

DISCUSSION PAPER SERIES

IZA DP No. 11879

**Does Health Insurance Make People
Happier? Evidence from Massachusetts'
Healthcare Reform**

Seonghoon Kim
Kanghyock Koh

OCTOBER 2018

DISCUSSION PAPER SERIES

IZA DP No. 11879

Does Health Insurance Make People Happier? Evidence from Massachusetts' Healthcare Reform

Seonghoon Kim

Singapore Management University and IZA

Kanghyock Koh

Ulsan National Institute of Science and Technology

OCTOBER 2018

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Does Health Insurance Make People Happier? Evidence from Massachusetts' Healthcare Reform*

We study the effects of Massachusetts' healthcare reform on individuals' subjective well-being. Using data from the Behavioral Risk Factor Surveillance System, we find that the reform significantly improved Massachusetts residents' overall life-satisfaction. This result is robust to various sensitivity checks and a falsification test. We also find that the reform improved mental health. An additional analysis on the Tennessee healthcare reform supports our findings' external validity. Using the reform as an instrument for health insurance coverage, we estimate its large impact on overall life-satisfaction. Our results provide novel evidence on the psychological consequences of Massachusetts' healthcare reform.

JEL Classification: I13, I18, I31

Keywords: health insurance, life satisfaction, happiness, subjective well-being, Massachusetts healthcare reform

Corresponding author:

Kanghyock Koh
School of Business Administration
Ulsan National Institute of Science and Technology
50 UNIST-gil, Ulsu-gun
Ulsan 44919
South Korea
E-mail: kanghyock.koh@unist.ac.kr

* Junxing Chay provided excellent research assistance. We are grateful to seminar participants for helpful comments. All errors are our own.

1. Introduction

Federal and state governments in the United States have implemented various policies to increase health insurance coverage among the uninsured. Much research has evaluated the effects of these healthcare reforms on such outcomes as health, healthcare utilization, household finances, wages, and employment (Chay et al. 2012; Finkelstein et al. 2012; Kolstad and Kowalski 2012, 2016; Baicker et al. 2013; Mazumder and Miller 2016; Brevoort et al. 2018; Koh 2018). In addition to these consequences, healthcare reforms could have a broader impact on well-being, which cannot be fully captured by those objective measures. This impact can be captured by subjective well-being (SWB), which is an individual's self-reported overall well-being.¹

Healthcare reforms can improve SWB through various channels. First, health insurance coverage can provide “peace of mind,” as it removes the risks of catastrophic healthcare expenses (Haushofer et al., 2018). Second, health insurance coverage can reduce the costs of unmet medical care, thereby improving health. Third, subsidized health insurance coverage can generate income effects (Mazumder and Miller 2016).

We argue that it is important to understand healthcare reforms' psychological consequences because SWB is an informative measure of individual welfare and is useful in evaluating public policy (Kahneman and Krueger 2006; Layard 2012; Oishi and Diener 2014). In addition, SWB is an important determinant of major life outcomes, such as health, social relationships, and labor productivity (Graham 2008; Diener and Biswas-Diener 2009; Oswald et al. 2015). As such, several researchers have used SWB data to evaluate public policies' impacts (Di Tella, MacCulloch, and Oswald 2003; Gruber and Mullainathan 2005; Alesina, Glaeser, and Sacerdote 2006; Ludwig et al. 2012; Lachowska 2016).

This study analyzes the 2006 Massachusetts healthcare reform's effects on SWB, which aimed for near-universal health insurance coverage within the state. To identify the effects of Massachusetts' healthcare reform on SWB, we compare a change in the SWB

¹ Data on SWB are typically obtained by responses to questions on overall life satisfaction or happiness.

levels of Massachusetts residents before and after the reform to those of residents in other states using the difference-in-differences (DID) approach. We use the Behavioral Risk Factor Surveillance System (BRFSS) for our empirical analyses.

We find that the Massachusetts healthcare reform significantly improved residents' SWB. Our graphical analysis indicates that Massachusetts and other control states exhibited the same trends of overall life satisfaction before the reform's introduction, validating the parallel pre-trend assumption. Furthermore, DID estimates reveal a significant, persistent increase in Massachusetts residents' overall life satisfaction after the reform. These results are robust when using alternative control groups or an alternative measure of SWB. As a falsification check, we find little evidence that Massachusetts' healthcare reform affects life satisfaction among the elderly, who were not affected by the reform. In addition, we assess our findings' external validity by examining Tennessee's healthcare reform in 2005, which revoked enrollment for some of the adult Medicaid population (Garthwaite et al. 2014). We demonstrate that the Tennessee reform decreased overall life satisfaction. This result is consistent with our findings from Massachusetts that access to health insurance coverage increases SWB.

The relationship between health insurance coverage and SWB could be an important economic parameter of interest. However, health insurance is a relatively under-explored determinant of individuals' SWB. We fill this gap in the literature by studying the effects of health insurance coverage along an extensive margin regarding individuals' overall life satisfaction. To overcome an endogeneity issue in identifying the causal link between health insurance coverage and life satisfaction, we use the Massachusetts reform as an instrument. The two-stage least-squares (2SLS) estimates indicate that health insurance coverage increases overall life satisfaction by approximately 1 standard deviation, which is similar to the cross-sectional difference in SWB between individuals with an annual household income of less than \$10,000 and those with income greater than \$75,000. Our back-of-the-envelope calculation suggests that the 1 standard deviation

increase in life satisfaction is similar to the magnitude that could be generated by a \$3,000 stimulus tax rebate during the recent Great Recession in the United States.²

This study contributes to the related literature by providing novel evidence of the psychological consequences of Massachusetts' healthcare reform. The studies most closely related to our research include those by Finkelstein et al. (2012) and Baicker et al. (2013), which examine the effects of Oregon's Medicaid expansion. Recently, Haushofer et al. (2018) report experimental evidence regarding the psychological impacts of health insurance.³ However, unlike previous studies focusing on healthcare reforms with specific populations, such as low-income families or children, our study focuses on a healthcare reform aiming to achieve near-universal health insurance coverage. This feature of our research setting is of importance because it can provide a useful benchmark for the impacts of the Affordable Care Act (ACA) on SWB. Despite the existing studies on the ACA's social, health, and economic impacts (Sommers et al. 2014; Barbaresco et al. 2015; Brevoort et al. 2018; Courtemanche et al. 2018; Koh 2018), no empirical study has estimated the ACA's impacts on SWB, to the best of our knowledge.⁴ Considering that the major features of the Massachusetts reform resemble those of the ACA, the estimated substantial impact of health insurance on SWB in our study implies substantial welfare gains provided by the ACA.

In addition, we contribute to the related literature by providing evidence on health insurance as an important determinant of SWB. Several studies have examined the determinants of SWB and their quantitative impacts, known as the "happiness equation" (Blanchflower and Oswald 2004; Oswald and Powdthavee 2008; Clark et al., 2018). However, health insurance's role has received relatively little attention compared to commonly discussed determinants, such as income, employment, children, and marriage

² Our calculation is based on Lachowska's (2016) finding that the 2008 stimulus tax rebate, worth approximately \$950 on average, increases life satisfaction by a 0.32 standard deviation.

³ However, Haushofer et al.'s (2018) research setting differs markedly from typical healthcare reforms: the health insurance coverage was provided for only a year, free of charge, to 259 informal workers and their family members in Kenya.

⁴ A possible reason is the absence of nationally representative SWB data collected both before and after the ACA. The American Time Use Survey includes nationally representative data with information on SWB, but it fielded a well-being question module only in 2010, 2012, and 2013.

(Layard 2005; Dolan, Peasgood, and White 2008). This study shows that health insurance coverage plays an important role in determining individuals' SWB.

Finally, we contribute to the growing literature estimating public policies' effects on SWB. Existing studies have examined the psychological consequences of major economic policies, such as the 2008 stimulus tax rebate program, changes in the minimum wage, and the Moving-to-Opportunity program (Lachowska 2016; Kuroki 2018; Ludwig et al. 2012). Our study offers novel evidence regarding how healthcare reform can affect individuals' SWB.

The remainder of this paper is structured as follows. Section 2 introduces the background of the Massachusetts health insurance reform, SWB, and potential mechanisms. Sections 3 and 4 present the empirical strategy and data, respectively. Section 5 presents evidence on the Massachusetts healthcare reform's effects on SWB. Section 6 concludes.

2. Background

A. Massachusetts Healthcare Reform

The Massachusetts healthcare reform was legislated in April 2006 to provide nearly universal health insurance coverage within the state. Except for a few cases, all residents were mandated to have health insurance coverage or to pay a tax penalty. In addition, employers with more than 10 full-time employees were required to offer employer-sponsored health insurance coverage or pay a tax penalty. Furthermore, the Massachusetts reform expanded the pre-existing Medicaid program to increase low-income families' health insurance coverage. These features of the Massachusetts reform were adopted in the ACA, the nationwide healthcare reform legislated in 2010. McDonough et al. (2006) and Courtemanche and Zapata (2014) provide the institutional details of the reform.

