

# Mandated Incentives: The Impact of Firm Size Thresholds for Employer Mandates in Massachusetts

Sean Lyons  
Cornell University  
sml55@cornell.edu

## **Abstract**

Massachusetts was the first state to pass legislation to achieve near universal coverage through a combination of insurance market reforms, individual and employer mandates, and subsidies for health insurance premiums. The Massachusetts Health Care and Insurance Reform Law of 2006 (MHCI) aimed to achieve near universal coverage without significantly affecting the traditional provision of health insurance coverage by employers. This paper takes an in depth look into MHCI by examining the extent to which more lenient mandates on small firms have differentially impacted the movement of their workers onto government subsidized insurance rolls. My lower bound estimates reveal that one of every two small firm workers covered by subsidies would have obtained ESI had their firm been subject to the more stringent large firm mandate. Alternatively, the trade-off to applying a more stringent mandate on small firms is a decrease in overall health insurance rates for small firm workers of six percent.

# 1 Introduction

One of the major policy dilemmas the federal government or a state faces in providing subsidized health insurance to its lower income families via state run subsidized exchanges is how to target the incentives to take up exchange coverage to encourage workers and their families without health insurance coverage to come onto the exchanges without providing an incentive for those who already have employer sponsored health insurance (ESI) to switch to subsidized exchange coverage. This is a real problem because the offer of subsidized state health insurance coverage has the possibility to encourage the mutual rearrangement of employment contracts between workers and their firms to shift the real costs of health insurance onto a third party—tax payers.

Massachusetts was well aware of this problem when they were the first state to pass legislation to achieve near universal health insurance coverage through a combination of insurance market reforms, individual and employer mandates, and subsidies for health insurance premiums. The Massachusetts Health Care and Insurance Reform Law of 2006 (MHCI) aimed to expand health insurance coverage without significantly affecting the traditional provision of health insurance coverage by employers. To achieve these ends, MHCI implemented an individual mandate that required all adult residents of Massachusetts to obtain and maintain health insurance coverage as well as an employer mandate that required all employers of more than 10 workers to offer ESI to their full time employees. The health reform also created a state run entity to regulate and offer both subsidized and unsubsidized private health insurance coverage to Massachusetts residents, with subsidies available to families below 300 percent of the federal poverty level (FPL). Additionally, to safeguard against workers substituting ESI coverage for subsidized coverage, a worker's access to subsidized coverage is not only tied to their family's income, but also to the availability of ESI through their employer.

However, the stringency of the employer mandate varies by firm size with exemptions and more lenient requirements applied to small firms (those with less than 50 workers) relative to large firms. This paper will show that this decision to differentially treat firms by size allows small firm employers to be in compliance with the employer mandate and still provide their income eligible employees (those below 300 percent FPL) the option of either accessing subsidized coverage or

using the firm's ESI plan, without decreasing their economic welfare. This is not the case for large firm employers. If a large firm is in compliance with the MHCI mandate all their employees are barred from accessing subsidized insurance, even if they are income eligible.

This paper shows that this differential treatment of small firms, provides a clear financial incentive, not open to larger firms, for small firm employers and their employees to work together to allow income eligible employees to access subsidized coverage while not affecting the actual cost or access to ESI provided to employees who are not income eligible. For this reason, it is argued that this differential treatment of small firms is more likely to encourage small firm employers and their employees to alter their existing health insurance contracts and result in a relatively higher share of their income eligible employees enrolling in subsidized coverage and a relatively lower share of them being enrolled in ESI coverage than would have been the case if MHCI treated small and large firms equally. That is, there is a real trade-off between treating small firms less stringently than large firms under MHCI and the goal of minimizing shifts from ESI to subsidized health insurance.

Using data from the Current Population Survey (CPS) and a triple differences analysis this paper shows the extent to which MHCI generated differential take-up of subsidized coverage and ESI between small and large firm employees in Massachusetts. In doing so it assesses the degree to which the special treatment of small firms under MHCI increased the shift from ESI to subsidized coverage above what it would have been absent this special treatment. Previous analyses of MHCI have primarily focused on the health service utilization, health outcomes, cost, and source of coverage. This paper extends this literature by analyzing the difference in coverage distributions due to the interaction of the employer mandate requirements and access to subsidies criteria by firm size. Thus, this paper provides a richer perspective of the incentives embedded in the reform legislation that potentially generate unintended consequences.

The distortions in health insurance coverage distributions between small and large firms are not trivial. Almost all new subsidized MHCI coverage after its enactment in 2006 came from employees in small firms. Of every two newly covered small firm workers receiving a MHCI subsidy one would have chosen ESI had they been subject to the more stringent large firm employer mandate.

These findings are the first to empirically show that effectively treating small firm employees who

are income eligible for exchange subsidies differently from similar employees in large firms will have a differential effect on these income eligible small firm employees movement onto exchange coverage instead of ESI. This has important implications for the Patient Protection and Affordable Care Act of 2010 (ACA) which exempts firms with less than 50 employees from the employer mandate to offer ESI while applying a stringent mandate to firms with 50 or more employees. The similar employer mandate structure in both MHCI and the ACA underscores the policy relevance of studying the extent to which the MHCI employer mandate resulted in shifts from ESI to subsidized coverage for small firm employees. Additionally, the ACA’s employer mandate has been postponed for a year to allow firms more time to adjust their health insurance benefit packages. The removal of such a mandate serves to exacerbate these coverage shifts that would have occurred under the original ACA employer mandate.

This paper proceeds as follows: Section 2 provides an in depth review of the relevant features of MHCI; Section 3 provides an outline of my hypotheses; Section 4 discusses the data used to empirically estimate the differential treatment effects; Section 5 is a discussion of my identification strategy; Section 6 previews the robustness check I perform on my baseline estimates; Section 7 displays of the results of my estimation; and Section 8 concludes this paper with a summary of my results and a discussion of my findings.

## **2 Massachusetts Health Reform**

Massachusetts was the first state to pass legislation to achieve near universal coverage through “incremental universalism” in April 2006 (Gruber, 2008). Gruber (2010) explained the Massachusetts Health Care and Insurance Reform Law of 2006 as a “Three-Legged Stool”. The first leg of the stool was insurance market reforms which included guaranteed issue, community rating, and merging the non-group and small-group markets. The second leg was mandates for individuals to obtain and maintain health insurance coverage and for employers to offer health insurance to all full time employees and to make a “fair and reasonable” contribution to such coverage. The third leg of the stool was to provide subsidized and unsubsidized coverage through the state’s Commonwealth Health Insurance Connector Authority (the Connector) to Massachusetts residents, with subsidies

available to individuals below 300 percent FPL. The first leg aimed to reduce premiums in the small and non-group markets by merging the two and allowing for a larger risk base, and to guarantee that individuals could obtain health insurance coverage despite pre-existing conditions. The individual mandate of the second leg serves as a safe-guard to adverse selection by not allowing healthy individuals to forgo coverage without a financial penalty, while the employer mandate of the second leg aimed to ensure that the traditional provision of ESI remained the primary source of health insurance coverage for the working population in Massachusetts. Lastly, the third leg of the stool exists to provide individuals below 300 percent FPL, who otherwise cannot obtain Medicaid or ESI, an opportunity to purchase affordable health insurance coverage by offering publicly subsidized private health insurance plans.

The Connector began offering subsidized coverage to residents in the 100 to 300 percent FPL range beginning February 2007. The requirement for an individual to maintain health insurance coverage took effect July 1, 2007 and imposed a penalty of \$219 for non-compliance. This penalty was subsequently increased in 2008 to 50 percent of the lowest health insurance premium available each month through the Connector. The requirement on firms of 11 or more full time equivalent (FTE) employees to offer health insurance to all full time employees and to make a “fair and reasonable” contribution to such coverage was finalized on June 29, 2007. Thus, the main elements of the health reform law were in place at the start of the 2008 calendar year. Massachusetts also expanded Medicaid coverage for children in families up to 300 percent FPL as part of the 2006 reform, but did not expand adult Medicaid (MassHealth). Massachusetts, however, did increase enrollment caps for previously eligible adults on the MassHealth waiting list. Thus, eligibility for Medicaid in Massachusetts has remained at 133% FPL throughout the health reform implementation. Massachusetts’ Medicaid rolls did increase since the passage of MHCI from 1.3 million in 2006 to 1.6 million in 2008 due to the increase in enrollment caps.<sup>1</sup> I compared the average number of Massachusetts workers below 133 percent FPL enrolled in Medicaid for years 2000-2005 to years 2006-2011 using CPS data and found that average enrollment increased by roughly 22,500 from the period 2000-2005 to the period 2006-2011, which indicates that the bulk of the increase in Massachusetts Medicaid roles came from the non-working poor.

---

<sup>1</sup><http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-State/massachusetts.html>

The individual mandate to obtain and maintain health insurance coverage can be met by either enrolling in Medicaid, enrolling in ESI, or obtaining coverage through the Connector. If a worker is above 133 percent FPL they cannot enroll in Medicaid and must seek coverage through either their employer or the Connector. The Connector offers subsidized insurance coverage to individuals not eligible for MassHealth (Medicaid) below 300 percent FPL through Commonwealth Care, and unsubsidized coverage to any resident not qualified for MassHealth or Commonwealth Care through Commonwealth Choice. An income eligible worker (between 133 and 300 percent FPL) and their dependents are allowed to access subsidies on the exchange if their employer either does not offer health insurance or the employer offers coverage, but contributes less than 33 percent of the annual premium cost of an individual health insurance plan or less than 20 percent of a family health insurance plan. Individuals eligible for subsidized coverage through the Connector receive subsidies on a sliding scale based on their FPL. In 2013 individuals below 150 percent FPL receive fully subsidized health insurance, individuals between 150 and 200 percent FPL can choose from a list of plans with monthly premiums between \$40 and \$81, individuals between 200 and 250 percent FPL face monthly premiums between \$78 and \$138, and individuals between 250 and 300 percent FPL face monthly premiums between \$118 and \$182.<sup>2</sup>

The employer mandate can be separated into two distinct requirements, the first of which is the requirement to offer an ESI plan in which employer and employee contributions are tax exempt. The second requirement is that the employer makes a “fair and reasonable” contribution to the employees health plan. Employers with 11 or more FTE employees who fail to offer coverage are subject to the “free-rider surcharge”. This penalty is assessed as a percentage of the dollars spent from the health safety net fund that can be attributed to a specific employer’s employees and dependents. The percentage is higher for firms sized greater than 50 FTE employees compared to firms sized 11 to 50 FTE employees.<sup>3</sup> Employers can avoid the “free-rider surcharge” as long as they offer a health insurance plan in which the employer and employee contributions are tax exempt, independent of whether or not they subsidize coverage. To date no firm has been subject

---

<sup>2</sup>2013 premiums available through <https://www.mahealthconnector.org>

<sup>3</sup>For costs incurred in the range of \$50,000-\$75,000 firms sized 11-25 are fined 20%, firms sized 26-50 are fined 50% and firms with more than 50 FTE employees are fined 80%. For costs incurred in the range of \$75,001-\$150,000 firms sized 11-25 are fined 30%, firms sized 26-50 are fined 60% and firms with more than 50 FTE employees are fined 90%. For costs incurred in excess of \$150,000 firms sized 11-25 are fined 40%, firms sized 26-50 are fined 70% and firms with more than 50 FTE employees are fined 100%.

to the “free-rider surcharge”, thus all firms with more than 11 FTEs are assumed to be offering tax exempt contribution health plans.

The second part of the employer mandate requires employers with 11 or more FTE employees to make a “fair and reasonable” contribution to their full time employees health insurance premiums. The “fair and reasonable” contribution requirement does not apply to firms with fewer than 11 FTE employees, and its requirements differ for firms with 11 to 50 FTE employees compared to firms with more than 50 FTE employees. There exist two basic criteria which comprise the “fair and reasonable” contribution requirement:

1. The employer offers health insurance coverage and contributes at least 33 percent of the total annual single coverage premium cost.
2. The employer offers health insurance coverage and at least 25 percent of the employers full time employees are enrolled in the offered plan.

Firms sized 11 to 50 FTE employees can meet the “fair and reasonable” contribution requirement by satisfying one of two criteria listed above. While firms with more than 50 FTE employees can satisfy the “fair and reasonable” contribution requirement by either complying with both criteria listed above, or demonstrating that at least 75 percent of their full time employees are enrolled in the offered health insurance plan. If any employer, independent of firm size, fails to meet the “fair and reasonable” contribution requirement, they are fined \$295 annually per FTE employee.

Combining the subsidy eligibility criteria and the “fair and reasonable” contribution requirement by firm size results in the ability of small firms (11-50 FTEs) to satisfy the “fair and reasonable” contribution requirement by meeting the second criteria of demonstrating that at least 25 percent of the firms full time employees are enrolled in the firm’s offered coverage plan, while still allowing their income eligible employees to access subsidies through the Connector by contributing less than 33 percent of the total annual single coverage premium cost. Large firms in compliance with the “fair and reasonable” contribution requirement categorically disqualify their income eligible employees from accessing subsidies through the connector because they must meet the first requirement of contributing at least 33 percent of the total annual single coverage premium cost. Appendix figures A.1, A.2, and A.3 display the decision trees under MHCI for exempt firms, small firms, and large

firms respectively.

Additionally, small firms can require that their employees contribute a greater share of the premium contribution without any economic harm to the employee. The split between employer and employee contributions under MHCI is completely artificial when the provision of health insurance is considered to be a part of the overall employees compensation package (Brown, 1980; Summers, 1989). Employers can require employees to contribute a higher share of the premium while passing back the increased contribution requirement in wages. The transfer of the premium contribution share from the employer to the employee maintains the tax exempt status due to the mandate on firms to meet the requirement to offer coverage or be subject to the “free-rider surcharge”. Therefore, small firms can be in compliance with the employer mandate to offer and contribute to their employees health plans while allowing their income eligible employees to decide between their employer sponsored tax exempt contribution plan or increased wages (taxed) and a subsidized plan. Under this scenario the employee is no worse off economically than when their employer contributed a higher share of the premium, and the employee is free to choose either ESI or subsidized coverage along with increased wages which are taxed at the employees marginal tax rate.

