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Seonghoon KIM
Singapore Management University, SEONGHOONKIM@smu.edu.sg

Kanghyock KOH

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Seonghoon Kim[a] and Kanghyock Koh[b]

[a]School of Economics, Singapore Management University and IZA, email: seonghoonkim@smu.edu.sg
[b]Corresponding author. Department of Economics, Korea University, Seoul, South Korea, email: kkoh@korea.ac.kr

Abstract

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 falsification tests. We find consistent evidence from other healthcare reforms such as the 2014 Affordable Care Act Medicaid expansion and the 2005 Tennessee Medicaid disenrollment, that support the external validity of our findings. Our results provide novel evidence of the psychological consequences of recent healthcare reforms that expand health insurance coverage.

Keywords: health insurance, life satisfaction, happiness, subjective well-being, Massachusetts healthcare reform, Tennessee Medicaid disenrollment, Affordable Care Act Medicaid expansion
JEL Codes: I13, I18, I31

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1. Introduction

Federal and state governments in the United States have implemented various reforms to increase health insurance coverage among the uninsured over the last 15 years. Much research has evaluated the effects of these healthcare reforms on outcomes such 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; Argys et al., 2017; Brevoort et al., 2018; Koh, 2019). In addition to these consequences, healthcare reforms could have a broader impact on well-being that cannot be captured fully by these objective measures. This impact can be captured by subjective well-being (SWB), which is an individual's self-reported overall well-being.

Access to health insurance coverage can improve SWB through two major channels. First, health insurance coverage can improve financial and health conditions (Courtemanche and Zapata, 2014; Mazumder and Miller, 2016; Argys et al., 2017; Brevoort et al., 2018). Second, health insurance coverage can provide "peace of mind," as it removes financial and health risks (Arrow, 1963; Nyman, 1999; Haushofer et al., 2018).

Understanding the effect of healthcare reforms on SWB can provide informative evidence on their welfare consequences, which is useful for both economists and policymakers. Although a direct approach to conducting welfare analysis is through counterfactual policy simulations using structurally estimated parameters, this imposes strong modeling assumptions and is computationally challenging.[1] To overcome these limitations, recently, researchers have used a reduced-form approach combined with SWB data to evaluate the welfare impacts of public policies (Gruber and Mullainathan, 2005; Alesina et al., 2006; Kahneman and Krueger, 2006; Layard, 2012; Ludwig et al., 2012; Oishi and Diener, 2014; Lachowska, 2016; Deaton, 2018) by presuming that SWB data can be a proxy for an individual's (experienced) utility (Kahneman and Sudgen, 2005).[2]

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, increasingly more governments are adopting SWB data to evaluate the success of public policies (Layard, 2006; Stiglitz et al., 2009).

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[1] This approach goes back to the seminal work of Hausman (1981) that computes the deadweight loss of income taxation. Recently, researchers have used the so-called *sufficient statistics* approach to conduct welfare analysis in a relatively simplified manner, combining the advantages of a structural estimation approach and a reduced-form approach (Chetty, 2006; Kolstad and Kowalski, 2016; Finkelstein et al., 2019).

[2] We acknowledge that SWB data provide little information of the cost-side consequences of a healthcare reform or the welfare of other economic agents involved in the reform.

This study analyzes the 2006 Massachusetts healthcare reform's effects on SWB. This reform aimed at achieving near-universal health insurance coverage within the state. To identify the effects of this reform on SWB, we compare changes in the SWB 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 data from 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 a significant, persistent increase in Massachusetts residents' overall life satisfaction after the reform. This graphical evidence is confirmed by the regression results using the DID specification. These results are robust when using alternative control groups or an alternative measure of SWB. As falsification checks, we find little evidence that Massachusetts's healthcare reform affects life satisfaction of the elderly, who are not targeted by the reform.

Next, we investigate the effects of other healthcare reforms on SWB to test our results' external validity. We first examine the effects of the 2014 Affordable Care Act (ACA) Medicaid expansion on SWB. Since the BRFSS does not provide information on SWB after 2010, we use data from the Panel Study of Income Dynamics (PSID). In addition, we examine Tennessee's 2005 healthcare reform, which revoked enrollment for some of the adult Medicaid population using the BRFSS (Garthwaite et al., 2014; Tello-Trillo, 2016). We demonstrate that the ACA Medicaid expansion increased overall life satisfaction, while the Tennessee reform decreased it. These results imply that healthcare reforms that expand health insurance coverage may improve SWB.

This study contributes to the literature by providing novel evidence of the psychological consequences of the Massachusetts's healthcare reform. 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 that aims for near-universal health insurance coverage. Our analysis of the 2014 ACA Medicaid expansion confirms that the recent national healthcare reform also improves individuals' SWB significantly.

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

In addition, we contribute to the literature by providing evidence on health insurance as an important determinant of SWB. Several studies have examined SWB determinants and their quantitative impacts known as the "happiness equation" (Blanchflower and Oswald, 2004; Oswald and Powdthavee, 2008; Clark et al., 2018). However, the role of health insurance has received relatively little attention compared with commonly discussed determinants such as income, employment, children, and marriage (Layard, 2005; Dolan, Peasgood, and White, 2008). This study shows that health insurance coverage plays an important role in determining individuals' SWB.

