000355	0.0616	0.0125
	(0.0322)	(0.0436)	(0.0543)	(0.0515)	(0.0593)	(0.0668)
AFTER	-0.0323	-0.0135	0.00582	0.180***	0.00775	0.0211
	(0.0302)	(0.0407)	(0.0534)	(0.0480)	(0.0490)	(0.0605)
MASS	0.550*	0.509*	0.679*	0.560*	0.490*	0.655*
	(0.273)	(0.266)	(0.343)	(0.277)	(0.265)	(0.340)
Observations	7946	7795	7795	7667	7747	7747
Panel C: All-Aged Establishments						
MASS x AFTER	0.0194	-0.0866	-0.157*	-0.127	0.0326	-0.118
	(0.0625)	(0.0709)	(0.0894)	(0.0885)	(0.0650)	(0.124)
AFTER	-0.0921	0.0465	0.0918	0.314***	0.0318	0.150
	(0.0605)	(0.0714)	(0.0925)	(0.0862)	(0.0597)	(0.125)
MASS	0.549*	0.509*	0.691*	0.571*	0.511*	0.700*
	(0.285)	(0.277)	(0.353)	(0.287)	(0.273)	(0.348)
Observations	7649	7791	7775	7436	7790	7898

Notes:
a) Each estimate measures the percent change in employment for a 0 to 1-mile border around Massachusetts for new firms (Panel A), existing firms (Panel B), and all-aged firms (Panel C). Standard errors are clustered by state-pair border. Asterisks denote statistical significance at the 10% (*), 5% (**) and 1% (***) levels.