The existing literature addressing MHCI is fairly limited. The impact of the Massachusetts health reform with respect to health care service utilization, health outcomes, cost, and source of coverage have been investigated. Massachusetts Division of Health Care, Finance, and Policy (2011) estimates that the percent uninsured in Massachusetts had fallen to 1.9 percent by September 2010, which is congruent with the finding of Long et al. (2009) of a significant decrease in uninsurance rates in Massachusetts. With respect to health services utilization, Long et al. (2012) found a significant increase in individuals reporting a usual source of care, Long and Stockley (2011) note a significant decrease in unmet medical needs, and Kolstad and Kowalski (2012a) found a significant increase in the use of primary and preventive health care services in conjunction with a small decrease in hospital admissions deemed preventable with quality outpatient care. Courtemanche and Zapata (2012) addressed the impact of Massachusetts reform on self reported health status and found that Massachusetts residents were more likely to report their health as “very good” or “excellent”. Raymond (2009) cites that half of the \$707 million annual cost of MHCI is funded through the federal government. Kolstad and Kowalski (2012b) find that employers have almost



fully adjusted real wages to offset the increased cost of health insurance post MHCI. The intuition behind these results is the notion that increased access to affordable health services results in better health outcomes and more efficient use of medical services, but these positive results come at a relatively high cost to taxpayers not living in Massachusetts (they pay for roughly 50 percent of the cost). Employers have also adjusted their behavior to accommodate their increase in costs to provide health insurance by decreasing wages by close to the full amount of the increase. While these are extremely relevant issues, the goal of this paper is to focus on the degree to which more lenient mandates on small firms have differentially impacted the movement of their workers onto government subsidized insurance rolls.

MHCI drew a significant amount of attention in both media and academic circles, and eventually became the inspiration and foundation for national health reform embodied in the Patient Protection and Affordable Care Act (ACA). Early research finds that MHCI succeeded in substantially increasing health insurance coverage with little or no subsidized insurance crowd out of ESI (Long, 2010; Kolstad and Kowalski, 2012a; Blue Cross Blue Shield of Massachusetts, 2012). These studies find that both ESI and publicly subsidized insurance coverage increased in Massachusetts subsequent to the implementation of MHCI. The increases in both public and private coverage is congruent with the structure of MHCI, which expands access to health insurance through employer mandates, individual mandates and the creation of a subsidized health insurance option through the state run Connector. The coverage shifts discussed in this paper differ from the concept crowd out. Coverage shifts occur under MHCI when a small firm employee obtains a subsidy for health insurance when they otherwise would have obtained or maintained ESI under the counterfactual scenario in which small firms are subject to the more stringent large firm employer mandate. Thus, the previous findings of no crowd out citePLONG, KK12a, BCBSMA under MHCI does not explicitly mean that coverage shifts do not exist. In fact, this paper supports the finding of no crowd out, yet identifies coverage shifts from ESI to subsidized coverage for small firm employees using an appropriate identification strategy that specifically targets the differential treatment of small and large firms under the MHCI employer mandate.

A major achievement of MHCI was to increase state wide health insurance coverage rates by providing incentives for employers to offer coverage, employees to purchase coverage from their

employer, and those without access to ESI to take up either Medicaid or subsidized insurance. In light of these achievements and the planned implementation of “Massachusetts-like” national health reform in 2014, it is important to further the health reform literature by investigating the extent to which unintended consequences may occur under specific MHCI policy parameters that have been built into the structure of the ACA. This paper achieves this goal by using the interaction of the MHCI firm size dependent employer mandate and access to subsidies criteria to identify coverage shifts from ESI to subsidized insurance for small firm employees.

### 3 Hypotheses

Traditionally federal and state labor market regulations have built in a firm size dependent component which imposes more lenient restrictions on smaller firms, and Massachusetts was not an exception when they crafted the MHCI for implementation in 2006.<sup>4</sup> This seemingly benign feature of the MHCI potentially affects a non trivial fraction of Massachusetts workers in that the small firm market sector accounted for 25 percent of private sector employed individuals and 74 percent of all firms in Massachusetts throughout 2012.<sup>5</sup> More lenient mandates on small firms can lead to asymmetric behavioral responses across small and large firms by allowing small firms to take advantage of exemptions. For MHCI, this would manifest in noticeably more small firm employees coming onto the subsidized coverage rolls and significantly less small firm employees taking up ESI relative to large firm employees.

MHCI allows small firms to be in compliance with the employer mandate and still provide their income eligible employees the option of either accessing subsidized coverage or using the firm’s ESI plan, without decreasing their economic welfare. This is not the case for large firm employers. This structure provides an incentive for small firms to send their income eligible employees to to the Connector for subsidized coverage to reduce their marginal costs of employing lower income

---

<sup>4</sup>For example, The Family and Medical Leave Plan exempts firms with fewer than 50 workers; the Americans with Disabilities Act exempts firms with fewer than 15 workers; the Worker Adjustment and Retraining Notification Act exempts firms with fewer than 100 workers; the Occupational Safety and Health Act exempts firms with fewer than 11 workers; the Age Discrimination in Employment Act exempts firms with fewer than 20 workers; the Civil Rights Act of 1964 exempts firms with fewer than 15 workers; the Fair Labor Standards Act exempts firms with fewer than 3 workers; and the Occupational Safety and Health Administration (OSHA) exempts firms with fewer than 11 workers from regular programmed inspections.

<sup>5</sup>2012 Medical Expenditure Panel Survey-Insurance Component Summary Tables

workers, thus placing the burden of health insurance coverage onto tax payers. Furthermore, there were roughly 130,000 income eligible small firm employees in Massachusetts in 2011 who could potentially access subsidies reaching up to \$5,000 annually for a single coverage health plan.<sup>6</sup> Thus, allowing small firms to send their income eligible employees to the Connector for subsidized coverage when they otherwise would have taken up ESI under a more stringent employer mandate may result in significantly higher costs to the state and federal government.

The MEPS-IC summary tables as well as the Blue Cross Blue Shield of Massachusetts (2012) report present evidence that small firms are in fact requiring their employees to pay a higher fraction of their health insurance premiums post MHCI reform. The Blue Cross Blue Shield of Massachusetts (2012) report claims that all employers have decreased their contributions toward ESI subsequent to the implementation of MHCI. And the MEPS-IC summary tables reveal that small firms (less than 50 employees) have, on average, increased the share of the premium employees must contribute to their single coverage health plan by over 7 percent subsequent to MHCI implementation (2000-2006 vs 2008-2011), while over the same time period large firms only increased employees premium share for single coverage by less than 1 percent.

Despite the final implementation of MHCI in the beginning of 2008, there is still uncertainty as to how employers have responded to the reform. The Connector has published various statistics regarding the effects of the Massachusetts health reform. The Connector cites that 192,000 Massachusetts residents were enrolled in subsidized insurance coverage in 2011. Additionally, Blue Cross Blue Shield of Massachusetts (2012) claims that employer offers of coverage have increased, take up of employer coverage has remained high, the number and percentage of people with ESI has increased, and most employers meet the mandated offer requirements under the reform. They also state that employers have decreased their contributions toward the cost of coverage since the reform. The Blue Cross Blue Shield of Massachusetts (2012) report cites an increase from 70% in 2005 to 77% in 2010 of employers offering coverage using a survey of employers in Massachusetts. According to the Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) summary tables, the percent increase in private employers offering coverage is much more muted (63.3% in 2005 and 65.7% in 2010). In fact, using the MEPS-IC summary tables, comparing the average

---

<sup>6</sup>Subsidies depend upon age, locality, and FPL. Subsidy estimate based on the annual unsubsidized premium cost for an individual health plan through the Commonwealth Choice program in 2013.

percent of employers offering health insurance from 2003-2006 to the average from 2008-2011 in Massachusetts results in a much smaller increase (64.6% before the reform and 65.7% after the reform). When these numbers are separated out by firm size, the average percent of small firms (firm size less than 50) offering coverage between 2003-2006 was 54.20% and the average for years 2008-2011 was 53.75% indicating a decrease of about half a percentage point post reform. The same analysis of large firms yields an increase in offer rates of 1.85% (97.18% from 2003-2006 and 99.03% from 2008-2011). The difference between the pre and post estimates for all firms, small firms and large firms are not significantly different from zero indicating that the percent of private employers offering health insurance in Massachusetts did not change significantly. The results presented in the Blue Cross Blue Shield of Massachusetts (2012) report are based on a different survey than the MEPS-IC tables and relate to all firms, not just private sector firms.

MHCI provides incentives for employers to offer insurance coverage and employees to take up insurance coverage. Additionally, Massachusetts created a new program (the Connector) which offers subsidized coverage to income and categorically eligible individuals. These policy parameters should result in increases in ESI, subsidized coverage, and overall insurance rates. This result has been documented by several studies (Long, 2010; Kolstad and Kowalski, 2012a; Blue Cross Blue Shield of Massachusetts, 2012). Despite the overall increases in ESI, subsidized coverage and overall insurance rates, there exists an incentive for employers to get their income eligible employees onto the subsidized coverage rolls because it transfers the cost of health insurance from the employer and the employee to tax payers. Massachusetts mitigated the extent to which workers could access subsidized coverage plans through the Connector by imposing several firewalls to accessing subsidies. First, MHCI imposes an income eligibility criteria limiting subsidies to those with family incomes in the 133 to 300 percent FPL range. Additionally, MHCI imposes a categorical requirement that individuals seeking subsidies either must not have access to ESI or have access, but the employer contributes less than 33 percent of the annual premium cost of an individual health insurance plan or less than 20 percent of a family health insurance plan. This categorical firewall prevents workers from taking up subsidized coverage when they have access to insurance through their employer. A small firm worker can overcome this firewall much easier than a worker in a large firm due to the differential application of the “fair and reasonable” contribution requirement for small firms compared to large firms.

The difference in the application of the “fair and reasonable” contribution requirement for small firms compared to large firms creates an environment in which it is easier for small firms to be in compliance with the requirement, while the fine for non-compliance is the same for all firm sizes greater than 11 FTEs.<sup>7</sup> Firms with less than 11 FTE employees can choose to simply drop coverage altogether, face no penalty, and allow all of their income eligible employees access to subsidies. As discussed above, firms with 11 to 50 FTE employees can be in compliance with the “fair and reasonable” contribution requirement and allow their income eligible employees access to subsidies, while firms with more than 50 FTEs cannot engage in such behavior and still satisfy the “fair and reasonable” contribution requirement.

The heterogeneous application of the “fair and reasonable” contribution requirement can be likened to a world in which different speed limits exist for trucks and cars, while leaving the fine for speeding identical for both vehicle types. For example, if a policy maker changes a universal speed limit of 30 miles per hour to one in which trucks are considered to be speeding if they travel above 30 miles per hour and cars are considered to be speeding if they travel above 50 miles per hour, while leaving the penalty for speeding at \$100 for both trucks and cars. In this world we would expect to observe an increase in the fraction of cars traveling between 30 and 50 miles per hour relative to trucks because there is no financial penalty for car drivers who drive under the 50 mile per hour speed limit. Although MHCI is more complex than this stylized example, the basic intuition is still relevant. Under MHCI it is easier for small firms to take advantage of the incentive to send their income eligible employees to the Connector for subsidized coverage than large firms. Therefore, I would expect relatively more small firm employees to come onto the subsidized coverage rolls compared to large firm employees. Following the same logic, I would expect relatively less small firm employees to take up ESI compared to large firm employees. The hypothesis that small firm employees will increase their take up of subsidized coverage and decrease their take up of ESI relative to large firm workers leaves a theoretically ambiguous outcome for the impact on overall insurance rates between small and large firms. Empirical evidence is needed to determine which effect is larger in absolute value.

---

<sup>7</sup>The “free-rider surcharge” does vary by firm size, but no firm has been subject to the fine since the implementation of MHCI, thus I will ignore this aspect of the law.

## 4 Data

I use Current Population Survey (CPS) data corresponding to years 2000 to 2011 to analyze the differential impact of MHCI on health insurance coverage distributions due to heterogeneous employer mandates by firm size. I compare Massachusetts insurance outcomes to insurance outcomes in a set of control states by firm size. The main control group is the north east states comprised of Connecticut, Washington DC, Delaware, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

I limit the CPS data to private sector workers age 18 to 64 who are between 133 and 300 percent FPL employed at work and not receiving any SSI or SSDI benefits.<sup>8</sup> This limitation allows me to focus on the population which is income eligible for subsidized coverage, which allows me to isolate the relevant group of workers who's health insurance coverage choice would be affected by the heterogeneous employer mandate by firm size. I also look into the treatment effect in Massachusetts for workers above 300 percent FPL as a falsification test.

The CPS does not assign firm sizes by FTE employee, but by the the number of employees in the firm. They also do not have firm size gradations that line up perfectly with the regulations in MHCI. Ideally firm size would be reported so I could identify workers in firms sized 1 to 10, 11 to 50, and more than 50. I can identify firms sized 1 to 10, 11 to 24, 25 to 99, and 100 or more. My main analysis defines small firms as firms sized 1 to 24 and large firms as firms sized 25 and over. This is an unavoidable data limitation which poses a threat to my identification strategy, thus I investigated firm size distributions in Massachusetts using the MEPS-IC. My baseline analysis of firms sized 1 to 24 compared to firms 25 and over assigns firms with 25 to 50 employees to the large firm group, which is not congruent with MHCI regulations. According to the MEPS-IC, firms sized 1 to 50 in Massachusetts represent about 26 percent of all employees, of which 6 percent fall into the 25 to 50 size group.<sup>9</sup> Thus, most small firm employees (80 percent) are represented by the 1 to 24 size group. Also, the number of small firms sized 1 to 50 in Massachusetts represent roughly 75 percent of all firms, of which 5 percent fall into the 25 to 50 category. Thus, most small firms

---

<sup>8</sup>FPL calculated by the author using family income, family size, and the U.S. Department of Health and Human Services poverty guidelines for each year.

<sup>9</sup>Using the CPS subsample of workers in Massachusetts between 133 and 300 percent of FPL that are not receiving SSI or SSDI benefits, I calculate the average percent of employees in firms sized 1 to 24 over the years 2000 to 2011 to be 33 percent

(93 percent) are represented by the 1 to 24 size group. Despite the issues posed by the firm size categories represented in the CPS, the relatively small percent of firms sized 25 to 50 and small percent of employees working in firms sized 25 to 50 serves to mitigate this problem. Additionally, to address some concerns related to firm size categories in the CPS, I check the robustness of my results to different definitions of small and large firms.

Kolstad and Kowalski (2012a) noted and verified with the Census Bureau that the individuals in Commonwealth Care (subsidized Connector coverage) and Commonwealth Choice (unsubsidized Connector coverage) were coded as Medicaid in the CPS. To identify individuals in the CPS with subsidized coverage I assign observations for individuals between 133 and 300 percent FPL reporting Medicaid coverage as receiving subsidized coverage, and individuals above 300 percent FPL reporting Medicaid as receiving unsubsidized coverage. Because my analysis focuses solely on income eligible workers aged 18 to 64, and because Massachusetts did not expand adult Medicaid eligibility, my analysis should capture the differences between subsidized Connector coverage take up between small and large firm employees.