In addition, 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, payroll taxation, and the "Moving-to-Opportunity" program (Ludwig et al., 2012; Lachowska, 2016; Kuroki, 2018; Kim and Koh, 2019a). Our study offers novel evidence regarding how a 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 data and empirical strategy, respectively. Section 5 presents evidence on the Massachusetts healthcare reform's effects on SWB and examines the internal and external validities of our findings. Section 6 provides our conclusions.

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,[4] all residents were mandated to have health insurance coverage or 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.[5] These features of the Massachusetts reform were adopted in the ACA, the nationwide

[4] For example, if individuals can prove that even subsidized health insurance plans being sold at the government-established health insurance marketplace are unaffordable, they can be exempted from the individual mandate.

[5] Implementation of the reform partially began from July 2006, but the full implementation was not in effect until July 2007.

healthcare reform legislated in 2010. McDonough et al. (2006) and Courtemanche and Zapata (2014) provide institutional details of the reform.

Figure 1 illustrates that the proportion of adults in Massachusetts aged 18 to 64 years with 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 number of inpatient admissions from 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 households' 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 et al. (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. It is a measure of well-being that not only covers cognitive evaluation of one's life in general but also captures both pleasant and painful experiences. Data on SWB are typically collected from responses to questions on overall life satisfaction or happiness. 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 use this information to assess individuals' quality of life and the effectiveness of public policies (Stiglitz et al., 2009).

There might be concerns regarding the use of self-reported 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 frequency of smiling, 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 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 and financial conditions. Previous studies have shown that the reform leads to better health (Miller, 2012, 2013; Courtemanche and Zapata, 2014; Sommers et al., 2014) and financial conditions (Mazumder and Miller, 2016). These *ex-post* improvements in health and household finances can improve SWB (Graham, 2008; Clark et al., 2018; Lindqvist et al., 2018). This mechanism could take time to affect SWB as chronic health conditions and household financial outcomes are unlikely to adjust immediately.

Second, the Massachusetts reform can improve SWB by increasing individuals' "peace of mind," even without improvements in their health or financial distress, as health insurance helps individuals by insuring them against catastrophic medical expenditure shocks and negative health shocks (Arrow, 1963; Nyman, 1999). This *ex-ante* risk-reduction could induce individuals to be more satisfied with their life in general by decreasing anxiety or stress (Haushofer et al., 2018). In particular, this mechanism can improve SWB as soon as the reform is expected to be legislated.

Finally, there could be a secondary 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 et al. (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. Data

A. BRFSS, 2005–2010

We use data from the BRFSS for the 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 other characteristics of individuals.

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.

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 only the non-elderly, we should observe that it has few impacts on the overall life satisfaction level of the elderly. Hence, estimating the effects of Massachusetts's health reform using the elderly sample can serve as a falsification test.

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[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 these 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.

B. PSID, 2009–2017

The main focus of this study is on estimating the SWB impacts of Massachusetts' healthcare reform. However, we also study the effects of the 2014 ACA Medicaid expansion on SWB to examine the external validity of our main analyses. Unfortunately, we cannot use the BRFSS data due to the absence of life satisfaction data after 2010. We overcome this limitation by using data from the PSID, which is a nationally representative bi-annual (since 1999) panel survey of U.S. households and has been collecting information on overall life satisfaction since 2009. Specifically, it asks the following question: "*Please think about your life as a whole. How satisfied are you with it? Are you completely satisfied, very satisfied, somewhat satisfied, not very satisfied, or not at all satisfied?*" We assign the value of 1 to "not at all satisfied", 2 to "not very satisfied", 3 to "somewhat satisfied", 4 to "very satisfied", and 5 to "completely satisfied."

4. Empirical Strategy

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

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

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 overall life satisfaction, and $\varepsilon_{ist}$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, β_1, 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, the year-fixed effect, 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 (Wing et al., 2018). To test the validity of this assumption, we need to

examine whether these trends of overall life satisfaction are parallel before the reform. However, it is difficult to justify this assumption in our setting, since only two years (2005 and 2006) of pre-reform life satisfaction data are available from the BRFSS.

To overcome several empirical issues arising from this limitation, we use several alternative control groups to study the sensitivity of our baseline results. First, the DID estimates can be biased due to heterogeneity across states (Issue 1). The short pre-reform periods' data may not guarantee that state-fixed effects sufficiently control for the heterogeneity across states. To address this issue, we use other northeastern states as alternative control states by assuming that, due to their close proximity, the characteristics of these states are much more similar than those of the baseline control states.[9] Additionally, we construct a "synthetic Massachusetts" as the most comparable to Massachusetts before the reform, in terms of overall life satisfaction as well as the control variables, following Abadie et al. (2010).

Second, our estimates can be biased due to time-varying unobserved confounding factors (Issue 2). The Great Recession of 2008 to 2009 (officially, December 2007 to June 2009) could have affected overall life satisfaction 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. We indirectly address this issue by comparing Massachusetts and states with similar reductions in the proportion of employed individuals during the recession period.[10]

Third, our baseline estimates can be biased due to both Issues 1 and 2 (Issue 3). To further investigate the sensitivity of our baseline estimates, we construct another "synthetic Massachusetts" among states that experienced similar recession shocks.