Figure 1 illustrates that the proportion of adults in Massachusetts aged 18 to 64 years with any health insurance coverage sharply increased to approximately 95 percent

after the reform, without a similar increase in other states. Long et al. (2009) report that the uninsured rate decreased by 6.6 percent for all adults and 17.3 percent for lower-income adults.

Several studies examine the consequences of the Massachusetts healthcare reform for both medical care utilization and health. Kolstad and Kowalski (2012) show that the reform decreased the length of hospital stays and inpatient admissions from the emergency room. Miller (2012, 2013) documents an increased use of primary and preventive healthcare services. Courtemanche and Zapata (2014) provide evidence of improved self-assessed health. Sommers et al. (2014) reveal that the reform significantly decreased mortality.

In addition, the Massachusetts healthcare reform affected household finances and labor market outcomes. Mazumder and Miller (2016) indicate that the reform improved household financial outcomes, including credit scores, overdue debt amounts, personal bankruptcies, and third-party collections. Kolstad and Kowalski (2016) discover a substantial compensating differential for employer-provided health insurance coverage due to the reform. Dillender, Heinrich, and Houseman (2016) report that the employer mandate increased the probability of part-time work.

B. Subjective Well-Being

SWB is an increasingly popular measure of the quality of life in social sciences and the public policy arena. SWB is a measure of well-being that not only covers a cognitive evaluation of one's life in general, but also captures both pleasant and painful experiences. Acknowledging its importance, the Stiglitz-Sen-Fitoussi commission, established by French president Nicolas Sarkozy in 2008, urged statistical offices to include SWB questions in their surveys and to use this information to assess nations' quality of life and effectiveness of public policies (Stiglitz et al., 2009).

Concern might arise regarding the use of self-reported, subjective SWB data to evaluate the impact of public policy. Several studies have tested SWB measurements'

validity by examining the correlations between self-reported life satisfaction and other indicators of well-being. For example, Diener and Suh (1999), Layard (2005), Graham (2008), and Frey and Stutzer (2010) indicate that smiling frequency, friends' ratings of one's happiness, frequent verbal expressions of positive emotions, sociability, sleep quality, close relatives' happiness, health, income, active involvement in religion, and recent positive changes in one's circumstances correlate with an individual's life satisfaction. Urry et al. (2004) also provide neuroscientific evidence that SWB measures highly correlate with activities in the brain's left prefrontal cortex, which is associated with the processing of pleasure.

C. Possible Mechanisms

The Massachusetts healthcare reform can affect individuals' SWB through various channels. It is noteworthy that the mechanisms that we discuss in this subsection are not mutually exclusive, and our data do not allow us to quantify each mechanism's relative importance.

First, the Massachusetts healthcare reform can increase SWB by improving individuals' health. Previous studies have shown that the reform leads to better health (Miller 2012, 2013; Courtemanche and Zapata 2014; Sommers et al. 2014). Since health is an important determinant of SWB (Graham 2008; Diener and Biswas-Diener 2009), improved health conditions can increase SWB.

Second, the Massachusetts reform can increase SWB through income effects. Because much of the expanded health insurance coverage was significantly subsidized, this could create substantial income effects (Mazumder and Miller 2016). These income effects could allow individuals to consume more or decrease their debts, thereby improving individuals' SWB.

Third, the Massachusetts reform can increase SWB by increasing individuals' "peace of mind" without improvements to their health or financial distress, as health insurance helps individuals by insuring them against a catastrophic medical expenditure

shock. This risk-reduction could induce an individual to be more satisfied with his or her life in general by decreasing anxiety or stress (Haushofer et al., 2018).

Finally, there is another mechanism through which the Massachusetts reform can decrease individuals' SWB. Kolstad and Kowalski (2016) indicate that the employer mandate decreases the wages and working hours of full-time workers who gain employer-provided health insurance coverage. Dillender, Heinrich, and Houseman (2016) find that the employer mandate increases the share of part-time employment among low-skilled workers, as employers do not need to offer health insurance coverage to part-time workers. These results imply that decreased earnings due to the reform could decrease SWB if the earnings reduction is not fully compensated by expanded access to health insurance coverage.

3. Empirical Strategy

To identify the effects of the Massachusetts healthcare reform on SWB, we compare the changes in self-reported life satisfaction between residents in Massachusetts and other states before and after the reform. We consider the following DID specification to implement this research design:

$$LS_{ist} = \beta_0 + \beta_1 MA_s * Post_t + \delta_s + \theta_t + \beta_2 X_{ist} + \varepsilon_{ist} \quad (1)$$

where LS_{ist} is the level of overall life satisfaction of individual i living in state s in year t ; MA_s denotes a binary indicator of whether a respondent lives in Massachusetts; $Post_t$ indicates whether the calendar year is 2007 or after; X_{ist} is a vector of individual characteristics related to individuals' overall life satisfaction; and ε_{ist} is an error term. We calculate standard errors corrected for heteroscedasticity and clustered at the state level by allowing for serial correlation within a state. The coefficient of interest is β_1 , which represents the Massachusetts healthcare reform's causal effect on overall life satisfaction; δ_s captures the time-invariant, state-specific unobserved heterogeneity; and θ_t is the year-

fixed effect, which controls for any common trend affecting individuals' life satisfaction over time.

The key identification assumption in the DID approach is that life-satisfaction trends between Massachusetts and the other states are common in the absence of the Massachusetts healthcare reform. To test the validity of this assumption, we examine whether these trends of overall life satisfaction before the reform occur in parallel.

We use three alternative control groups to study the sensitivity of our baseline results. First, we use other northeastern states as control states by assuming similar characteristics among these states located in close proximity, namely, Connecticut, Maine, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania. Second, we construct the synthetic control states selected as most comparable to Massachusetts before the reform, in terms of overall life satisfaction as well as the control variables following Abadie et al. (2010). Third, we use states that experienced similar recession shocks, measured by the change in the proportion of employed individuals between 2007 and 2009. The Great Recession of 2008–2009—officially, December 2007 to June 2009—could have affected the overall life satisfaction trends differently across states over time. For example, if individuals in Massachusetts experienced less severe recession shocks than did individuals in the control states during the post-reform period, then Massachusetts residents might have higher overall life satisfaction than do residents in the control states owing to the healthcare reform as well as the differential adverse effects of the Great Recession. We attempt to address this issue by comparing Massachusetts and the states with similar changes in proportion of employed individuals during the recession period.⁵

We use the following linear model to study the effects of health insurance coverage along an extensive margin on individuals' overall life satisfaction:

⁵ Table A1 in the Appendix lists states with similar changes in proportion of employed individuals (i.e., +/- 0.01 percentage point of Massachusetts' change in the share of employed individuals out of the non-elderly population, aged 18 to 64 years).

$$LS_{ist} = \alpha_0 + \alpha_1 HI_{ist} + \delta_s + \theta_t + \alpha_2 X_{ist} + \omega_{ist} \quad (2)$$

where LS_{ist} and HI_{ist} represent an individual i 's self-reported life satisfaction and health insurance coverage, respectively; δ_s and θ_t are state- and year-specific fixed effects, respectively; X_{ist} includes individual characteristics that relate to individuals' life satisfaction; and ω_{ist} is an error term. We calculate standard errors, corrected for heteroscedasticity and clustered at the state level, by allowing for serial correlation within a state. The coefficient of interest is α_1 , which captures the effects of health insurance coverage on overall life satisfaction. It is difficult to obtain an unbiased estimator for α_1 due to the unobservable confounding factors correlated with health insurance status and life satisfaction. We overcome this identification challenge by using the Massachusetts healthcare reform as an instrument—specifically, a dummy variable indicating whether an individual resided in Massachusetts after 2007—to induce an exogenous variation in individual health insurance coverage. We estimate Equation (2) using the 2SLS method.

4. Data

We use data from the BRFSS for this study's empirical analysis. The BRFSS comprises state-based, cross-sectional data surveyed annually in the United States. This survey interviews a random sample of nationally representative adults by telephone, aged 18 years or older. The data provide detailed information on measures of SWB, health, healthcare utilization, health insurance coverage, and individuals' other characteristics.

Our key dependent variable is an individual's overall life satisfaction. The BRFSS asks respondents: "In general, how satisfied are you with your life?" A respondent can answer "very satisfied," "satisfied," "dissatisfied," or "very dissatisfied." We treat this as a cardinal variable by assigning a value of 1 to "very dissatisfied" and 4 to "very satisfied," following the SWB literature (Dehejia et al. 2007; Oswald and Powdthavee 2008; Oswald

and Wu 2011).⁶ The BRFSS also asks, “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” In addition to the overall life satisfaction variable, which is relatively evaluative, we use the responses to this question as a relatively experiential (affective) measure of SWB.