The Connector reported that of the approximate 42,000 individuals enrolled in Commonwealth Choice at all income levels (unsubsidized Connector coverage) about 4,500 are small firm workers and their dependents (Commonwealth Health Insurance Connector Authority, 2012). From CPS data, I estimate average Medicaid enrollment for employees in firm sizes 1-24 from 2000-2006 at 18,604 individuals per year, and from 2008-2011 at 53,194. Thus, an average increase from pre to post-period of 34,590. The increase of 34,590 workers in the 133 to 300 percent FPL range far outweighs the total reported value of 4,500 total enrollees (workers and dependents) from all income levels in Commonwealth Choice (unsubsidized coverage). Therefore, almost all of the increase in coded Medicaid coverage in my CPS sample of interest appears to be coming from subsidized Connector coverage, which the Connector reports a total enrollment of 192,000 in 2011.

As a robustness check, I also use CPS data corresponding to years 2003-2011 in conjunction with the Medical Expenditure Panel Survey - Insurance Component (MEPS-IC) summary tables from 2003-2006 to construct a synthetic control group to analyze the impact of a heterogeneous employer mandate by firm size on coverage distributions at an aggregate level.

## 5 Identification Strategy

To identify the extent to which more lenient mandates on small firms have differentially impacted the movement of their workers onto government subsidized insurance rolls, I exploit the differences in how MHCI treats small and large firms with respect to the “fair and reasonable” contribution requirement of the employer mandate. I demonstrate that when one looks specifically at the population for which substitution of employer coverage towards subsidized coverage might occur (among workers who are income eligible for subsidies), there is evidence of substantial differences in the source of health insurance coverage by firm size. Small firms are subject to far less stringent requirements on what constitutes a “fair and reasonable” contribution to health insurance, and are subject to smaller penalties resulting from uninsured employees accessing services through the health safety net.

The main goal of this research is to assess the asymmetric impact of MHCI’s firm size dependent employer mandate on health insurance coverage distributions. The difference in the treatment of small and large firms under MHCI generated a quasi-experiment within the state. Thus, I compare the effect of the firm size dependent employer mandate on small firm employees coverage distributions relative to large firm employees within Massachusetts. Under the assumption that other states that have not implemented widespread health reform laws can serve as a valid counterfactual for Massachusetts, I can identify the difference in MHCI’s treatment effect on small firms compared to large firms due to the differential application of the employer mandate. Furthermore, under the assumption that the treatment effect on small and large firms would be identical if both firm sizes were subject to the more stringent large firm employer mandate, I can identify the trade-offs inherent in applying a more lenient mandate on small firms. As noted above, I expect ESI take-up to decrease and subsidized coverage take up to increase for small firm employees relative to large firm employees.

To identify the impact of the heterogeneous employer mandate by firm size, I first focus solely on the subsample aged 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Massachusetts small firm workers in this cohort have a greater ability to overcome the firewall to access subsidies than workers in large firms.



Using this sample, I estimate a triple differences model which allows me to compare the coverage outcomes in Massachusetts by firm size, while controlling for the counterfactual situation in which Massachusetts did not implement MHCI by using a set of reasonable control states.

## 5.1 Triple Differences

I first estimate the coverage impacts in Massachusetts using a differences in differences approach to verify that the income eligible working population in Massachusetts did in fact experience increases in ESI, subsidized coverage, and overall insurance rates. I classify workers in my sample as either being enrolled in subsidized Connector coverage (coded as Medicaid in the CPS), ESI, or uninsured. I removed individuals from my sample that reported having both ESI and subsidized coverage, as well as any individual reporting a source of health insurance coverage that was not subsidized coverage or ESI (e.g., private non-group health insurance).<sup>10</sup> Figures 1, 2, and 3 display the distribution of individuals by coverage type in Massachusetts compared to the north east control states for the sample of workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. The Massachusetts reform was passed in 2006, implemented in 2007 and finalized by the beginning 2008, thus I view 2007 as a during period in which the implementation of MHCI was completed. Figures 1, 2, and 3 confirms that my subsample of income eligible workers displays the previously documented result that there is no evidence of crowd out and MHCI resulted in increases in ESI, subsidized coverage, and overall insurance rates.

Table 1 displays the summary statistics for insurance outcomes and predictors of insurance outcomes in Massachusetts and the North East Control states for the pre-period (2000-2006) compared to the post-period (2008-2011) calculated from the CPS sample of income eligible workers (the during period of 2007 has been omitted). It is important to note here that income eligible workers in firms sized 1 to 24 comprise about one third of the total income eligible working population in Massachusetts in all years (2000-2011). This corresponds to about 130,000 small firm workers that are income eligible for subsidized coverage in any given year. Thus, any differential impacts on coverage distributions due to the heterogeneous employer mandate are non-trivial in that the

---

<sup>10</sup>This sample limitation resulted in a removal of 174(6.69%) observations from Massachusetts and 2,564(6.28%) observations from the main north east control states group.

differential treatment impacts at a minimum one third of the income eligible working population in Massachusetts.

Table 1 displays the pre-period and post-period summary statistics for FPL, firm size, educational attainment, race, age, sex, and family characteristics. Neither Massachusetts nor the control states experienced any dramatic changes in the insurance predictor variables when moving from the pre-period to post-period. It is worth noting here that the more lenient treatment of small firms under MHCI’s employer mandate should result in growth of small firm employment due to MHCI reducing the short run costs of hiring income eligible workers by allowing them access to subsidized health insurance coverage (Gourio and Roys, 2012). I do not observe this outcome in the post-period for Massachusetts, and there are several confounding factors that may contribute to this finding. Employment growth in the small firm business sector requires additional investment and creation of more small firms, which is a long run concept. I only observe four post years which is not nearly enough time to capture any small firm employment growth effects. Second, the United States was in the midst of the “great recession” throughout the implementation and post-periods of MHCI.<sup>11</sup> This serves to dampen all employment growth, especially in the small firm market due to relatively difficult access to liquid assets and investment to create new firms. Thus, future research should focus on the long run implications of MHCI and its effect on small business growth as I am unable to capture this phenomenon. The regression unadjusted difference in difference estimates for insurance outcomes reveal an increase in both ESI and subsidized insurance, and the sum of the increase for both ESI and subsidized coverage equals the increase in overall insurance rates. These results are in line with past analyses of MHCI.

To formalize the intuition from Figures 1, 2, and 3 and Table 1, I estimate the following difference in difference model:

$$y_i = \alpha + \beta(MA * Post)_i + \gamma(MA * During)_i + X_i' \delta + \sum_s \phi_s + \sum_t \tau_t + \varepsilon_i \quad (1)$$

---

<sup>11</sup>I tested whether unemployment in Massachusetts responded differently to the recessions compared to the North East control group over the following time periods 2000-2012, 2000-2003 (minor recession), 2004-2007 (no recession), and 2008-2010 (the “great recession”). I regressed a time trend, a Massachusetts fixed effect, and an interaction term of the time trend and the Massachusetts fixed effect on annual unemployment reported by the BLS and found that unemployment trends in Massachusetts did not statistically differ from the North East control states for any of the time periods listed above.

I include a during period for 2007, and a treatment period for 2008 to 2011.<sup>12</sup> The identification assumption used for the estimation of equation 1 is that outside of the Massachusetts reform, no other factors differentially impacted the coverage outcome variables between Massachusetts and the control states. I estimated equation 1 for all three coverage outcomes (ESI, subsidized coverage, uninsurance) jointly using seeming unrelated regression estimation. Each observation corresponds to a person  $i$  in state  $s$  at time  $t$ .  $\beta$  is the difference in difference coefficient of interest. The matrix  $X$  includes individual and family characteristics<sup>13</sup>, and  $\phi$  and  $\tau$  are state and year fixed effects respectively, thus the differences in differences estimate is identifying within Massachusetts changes over time. The standard errors from this regression are clustered at the state level.

Table 2 displays regression coefficients from the estimation of equation 1. The estimates of the parameters of interest ( $MA * Post$ ) are all significant at the 1 percent level. These estimates indicate an increase in both ESI and subsidized coverage in Massachusetts, and the sum of the coefficients from the ESI and subsidized coverage equations equals the increase in overall insurance rates.

This differences in differences estimation for income eligible workers matches previous research that has used difference in difference techniques to analyze changes in the insurance coverage distribution for all Massachusetts residents due to MHCI. The next step is to now focus on the heterogeneous treatment effects of a firm size dependent employer mandate in Massachusetts. Figures 4, 5, and 6 displays the trends in insurance outcomes in Massachusetts and the north east control states broken out by firm size ( 1-24 vs 25+) for the sample of workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. During the pre-period (2000-2006), large firm employees were more likely to have ESI than small firm employees, but small and large firms in Massachusetts move together. The same holds true for ESI in the North East control states. Large firm workers were also more likely to be insured in the pre-period and about equally likely to have public coverage compared to small firm workers. Additionally, the general trends for subsidized coverage and uninsurance rates for the pre-period match reasonably well. It is important to note here that uninsurance rates for workers

---

<sup>12</sup>Kolstad and Kowalski (2012a) also accounted for a during period in 2007 for their differences in differences analysis of coverage distributions.

<sup>13</sup>The characteristics are age category, FPL category, sex, family size, marital status, full time vs part time employee, presence of dependents, race, ethnicity, firm size, and education.

between 133 and 300 percent FPL in Massachusetts is between 10 and 25 percent post reform. This is relatively high compared to the overall uninsurance rate of 2 percent, thus lower income workers in Massachusetts are far more likely to lack health insurance coverage than the overall population.

Table 3 displays the summary statistics for insurance outcomes and the predictors of insurance outcomes (FPL, firm size, educational attainment, race, age, sex, and family characteristics) by firm size in Massachusetts and the North East control states for the pre-period (2000-2006) compared to the post-period (2008-2011) calculated from the CPS sample of income eligible workers (the during period of 2007 has been omitted). Neither Massachusetts nor the control states show any dramatic changes in these predictor variables. The regression unadjusted triple difference estimates for insurance outcomes can be used to construct an estimate of small firm ESI to subsidized insurance coverage shifts. I use the following definition for small firm coverage shifts: Let  $\beta_{ESI}$  and  $\beta_{Subsidy}$  be the triple difference estimates for ESI and subsidized coverage respectively.

$$Coverage\ Shift = -\frac{\beta_{ESI}}{\beta_{Subsidy}} \quad (2)$$

This definition can be interpreted to mean that for all individuals in small firms who are newly covered by subsidized coverage, the fraction *Coverage Shift* would have chosen ESI had they been subject to the more stringent large firm employer mandate. Using equation 2 and the estimates provided in Table 3, the estimated coverage shift is 40 percent and the differential impact on overall insurance rates for workers in small firms is 7 percent. This can be interpreted to mean that 40 percent of small firm workers newly covered by subsidized insurance would have taken up ESI had they been subject to the more stringent large firm employer mandate. And the trade-off of applying the more stringent large firm mandate to all firms would be an observed decrease in overall insurance rates for small firm workers of 7 percent.

To formalize the intuition from Figures 4, 5, and 6 and Table 3, I estimate the following equation for all three coverage outcomes (ESI, subsidized coverage, uninsurance) jointly using seeming unrelated

regression estimation:

$$\begin{aligned}
y_i = & \alpha + \beta(MA * Post * Small Firm)_i + \gamma_1(MA * During * Small Firm)_i + \\
& \gamma_2(MA * Post)_i + \gamma_3(MA * During)_i + \sum_s \phi_s(Small Firm)_i + \\
& \sum_t \tau_t(Small Firm)_i + X_i' \delta + \sum_s \phi_s + \sum_t \tau_t + \varepsilon_i
\end{aligned} \tag{3}$$

Each observation corresponds to a person  $i$  in state  $s$  at time  $t$ .  $\beta$  is the triple difference coefficient of interest. The matrix  $X$  includes individual and family characteristics<sup>14</sup>, and  $\phi$  and  $\tau$  are state and year fixed effects respectively. Thus, the parameter of interest ( $\beta$ ) is identified from the variation between small firms and large firms in Massachusetts. The standard errors from this regression are clustered at the state level.

The identifying assumption for this triple difference estimation strategy is that outside of the Massachusetts reform and the heterogeneous application of the employer mandate by firm size, no other factors differentially impacted the coverage outcome variables between Massachusetts and the control states and small firms and large firms. Additionally, to explicitly state the trade-offs of the heterogeneous employer mandate in Massachusetts I must assume that the treatment effect of MHCI would be identical for both small and large firms had both firm sizes been subject to a homogeneous employer mandate. Specifically, outside of the heterogeneous employer mandate, no other factors differentially impacted the coverage outcome variables between small and large firms in Massachusetts.

## 6 Robustness Checks

### 6.1 Overview

The first threat to my identification strategy is that the employer fine for non-compliance is relatively low, and set at \$295 per FTE per year. Thus, it may be reasonable to assume that both large and small firms would restructure their employment contracts to allow their income eligible

---

<sup>14</sup>The characteristics used are the same as the difference in difference estimation (excluding firm size less than 25)

employees to choose between accessing subsidies and the firm's ESI plan while paying a seemingly trivial fine. If this were to be true then the assumption that small firm employees can overcome the categorical firewall to access subsidies easier than large firm employees does not hold, and the proposed mechanism through which small firm ESI to subsidized insurance coverage shifts occurs is not valid.

Absent any spillover effects across state lines, the assumption that no other factors outside of MHCI affected coverage distributions between Massachusetts and the control states should hold in general. MHCI only affected the residents of Massachusetts and no other states. Spillover effects that pose a threat to my identification would be migration of lower income workers from neighboring states into Massachusetts. Migration of this population from other states into Massachusetts would increase the percent of small firms workers on the subsidized exchange rolls, increase the percent of workers with ESI in neighboring states (migration would be done presumably to obtain coverage, thus removing uninsured workers from the coverage distribution), and increase overall insurance rates in neighboring states due to the migration of uninsured workers. The combined effect of migration would serve to positively bias the triple differences estimates for ESI and subsidized coverage, and negatively bias the uninsurance estimate. These biases would combine to produce an overestimate of small firm ESI to subsidized insurance coverage shifts.

Another threat to my identification strategy would be the existence of an adjustment period in Massachusetts over which firms and employees had a slow reaction to the incentives embedded in MHCI. This phenomena could dampen all estimated effects toward zero, but also might initially bias ESI estimates upwards. Suppose firms and workers responded to MHCI by initially offering and taking up ESI respectively, then small firms learned that they could reduce labor costs by changing their ESI contracts to allow their income eligible workers access to subsidies. This behavior would result in large initial increases in ESI rates for small firms that eventually decrease over the small firm learning process. Additionally, there would be relatively low take up of subsidized coverage throughout the learning process. This would initially result in increased ESI and overall insurance rates followed by decreased in ESI and increases in subsidized coverage rates. The learning process would result in different post-period trends that ultimately serve to bias estimates of small firm ESI to subsidized insurance coverage shifts downward.