Our approaches to address Issues 2 and 3 presume that the Great Recession is the leading time-varying confounding factor. However, other unknown time-varying factors could cause a bias in our estimates. To address this bias, we use the fact that the Massachusetts healthcare reform only targets non-elderly individuals. We use the elderly sample for a falsification check. We also examine changes in life satisfaction between the non-elderly and elderly in Massachusetts using the elderly as an additional control group. Since it is possible that the Great Recession had different effects on the elderly, we compare

[9] We include Connecticut, Maine, New Hampshire, Rhode Island, Vermont, New Jersey, New York, and Pennsylvania.

[10] Table A1 in the Appendix lists states with similar changes in the proportion of employed individuals (i.e., +/- 1 percentage point of Massachusetts' change in the share of employed individuals out of the non-elderly population, aged 18 to 64 years).

changes in life-satisfaction gaps between the non-elderly and elderly to those of the baseline control states by using the following triple DID (TD) specification:

$$LS_{ist} = \gamma_0 + \gamma_1 MA_s * Post_t * NonElderly_i + \delta_s + \theta_t + \gamma_2 NonElderly_i + \gamma_3 X_{ist} + \omega_{ist}, \quad (2)$$

where *NonElderly* indicates non-elderly individuals aged 18 to 64 years. In the regression analysis, we include the two-way interaction terms among *MA*, *Post*, and *NonElderly* but do not show them above to save space. Otherwise, we follow the same notations and use the same control variables used in regression specification (1). The coefficient of the triple interaction term, γ_1, is the coefficient of interest, which captures differential effects of the Massachusetts healthcare reform on overall life satisfaction of non-elderly individuals compared with elderly individuals.

To examine whether the treatment and control groups have similar characteristics during the pre-reform periods, we present summary statistics of sample characteristics in Table 1. Panel A of Table 1 presents the summary statistics of overall life satisfaction before the Massachusetts healthcare reform. It is noteworthy that the average values of overall life satisfaction are similar between Massachusetts and the baseline control states (the other states) and the four alternative control groups before the reform. Similar to the average life satisfaction score, the distributions of overall life satisfaction are also similar between Massachusetts and these control states. Approximately 45% and 50% of residents reported that they are very satisfied and satisfied with their lives, respectively, while only 5% to 6% 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 the results of overall life satisfaction, residents of Massachusetts and of other states experienced stress, depression, and problems with emotions over a similar number of days.

Panel C describes the resident characteristics of Massachusetts compared with those in these five control groups. Generally, Massachusetts residents are more likely to be white, college educated, and employed, and thus, they have higher income than residents of other states do. We control for individuals' characteristics related to overall life satisfaction by including resident characteristics such as 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 of Massachusetts' healthcare reform can affect employment, wages, and working hours, and, consequently, family income (Dillender et al., 2016; Kolstad and Kowalski, 2016). However,

as a robustness check, we include household income and employment as additional control variables.

5. Empirical Results

A. Main Results

Figure 2 illustrates the trends of overall life satisfaction among the non-elderly, aged 18 to 64 years, in Massachusetts and other states from 2005 to 2010. Little difference in overall life satisfaction is observed between the residents of Massachusetts and of other states until 2006, when the Massachusetts healthcare reform was legislated. Only Massachusetts residents experienced an increase in overall life satisfaction relative to those of other states after 2007.

Table 2 reports the results of estimating the effects of Massachusetts' healthcare reform using regression specification (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% level. Columns (2), (3), and (4) add individual characteristics, state- and year-fixed effects, and state- and year-month-fixed effects, respectively.[11] In columns (2)-(4), we find that the Massachusetts reform increased the overall life satisfaction by approximately 0.03, which is statistically significant at the 1% 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% level. Our results are similar when we additionally control for household income and employment (Table A2 in the Appendix).[12]

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[11] The coefficient estimates of *MA* and *Post*, based on column (2) of Table 2, are -0.009 (SE of 0.006) and -0.026 (SE of 0.003), respectively. The small and insignificant difference in overall life-satisfaction levels between Massachusetts and other states during the pre-reform periods is consistent with the findings of Table 1 and Figure 1. The coefficient estimate of *Post* indicates that life satisfaction of the control states decreased during the post-reform periods, presumably due to the Great Recession.

[12] If marital status is affected by the reform, controlling for marital status can cause a bias. To examine this issue, we excluded marital status from the regression analysis as a robustness check. The estimated effect of the reform on overall life satisfaction (i.e., coefficient value of *MA*Post*) was 0.035 with the SE of 0.004, similar to that of the baseline estimates. Given this finding, we argue that marriage is less likely to be a mediator or cause a bias in our estimation.

The baseline analysis uses 2007 as the reference year, because the Massachusetts reform was fully implemented after July 2007. As discussed in Section 2.C, health insurance can reduce (*ex-ante*) health and financial risks (Arrow, 1963; Nyman, 1999). This implies that the reform might have improved individuals' overall life satisfaction even before it was fully implemented (transition period) through anticipation. We test the reform's differential effects between the transition period and the period after its full implementation by dividing the post-reform period 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 transition period. For example, the coefficient estimates of the reform impact on overall life satisfaction during the transition periods range from -0.007 to 0.005 points in columns (2) to (4). The probabilities of being either very satisfied or satisfied or being very satisfied with life in columns (5) to (8) increased only by about 0.3 percentage points. However, the magnitudes of the reform's SWB effects after the full implementation are around 0.03 in columns (2) to (4), 1 percentage point in columns (5) and (6), and 2 percentage points in columns (7) and (8), respectively. The coefficient estimates on the reform impact after the full implementation period are generally similar to those in panel A.[13] These results imply that there have been little anticipation impacts of the reform on individuals' life satisfaction.