The BRFSS also asks similar questions, such as “Ever told you had an anxiety disorder?”, “Ever told you had a depressive disorder?”, and “Days had little pleasure doing things.” Unfortunately, the state of Massachusetts did not field these questions during our sample period, and thus, we could not use them. The BRFSS is a state-based surveillance system; hence, different states can ask different sets of questions, although the core questions are identical.

We consider the years from 2005 to 2010 as the sample period because the life satisfaction question was surveyed in all states only during this time frame.⁷ The life satisfaction question was not included in the 2011 and 2012 surveys due to a major change in the survey method in 2011, and only five states have intermittently included the life satisfaction question again in their surveys since 2013.⁸

Massachusetts’ healthcare reform was intended to increase health insurance coverage among the non-elderly, as those aged 65 years and older are covered by Medicare; thus, we restrict our sample to those aged 18 to 64 years. If the reform indeed affected the non-elderly, we should observe that the reform has few impacts on overall life satisfaction among the elderly. Hence, estimating the effects of Massachusetts’s health reform using the elderly sample can serve as a falsification test.

Panel A in Table 1 presents the summary statistics of overall life satisfaction before the Massachusetts health reform. It is noteworthy that the average values of overall life

⁶ Ferrer-i-Carbonell and Frijters (2004) find that assuming cardinality or ordinality of a happiness measure in the German socio-economic panel survey makes little difference when estimating determinants of happiness.

⁷ We exclude individuals who reside in Guam, Puerto Rico, and the Virgin Islands from the sample; however, the results are robust when including those sample individuals.

⁸ Louisiana included the overall life satisfaction question in its 2016 and 2017 surveys; Minnesota in 2014, 2015, 2016, and 2017; Mississippi in 2013 and 2014; Rhode Island in 2015 and 2016; and Tennessee in 2013, 2016, and 2017.

satisfaction are similar between Massachusetts and the other states before the reform. Consistent with the average life satisfaction score, the distributions of overall life satisfaction are also similar between Massachusetts and the other states. Approximately 45 and 50 percent of residents reported that they are either very satisfied or satisfied with their lives, respectively, while only 5 to 6 percent of residents reported that they are either dissatisfied or very dissatisfied with their life in general. Panel B presents the descriptive statistics of mental health, measured by the number of days on which mental health was not good in the past 30 days. Consistent with overall life satisfaction, Massachusetts residents and those in other states experienced a similar number of days that involved stress, depression, and problems with emotions. Panel C in Table 1 describes the resident characteristics of Massachusetts compared to those in other states. Generally, Massachusetts residents are more likely to be white, college educated, and employed, and thus, have higher income than those in other states.

We control for individuals' characteristics related to overall life satisfaction by including the resident characteristics, reported in panel C of Table 1: age, age squared, number of children, college education, marital status, gender, race, and ethnicity (Hispanic origin). We do not control for employment status and household income in the baseline analysis, as the employer mandate portion of Massachusetts' healthcare reform can affect employment, wages, and working hours, and consequently family income (Dillender, Heinrich, and Houseman 2016; Kolstad and Kowalski 2016). As a robustness check, we report the estimation results that include household income and employment as additional control variables.

5. Empirical Results

Figure 2 illustrates the trends of the overall life satisfaction among the non-elderly, aged 18 to 64 years, in Massachusetts and other states from 2005 through 2010. Little difference in overall life satisfaction can be observed between the residents of Massachusetts and those in the other states until 2006, when the Massachusetts healthcare

reform was legislated. This pattern provides evidence of the parallel trend assumption; only Massachusetts residents experienced an increase in overall life satisfaction relative to other states after 2007.

Table 2 reports the results from estimating the effects of Massachusetts' healthcare reform using Equation (1). Panel A illustrates that the estimation results are consistent with the findings from Figure 2. Column (1) indicates that the Massachusetts healthcare reform increased overall life satisfaction by 0.04 when estimated without any individual characteristics as control variables. The result is statistically significant at the 1 percent level. Columns (2), (3), and (4) add individual characteristics, state- and year-fixed effects, and state- and year-month-fixed effects, respectively. We find that the Massachusetts reform increased the overall life satisfaction by approximately 0.031, which is statistically significant at the 1 percent level. Columns (5) to (8) demonstrate that the results are robust when using alternative dependent variables. Columns (5) and (6) reveal that the Massachusetts reform increased the probability of being either very satisfied or satisfied, respectively, with life in general by approximately 1 percentage point. Columns (7) and (8) demonstrate that the Massachusetts reform increased the probability of being very satisfied with life in general by approximately 2 percentage points. These estimates are statistically significant at the 1 percent level. Our results are similar when we additionally control for household income and employment (Table A2 in the Appendix).

The baseline analysis uses 2007 as the reference year, because the Massachusetts reform was fully implemented after July 2007. Thus, it is possible that the reform improved individuals' overall life satisfaction during the transition period. We test the reform's differential effects between the transition period and the period after its full implementation by dividing the post-reform period (captured by the *Post* dummy variable) into the transition period (captured by the *During* dummy variable) and the full implementation period (captured by the *After* dummy variable), and we repeat the regression analyses conducted in panel A of Table 2. *During* represents the period between July 2006 and June 2007, following Kolstad and Kowalski (2012), while *After* represents the period after July 2007. Panel B shows that the improvements in overall life satisfaction mostly arise after the

reform's full implementation, and not during the phase-in stage. The magnitudes of the reform's SWB effects after the full implementation are generally similar to those in panel A.⁹

In panel C of Table 2, we study how the Massachusetts healthcare reform's effects on overall life satisfaction have evolved over time. We split the *Post* dummy variable into two parts, *Post1* and *Post2*, which indicate the periods 2007 to 2008 and 2009 to 2010, respectively. Consistent with the findings from Figure 2, the reform's estimated effects on SWB persist over time.

We then analyze the main results' internal validity by conducting several robustness and falsification checks.

First, one might be concerned that Massachusetts differs from the other states in various dimensions, as discussed in Section 3. We test our findings' robustness by considering alternative control groups, as stated in Section 3. Figure 3 plots the trends of overall life satisfaction by using different control groups. Panel A compares Massachusetts against other northeastern states, which are geographically close. Panel B compares Massachusetts against the states chosen by the synthetic control method. Weights for constructing synthetic control states are available in Table A4 in the Appendix. Panel C compares Massachusetts against states that experienced similar recession shocks. We observe consistent patterns regardless of the control groups' definitions, in that 1) a parallel trend exists before the Massachusetts reform between Massachusetts and the control states, and 2) Massachusetts' overall life satisfaction level increased compared to that of the control states after the reform. The regression results reported in Table 3 are robust under the alternative control groups. The results are also robust when using the ordered logit specification (Table A5 in the Appendix).

Second, in the baseline regression analysis, we calculate clustered standard errors to correct for the serial correlation within each state. However, we have only one treatment state (Massachusetts). Clustering standard errors at the state level might not be the most

⁹ We also use a slightly different definition of the *During* period—April 2006 to June 2007—following Courtemanche and Zapata (2014). The results are robust, as reported in Table A3 of the Appendix.

conservative approach for statistical inferences (Buchmueller, DiNardo, and Valletta 2011). We address this concern by conducting Fisher's (1935) permutation test. First, we assign a "fake" treatment status to one of the other states after excluding Massachusetts from the sample. Subsequently, we estimate the fake treatment effects by using regression specification (1). Finally, we repeat this exercise for the other 49 states. Figure 4 plots the DID estimates of the fake treatment effects. The distribution reveals the possible estimates under the null hypothesis that the Massachusetts healthcare reform does not affect individuals' overall life satisfaction. We locate our baseline estimate with a solid vertical line; the baseline estimate remains outside of the dashed lines, which represent the 5th and 95th percentile values of the estimated fake treatment effects. This exercise implies that the baseline estimate is still statistically significant under an alternative metric for statistical inference.

Third, we examine the Massachusetts healthcare reform's effects on an alternative measure of SWB: the number of days on which mental health was not good in the past 30 days. Given the negative relationship between life satisfaction and mental health (Oswald and Wu 2011), we expect that the reform improved mental health. Column (1) in Table 4 shows that the Massachusetts healthcare reform reduced the number of days on which mental health was not good in the past 30 days by approximately 0.165 days, which is statistically significant at the 1 percent level (see Figure A1 of the Appendix). Columns (2) to (4) indicate that the results are robust when using the alternative control groups.