MHCI generates a larger incentive for lower income workers to take up subsidized coverage due to the higher subsidies awarded to lower income workers. This is not necessarily a threat to identification, but an issue worth investigating to verify that heterogeneity exists in the treatment effect by FPL. Additionally, the assumption that small and large firms in the control states can serve as a counterfactual for Massachusetts requires small and large firms in Massachusetts to react to economic conditions with respect to ESI offerings similarly. States have heterogeneous regulations with regard to insurance markets, thus ESI offerings may be differentially affected by the same economic conditions across states. For example, community rating and guaranteed issue in the health insurance market raises the cost of insurance relative to states that have not imposed guaranteed issue and community rating. Massachusetts implemented community rating and guaranteed issue in 1996, therefore Massachusetts firms may respond differently to economic conditions when choosing ESI plans to offer their employees.

## **6.2 Small Employer Fines**

The relative ease with which small firm employees can overcome the categorical firewall to access subsidized coverage hinges upon the employer fine (\$295 per FTE per year) being large enough to cause a differential response between small and large firms. The decision of a firm sized 11 to 50 FTE employees to allow their income eligible employees to have the option of choosing either subsidized coverage or the firm's ESI plan imposes no additional fines on the employer since they are in compliance with the "fair and reasonable" contribution requirement. While a large firm must weigh the costs of a \$295 per FTE per year fine against the potential savings from allowing their income eligible workers access to subsidized coverage. Therefore, the ultimate decision of a large firm to not be in compliance with the "fair and reasonable" contribution requirement to allow the income eligible employees access to subsidies depends entirely upon the distribution of incomes within the firm.

Suppose a that a small firm with 40 FTEs and 30 full time employees is deciding whether to allow their income eligible employees the option to choose either subsidized coverage or the firm's ESI plan. If 8 full time employees are above 300% FPL and enrolled in ESI then the firm meets the "fair and reasonable contribution" requirement and can allow the other 22 employees below 300%

FPL to access subsidies without facing any employer fines if the employer pays less than 33% of the single premium. If the employer was contributing more than 33% of the annual premium prior to the decision they would simply pass back the increased employee contribution in wages to make the employee economically no worse off, independent of their ultimate decision.

Now suppose that a large firm with 300 FTEs and 150 full time employees is considering the same problem. If 125 full time employees are above 300% FPL and the employer pays less than 33% of the single premium then their 25 income eligible full time employees can access subsidies, but the firm is fined  $300 * 295 = \$88,500$ . This amounts to an average fine of \$3,540 per subsidized coverage enrollee. If the employer does not save at least \$3,540 per subsidized coverage enrollee then they will not violate the “fair and reasonable contribution” requirement. This stylized calculation also assumes that all income eligible employees would choose to enroll in subsidized coverage. If this is not the case then the per subsidized coverage enrollee fine increases.

Therefore there may be instances in which large firms find it beneficial to pay the \$295 per FTE per year fine to allow their income eligible employees to access subsidized coverage, but there are also instances in which it is not in the firms interest to engage in such behavior. My assumption that the employer fine generates asymmetric behavioral responses across small and large firms is appropriate if the fine is large enough such that some large firms choose not to allow their income eligible employees to access subsidized coverage. I do not need to assume anything about the distribution of employees within a firm, only that there are instances in which large firms do not allow their income eligible employees to access subsidized coverage to avoid the fine and be in compliance with the mandate.

### **6.3 Firm Size Definition**

I cannot capture firms sized 1 to 50, hence I used firms sized 1 to 24 compared to firms over 25 for my main estimation. I check the robustness of my results by estimating equation 3 for varying definitions of small firms and large firms. Table 4 displays the alternative definitions of small and large firms.



## 6.4 Implementation of Less Substantial Health Reforms

Over the analysis period California, Maine, Vermont and Oregon implemented less substantial health reforms which may serve to bias all of my estimates toward zero. To address this issue I re-estimate equation 3 using my original North East control states with Maine and Vermont excluded. Additionally, I estimate equation 3 for the contiguous 48 states and the contiguous 48 states with California, Maine, Vermont and Oregon removed as well. The additional control group of the 48 contiguous states serves as a robustness check to my North East control group specification. ESI has been the traditional source of health insurance for workers since World War II, thus firms in all states have adapted to this market feature over the past 70 years. Across state trends in ESI for the 48 contiguous states should be relatively similar due to the tenure of ESI as a market institution. Estimates from the North East and the contiguous 48 states should be nearly identical.

## 6.5 Heterogeneous Insurance Market Regulations

To test whether heterogeneous insurance market regulations bias my estimates, I re-estimate equation 3 including only New Jersey, New York and Washington as control states. These three states and Massachusetts all implemented guaranteed issue and community rating prior to 1997 and still have these policies in place as of 2013.<sup>15</sup>

## 6.6 Migration Spillovers

To address the potential for migration spillovers to occur I re-estimate equation 3 using the surrounding New England states of Maine, Vermont, New Hampshire, Connecticut and Rhode Island, as well as the surrounding New England states with Maine and Vermont removed due to their implementation of less substantial health reforms during the analysis period. If spillovers exists, I would expect a positive bias on the triple differences estimates for ESI and subsidized coverage, and a negative bias on the uninsurance estimate. These biases would result in an overestimate of small firm ESI to subsidized insurance coverage shifts. Subsequent to this test, I also re-estimate equation 3 using my original North East control group with the above listed New England states removed. I

---

<sup>15</sup>Massachusetts implemented these policies in 1996, New Jersey in 1992, New York in 1993, and Washington in 1993

additionally estimate equation 3 for the contiguous 48 states with the New England states removed, and again with the New England states along with California and Oregon removed.

## **6.7 Heterogeneity in the Treatment Effect by FPL**

I check for heterogeneity in the treatment effect by FPL by estimating equation 3 for FPL brackets 133 to 200 percent and 200 to 300 percent FPL. Due to the availability of higher subsidies for lower income workers, I expect the treatment effect to be greater for workers in the 133 to 200 percent FPL bracket compared to workers in the 200 to 300 percent FPL bracket. Additionally I conduct a falsification test by estimating equation 3 for workers above 300 percent FPL. Employees that are not income eligible for subsidies (FPL greater than 300 percent) should not demonstrate any substantial increase in subsidized coverage. Almost all large firms offer ESI (99 percent), and just over half of small firms offer ESI (54 percent). Thus, uninsured large firm workers have chosen to remain without coverage due to some other factor outside of access to ESI, while small firm workers may be uninsured because they do not have access to insurance through their employer. The distribution of firms offering coverage by firm size indicates that increases in ESI rates due to MHCI for large firm workers will mostly come from uninsured employees taking up ESI that was already being offered due to the individual mandate, while increases in ESI rates for small firm workers will come from increased offer rates due to the employer mandate and the individual mandate incentive to obtain health insurance as well. Therefore, small firm workers above 300 percent FPL should exhibit a much larger positive increase in ESI rates due to MHCI than large firm employees.

## **6.8 Adjustment Period**

I test for an adjustment period by examining heterogeneity in pre-treatment trends and post-treatment effects by further refining my definition of pre-periods and post-periods into “early pre-period” (2000-2003), “late pre-period” (2004-2006), “during” (2007), “early post-period” (2008-

2009), and “late post-period” (2010-2011) and estimating the following equation:

$$\begin{aligned}
y_i = & \alpha + \beta_1(MA * Early Pre * Small Firm)_i + \beta_1(MA * During * Small Firm)_i + \\
& \beta_1(MA * Early Post * Small Firm)_i + \\
& \beta_1(MA * Early Post * Small Firm)_i + \gamma_1(MA * Late Post * Small Firm)_i + \\
& \gamma_2(MA * Post)_i + \gamma_3(MA * During)_i + \sum_s \phi_s(Small Firm)_i + \\
& \sum_t \tau_t(Small Firm)_i + X_i' \delta + \sum_s \phi_s + \sum_t \tau_t + \varepsilon_i
\end{aligned} \tag{4}$$

Larger (in absolute value) significant subsidized insurance and ESI estimates of the triple difference parameter for the “late post-period” relative to the “early post-period” would be indicative of an adjustment period immediately following MHCI implementation.

## 6.9 Synthetic Control Group

I constructed a synthetic control group for Massachusetts small firms and large firms from aggregate data using the methods outlines in Abadie et al. (2010). This method provides a robustness check to my triple differences specification by using aggregate data and a data driven method to develop estimates of MHCI’s heterogenous impact on coverage distributions.

To estimate the impact on coverage distributions from a heterogeneous employer mandate using the synthetic control approach I allow for 48 donor states, which includes all states in the contiguous Unites States and Washington DC. The CPS data is aggregated up to the state-year level, and statistics from the MEPS-IC are reported in this format as well. The goal of this exercise is to generate a linear combination of donor state insurance outcomes and insurance predictors that best match Massachusetts. To do this I solve for both  $W$  and  $V$  in the following equation for each

insurance outcome by firm size:

$$\begin{aligned}
 & \min_W (Y_{MA} - \mathbf{Y}W) \mathbf{V} (Y_{MA} - \mathbf{Y}W) & (5) \\
 & s.t. W = [w_1 \ w_2 \ \dots \ w_{48}]' \\
 & \quad \sum w_i = 1 \\
 & \quad w_i \geq 0 \ \forall i = 1, \dots, 48
 \end{aligned}$$

$Y_{MA}$  is a column vector containing the relevant outcome variable for 2003 to 2006 (ESI, subsidized coverage, and uninsurance) and the following predictors of aggregate insurance status: average of the median FPL for workers in the 133-300 percent FPL range by firm size over 2003-2006, average of the fraction of college educated workers in the 133-300 percent FPL range by firm size from 2003-2006, average of the fraction of firms that offered health insurance by firm size from 2003-2006, average of the fraction of employees in firms that offered health insurance by firm size from 2003-2006, and average of the fraction of employees eligible for employer sponsored health insurance in firms that offer health insurance by firm size from 2003-2006. The aggregate coverage outcomes, median FPL, and fraction of college educated were calculated using the CPS sample previously described. The MEPS-IC tables by state and firm size were used to obtain the fraction of employers offering coverage, fraction of employees in firms that offer coverage, and fraction of employees in firms that offer coverage who are eligible to enroll in coverage.<sup>16</sup>  $\mathbf{Y}$  is a matrix which has columns for each donor state that correspond to the row entries in  $Y_{MA}$ .  $W$  is a set of weights to be estimated that minimizes the distance defined in equation 5.  $\mathbf{V}$  is a weighting matrix that is calculated to minimize the difference between the trajectories of the outcome variable over the 2003 to 2006 period.<sup>17</sup>

After estimating  $W$  I construct the synthetic control groups for Massachusetts by firm size and calculate the triple differenced average treatment effect from 2008-2011. I then estimate placebo treatment effects for each of the 48 states in the donor pool and estimate an empirical and kernel smoothed distribution of outcomes which can be used to compare the treatment effect in MA to the placebo donor states in order to generate a measure of significance. I then estimate the small

<sup>16</sup>The MEPS-IC tables broke out firm size by 1-50 employees and 51 or more employees

<sup>17</sup>The results presented from this method are robust to using a weighting matrix that minimizes the mean squared error.

firm ESI to subsidized insurance coverage shifts using the calculated average treatment effects and equation 2.

One of the main concerns regarding the synthetic control group approach is that the researcher has a large degree of latitude in choosing the predictor variables that enter into the objective function in equation 5. I address this issue by re-estimating the weights from equation 5 including a variable containing the number of letters in the state's name (e.g., Massachusetts has 13 letters). The inclusion of this variable should not be related to coverage outcomes, thus its presence should not significantly alter the original estimation results.

## 7 Results

Alternative firm size definitions and control groups are summarized in Tables 4 and 5 respectively. Table 6 displays regression coefficients for the parameter of interest (MA\*Post\*Small Firm) from the estimation of equation 3 for the baseline control group (North East) and the baseline definition of firm size as well as the six other firm size definitions listed in Table 4.

The first three alternative firm size definitions (SF-1, SF-2, and SF-3) check the robustness of my baseline result to varying definitions of firm size. The small firm ESI to subsidized insurance coverage shift estimates remain highly significant and large for the baseline firm size definition as well as the first three alternative definitions. The last three alternative definitions test whether there exists coverage shifts between mandate exempt firms (size 1-10) and other sized firms. SF-4 tests whether there is significant small firm ESI to subsidized insurance coverage shifts between exempt firms and small firms subject to the mandate (size 11-24). This test resulted in a positive but not significant coverage shift estimate, indicating that there is no significant difference in the treatment effect between these two firm sizes. This result is due to an imprecise measure of the ESI triple difference parameter. The sign of the estimate is in line with the intuition that exempt firms would rely more heavily on the Connector to provide insurance to their employees than non-exempt firms, but the small sample sizes of these two firm size groups and the relatively small coefficient estimate of the triple difference parameter resulted in an imprecise estimate. SF-5 and SF-6 tested exempt firms against firms sized 25 and over and firms sized 100 and over respectively.

Both tests resulted in positive and significant small firm ESI to subsidized insurance coverage shift estimates.

The first three estimates (baseline, SF-1, and SF-2) demonstrate very similar effects of MHCI on ESI, subsidized coverage and overall insurance rates. In all instances small firms responded with a lower increase in ESI rates, and higher increases in both subsidized coverage and overall insurance rates. These responses resulted in coverage shift estimates between 46 and 55 percent. The estimates indicate that about half of newly covered small firm employees with subsidies would have chosen ESI had they been subject to the more stringent large firm employer mandate. The coverage shift estimate for SF-3 is noticeably higher, but less precise than the first three, resulting in a one standard deviation range of 42 to 82 percent. The first three estimates fall within this range, and are far more precise. The last three estimates in Table 4 (SF-4, SF-5, and SF-6) indicate smaller estimates of small firm ESI to subsidized insurance coverage shifts. The treatment effect on ESI was relatively similar to the baseline and first three alternative firm sizes, but the take up of subsidized coverage was much higher resulting in a lower coverage shift estimate. This result is congruent with a larger pool of uninsured workers in small firms than larger firms and the incentive for exempt firms to rely more heavily on the Connector to subsidize their employees health insurance.

Table 7 displays regression coefficients for the parameter of interest (MA\*Post\*Small Firm) from the estimation of equation 3 for the baseline definition of firm size and baseline North East control group as well as the nine other control groups listed in Table 5. The estimates from the baseline specification, and the alternative 48 contiguous states control group are very similar for all coverage outcomes, and indicates that small firm employees had a smaller ESI treatment effect and larger subsidized coverage and overall insurance rates effects. Both estimations yielded coverage shift estimates of approximately 50 percent. Removing states from the control group that implemented less substantial health reforms over the analysis period did not substantially change the 50 percent coverage shift estimate as well, indicating that these health reforms did not have a substantial impact on coverage distributions for lower income workers. Testing for heterogeneity in firm response to different insurance market regulations by only analyzing states with both guaranteed issue and community rating resulted in similar results to the baseline model and a coverage shift estimate of

42 percent.