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*, indicating the periods from 2007 to 2008 and 2009 to 2010, respectively. The effects of the reform during the first and second halves are around 0.03 points in columns (2) to (4). Dynamic impacts of the reform on the binary indicator of life satisfaction show similar patterns. The reform increased the probability of being either satisfied or very satisfied by about 0.8 percentage points during the first half and by 1.3 percentage points during the second half, and it increased the probability of being very satisfied by 2.2 percentage points during the first half and 1.9 percentage points during the second half. These results imply that the reform's estimated effects on SWB persist over time, consistent with the findings from Figure 2. One possible explanation for these patterns is that different mechanisms may be at play in different periods. There could be immediate

[13] 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.

improvements in SWB through *ex-ante* reductions in financial and health risks. Previous studies on the effects of major life events, such as marriage, divorce, widowhood, and unemployment, on SWB showed that people adapt in terms of life satisfaction (Clark et al., 2008). If *ex-ante* reductions are the only mechanism for improvement in SWB, individuals might have adapted after the reform. However, we find little evidence of such adaptation. The lack of adaptation can be achieved through *ex-post* improvements in financial and health conditions, which take some time to build health and financial capital.

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 that for older individuals (panel A of Table A4 in 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 3 shows that the younger group exhibits the largest improvement in overall life satisfaction. The reform increased life satisfaction by 0.05 points among individuals aged 18 to 34 years; while it increased life satisfaction by 0.009 points among individuals aged 55 to 64 years.[14] 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 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. These results provide evidence that SWB accounts for different aspects of individuals' welfare, which are not fully captured by health status.

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 (panel B of Table A4 in the Appendix). 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 3 indicates that this is indeed the case. The reform increased life satisfaction by 0.06 points among individuals whose family income is lower than $25,000 while it increased life satisfaction by 0.03 points among individuals whose

[14] The impacts of the reform on life satisfaction do not monotonically change by age. One possible explanation is the non-monotonic increases in health insurance coverage across ages (panel A of Table A4).

family income is higher than $75,000. These results imply that the healthcare reform decreased inequality in SWB by income.[15]

B. Internal Validity

We 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 4. We test our findings' robustness by considering alternative control groups. Figure 3 plots the trends of overall life satisfaction by using different control groups. Panel A compares Massachusetts against other northeastern states that are geographically close. Panel B compares Massachusetts against the states chosen by the synthetic control method. Panel C compares Massachusetts against states that experienced similar recession shocks. Panel D compares Massachusetts against the "synthetic Massachusetts" control constructed by using states with similar recession shocks. Weights for constructing the synthetic control states in panels B and D are available in panels A and B of Table A5 in the Appendix. We observe consistent patterns regardless of the control groups' definitions in the sense that i) a parallel trend exists before the Massachusetts reform between Massachusetts and the control states, and ii) Massachusetts' overall life satisfaction level increased compared with that of the control states after the reform. The regression results reported in Table 4 are robust under the alternative control groups in panels A to D. The estimated effects of the reform on i) overall life satisfaction in column (1), ii) probability of either being satisfied or very satisfied in life in column (2), and iii) probability of being very satisfied in column (3) are from 0.027 to 0.037 points, 0.9 to 1.2 percentage points, and 1.6 to 2.5 percentage points, respectively. The results are also robust when using the ordered logit specification (Table A6 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 conservative approach for statistical inferences (Buchmueller et al., 2011). We address this concern by conducting Fisher's (1935) permutation test. We first 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

[15] However, we do not have a clear explanation regarding why the effect of the Massachusetts reform on life satisfaction among individuals in the middle income group ($25,000 to $75,000) level is smaller than that in the higher income group (>$75,000).

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 indicate our baseline estimate with a solid vertical line; the baseline estimate remains outside 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: 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. Figure A1 shows trends of the mental health of the residents of Massachusetts and several control states. In panel A, we use the baseline control states. In panels B to E, we use i) other northeastern states, ii) states used for constructing the "synthetic Massachusetts", iii) states that experienced similar recession shocks, and iv) states used for constructing "synthetic Massachusetts" among those with similar recession shocks. These graphs generally show that days of mental health not good in the past 30 days decreased in Massachusetts as opposed to the control groups once the reform was implemented. Column (1) in Table 5 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% level. Columns (2) to (5) indicate that the results are robust when using the alternative control groups. The estimated effects are from -0.243 to -0.144 days, which are statistically significant at the 1% or 5% level.[16]

Fourth, 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 in Massachusetts and other states; no differential trends were found for the period from 2005 to 2010. In fact, the overall life satisfaction level of the elderly in Massachusetts was even lower in 2009 than in other states. Table 6 reports that the reform did not increase the elderly's life satisfaction regardless of the definitions of control states or outcome variables in panels A to E. The estimated effects of the reform on the elderly's i) overall life satisfaction, ii) probability of either being satisfied or very satisfied,

[16] We use the days of bad mental health as a robustness check for the baseline finding and acknowledge that a similar finding using this measure has been reported in Van der Wees (2013).

and iii) probability of being very satisfied are from -0.022 to -0.0004 points in column (1), -0.4 to -0.2 percentage points in column (2), and -1.8 to 0.3 percentage points in column (3), respectively.