Finally, we conduct a falsification test using the elderly sample, as individuals aged 65 years and over are covered by Medicare. If the observed increase in the non-elderly's overall life satisfaction after 2007 indeed occurred due to the Massachusetts healthcare reform, the reform would have little impact on the elderly's life satisfaction. Figure 5 plots trends of the elderly's overall life satisfaction between Massachusetts and other states; no differential trends were found for the period between 2005 and 2010. In fact, the overall life satisfaction level of the elderly in Massachusetts was even lower in 2009 than in other states. Table 5 reports that the reform did not increase the elderly's life satisfaction regardless of the definitions of control states or outcome variables.

Although we find robust evidence that the Massachusetts healthcare reform increased individuals' SWB, this might not necessarily apply to other contexts due to the significant heterogeneity across states. Thus, we assess our findings' external validity by studying another state-level healthcare reform's impact on SWB, which previous literature has not examined: Tennessee's healthcare reform in 2005. The Tennessee reform discontinued the expansion of its Medicaid program (TennCare); approximately 170,000 adults abruptly lost their Medicaid coverage (Garthwaite et al., 2014). We use other southern states as control states to identify the Tennessee reform's effect, and we define the post-reform period as the survey months after August 2005.¹⁰ Column (1) of Table 6 indicates that Tennessee's healthcare reform decreased the proportion of adults with any health insurance coverage, aged 18 to 64 years, by 6.33 percentage points. Column (2) demonstrates that these reforms decreased overall life satisfaction in Tennessee by 2.94. These results provide evidence of the external validity of our main findings, in that expanded access to health insurance coverage increases overall life satisfaction.

The Massachusetts healthcare reform's impacts on overall life satisfaction could be heterogeneous by individual characteristics. First, we examine the reform's heterogeneous effects by age. The reform expanded health insurance coverage to the entire population of the uninsured; thus, it increased health insurance coverage for younger individuals (aged 18 to 34 years) relatively more than for older individuals (see panel A in Table A6 of the Appendix), as younger individuals are more likely to be uninsured. Hence, we conjecture that the reform's life satisfaction effects would be larger among younger than older individuals. Consistent with this conjecture, panel A in Table 7 shows that the younger group exhibits the largest improvement in overall life satisfaction. Although we observe a larger improvement in overall life satisfaction among younger individuals, Courtemanche and Zapata (2014) find larger improvements in health among older individuals. The fact that younger individuals experienced a larger SWB improvement despite a relatively

¹⁰ Other southern states include Alabama, Arkansas, Delaware, Washington D.C., Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, Texas, Virginia, South Carolina, and West Virginia. The reversion of Medicaid eligibility for de-enrollment in Tennessee began in late July 2005 (Garthwaite et al., 2014).

modest health improvement implies that the peace of mind from having health insurance coverage could be a primary mechanism to explain the observed patterns in the data.

Second, we study heterogeneous impacts by individuals' income. Long et al. (2009) find that the reform decreased the uninsured rate among low-income individuals more significantly than among high-income individuals.¹¹ If the reform increased SWB through an increase in health insurance coverage, we expect that the reform would have larger impacts among low-income individuals than among high-income individuals. Panel B in Table 7 indicates that this is indeed the case; this result also implies that the healthcare reform decreased inequality in SWB by income.

Lastly, we study the role of health insurance as a determinant of SWB by estimating the effect of health insurance coverage on overall life satisfaction using the 2SLS approach. Table 8 reports the first-stage regression results.¹² Consistent with the findings reported in Figure 1, column (1) demonstrates that the Massachusetts health reform increased health insurance coverage by approximately 4 percentage points. The estimate is statistically significant at the 1 percent level. Columns (2) to (4) indicate that the first-stage estimation results are robust when we consider alternative control states. These results provide evidence that our instrumental variable significantly induces a variation in health insurance coverage.

Table 9 reports the 2SLS regression results from estimating Equation (2). We use the baseline sample of non-elderly adults aged 18 to 64 years; Column (1) shows that gaining access to health insurance coverage through the Massachusetts reform increased overall life satisfaction by 0.7. The magnitude of this coefficient estimate is approximately 1 standard deviation of the dependent variable and is statistically significant at the 1 percent level. Columns (2) to (4) re-estimate the health insurance coverage's effects on life satisfaction by using alternative control states, and these estimates range from 0.62 to 0.87. All estimates are statistically significant at the 1 or 5 percent levels. These results indicate

¹¹ We replicate their results using the BRFSS data in panel B of Appendix Table A6.

¹² We cannot estimate the impact of cost-sharing of health insurance on life satisfaction due to data limitations.

that access to health insurance has a large, positive impact on an individual's overall life satisfaction. For example, the magnitude of the 2SLS estimate is similar to the cross-sectional difference in overall life satisfaction between individuals whose annual household income is less than \$10,000 and greater than \$75,000. Considering that the United States' 2008 stimulus tax rebate, in which the average household received approximately \$950, increased life satisfaction by a 0.32 standard deviation (Lachowska, 2016), a back-of-envelope calculation suggests that a 1 standard deviation-increase in life satisfaction is similar to the magnitude that could be generated by an approximately \$3,000 stimulus tax rebate during the Great Recession in the United States.

6. Concluding Remarks

We provide novel evidence that Massachusetts' 2006 healthcare reform significantly improved individuals' SWB, as measured by the self-reported level of overall life satisfaction. Various robustness checks and a falsification test support our causal inference. The additional analyses on the Tennessee healthcare reform provide evidence for our findings' external validity. Finally, the 2SLS estimates demonstrate that access to health insurance coverage has a large impact on SWB, increasing overall life satisfaction by approximately 1 standard deviation.

The 2010 ACA was implemented to achieve nearly universal health insurance coverage among all residents in the United States. Although several studies have evaluated its impacts on a variety of measures, such as medical spending, health, financial stress, and labor supply, no study has evaluated its impacts on SWB. This study's findings imply that the ACA might have significantly improved individuals' SWB. Without considering this psychological consequence, we might underemphasize the true beneficial effects of the national healthcare reform.

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: 493-505.
- Alesina, Alberto F., Edward L. Glaeser, and Bruce Sacerdote. 2006. Work and Leisure in the U.S. and Europe: Why So Different? Alberto F. Alesina, Edward L. Glaeser, Bruce Sacerdote. in NBER Macroeconomics Annual 2005, Volume 20, Gertler and Rogoff.
- Baicker, Katherine, Sarah Taubman, Heidi Allen, Mira Bernstein, Jonathan Gruber, Joseph P. Newhouse, Eric Schneider, Bill Wright, Alan Zaslavsky, Amy Finkelstein, and the Oregon Health Study Group. 2013. "The Oregon Experiment – Effects of Medicaid on Clinical Outcomes." *New England Journal of Medicine*, 368(18): 1713-1722.
- Barbaresco, S., Courtemanche, C.J. and Qi, Y., 2015. Impacts of the Affordable Care Act dependent coverage provision on health-related outcomes of young adults. *Journal of Health Economics*, 40, pp.54-68.
- Blanchflower, David G. and Andrew J. Oswald. 2004. "Well-Being Over Time in Britain and The USA," *Journal of Public Economics*, vol. 88, 1359-1386
- Brevoort, Kenneth, Daniel Grodzicki, and Martin B. Hackmann. 2018. "The Credit Consequences of Unpaid Medical Bills". Working Paper.
- Buchmueller, Thomas C., John DiNardo, and Robert G. Valletta. 2011. "The Effect of an Employer Health Insurance Mandate on Health Insurance Coverage and the Demand for Labor: Evidence from Hawaii." *American Economic Journal: Economic Policy*, 3 (4): 25-51.
- Chay, Kenneth, Deaho Kim, and Shailender Swaminathan. 2012. Health Insurance, Hospital Utilization and Mortality: Evidence from Medicare's Origins. Working Paper.
- Clark, Andrew, Sarah Flèche, Richard Layard, Nattavudh Powdthavee, and George Ward. 2018. The Origins of Happiness: The Science of Well-Being over the Life Course. Princeton Press.