The robustness test for migration spillovers generated estimates in line with the migration theory. The estimated ESI treatment effect is much more negative compared to the baseline, potentially due to small firm workers migrating into Massachusetts to access subsidies which closes the post-period treatment effect gap between small firms in Massachusetts and the neighboring control states, while leaving the difference between large firms in Massachusetts and the control states unaffected. The estimated subsidized coverage treatment effect is slightly more positive than the baseline, potentially due to increased take up of subsidized coverage of migrating small firm workers and a decrease in the neighboring states of lower income workers who may have been on the Medicaid rolls. The overall insurance rate estimate is more positive and closer to zero than the baseline estimate, possibly due to reducing the uninsured rate in neighboring states via migration. All of these estimates are congruent with a theory of migration yielding an overestimate of coverage shifts. Removing New England from the North East and contiguous 48 states control groups yielded treatment effect estimates similar to the baseline model resulting in a significant coverage shift estimate of 50 percent.

Table 9 displays regression coefficients for the parameter of interest (MA\*Post\*Small Firm) from the estimation of equation 3 for the baseline definition of firm size (1-24 vs 25+) and baseline North East control group separated by FPL. The estimated small firm ESI to subsidized insurance coverage shift is much higher and significant for lower income workers. Lower income workers have access to higher subsidies so they have a greater incentive to switch from ESI to subsidized health insurance. The results for individuals above 300 percent FPL, and thus not eligible for subsidies, reveal that higher income small firm workers are more likely to newly take up ESI coverage after MHCI reform than large firm employees. These results are congruent with the heterogeneous distribution of ESI offer rates between small and large firms (99 percent of large firms and 54 percent of small firms offer ESI), as discussed in Section 6.

Table 9 displays regression coefficients for the parameters of interest from the estimation of equation 4 for the baseline definition of firm size (1-24 vs 25+) and baseline North East control group separated into finer pre and post periods. The “early pre-period” is 2000-2003, the “late pre-period” is 2004-2006, the “during period” is 2007, the “early post-period” is 2008-2009, and the

“late post-period” is 2010-2011. The omitted period is the “late pre-period”, thus all estimates are relative to this pre-period. There is no statistically significant difference between the “early pre-period” and the “late pre-period”. There were positive and significant increases in both ESI for small firms in the “during period” relative to large firms, followed by no difference in the treatment effect between small and large firms in the “early post-period”, then large and significant reductions in ESI for small firm workers in the “late post-period” relative to large firms. Take up of subsidized coverage throughout the during and post periods was differentially higher for small firm workers, and overall insurance rates increased for small firm workers relative to large firm workers in all post periods. These results are congruent with an adjustment period in which small firms and their employees responded to MHCI by offering and taking up ESI, and eventually adjusted to the incentives to reduce labor costs and increase earnings by receiving subsidized coverage.

To further check the robustness of these results I used a synthetic control group approach. Equation 5 was solved and weights assigned to each state. Most states were assigned a weight of zero, the weights for each synthetic control group are reported in Table 10. It is important to note here that of the 11 control states used in the triple differences analysis, 10 show up with positive weights for at least one synthetic control group (New Jersey was not assigned a positive weight for any control group). These weights were applied to each state to construct synthetic control groups for each outcome in Massachusetts by firm size. Figures 7, 8, and 9 display the resulting synthetic control groups compared to Massachusetts. For each of the outcomes, the pre-trends for the synthetic control group match well to the pre-trends for Massachusetts.

To assess the significance of the treatment effect in Massachusetts for each of the insurance coverage outcomes (ESI, subsidized coverage, and uninsurance), I used the placebo method outlined in Abadie et al. (2010). Subsequently, I calculated the average treatment effect using years 2008-2011 for Massachusetts and all 48 placebo states and constructed an empirical and smoothed cumulative density function to see where Massachusetts’ treatment effects fell relative to the placebo study. These results are presented in appendix Figures A.4, A.5, and A.6. The estimated average treatment effect in Massachusetts were all significant; ESI is significant at 10 percent level, subsidized coverage is significant at the 1 percent level, and the overall insurance rate is significant at the 10 percent level. The treatment effects taken jointly are significant at the 1 percent level. The estimated average



treatment effects on ESI, subsidized coverage, and uninsurance, respectively, are -9.42 percent, 15.11 percent, and -7.19 percent. Now, using equation 2, I estimate small firm ESI to subsidized insurance coverage shifts to be 62.33 percent using the synthetic control group approach.

Including the number of letters in a state's name as a variable in the estimation of equation 5 resulted in similar estimates of average treatment effects on ESI, subsidized coverage, and uninsurance. The specific estimates respectively are -10.46 percent, 15.13 percent, and -8.12 percent (*Coverage Shift* = 69.11 percent). It is important to note here that the inclusion of this variable did change the estimated weights for each insurance outcome and leaned heavily toward states with longer names. This occurred because Massachusetts has a relatively long name compared to other states. In fact, Washington DC and New Hampshire (both with same number of letters in the state name as Massachusetts) had positive estimated weights in more outcomes than in the original estimation. Appendix Table A.1 displays the weights from this exercise. Despite obtaining similar results when this variable was included, the dramatic change in the estimated weights should not be ignored, and it is noted that results from this method should be scrutinized heavily with respect to the variables chosen to be included in the estimation. This method still retains some merit as a data driven robustness check that is congruent with my triple difference estimates.

## 8 Conclusion

In this paper I investigate the extent to which more lenient mandates on small firms have differentially impacted the movement of their workers onto government subsidized insurance rolls. I find that the relatively lenient treatment of small firms generated enough incentives to noticeably distort health insurance coverage distributions between small and large firms. Evidence presented in this paper demonstrates a substantial and significant response from small firms and their employees to the incentive to shift burden of health insurance costs from the firm and the worker to tax payers by sending their income eligible employees to the Connector for subsidized coverage. Specifically, I find that almost all of newly subsidized coverage take-up is generated by small firm employees and one out of every two newly covered small firm employees receiving subsidies would have obtained or maintained ESI had they been subject to the more stringent large firm employer

mandate. Additionally, the trade-off of not allowing these coverage shifts to occur by applying the large firm mandate to all firms is estimated to be a 6 percent reduction in overall insurance rates for small firm employees.

The results presented in this paper are robust to firm size definition, the elimination of states that implemented less substantial health reforms over the analysis period, limiting the control group to only states with guaranteed issue and community rating, migration spillover effects, and the creation of a synthetic Massachusetts. Testing for heterogeneity in the treatment effect of MHCI by FPL, I find that lower income working individuals are more likely to enroll in subsidized coverage. I also find no evidence of differential impacts on coverage distributions between small and large firm employees immediately following MHCI implementation (2008-2009), but substantial differences since 2010, which is indicative of an adjustment period immediately following implementation.

These findings are congruent with an interpretation that small firms responded to the incentives embedded in MHCI by sending relatively more of their income eligible employees to the Connector for subsidized health insurance coverage compared to large firms. This effect is strongest among lower income groups who have access to higher subsidies, and non-existent for workers not eligible for subsidized coverage (workers above 300 percent FPL). There appears to be an adjustment period immediately following MHCI implementation in which there is no evidence that small firms were responding to a relatively more lenient application of the employer mandate, but since 2010 small firm employees have been taking up subsidized coverage at much higher rates than demographically similar large firm workers. In fact, current ESI levels for income eligible small firm workers has fallen to pre-MHCI levels after an initial increase in the take up of ESI.

The question of whether firms and employees responded differently to the MHCI employer mandate has both economic and policy relevant implications. Economically, one would expect small firms to respond to their more lenient employer mandate by sending more income eligible employees to the Connector for subsidized coverage and have less employees taking up ESI than large firms. This behavioral response on the part of small firms is due to the ease in which small firms can reduce the costs of hiring income eligible workers by transferring health insurance costs to tax payers. This paper provides evidence that small firms have in fact responded to the differential incentives embedded in MHCI. The main policy conclusion that can be drawn from this paper is that MHCI

increased overall health insurance coverage rates for small firm employees by six percent by applying more lenient employer mandated to small firms. However, this increase in coverage rates comes at a cost. Specifically, the cost of increased health insurance coverage rates for small firm employees is that half of the subsidized coverage pool would have otherwise obtained or maintained their employer plan had small firms been subject to the more stringent employer mandate.

The ACA has a much more lenient definition of a small firm, and much more generous income eligibility guidelines than the Massachusetts reform. Thus, the extent to which I find small firm ESI to subsidized insurance coverage shifts will arguably be exacerbated under the ACA. The results from this study of Massachusetts indicate that firms will respond to more lenient mandates by restructuring their compensation packages to allow income eligible employees the option to access subsidized coverage without decreasing their overall economic welfare, independent of the coverage choice made by the employee. The ACA exempts firms with less than 50 FTEs from any employer mandates to offer coverage. Presumably, employers across the nation will respond to the incentive to transfer health insurance costs to tax payers by allowing their income eligible employees (those below 400% FPL) to access exchange subsidies. Assuming US firms will respond to the ACA in the same manner as firms in Massachusetts responded to MHCI, the ACA's more liberal definition of small firm combined with more generous subsidies will lead to much larger small firm ESI to subsidized insurance coverage shifts than I have estimated for Massachusetts. Additionally, the federal government has postponed the implementation of the employer mandate under the ACA for at least one year. The complete lack of a mandate effectively categorizes all firms as exempt from the law, hence providing an incentive for all firms to transfer health care costs to tax payers. The potential for such a response is supported by the evidence presented in this paper, and should be of great policy and research interest as the US moves forward with the implementation of the ACA in 2014.

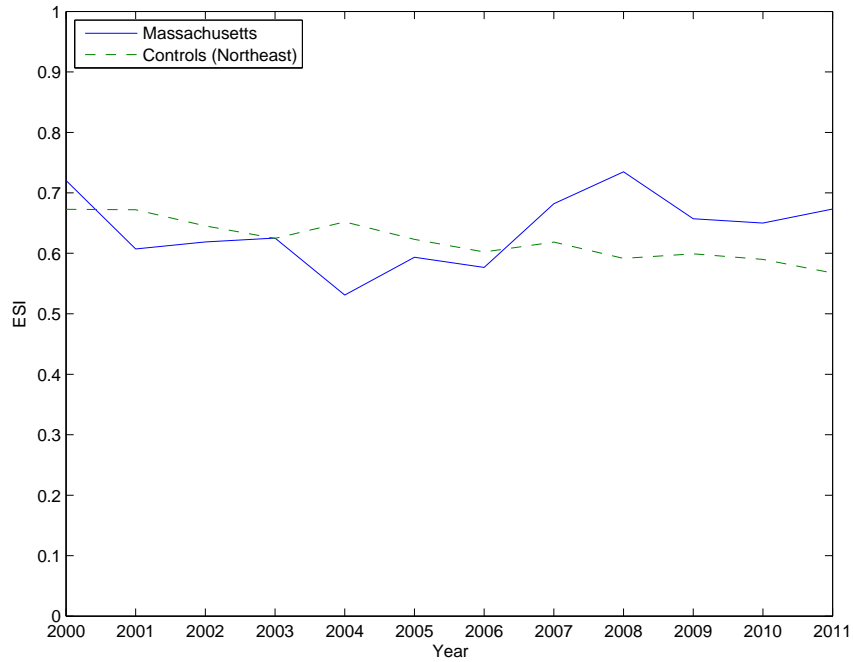
## References

- Abadie, A., A. Diamond, and J. Hainmueller (2010). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California’s Tobacco Control Program. *Journal of the American Statistical Association*, 105(490):493–505.
- Blue Cross Blue Shield of Massachusetts, (2012). Health Reform in Massachusetts: Expanding Access to Health Insurance Coverage.
- URL <https://www.mahealthconnector.org/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/Health%2520Care%2520Reform/Overview/HealthReformAssessingtheResults.pdf>
- Brown, C. (1980). Equalizing Differences in the Labor Market. *The Quarterly Journal of Economics*, 94(1):113–134.
- Commonwealth Health Insurance Connector Authority, (2012). Health Reform Facts and Figures.
- URL <https://www.mahealthconnector.org/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/Health%2520Care%2520Reform/Facts%2520and%2520Figures/Facts%2520and%2520Figures.pdf>
- Courtemanche, C. J. and D. Zapata (2012). Does Universal Coverage Improve Health? The Massachusetts Experience. *Georgia State University Working Paper*.
- Gourio, F. and N. Roys (2012). Size-Dependent Regulations, Firm Size Distribution, and Reallocation. *NBER Working Paper 18657*.
- Gruber, J. (2008). Incremental Universalism for the United States: The States First Move? *Journal of Economic Perspectives*, 22(4):51–68.
- Gruber, J. (2010). Health Care Reform is a “Three-Legged Stool”: The Costs of Partially Repealing the Affordable Care Act. *Center for American Progress*.
- URL [http://www.americanprogress.org/wp-content/uploads/issues/2010/08/pdf/repealing\\_reform.pdf](http://www.americanprogress.org/wp-content/uploads/issues/2010/08/pdf/repealing_reform.pdf)
- Kolstad, J. T. and A. E. Kowalski (2012a). The Impact of an Individual Health Insurance Mandate

- on Hospital and Preventive Care: Evidence from Massachusetts. *Journal of Public Economics*, 96(11-12):909–929.
- Kolstad, J. T. and A. E. Kowalski (2012b). Mandate-Based Health Reform and the Labor Market: Evidence from the Massachusetts Reform. *NBER Working Paper 17933*.
- Long, S. (2010). A Comment On “The Massachusetts Health Plan: Much Pain Little Gain”. *Urban Institute Health Policy Center Brief*.
- Long, S. and K. Stockley (2011). The Impacts of State Health Reform Initiatives on Adults in New York and Massachusetts. *Health Services Research*, 46(1,2):365–428.
- Long, S., K. Stockley, and H. Dahlen (2012). Health Reform in Massachusetts as of Fall 2010: Getting Ready for the Affordable Care Act and Addressing Affordability. *Urban Institute Research Report*.
- Long, S., K. Stockley, and A. Yemane (2009). Another Look at the Impacts of Health Reform in Massachusetts: Evidence Using New Data and a Stronger Model. *American Economic Review Papers and Proceedings*, 99(2):508–511.
- Massachusetts Division of Health Care, Finance, and Policy, (2011). Health Care in Massachusetts: Key Indicators.  
 URL <http://www.mass.gov/chia/docs/r/pubs/11/2011-key-indicators-february.pdf>
- Raymond, A. (2009). Massachusetts Health Reform: The Myth of Uncontrolled Costs. *Massachusetts Taxpayer Foundation*.  
 URL <http://www.masstaxpayers.org/sites/masstaxpayers.org/files/Health%20care-NT.pdf>
- Summers, L. (1989). Some Simple Economics of Mandated Benefits. *American Economic Review*, 79(2):177–183.