Finally, we use the elderly group as an additional control group. In Figure 6, we plot trends of differences in overall life satisfaction between the non-elderly aged below 65 and the elderly aged 65 and above in both Massachusetts and the baseline control states. The figure shows that life satisfaction sharply increases among the non-elderly compared with the elderly in Massachusetts once the reform was introduced. This finding provides additional evidence that the reform has indeed increased SWB. However, we find little change in differences in life satisfaction between the non-elderly and the elderly in control states. We estimate these differential changes in life satisfaction between the non-elderly and elderly across states by using regression specification (2) in Table 7. Column (1) of panel A shows that the reform increased the cardinal value of life satisfaction by 0.04 points, which is statistically significant at the 1% level. The results are qualitatively similar when using the binary indicators of life satisfaction in columns (2) and (3). The reform increased the probability of either being satisfied or very satisfied and the probability of being very satisfied by 1.2 and 2.7 percentage points, which are statistically significant at the 1% level. The results are also robust when using the aforementioned alternative control groups in panels B to E. The estimated effects of the reform on the i) overall life satisfaction, ii) probability of either being satisfied or very satisfied, and iii) probability of being very satisfied are 0.027 to 0.052 points in column (1), 1.1 to 1.3 percentage points in column (2), and 1.3 to 4.0 percentage points in column (3).

C. External Validity

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 two other healthcare reforms' impacts on SWB: the i) ACA Medicaid expansion in 2014 and ii) Tennessee's Medicaid disenrollment in 2005.

ACA Medicaid Expansion in 2014[17]

The ACA expanded Medicaid eligibility to people earning up to 138% of the federal poverty level, as part of the largest expansion of coverage to non-elderly adults. Although the expansion was originally intended to be enacted nationally, a 2012 U.S. Supreme Court decision made it optional for the states. Thus, some states decided not to expand Medicaid eligibility. To identify the effects of the ACA Medicaid expansion, we compare changes in SWB measured by overall life satisfaction of the residents in "expansion states" and "non-expansion states" before and after 2014 using the PSID, 2009–2017.[18] To implement this research design, we use a DID specification. Specifically, we replace *MA* with *Treat* in the regression specification (1) in which *Treat* is a binary indicator of the "expansion states" and *Post* is 1 if calendar year is 2015 or 2017, and 0 otherwise. Other than these changes, we follow the same notations and use the same control variables as in regression specification (1).

Panel A of Figure 7 shows trends of non-elderly individuals' life satisfaction for expansion and non-expansion states during 2009 to 2017.[19] It shows that individuals in expansion states had lower SWB than those in non-expansion states before the ACA Medicaid expansion. However, the SWB level in expansion states increased after the introduction of the reform, and it became larger than SWB in non-expansion states. We then estimate the effects of the ACA Medicaid expansion on Medicaid coverage and SWB. The estimation results are presented in Table 8. Column (1) shows that the expansion increased Medicaid coverage among individuals aged 18 to 64 years by 4.2 percentage points, which is statistically significant at the 1% level.[20] Column (2) shows that the expansion increased life satisfaction by 0.052 points, which is statistically at the 1% level. While we do not report the results to save space, they are robust under alternative specifications. It is noteworthy that the PSID measures the overall life satisfaction on a scale of 1 to 5, while the BRFSS data report overall life satisfaction on a scale of 1 to 4. Hence, we multiply the ACA Medicaid expansion estimate (0.052) by 0.8 to compare the ACA Medicaid expansion estimate to that of the Massachusetts reform. The adjusted coefficient estimate is about 0.042, which is slightly bigger than our baseline estimates reported in Table 2.

[17] We thank the editor for her suggestion to include the analysis of the effects of the ACA Medicaid expansion on life satisfaction.
[18] Following Simon et al. (2017), we define treatment states as states that expanded Medicaid by December 2015 and control states as states that did not expand Medicaid or expanded later than December 2015.
[19] We borrow the results presented in Panel A of Figure 7 and columns (1) and (2) of Table 8 from Kim and Koh(2019b).
[20] We use data from the American Community Survey, 2009–2017.

Tennessee's Medicaid Disenrollment in 2005

Tennessee discontinued the expansion of its Medicaid program (TennCare) in 2005, and approximately 170,000 adults abruptly lost their Medicaid coverage (Garthwaite et al., 2014). We use other southern states as control states to determine the effect of the Tennessee Medicaid disenrollment using BRFSS data. We define the post-reform period as the survey months after August 2005.[21] Panel B of Figure 7 shows life satisfaction trends of individuals aged 18 to 64 years in Tennessee and other Southern states. It demonstrates that life satisfaction sharply decreased one year after the disenrollment, while there were minimal changes in life satisfaction among residents in the control states. Next, we estimate the effects of TennCare disenrollment on any health insurance coverage and life satisfaction by using the DID specification. The estimation results are reported in columns (3) and (4) of Table 8. Specifically, we replace *MA* with *Treat* in the regression specification (1) in which *Treat* is a binary indicator of treatment states and *Post* is 1 if the calendar year is July 2005 and after, and 0 otherwise. Other than these changes, we follow the same notations and use the same control variables as in regression specification (1). Column (3) indicates that Tennessee's Medicaid disenrollment decreased the proportion of adults aged 18 to 64 years with any health insurance coverage by 6.3 percentage points. Column (4) demonstrates that the Medicaid disenrollment decreased overall life satisfaction in Tennessee by 0.029 percentage points. It is noteworthy that we use only one year as the pre-reform period due to the data limitation of the BRFSS. Nevertheless, this result provides another evidence of the external validity of our main findings.[22]

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 falsification tests support our causal inference. Analyses of the 2014 ACA Medicaid expansion and 2005 Tennessee Medicaid disenrollment provide evidence of external validity of our findings.