- Courtemanche, C. J. and D. Zapata. 2014. "Does universal coverage improve health? The Massachusetts experience." *Journal of Policy Analysis and Management*, 33(1), 36-69.
- Courtemanche, C., Marton, J., Ukert, B., Yelowitz, A. and Zapata, D., 2018. Early Effects of the Affordable Care Act on Health Care Access, Risky Health Behaviors, and Self-Assessed Health. *Southern Economic Journal*, 84(3), pp.660-691.
- Diener, Ed. and Suh, E., 1999. National differences in well-being. *Well-being: The foundations of hedonic psychology*, pp.434-450.
- Diener Ed, and Robert Biswas-Diener. 2009. Happiness: Unlocking the Mysteries of Psychological Wealth. Wiley.
- Dehejia, Rajeev, Thomas DeLeire, and Erzo F. P. Luttmer, 2007. "Insuring consumption and happiness through religious organizations," *Journal of Public Economics*, 91(1-2), pages 259-279, February.
- Dillender, M. O., Heinrich, C.J. and Houseman, S. N., 2016. "Health insurance reform and part-time work: Evidence from Massachusetts." *Labour Economics*, 43, pp.151-158.
- Dolan, P., Peasgood, T. and White, M., 2008. "Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being." *Journal of Economic Psychology*, 29(1), pp.94-122.
- Ferrer-i-Carbonell, A. and Frijters, P., 2004. "How important is methodology for the estimates of the determinants of happiness?" *The Economic Journal*, 114(497), pp.641-659.
- Finkelstein, Amy, Sarah Taubman, Bill Wright, Mira Bernstein, Jonathan Gruber, Joseph P. Newhouse, Heidi Allen, Katherine Baicker, Oregon Health Study Group. 2012. "The Oregon Health Insurance Experiment: Evidence from the First Year." *Quarterly Journal of Economics*, Volume 127, Issue 3, Pages 1057–1106.
- Fisher, R. A. 1935. The design of experiments. Oxford, England: Oliver & Boyd.
- Frey, Bruno S. and Stutzer, A., 2010. *Happiness and economics: How the economy and institutions affect human well-being*. Princeton University Press.

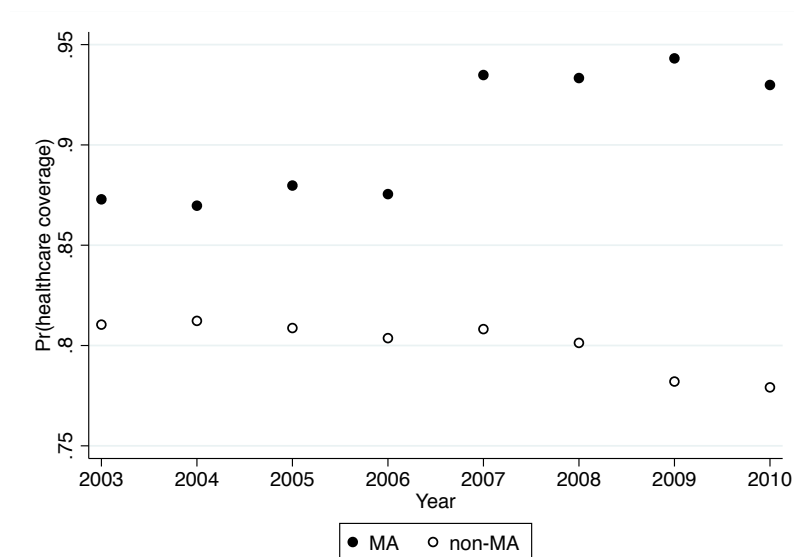
- Garthwaite, Craig, Tal Gross, and Matthew J. Notowidigdo. 2014. "Public Health Insurance, Labor Supply, and Employment Lock." *The Quarterly Journal of Economics*, Volume 129, Pages 653–696.
- Graham, Carol. 2008. "Happiness and Health: Lessons and Questions for Public Policy," *Health Affairs*, Vol.27, No.1, January-February.
- Gruber, Jonathan H. and Sendhil Mullainathan, 2005. "Do Cigarette Taxes Make Smokers Happier," *The B.E. Journal of Economic Analysis & Policy*, Berkeley Electronic Press, vol. 0(1), pages 4.
- Haushofer, J., Chemin, M., Jang, C., and Abraham, J. 2018. "Economic and Psychological Effects of Health Insurance and Cash Transfers: Evidence from a Randomized Experiment in Kenya" Working Paper.
- Kahneman, Daniel, and Alan B. Krueger. 2006. "Developments in the Measurement of Subjective Well-Being." *Journal of Economic Perspectives*, 20 (1): 3-24.
- Koh, Kanghyock. 2018. "The Affordable Care Act Dependent Mandate, Parents' Labor Market Outcomes, and Young Adults' Medical Expenditure." Working Paper.
- Kolstad, Jonathan T. and Amanda E. Kowalski. 2012. "The impact of health care reform on hospital and preventive care: Evidence from Massachusetts." *Journal of Public Economics*, Volume 96, Issues 11–12, Pages 909-929.
- Kolstad, Jonathan T., and Amanda E. Kowalski. 2016. "Mandate-based health reform and the labor market: Evidence from the Massachusetts reform." *Journal of Health Economics*, Volume 47, Pages 81-106.
- Kuroki, M. 2018. "Subjective well-being and minimum wages: Evidence from U.S. states." *Health Economics*, 27: 171-180.
- Lachowska, M., 2016. "The Effect of Income on Subjective Well-Being: Evidence from the 2008 Economic Stimulus Tax Rebates." *Journal of Human Resources*.
- Layard, Richard. 2005. *Happiness: lessons from a new science*. Penguin, London, UK
- Layard, Richard. 2012. "Big ideas: wellbeing and public policy." *Centrepiece*, 16 (3). pp. 2-5

- Long S., Stockely K. and Yemane A. 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.
- Ludwig, Jens, Greg J. Duncan, Lisa A. Gennetian, Lawrence F. Katz, Ronald C. Kessler, Jeffrey R. Kling, and Lisa Sanbonmatsu. 2012. "Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults." *Science*, 21 SEP: 1505-1510
- McDonough, John E., Brian Rosman, Fawan Phelps, and Melissa Shannon. 2006. "The Third Wave of Massachusetts Health Care Access Reform." *Health Affairs*, 25:6, w420-w431.
- Mazumder, Bhashkar, and Sarah Miller. 2016. "The Effects of the Massachusetts Health Reform on Household Financial Distress." *American Economic Journal: Economic Policy*, 8 (3): 284-313.
- Miller, Sarah. 2012. "The Impact of the Massachusetts Health Care Reform on Health Care Use Among Children." *The American Economic Review Papers and Proceedings*, Vol. 102, No. 3, pp. 502-507.
- Miller, Sarah. 2013. "The effect of the Massachusetts reform on health care utilization." *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, 49(4), pp.317-326.
- Oishi, Shigehiro, and Ed Diener. 2014. "Can and Should Happiness Be a Policy Goal?" *Policy Insights from the Behavioral and Brain Sciences*, Vol. 1(1) 195–203
- Oswald, Andrew, and Nattavudh Powdthavee. 2008. "Does Happiness Adapt? A Longitudinal Study of Disability with Implications for Economists and Judges." *Journal of Public Economics*. 92. 1061-1077.
- Oswald, Andrew J., and S. Wu. 2011. "Well-being across America." *Review of Economics and Statistics*, 93(4), 1118-1134.
- Oswald, Andrew J., E. Proto and D. Sgroi. 2015. "Happiness and productivity." *Journal of Labor Economics*, 33(4), pp.789-822.

- Sommers, Benjamin D., Sharon K. Long, and Katherine Baicker. 2014. "Changes in Mortality After Massachusetts Health Care Reform: A Quasi-experimental Study." *Annals of Internal Medicine*, 160:585–593.
- Stiglitz, Joseph E., Amartya Sen, and Jean-Paul Fitoussi. 2009. Report of the Commission on the Measurement of Economic Performance and Social Progress. Available at <http://www.stiglitz-sen-fitoussi.fr>
- Tella, R.D., MacCulloch, R.J. and Oswald, A.J., 2003. The macroeconomics of happiness. *Review of Economics and Statistics*, 85(4), pp.809-827.
- Urry, H.L., Nitschke, J.B., Dolski, I., Jackson, D.C., Dalton, K.M., Mueller, C.J., Rosenkranz, M.A., Ryff, C.D., Singer, B.H. and Davidson, R.J., 2004. "Making a Life Worth Living: Neural Correlates of Well-being." *Psychological Science*, 15(6), pp.367-372.

Figures and Tables

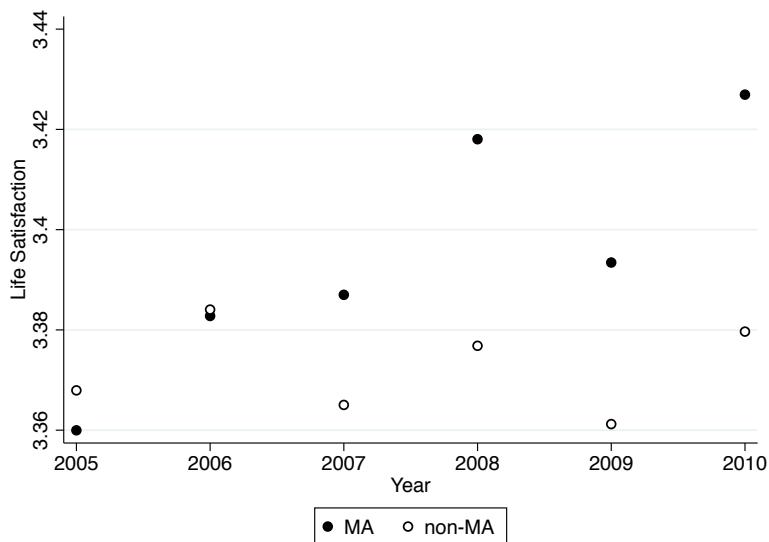
Figure 1. Trends of Health Insurance Coverage



Data Source: Current Population Survey (March Supplement), 2003-2010

Notes: We restrict the sample to individuals aged 18-64 years. The outcome variable is the probability of any health insurance coverage. We use the supplement sampling weight as a probabilistic weight.