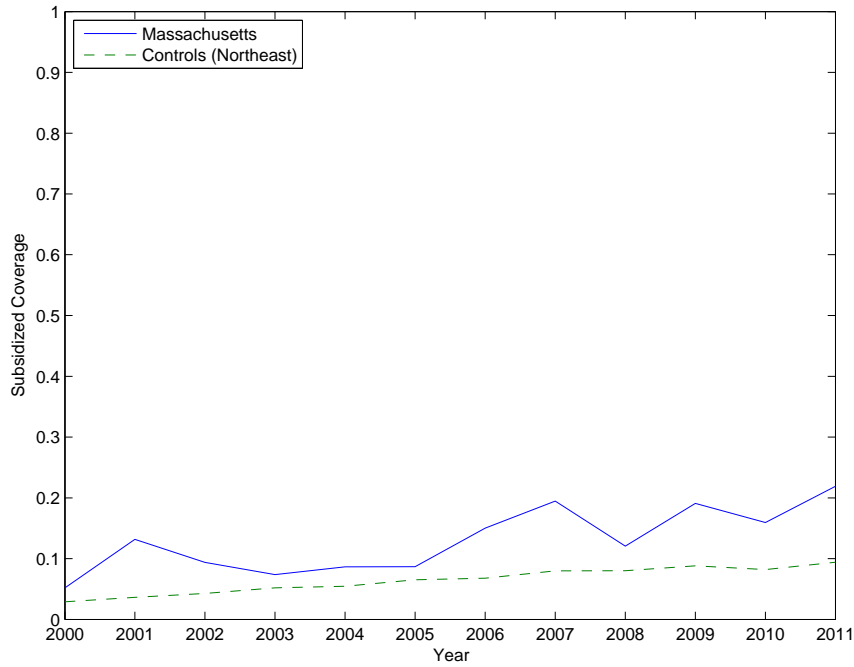
## 9 Tables and Figures

Figure 1: ESI: Massachusetts vs. North East (Income Eligible Workers)



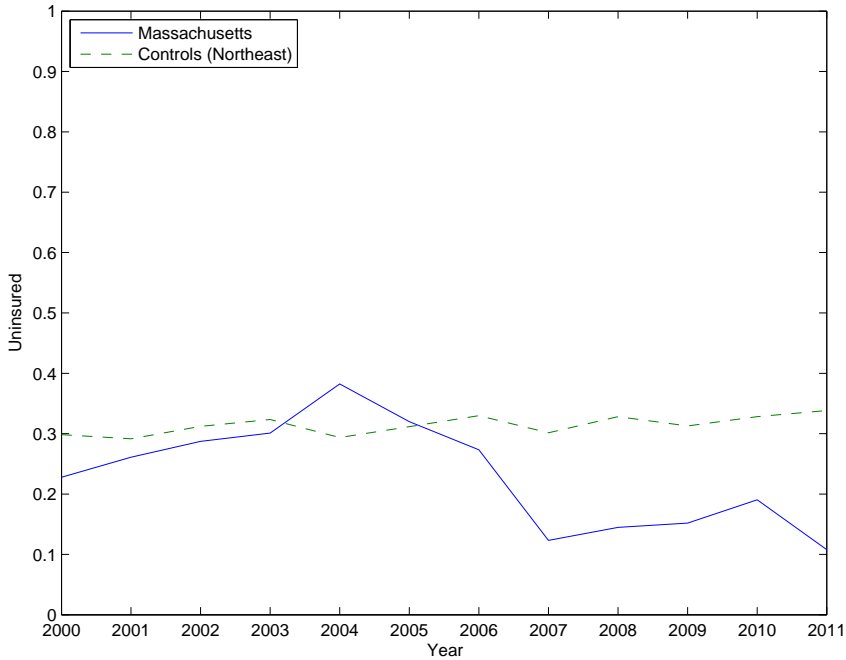
Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits.

Figure 2: Subsidized Coverage: Massachusetts vs. North East (Income Eligible Workers)



Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits.

Figure 3: Uninsured: Massachusetts vs. North East (Income Eligible Workers)



Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits.

Table 1: Summary Statistics

	North East			Massachusetts			Difference in Difference
	Pre	Post	Difference	Pre	Post	Difference	
N	21,927	13,084		1,524	740		
Weighted Count	25,714,283	15,246,150		2,829,006	1,567,623		
Insurance Outcomes							
ESI	0.64	0.59	-0.05	0.61	0.68	0.06	0.12
Subsidized Coverage	0.05	0.09	0.04	0.10	0.17	0.08	0.04
Uninsured	0.31	0.33	0.02	0.29	0.15	-0.14	-0.16
Insurance Predictors							
Age	37.21	38.09	0.88	37.15	37.10	-0.04	-0.92
Male	0.51	0.52	0.00	0.47	0.44	-0.04	-0.04
Family Size	2.81	2.71	-0.10	2.79	2.77	-0.02	0.08
Married	0.44	0.41	-0.03	0.40	0.38	-0.02	0.01
Dependents (indicator)	0.72	0.69	-0.03	0.69	0.68	-0.01	0.02
Children (indicator)	0.48	0.44	-0.04	0.46	0.45	-0.01	0.03
Median FPL	2.24	2.26	0.01	2.24	2.29	0.04	0.03
Full Time	0.89	0.87	-0.02	0.85	0.84	-0.01	0.01
Firm Size < 10	0.18	0.18	0.00	0.19	0.18	-0.01	-0.02
Firm Size 10-24	0.14	0.19	0.06	0.13	0.16	0.03	-0.02
Firm Size 25-99	0.17	0.12	-0.05	0.15	0.10	-0.05	0.01
Firm Size 100-499	0.15	0.14	-0.01	0.16	0.15	-0.01	0.00
Firm Size 500-999	0.06	0.05	-0.01	0.06	0.07	0.01	0.02
Firm Size 1,000+	0.30	0.31	0.01	0.31	0.33	0.02	0.01
White	0.75	0.74	-0.01	0.80	0.80	-0.01	0.00
Black	0.19	0.19	0.00	0.13	0.14	0.01	0.01
Native American	0.01	0.01	0.00	0.01	0.00	0.00	-0.01
Asian	0.05	0.06	0.01	0.06	0.07	0.00	-0.01
Hispanic	0.18	0.22	0.04	0.18	0.15	-0.03	-0.07
Lss than High School	0.17	0.14	-0.03	0.19	0.10	-0.08	-0.05
High School Diploma	0.43	0.41	-0.02	0.40	0.39	0.00	0.01
Some College	0.26	0.27	0.02	0.25	0.29	0.04	0.02
College Graduate	0.10	0.13	0.02	0.13	0.17	0.04	0.02
Graduate School	0.03	0.04	0.01	0.04	0.04	0.01	0.00
At least High School	0.83	0.86	0.03	0.81	0.90	0.08	0.05
At least College	0.14	0.17	0.03	0.17	0.22	0.05	0.02

Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. All data has been weighted by the March CPS Supplement weight.

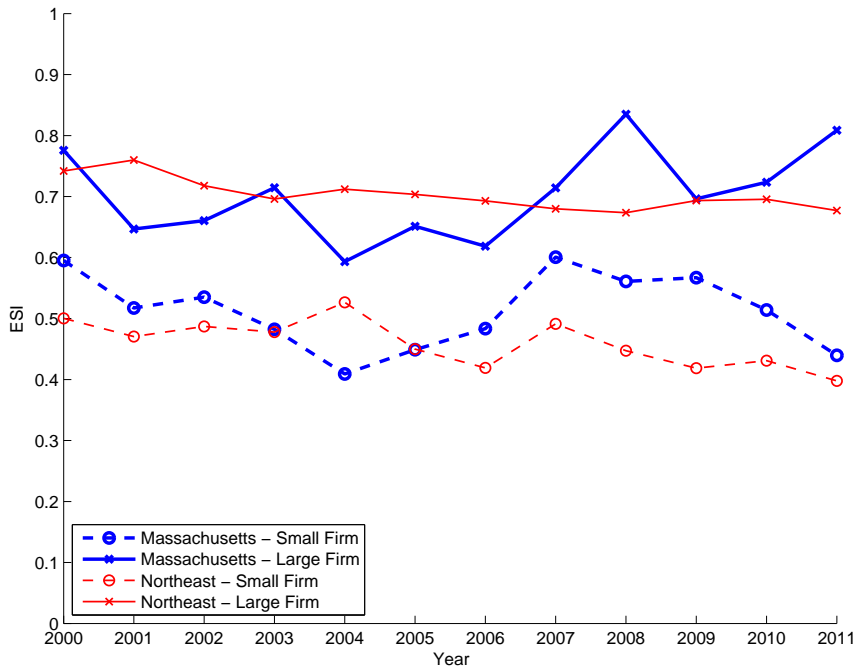
Table 2: Difference in Difference Estimation (N=40,696)

Variable	ESI	Subsidized Coverage	Uninsured
<i>MA * Post</i>	0.088 (0.005)***	0.044 (0.006)***	-0.132 (0.010)***
<i>MA * During</i>	0.091 (0.009)***	0.079 (0.009)***	-0.170 (0.016)***
Demographic Characteristics	Y	Y	Y
State Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y

Note: The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Standard errors are clustered at the state level.

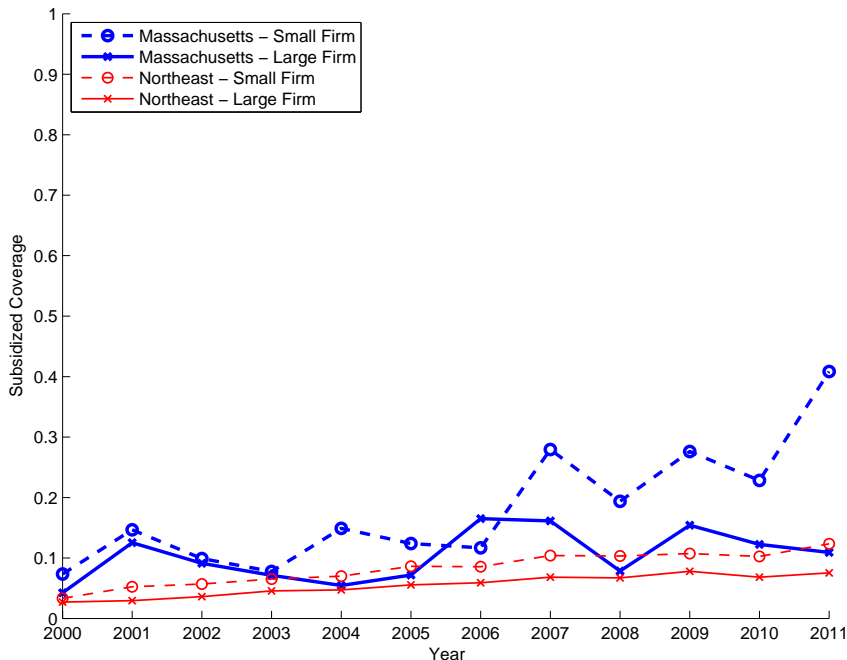


Figure 4: ESI: Massachusetts vs. North East



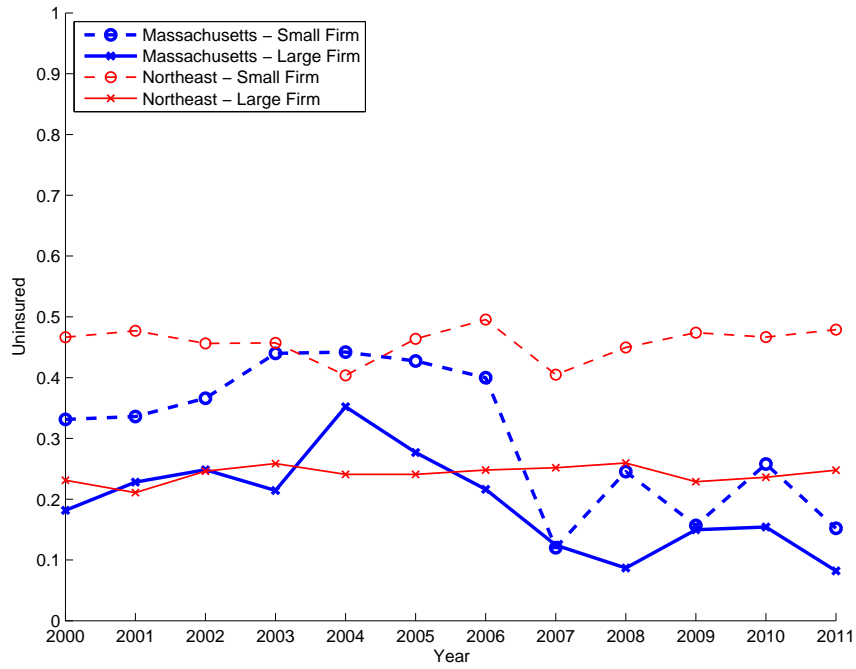
Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Small firms are defined as 1-24 employees and large firms as 25 or more employees.

Figure 5: Subsidized Coverage: Massachusetts vs. North East



Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Small firms are defined as 1-24 employees and large firms as 25 or more employees.

Figure 6: Uninsured: Massachusetts vs. North East



Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Small firms are defined as 1-24 employees and large firms as 25 or more employees.