[21] 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 reverification of Medicaid eligibility for disenrollment in Tennessee began in late July 2005 (Garthwaite et al., 2014). We use the same set of control variables used in regression specification (1).

[22] Although Tello-Trillo (2016) does not examine life satisfaction, he finds consistent evidence that the number of days with poor mental health increased after the disenrollment of Medicaid in Tennessee.

To further discuss the magnitude of the Massachusetts reform with other public policies, we first calculate the average SWB improvement per health insurance coverage via the reform, which is approximately 0.54 point or a 0.83 standard deviation (SD) of overall life satisfaction.[23] Then, we compare this metric to those of several studies that examine the SWB impacts of public policies such as "Moving to Opportunity" (MTO), minimum wage, and tax rebate during the Great Recession in the United States. Ludwig et al. (2012) find that a 10-percentage-point reduction in tract poverty due to MTO increased life satisfaction by 0.11 SD. Kuroki (2018) demonstrates that a 100% increase in minimum wages raises life satisfaction by about 0.4 SD among individuals who dropped out of high school. Lachowska (2016) indicates that the $950 stimulus tax rebate during the recession increased life satisfaction by 0.32 SD. Our back-of-the-envelope calculations suggest that a 0.83 SD-increase in life satisfaction could be generated by reducing track poverty by about 27 percentage points, increasing minimum wage by around 200%, or providing a stimulus tax rebate of approximately $2,500 during the Great Recession. The comparisons indicate that access to health insurance has a large, positive impact on an individual's overall life satisfaction.

Finally, we discuss whether health insurance gains under different reforms have similar effects on SWB. We first compute the average improvements in life satisfaction per health insurance coverage under the ACA Medicaid expansion and find that it is approximately 1.04 SD.[24] The results indicate that SWB impacts are larger when the increase in health insurance coverage is achieved through the ACA Medicaid expansion than through the Massachusetts healthcare reform, probably because the ACA Medicaid expansion only targets low-income individuals, while the Massachusetts reform targets a broader range of individuals. Since the effects of health insurance on life satisfaction can be heterogeneous by individuals' socioeconomic status (Panel B of Table 3), this heterogeneity in population characteristics might explain different magnitudes across healthcare reforms. Meanwhile, we find that the average reduction in life satisfaction per health insurance coverage of the Tennessee's Medicaid disenrollment is around 0.69 SD, which is similar to the SWB impacts of health insurance gain through Massachusetts's reform.[25] Interestingly, the SWB impacts of

[23] Since Kolstad and Kowalski (2012) estimate that the Massachusetts healthcare reform increased health insurance coverage by 5.7 percentage points, the average SWB improvement per health insurance coverage is 0.54 (=0.031/0.057). The SD of life satisfaction in column (1) of Table 1 is 0.65, and thus, the average SWB improvement per health insurance coverage is 0.83 SD (=0.54/0.65).

[24] The SWB impact per health insurance coverage is around 0.88 points (=0.052/0.042). We transform this into the SD of life satisfaction of the sample used in column (2) of Table 8, which is 0.12 SD (=0.88/0.85).

[25] The SWB impacts per health insurance coverage under the Tennessee reform is around 0.46 points (= -0.029/-0.063). We compare this magnitude to the SD of life satisfaction of the sample used in column (4) of Table 8, which is 0.69 (=0.46/0.67).

gaining and losing Medicaid coverage via the ACA and the TennCare reform are asymmetric. We believe that investigating the robustness of this pattern and the possible mechanisms is interesting but beyond the scope of this study. We leave these as an avenue for future research.

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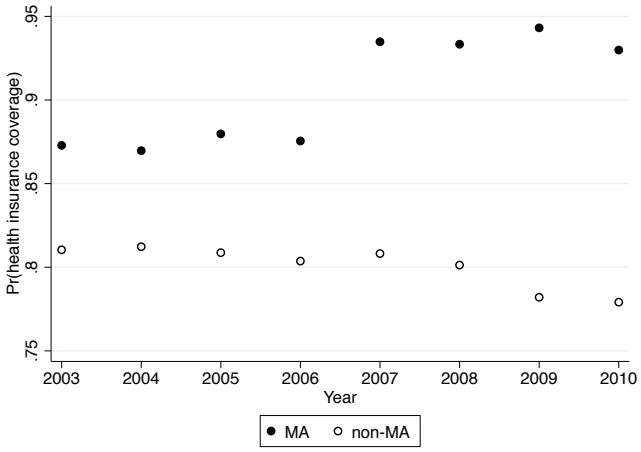
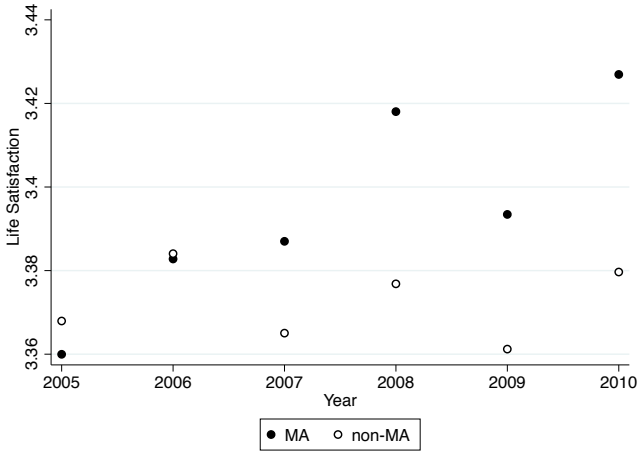
Figures and Tables