Figure 2. Trends of Overall Life Satisfaction

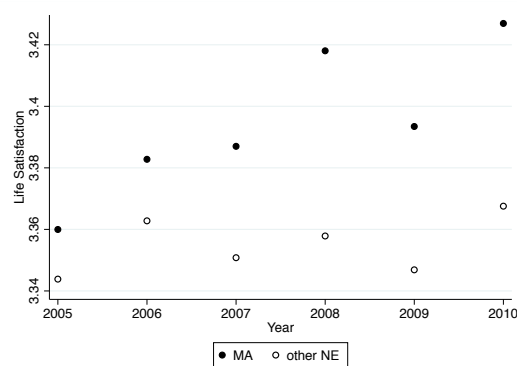


Data Source: BRFSS, 2005-2010

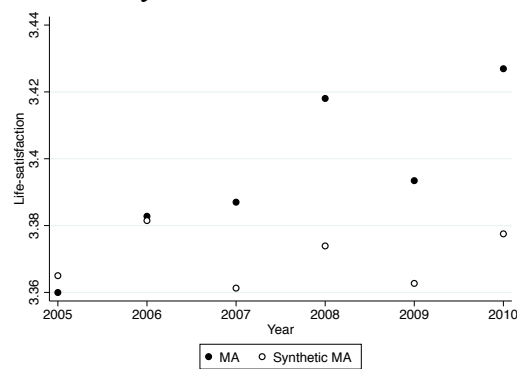
Notes: We restrict the sample to individuals aged 18-64 years. We use the individual sampling weight as a probabilistic weight.

Figure 3. Trends of Overall Life Satisfaction by Alternative Control Groups

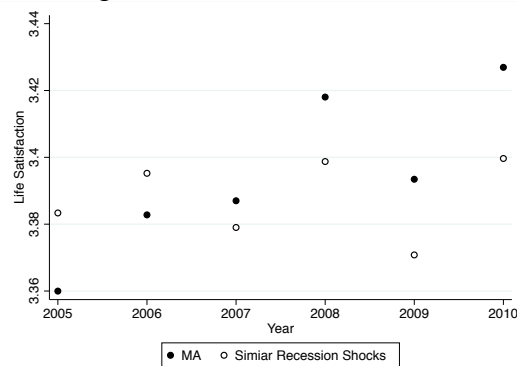
A. Other Northeastern States



B. Synthetic Massachusetts



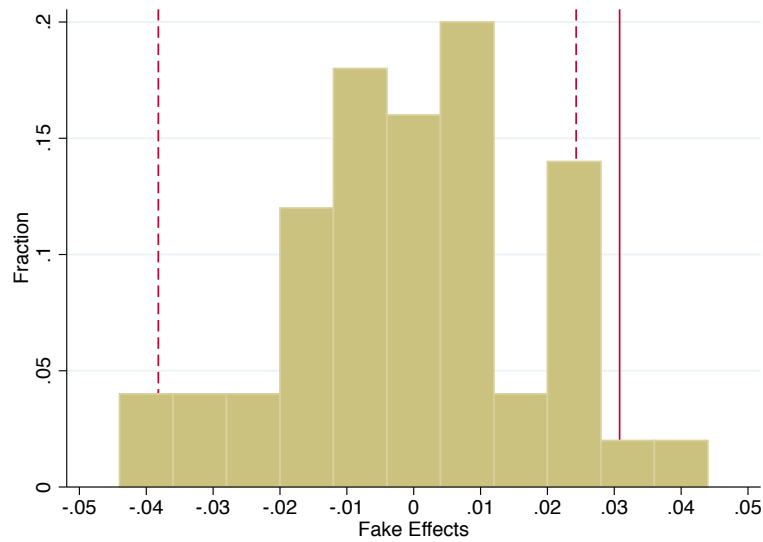
C. States Experienced Similar Recessions Shocks



Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. In panel A, we use other northeastern states as control states. In panel B, we use overall life satisfaction, age, the age squared, dummy for Hispanic ethnicity, gender, white, the number of children, dummies for marital status, college education to calculate state weights for synthetic Massachusetts. In Panel C, we use Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont as control states that experienced similar recession shocks. We use the individual sampling weight as a probabilistic weight.

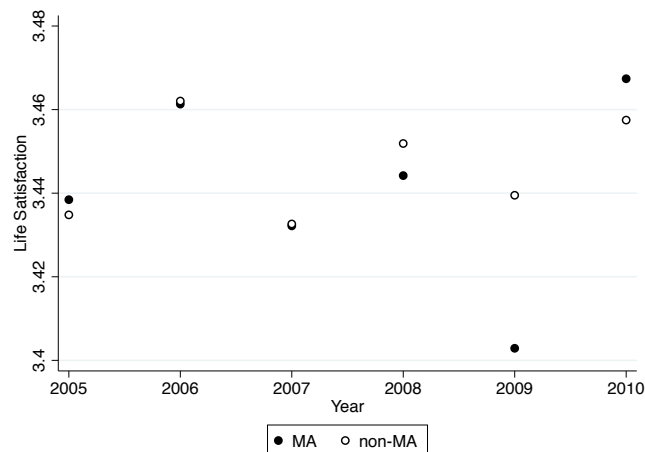
Figure 4. Distribution of Fake Treatment Effects



Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. The solid vertical line indicates the baseline estimate. The dashed vertical lines indicate 5th and 95th percentile values of fake treatment effects. We include state fixed effects, year fixed effects, age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status and college education as control variables. We use the individual sampling weight as a probabilistic weight.

Figure 5. Trends of Overall Life Satisfaction of the Elderly



Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 65 years or older. We use the individual sampling weight as a probabilistic weight.

Table 1. Summary Statistics

	Massachusetts	Other States
<u>A. Overall Life Satisfaction</u>		
Overall Life Satisfaction	3.39	3.39
	(.65)	(.63)
Pr(Very Dissatisfied)	.01	.01
	(.11)	(.11)
Pr(Dissatisfied)	.05	.04
	(.22)	(.21)
Pr(Satisfied)	.49	.50
	(.50)	(.50)
Pr(Very Satisfied)	.45	.45
	(.49)	(.50)
<u>B. Mental Health</u>		
Number of Days Mental Health Not Good in the Past 30 Days	3.27	3.40
	(7.93)	(7.67)
<u>C. Other Characteristics</u>		
Age	46.3	45.7
	(17.0)	(17.2)
Pr(Hispanic)	.08	.14
	(.29)	(.26)
Pr(Male)	.47	.49
	(.49)	(.49)
Pr(White)	.21	.18
	(.45)	(.41)
Number of Children	.72	.82
	(1.05)	(1.09)
Pr(Married)	.56	.59
	(.50)	(.50)
Pr(College)	.67	.58
	(.48)	(.49)
Pr(Employed)	.63	.61
	(.49)	(.49)
Annual Household Income Distribution		
Pr(< \$20K)	.13	.19
	(.39)	(.40)
Pr(\$20K - \$35K)	.17	.22
	(.39)	(.43)
Pr(\$35K - \$50K)	.14	.16
	(.35)	(.38)
Pr(\$50K - \$75K)	.18	.17
	(.38)	(.38)
Pr(>\$75K)	.37	.25
	(.46)	(.41)

Data Source: BRFSS, 2005-2006

Note: Numbers in parentheses are standard deviations.