Table 3: Summary Statistics by Firm Size

	Control States				Massachusetts				Triple Difference
	Pre LF	Pre SF	Post LF	Post SF	Pre LF	Pre SF	Post LF	Post SF	
N	15,157	6,770	8,410	4,674	1,022	502	488	252	
Weighted Count	17,626,284	8,087,999	9,541,953	5,704,196	1,915,560	913,446	1,029,789	537,835	
Insurance Outcomes									
ESI	0.72	0.48	0.68	0.42	0.67	0.50	0.76	0.52	-0.05
Subsidized Coverage	0.04	0.07	0.07	0.11	0.09	0.11	0.12	0.28	0.12
Uninsured	0.24	0.46	0.24	0.47	0.25	0.39	0.12	0.20	-0.07
Insurance Predictors									
Age	37.27	37.09	38.16	37.98	36.83	37.82	37.36	36.60	-1.75
Male	0.49	0.56	0.49	0.57	0.46	0.51	0.43	0.44	-0.06
Family Size	2.81	2.80	2.72	2.69	2.79	2.79	2.73	2.84	0.14
Married	0.43	0.45	0.39	0.44	0.38	0.44	0.35	0.44	0.01
Dependents (indicator)	0.72	0.71	0.69	0.69	0.69	0.69	0.67	0.72	0.04
Children (indicator)	0.50	0.44	0.46	0.41	0.45	0.48	0.43	0.49	0.02
Median FPL	2.26	2.18	2.27	2.22	2.29	2.16	2.26	2.31	0.14
Full Time	0.90	0.86	0.87	0.86	0.86	0.81	0.84	0.83	0.02
Firm Size < 10	0.00	0.57	0.00	0.49	0.00	0.59	0.00	0.53	0.01
Firm Size 10-24	0.00	0.43	0.00	0.51	0.00	0.41	0.00	0.47	-0.01
Firm Size 25-99	0.25	0.00	0.19	0.00	0.22	0.00	0.16	0.00	0.01
Firm Size 100-499	0.23	0.00	0.23	0.00	0.23	0.00	0.22	0.00	0.01
Firm Size 500-999	0.09	0.00	0.09	0.00	0.09	0.00	0.11	0.00	-0.03
Firm Size 1,000+	0.43	0.00	0.49	0.00	0.46	0.00	0.51	0.00	0.01
White	0.73	0.79	0.72	0.76	0.78	0.86	0.79	0.82	-0.03
Black	0.22	0.13	0.22	0.14	0.15	0.08	0.15	0.10	0.02
Native American	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.00
Asian	0.05	0.07	0.05	0.09	0.07	0.05	0.06	0.07	0.01
Hispanic	0.16	0.23	0.18	0.30	0.18	0.19	0.15	0.16	-0.06
Lss than High School	0.15	0.23	0.11	0.19	0.18	0.21	0.11	0.08	-0.07
High School Diploma	0.44	0.43	0.41	0.42	0.37	0.45	0.35	0.47	0.02
Some College	0.27	0.23	0.29	0.24	0.27	0.22	0.29	0.29	0.07
College Graduate	0.11	0.09	0.14	0.11	0.14	0.10	0.20	0.13	-0.02
Graduate School	0.03	0.03	0.04	0.03	0.04	0.03	0.05	0.03	-0.01
At least High School	0.85	0.77	0.89	0.81	0.82	0.79	0.89	0.92	0.07
At least College	0.14	0.12	0.18	0.15	0.19	0.12	0.25	0.15	-0.02

Note: CPS data. The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Small firms (SF) are defined as 1-24 employees and large firms (LF) as 25 or more employees. All data has been weighted by the March CPS Supplement weight.

Table 4: Alternative Firm Size Definitions

Label	Firm Size	Label	Firm Size
SF Baseline	1-24	LF Baseline	25+
SF-1	1-24	LF-1	100+
SF-2	11-24	LF-2	100+
SF-3	11-24	LF31	25+
SF-4	1-10	LF-4	11-24
SF-5	1-10	LF-5	25+
SF-6	1-10	LF-6	100+

Table 5: Alternative Control Groups

Label	States
<i>North East and Contiguous 48</i>	
North East (Baseline)	CT, DC, DE, MD, ME, NH, NJ, NY, PA, RI, VT
Contiguous 48	The contiguous 48 state of the U.S.
<i>Less Substantial Health Reforms</i>	
North East Limited	CT, DC, DE, MD, NH, NJ, NY, PA, RI
Contiguous 48 Limited	The contiguous 48 state of the U.S. with CA, ME, VT, and OR removed
<i>Community Rating and Guaranteed Issue</i>	
Community Rating/Guaranteed Issue	NY, NJ and WA
<i>Migration Spillovers</i>	
New England	CT, ME, NH, RI, VT
New England Limited	CT, NH, RI
North East with New England Removed	DC, DE, MD, NJ, NY, PA
Contiguous 48 with New England Removed	The contiguous 48 state of the U.S. with CT, ME, NH, RI, and VT removed
Contiguous 48 with New England Removed Limited	The contiguous 48 state of the U.S. with CT, ME, NH, RI, VT, CA and OR removed

Table 6: Triple Differences Estimation - Firm Size Robust

Firm Size	N	ESI	Subsidized Coverage	Uninsured	Coverage Shift
Baseline	40,696	-0.059	0.116	-0.057	0.507
(1-24 vs 25+)		(0.021)**	(0.010)***	(0.016)***	(0.154)***
SF-1	34,271	-0.051	0.110	-0.059	0.465
(1-24 vs 100+)		(0.021)*	(0.012)***	(0.015)***	(0.157)***
SF-2	27,048	-0.040	0.072	-0.032	0.554
(11-24 vs 100+)		(0.020)	(0.012)***	(0.013)*	(0.219)**
SF-3	33,473	-0.049	0.078	-0.029	0.625
(11-24 vs 25+)		(0.021)*	(0.010)***	(0.015)*	(0.212)***
SF-4	13,266	-0.025	0.079	-0.055	0.314
(1-10 vs 11-24)		(0.018)	(0.007)***	(0.013)***	(0.209)
SF-5	34,653	-0.067	0.154	-0.088	0.432
(1-10 vs 25+)		(0.022)**	(0.012)***	(0.018)***	(0.128)***
SF-6	28,228	-0.059	0.148	-0.089	0.398
(1-10 vs 100+)		(0.023)**	(0.014)***	(0.017)***	(0.132)***

Note: The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. The control group used here is the North East. Standard errors for coefficients are clustered at the state level. Standard errors for the coverage shift estimates were calculated using the delta method. Full regression results available upon request.

Table 7: Triple Differences Estimation -Control Group Robust

Firm Size	N	ESI	Subsidized Coverage	Uninsured	Coverage Shift
<i>North East and Contiguous 48</i>					
North East (Baseline)	40,696	-0.059 (0.021)**	0.116 (0.010)***	-0.057 (0.016)***	0.507 (0.154)***
Contiguous 48	185,112	-0.065 (0.006)***	0.126 (0.004)***	-0.061 (0.005)***	0.515 (0.041)***
<i>Less Substantial Health Reforms</i>					
North East Limited	35,393	-0.056 (0.021)**	0.117 (0.011)***	-0.061 (0.016)***	0.479 (0.157)***
Contiguous 48 Limited	159,401	-0.064 (0.007)***	0.126 (0.005)***	-0.062 (0.006)***	0.509 (0.048)***
<i>Community Rating and Guaranteed Issue</i>					
Community Rating/Guaranteed Issue	17,036	-0.049 (0.025)*	0.116 (0.015)***	-0.068 (0.021)**	0.419 (0.190)**
<i>Migration Spillovers</i>					
New England	15,987	-0.124 (0.018)***	0.136 (0.011)***	-0.011 (0.018)	0.916 (0.129)***
New England Limited	10,684	-0.119 (0.029)***	0.149 (0.007)***	-0.030 (0.026)	0.797 (0.177)***
North East with New England Removed	27,134	-0.051 (0.022)*	0.115 (0.011)***	-0.064 (0.018)***	0.440 (0.170)***
Contiguous 48 with New England Removed	171,550	-0.063 (0.006)***	0.126 (0.004)***	-0.062 (0.005)***	0.505 (0.042)***
Contiguous 48 with New England Removed Limited	151,142	-0.063 (0.007)***	0.126 (0.005)***	-0.063 (0.006)***	0.503 (0.048)***

Note: The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 who are between 133 and 300 percent FPL working in the private sector and not receiving any SSI or SSDI benefits. Standard errors for coefficients are clustered at the state level. Standard errors for the coverage shift estimates were calculated using the delta method. Full regression results available upon request.

Table 8: Triple Differences Estimation - FPL Heterogeneity

Firm Size	N	ESI	Subsidized Coverage	Uninsured	Coverage Shift
Baseline	40,696	-0.059 (0.021)**	0.116 (0.010)***	-0.057 (0.016)***	0.507 (0.154)***
<i>FPL Heterogeneity</i>					
$133 \leq FPL \leq 200$	14,220	-0.134 (0.023)***	0.195 (0.022)***	-0.061 (0.028)*	0.688 (0.125)***
$200 < FPL \leq 300$	26,476	-0.023 (0.019)	0.072 (0.007)***	-0.050 (0.013)***	0.312 (0.234)
$FPL > 300$	125,267	0.045 (0.006)***	0.013 (0.003)***	-0.058 (0.009)***	N/A

Note: The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 working in the private sector and not receiving any SSI or SSDI benefits. The control group used here is the North East. Standard errors for coefficients are clustered at the state level. Standard errors for the coverage shift estimates were calculated using the delta method. Full regression results available upon request.

Table 9: Triple Differences Estimation - Heterogeneity in pre-period and post-period Trends (N=40,696)

Firm Size	ESI	Subsidized Coverage	Uninsured	Coverage Shift
<i>MA * Early Pre * Small Firm</i>	0.019 (0.033)	-0.011 (0.009)	-0.008 (0.033)	
<i>MA * During * Small Firm</i>	0.048 (0.021)*	0.070 (0.010)***	-0.118 (0.024)***	
<i>MA * Early Post * Small Firm</i>	-0.000 (0.024)	0.064 (0.006)***	-0.064 (0.022)**	0.006 (0.378)
<i>MA * Late Post * Small Firm</i>	-0.092 (0.016)***	0.154 (0.007)***	-0.062 (0.013)***	0.595 (0.091)***

Note: The pre years are 2000-2006 and the post years are 2008-2011. The sample is restricted to workers age 18 to 64 working in the private sector and not receiving any SSI or SSDI benefits. The control group used here is the North East. Standard errors for coefficients are clustered at the state level. Standard errors for the coverage shift estimates were calculated using the delta method. Full regression results available upon request.

Table 10: State Weights for Synthetic Control Groups

STATE	ESI - SF	ESI - LF	Subsidy - SF	Subsidy - LF	Uninsured - SF	Uninsured - LF
AZ	0.000	0.000	0.000	<b>0.177</b>	0.000	0.000
CA	0.000	<b>0.261</b>	0.000	0.000	0.000	0.000
CT	<b>0.407</b>	0.000	<b>0.508</b>	0.000	0.000	0.000
DC	<b>0.193</b>	<b>0.138</b>	0.000	<b>0.347</b>	<b>0.300</b>	0.000
DE	0.000	0.000	0.000	0.000	<b>0.206</b>	0.000
IA	0.000	0.000	0.000	0.000	<b>0.050</b>	0.000
MD	0.000	0.000	0.000	0.000	0.000	<b>0.502</b>
ME	0.000	0.000	<b>0.058</b>	<b>0.137</b>	0.000	0.000
MI	0.000	0.000	0.000	0.000	<b>0.052</b>	0.000
MT	0.000	0.000	0.000	0.000	0.000	<b>0.137</b>
NH	<b>0.074</b>	0.000	0.000	<b>0.178</b>	0.000	0.000
NY	0.000	0.000	0.000	<b>0.029</b>	0.000	0.000
OH	<b>0.259</b>	0.000	0.000	0.000	<b>0.231</b>	0.000
OR	<b>0.067</b>	0.000	0.000	0.000	0.000	0.000
PA	0.000	0.000	<b>0.169</b>	0.000	0.000	0.000
RI	0.000	<b>0.334</b>	<b>0.132</b>	<b>0.131</b>	<b>0.160</b>	0.000
TN	0.000	0.000	0.000	0.000	0.000	<b>0.002</b>
VA	0.000	0.000	0.000	0.000	0.000	<b>0.295</b>
VT	0.000	<b>0.267</b>	<b>0.133</b>	0.000	<b>0.001</b>	<b>0.064</b>

Note: States which contributed zero weight for all synthetic control groups have been omitted from this table.