Figure 1. Trends of Health Insurance Coverage



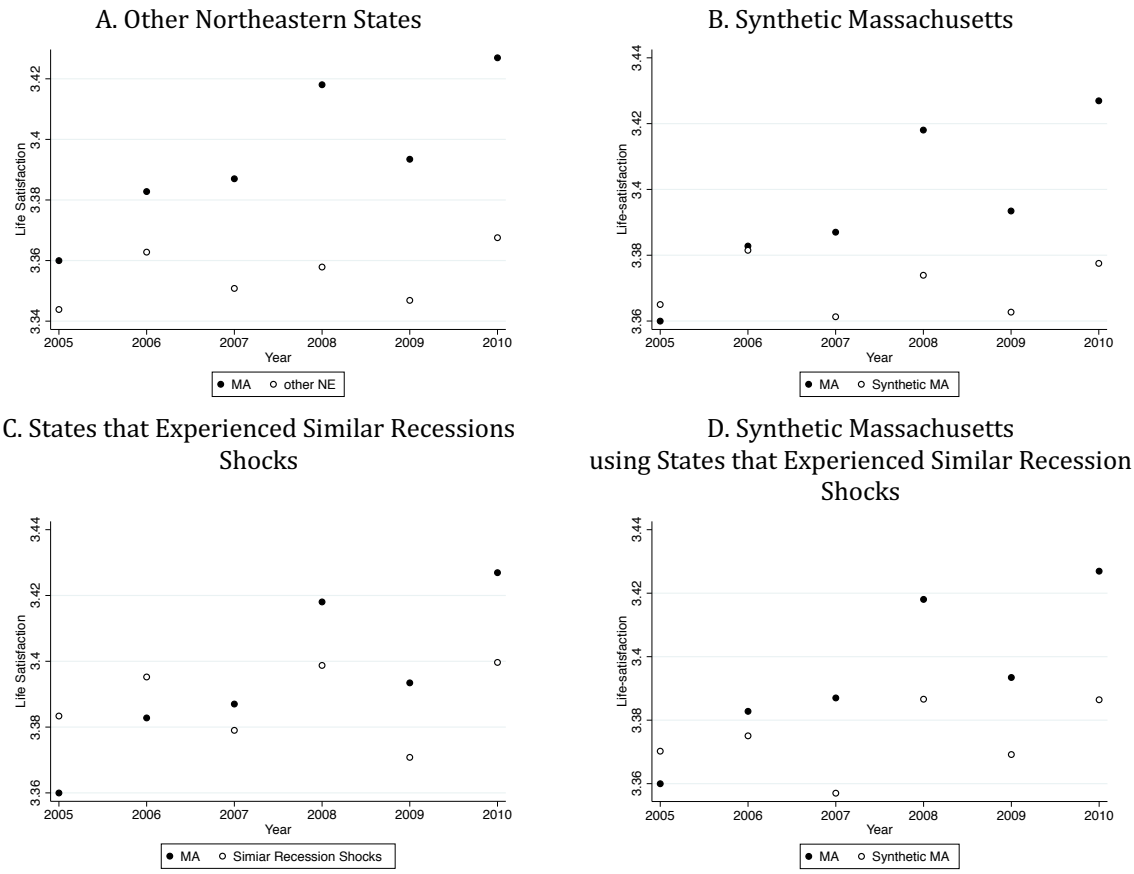
Data source: Current Population Survey (March Supplement), 2003 to 2010
Notes: We restrict the sample to individuals aged 18 to 64 years. The outcome variable is the probability of any health insurance coverage. We use the supplement sampling weight as a probabilistic weight.

Figure 2. Trends of Overall Life Satisfaction



Data source: BRFSS, 2005-2010
Notes: We restrict the sample to individuals aged 18 to 64 years. We use the individual sampling weight as a probabilistic weight.

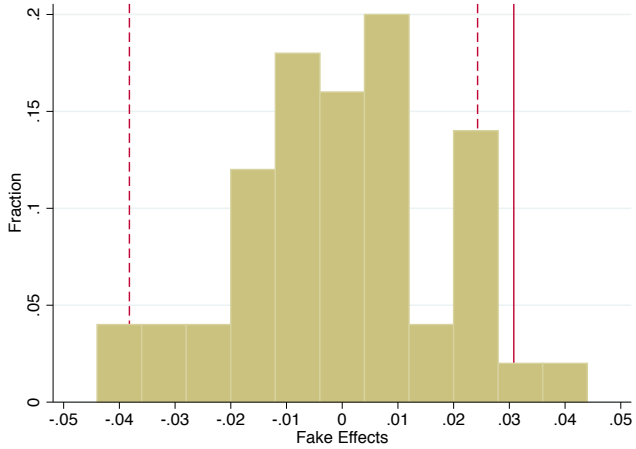
Figure 3. Trends of Overall Life Satisfaction by Alternative Control Groups