Table 2. The Effects of the Massachusetts' Healthcare Reform
on Overall Life Satisfaction

Dependent Variables:	Overall Life Satisfaction				Pr(Very Satisfied or Satisfied)		Pr(Very Satisfied)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Baseline								
MA×Post	0.040*** (0.003)	0.031*** (0.003)	0.031*** (0.004)	0.031*** (0.003)	0.010*** (0.001)	0.010*** (0.001)	0.021*** (0.002)	0.020*** (0.002)
Observations	1,599,569	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821
R-squared	0.00	0.06	0.06	0.07	0.03	0.03	0.05	0.05
B. Dynamic effects 1: (<i>During: July 2006 – June 2007</i>)								
MA×During	0.015*** (0.001)	-0.007*** (0.003)	0.004* (0.002)	0.005 (0.003)	0.003*** (0.001)	0.002** (0.001)	0.003* (0.002)	0.004* (0.003)
MA×After	0.047*** (0.003)	0.028*** (0.004)	0.031*** (0.003)	0.031*** (0.003)	0.012*** (0.001)	0.012*** (0.001)	0.019*** (0.002)	0.018*** (0.002)
Observations	1,599,569	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821
R-squared	0.000	0.06	0.06	0.07	0.03	0.03	0.05	0.05
C. Dynamic effects 2: (<i>Post1: 2007-2008, Post2: 2009-2010</i>)								
MA×Post1	0.036*** (0.003)	0.031*** (0.003)	0.030*** (0.003)	0.029*** (0.003)	0.008*** (0.001)	0.008*** (0.001)	0.022*** (0.002)	0.022*** (0.002)
MA×Post2	0.044*** (0.003)	0.031*** (0.003)	0.032*** (0.005)	0.032*** (0.005)	0.013*** (0.002)	0.013*** (0.002)	0.019*** (0.003)	0.019*** (0.003)
Observations	1,599,569	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821
R-squared	0.000	0.06	0.06	0.07	0.03	0.03	0.05	0.05
Controls		Y	Y	Y	Y	Y	Y	Y
State FE			Y	Y	Y	Y	Y	Y
Year FE			Y		Y		Y	
Year-Month FE				Y		Y		Y

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For dependent variables, we use categorical responses about overall life satisfaction in columns (1) to (4), a dummy variable indicating very satisfied or satisfied in columns (5) and (6), and a dummy variable indicating very satisfied in columns (7) and (8). For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. The Effects of the Massachusetts' Healthcare Reform on Overall Life Satisfaction by Using Alternative Control Groups

Dependent Variables:	Overall Life Satisfaction (1)	Pr(Very Satisfied or Satisfied) (2)	Pr(Very Satisfied) (3)
A. Alternative Control Group 1: <i>Other Northeastern States</i>			
MA×Post	0.029*** (0.007)	0.012*** (0.002)	0.018** (0.006)
Observations	311,548	311,548	311,548
R-squared	0.07	0.03	0.05
B. Alternative Control Group 2: <i>States used for Synthetic Massachusetts</i>			
MA×Post	0.027*** (0.006)	0.010*** (0.002)	0.016*** (0.005)
Observations	301,651	301,651	301,651
R-squared	0.07	0.03	0.06
C. Alternative Control Group 3: <i>States with Similar Recession Shocks</i>			
MA×Post	0.032*** (0.006)	0.008** (0.003)	0.023*** (0.003)
Observations	266,524	266,524	266,524
R-squared	0.07	0.03	0.05

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. As alternative control groups, we use northeastern states in panel A, Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in panel B, and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel C. For dependent variables, we use categorical responses about overall life satisfaction in column (1), a dummy variable indicating very satisfied or satisfied in column (2), and a dummy variable indicating very satisfied in column (3). For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. The Effects of the Massachusetts' Healthcare Reform on Mental Health

Dependent Variables: Days Mental Health Not Good during the Past 30 Days				
	(1)	(2)	(3)	(4)
MA×Post	-0.165*** (0.039)	-0.161*** (0.044)	-0.144** (0.059)	-0.243*** (0.071)
Observations	2,062,310	404,863	406,150	332,693
R-squared	0.03	0.03	0.03	0.04
Control Group	Other 50 States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks

Data Source: BRFSS, 2003-2010

Notes: We restrict the sample to individuals aged 18-64 years. As alternative control groups, we use Northeastern states in column (2), Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in column (3), and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4). For dependent variables, we use the number of days mental health was not good during the past 30 days. For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. The Effects of Massachusetts' Healthcare Reform on Overall Life Satisfaction Among the Elderly

Dependent Variables:	Overall Life Satisfaction	Pr(Very Satisfied or Satisfied)	Pr(Very Satisfied)
	(1)	(2)	(3)
A. Control Group: <i>Other 50 States</i>			
MA×Post	-0.010*** (0.003)	-0.002*** (0.001)	-0.007** (0.003)
Observations	662,567	662,567	662,567
R-squared	0.04	0.01	0.04
B. Alternative Control Group 1: <i>Other Northeastern States</i>			
MA×Post	-0.0004 (0.006)	-0.002 (0.002)	0.003 (0.006)
Observations	126,238	126,238	126,238
R-squared	0.04	0.01	0.04
C. Alternative Control Group 2: <i>States used for Synthetic Massachusetts</i>			
MA×Post	-0.014 (0.010)	-0.004*** (0.001)	-0.009 (0.009)
Observations	121,038	121,038	121,038
R-squared	0.04	0.01	0.04
D. Alternative Control Group 3: <i>States with Similar Recession Shocks</i>			
MA×Post	-0.022** (0.007)	-0.003 (0.002)	-0.018** (0.006)
Observations	110,869	110,869	110,869
R-squared	0.04	0.01	0.04

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 65 years or older. As alternative control groups, we use Northeastern states in panel B, Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in panel C, and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel D. For dependent variables, we use categorical responses about overall life satisfaction, a dummy variable indicating very satisfied or satisfied, and a dummy variable indicating very satisfied in columns (1) to (3), respectively. For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Effects of the 2005 Tennessee Healthcare Reforms on Overall Life Satisfaction

Dependent Variables	Pr(Any health insurance coverage) (1)	Overall life satisfaction (2)
Reform	-0.063*** (0.005)	-0.029*** (0.005)
Observations	553,785	530,100
R-squared	0.15	0.06

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For control states, we use other southern states. For the dependent variable, we use a dummy variable indicating any health insurance coverage in column (1), and categorical responses about overall life satisfaction in column (2). For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Heterogeneous Effects of Massachusetts' Healthcare Reform on Overall Life Satisfaction

A. By Age				
Age groups	18-34 years (1)	35-44 years (2)	45-54 years (3)	55-64 years (4)
MA×Post	0.050*** (0.007)	0.020*** (0.005)	0.037*** (0.004)	0.009** (0.004)
Observations	309,053	346,697	460,465	474,606
R-squared	0.06	0.08	0.07	0.06
B. By Annual Household Income				
Income groups	<\$25,000 (1)	\$25,000-\$75,000 (2)	>=\$75,000 (3)	
MA×Post	0.058*** (0.009)	0.023*** (0.003)	0.033*** (0.003)	
Observations	332,438	659,297	599,086	
R-squared	0.04	0.03	0.05	

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For dependent variable, we use categorical responses about overall life satisfaction. For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Effects of Massachusetts' Healthcare Reform on Health Insurance Coverage (First Stage Regression)

Dependent Variable: Health Insurance Coverage				
	(1)	(2)	(3)	(4)
MA×Post	0.036*** (0.003)	0.038*** (0.006)	0.037*** (0.004)	0.035*** (0.005)
Observations	1,661,878	328,275	320,439	279,568
R-squared	0.13	0.10	0.11	0.13
Control Group	Other 50 States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. We use the all states in column (1). As alternative control groups, we use northeastern states in column (2), Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in column (3), and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4). For the dependent variable, we use a dummy variable indicating whether an individual is covered by any type of health insurance. For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9. TSLS Estimate of the Effects of Health Insurance on Overall Life Satisfaction

Dependent Variable: Overall Life Satisfaction				
	(1)	(2)	(3)	(4)
Health Insurance	0.701*** (0.064)	0.865*** (0.246)	0.617*** (0.189)	0.853*** (0.217)
Observations	1,590,821	311,548	301,651	266,524
Control Group	All Other States	Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. We use the all states in column (1). As alternative control groups, we use northeastern states in column (2), Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in column (3), and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4). For dependent variable, we use categorical responses about overall life satisfaction. For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1. List of States Experienced Similar Recession Shocks

State	Change in % Employed
Maryland	-2.14%
Nebraska	-1.87%
Kentucky	-1.46%
Massachusetts	-1.35%
Vermont	-0.93%
Louisiana	-0.90%
Oklahoma	-0.43%

Data Source: Current Population Survey (March Supplement), 2007-2009

Notes: We restrict the sample to those aged 18-64 years. We use the supplemental sampling weight as a probabilistic weight.