Figure 7: ESI: Massachusetts vs. Synthetic Massachusetts

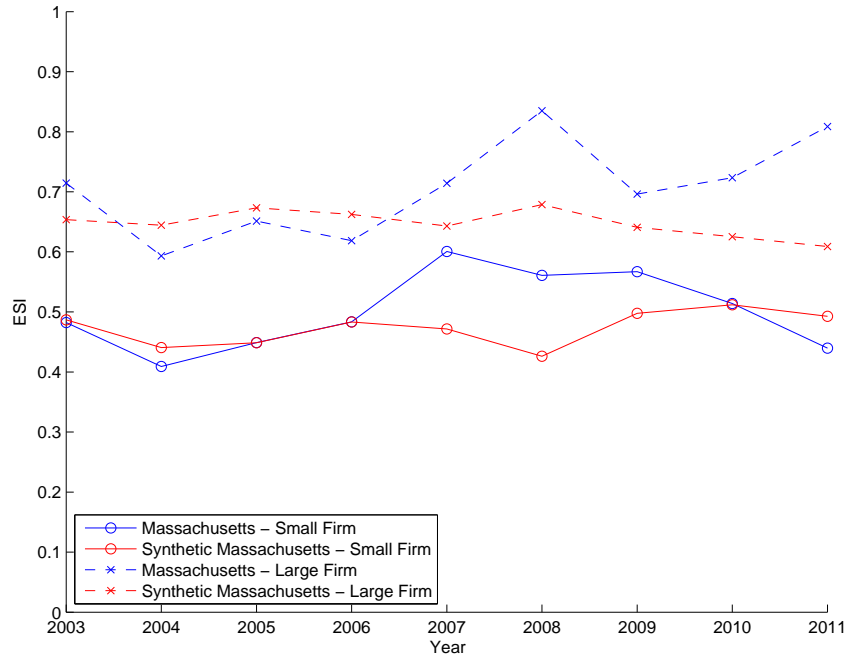


Figure 8: Subsidized Coverage: Massachusetts vs. Synthetic Massachusetts

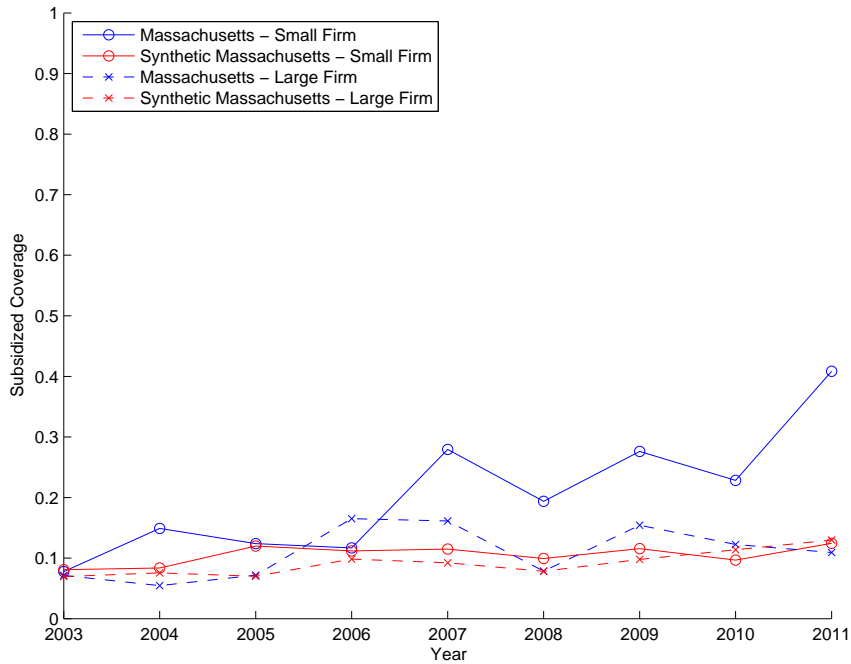
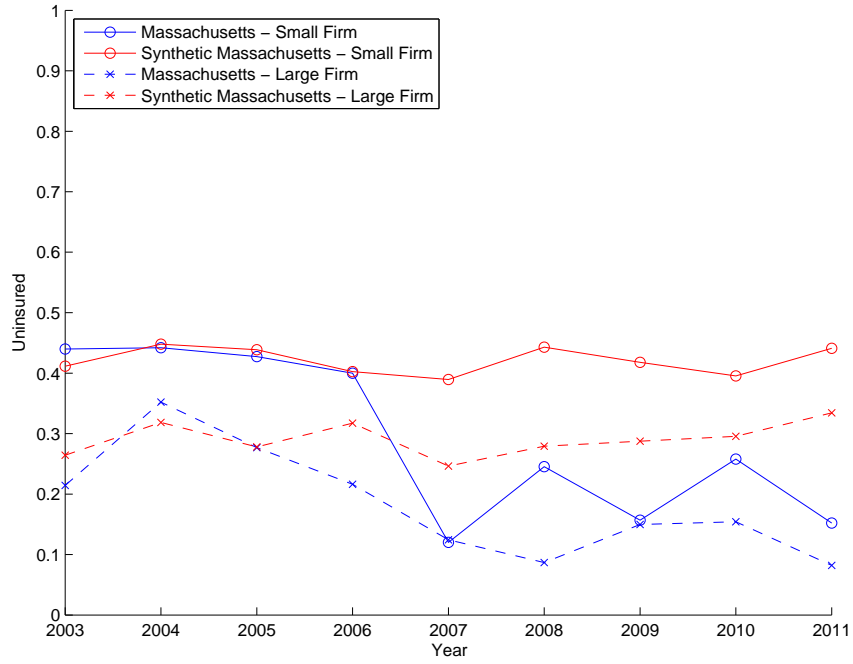


Figure 9: Uninsured: Massachusetts vs. Synthetic Massachusetts





# A Appendix Tables and Figures

Figure A.1: Decision Tree - Exempt Firms (<11 FTEs)

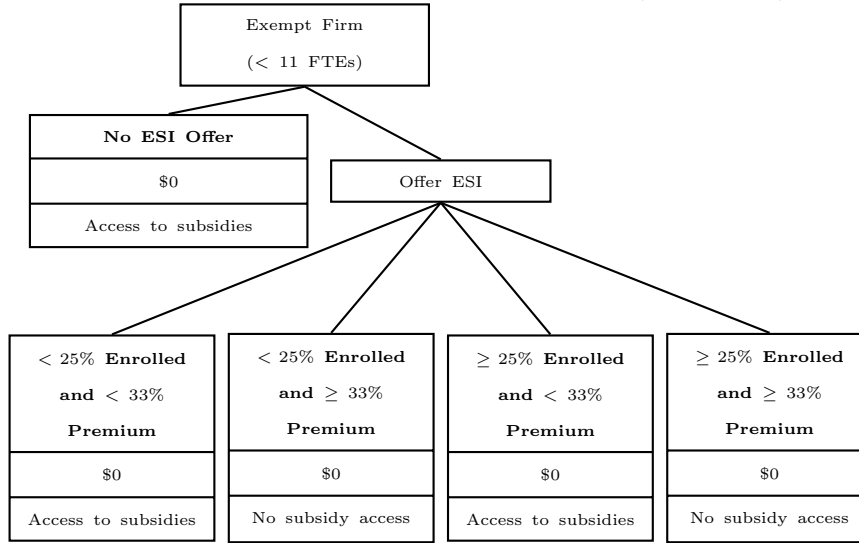


Figure A.2: Decision Tree -Small Firms (11-50 FTEs)

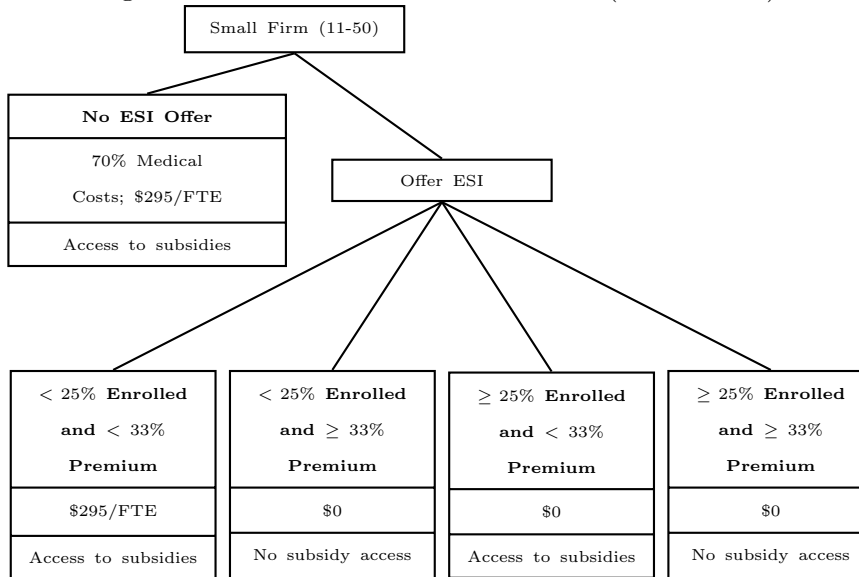


Figure A.3: Decision Tree -Large Firms (>50 FTEs)

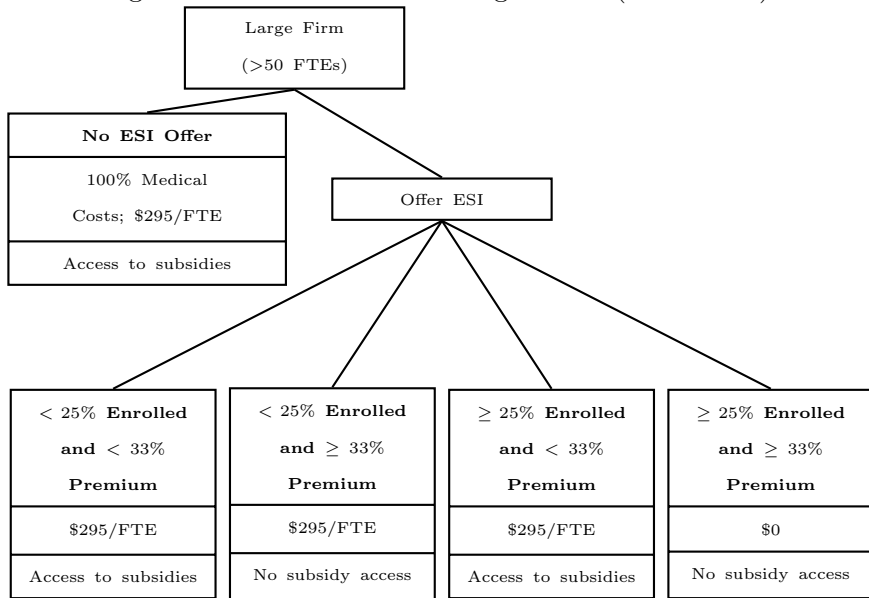


Figure A.4: Significance of the Average Treatment Effect for ESI in Massachusetts

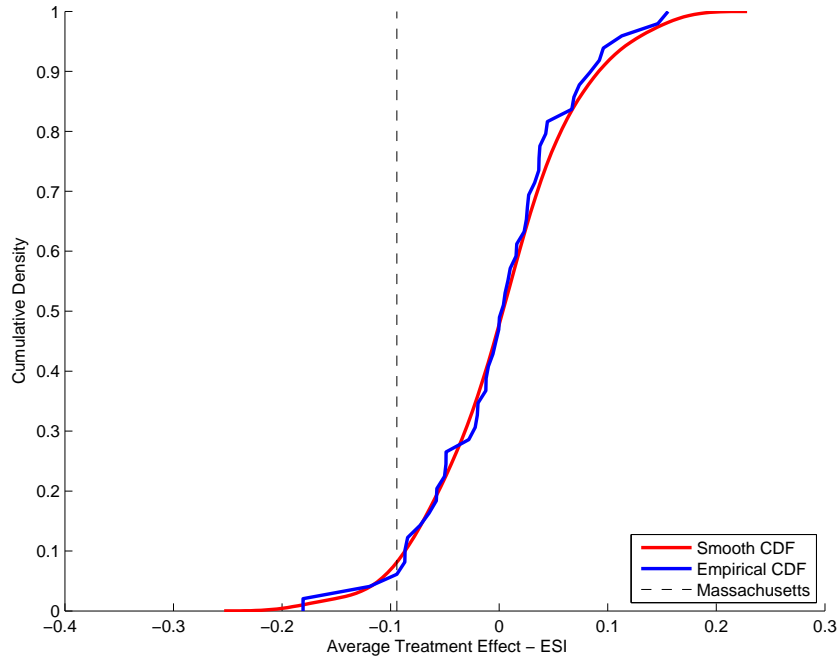


Figure A.5: Significance of the Average Treatment Effect for Subsidized Coverage in Massachusetts

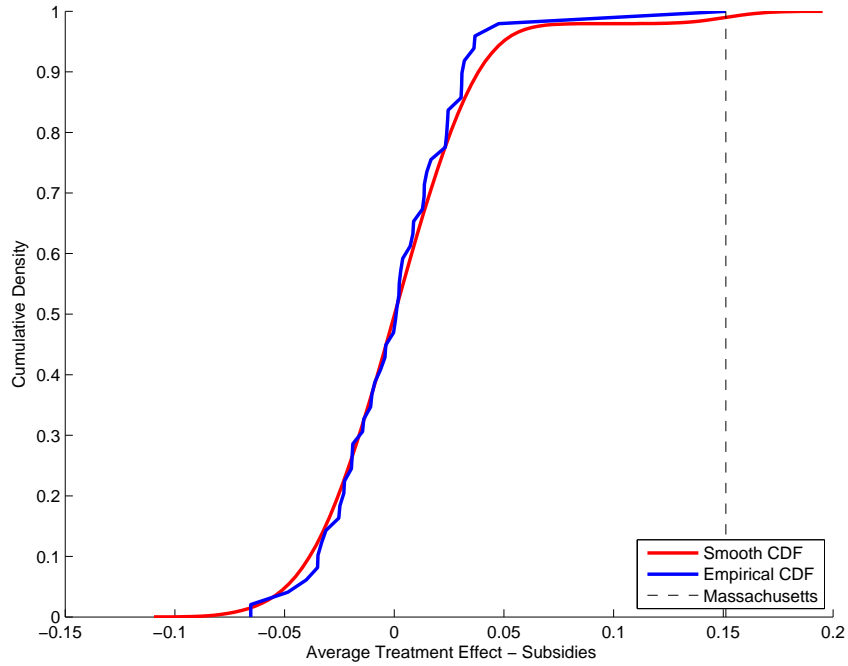


Figure A.6: Significance of the Average Treatment Effect on the Uninsured in Massachusetts

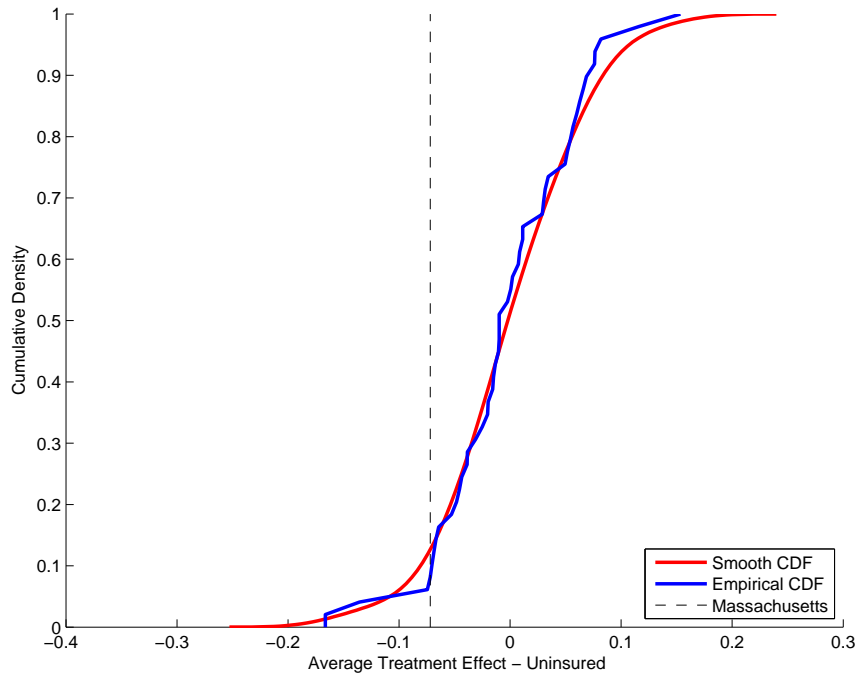


Table A.1: State Weights for Synthetic Control Groups (Adding Number of Letters in State's Name)

STATE	ESI - SF	ESI - LF	Subsidy - SF	Subsidy - LF	Uninsured - SF	Uninsured - LF
AZ	0.000	0.070	0.000	0.000	0.000	0.000
CA	0.000	<b>0.141</b>	0.000	0.000	0.000	0.000
CT	<b>0.505</b>	0.000	<b>0.277</b>	0.000	<b>0.020</b>	0.000
DC	0.000	0.000	<b>0.033</b>	<b>0.390</b>	<b>0.131</b>	<b>0.150</b>
MI	0.000	0.000	0.000	0.000	<b>0.597</b>	0.000
NC	0.000	<b>0.587</b>	0.000	0.000	0.000	<b>0.337</b>
NH	<b>0.422</b>	<b>0.185</b>	0.000	<b>0.083</b>	<b>0.253</b>	<b>0.512</b>
NM	<b>0.073</b>	0.000	0.000	0.000	0.000	0.000
RI	0.000	0.000	<b>0.629</b>	<b>0.322</b>	0.000	0.000
VT	0.000	0.000	<b>0.060</b>	0.000	0.000	0.000
WV	0.000	0.000	0.000	<b>0.206</b>	0.000	0.000
WY	0.000	<b>0.018</b>	0.000	0.000	0.000	0.000

Note: States which contributed zero weight for all synthetic control groups have been omitted from this table.