Table A2. The Effects of the Massachusetts' Healthcare Reform
on Overall Life Satisfaction
Including employment and household income as additional control variables

Dependent Variables:	Overall Life Satisfaction			Pr(Very Satisfied or Satisfied)		Pr(Very Satisfied)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MA×Post	0.026*** (0.003)	0.027*** (0.004)	0.026*** (0.003)	0.006*** (0.001)	0.007*** (0.001)	0.021*** (0.002)	0.021*** (0.002)
Observations	1,438,142	1,438,142	1,438,142	1,438,142	1,438,142	1,438,142	1,438,142
R-squared	0.10	0.11	0.11	0.06	0.06	0.08	0.08
Controls	Y	Y	Y	Y	Y	Y	Y
State FE		Y	Y	Y	Y	Y	Y
Year FE		Y		Y		Y	
Year-Month FE			Y		Y		Y

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For dependent variables, we use categorical responses about life-satisfaction in columns (1) to (4) and dummy variables indicating very satisfied or satisfied in columns (5) and (6) and indicating very satisfied in columns (7) and (8). For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table A3. The Effects of the Massachusetts' Health Reform on Overall Life Satisfaction
Using an alternative definition of the "during" period (April 2006 – June 2007)

Dependent Variables:	Overall Life Satisfaction				Pr(Very Satisfied or Satisfied)		Pr(Very Satisfied)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MA×During	0.019*** (0.001)	-0.012*** (0.003)	0.003 (0.003)	0.003 (0.004)	0.004*** (0.001)	0.003** (0.001)	0.002 (0.002)	0.003 (0.003)
MA×After	0.051*** (0.003)	0.025*** (0.004)	0.031*** (0.004)	0.030*** (0.004)	0.013*** (0.001)	0.013*** (0.001)	0.018*** (0.003)	0.018*** (0.003)
Observations	1,599,569	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821	1,590,821
R-squared	0.00	0.06	0.06	0.07	0.03	0.03	0.05	0.05
Controls		Y	Y	Y	Y	Y	Y	Y
State FE			Y	Y	Y	Y	Y	Y
Year FE			Y		Y		Y	
Year-Month FE				Y		Y		Y

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For dependent variables, we use categorical responses about overall life satisfaction in columns (1) to (4), a dummy variable indicating very satisfied or satisfied in columns (5) and (6), and a dummy variable indicating very satisfied in columns (7) and (8). For control variables, we use age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Table A4. State Weights in Synthetic Massachusetts

State	Weight	State	Weight
Alabama	0	Montana	0
Alaska	0	Nebraska	0
Arizona	0	Nevada	0
Arkansas	0	New Hampshire	0
California	0	<i>New Jersey</i>	<i>0.165</i>
Colorado	0	New Mexico	0
<i>Connecticut</i>	<i>0.267</i>	<i>New York</i>	<i>0.169</i>
Delaware	0	North Carolina	0
<i>District of Columbia</i>	<i>0.011</i>	North Dakota	0
Florida	0	Ohio	0
Georgia	0	Oklahoma	0
Hawaii	0	Oregon	0
Idaho	0	Pennsylvania	0
Illinois	0	<i>Rhode Island</i>	<i>0.281</i>
<i>Indiana</i>	<i>0.005</i>	South Carolina	0
Iowa	0	South Dakota	0
Kansas	0	Tennessee	0
<i>Kentucky</i>	<i>0.012</i>	Texas	0
Louisiana	0	Utah	0
Maine	0	Vermont	0
Maryland	0	Virginia	0
Michigan	0	Washington	0
Minnesota	0	West Virginia	0
Mississippi	0	<i>Wisconsin</i>	<i>0.014</i>
<i>Missouri</i>	<i>0.076</i>	Wyoming	0

Data Source: BRFSS, 2005-2010.

Notes: We restrict the sample to individuals aged 18-64 years. To calculate state weights in synthetic Massachusetts, we use categorical responses about overall life satisfaction, state and year fixed effects, age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, and white, and fixed effects for marital status, education, income category, and labor force status.

Table A5. Ordered Logit Estimation of the Effects of the Massachusetts Healthcare Reform on Overall Life Satisfaction

Dependent Variables:	Overall Life Satisfaction			
	(1)	(2)	(3)	(4)
MA×Post	0.10 ^{***} (0.01)	0.09 ^{***} (0.03)	0.09 ^{***} (0.02)	0.10 ^{***} (0.02)
Observations	1,590,821	311,548	301,651	259,028
Control Group	Other 50 States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For the control group, we use all states except for Massachusetts in column (1). As alternative control groups, we use northeastern states in column (2), Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in column (3), and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4). For dependent variables, we use categorical responses about overall life satisfaction. In all specifications, we control for state and year fixed effects, age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

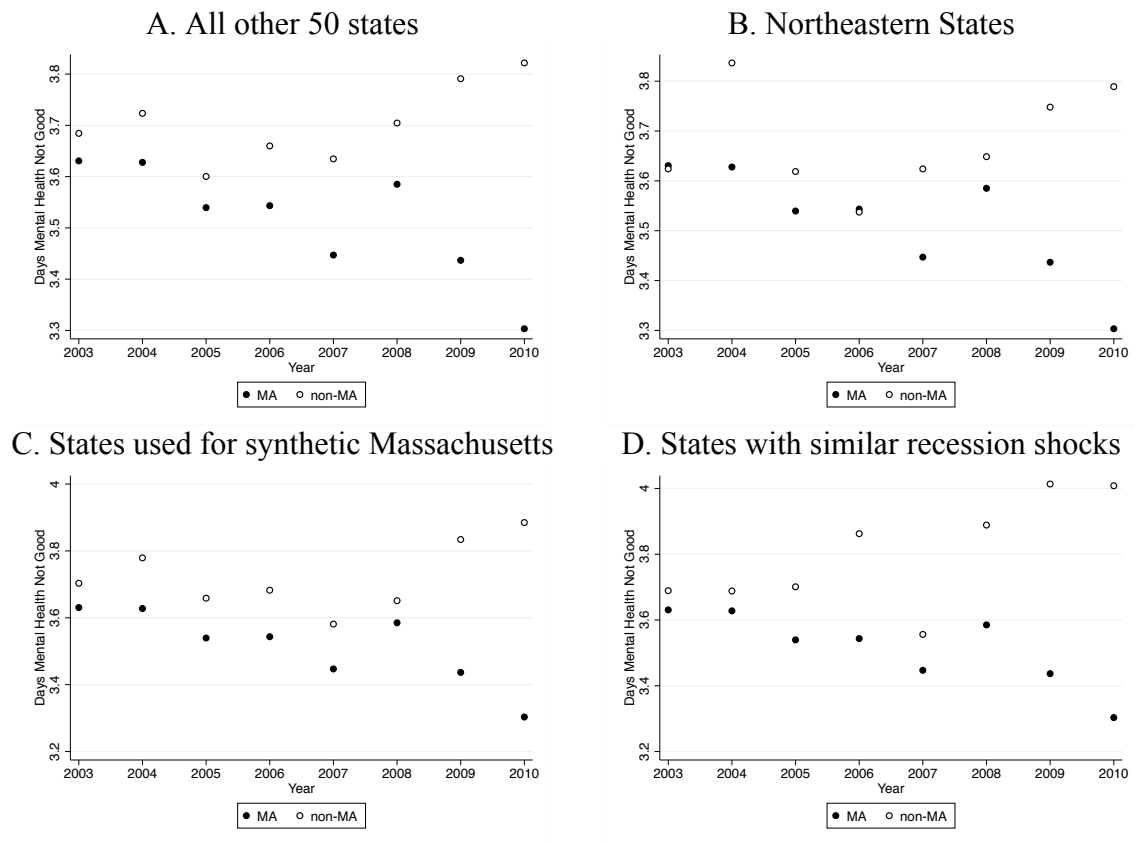
Table A6. Heterogeneous Effects of the Massachusetts Healthcare Reform
on Health Insurance Coverage

A. By Age				
Age groups	18-34 years	35-44 years	45-54 years	55-64 years
	(1)	(2)	(3)	(4)
MA×Post	0.053 ^{***} (0.005)	0.029 ^{***} (0.004)	0.034 ^{***} (0.004)	0.035 ^{***} (0.003)
Observations	324,135	362,389	480,679	494,675
R-squared	0.13	0.14	0.10	0.07
B. By Annual Household Income				
Income groups	<\$25,000	\$25,000-\$75,000	>=\$75,000	
	(1)	(2)	(3)	
MA×Post	0.093 ^{***} (0.005)	0.060 ^{***} (0.003)	0.010 ^{***} (0.002)	
Observations	352,260	682,866	626,752	
R-squared	0.08	0.07	0.16	

Data Source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18-64 years. For dependent variable, we use a dummy variable of indicating any health insurance coverage. In all specifications, we control for state and year fixed effects, age, age squared, number of children, dummy variables for Hispanic ethnicity, gender, white, marital status, and college education. We use the individual sampling weight as a probabilistic weight. Standard errors in parentheses are corrected for heteroscedasticity and clustered at the state level. *** p<0.01, ** p<0.05, * p<0.1.

Figure A1. Trends of Mental Health



Data Source: BRFSS, 2003-2010

Notes: We restrict the sample to individuals aged 18-64 years. As the dependent variable, we use the number of days mental health was not good during the past 30 days. As alternative control groups, we use northeastern states in panel B, Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in panel C, and Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel D. We use the individual sampling weight as a probabilistic weight.