Data source: BRFSS, 2005-2010

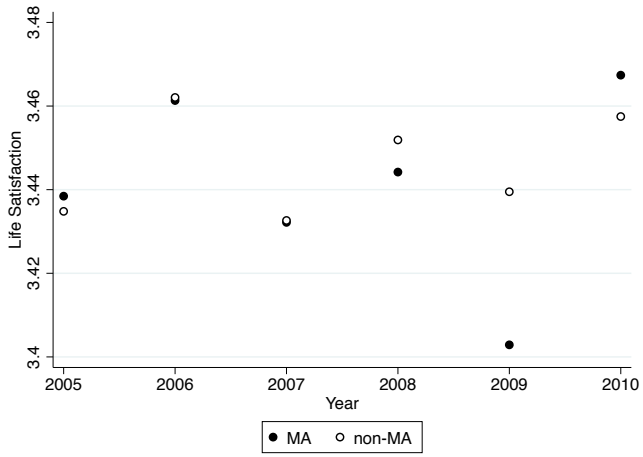
Notes: We restrict the sample to individuals aged 18 to 64 years. In panel A, we use other northeastern states as control states. In panel B, we use overall life satisfaction; age; the age squared dummy for Hispanic ethnicity, gender, white, the number of children; and dummies for marital status and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

Figure 4. Distribution of "Fake" Treatment Effects



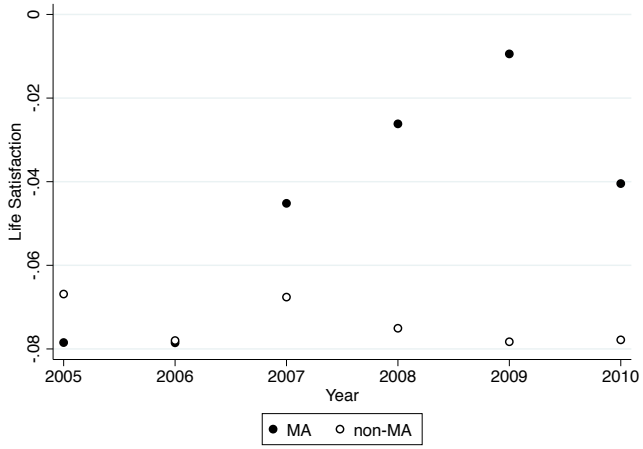
Data source: BRFSS, 2005-2010
Notes: We restrict the sample to individuals aged 18 to 64 years. The solid vertical line indicates the baseline estimate. The dashed vertical lines indicate 5th and 95th percentile values of "fake" treatment effects. We include state-fixed effects; year-fixed effects; age; age squared number of children; and 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. MA = Massachusetts.

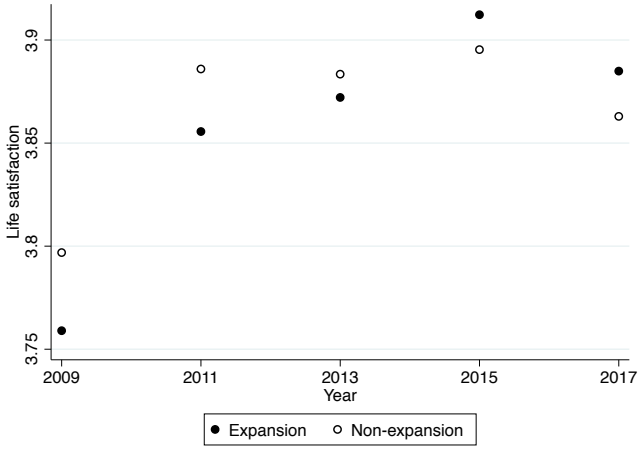
Figure 6. Trends of Differences in Overall Life Satisfaction (Non-elderly and Elderly)



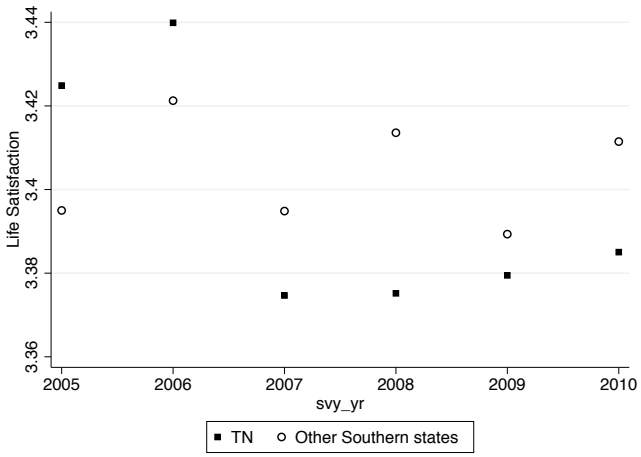
Data source: BRFSS, 2005-2010
Notes: We plot differences in overall life satisfaction between the non-elderly and the elderly. We use the individual sampling weight as a probabilistic weight. MA = Massachusetts.

Figure 7. Trends of Overall Life Satisfaction among Individuals Aged 18 to 64 years: Other Healthcare Reforms

A. 2014 ACA Medicaid Expansion



B. 2005 Tennessee Medicaid Disenrollment



Data sources: the PSID, 2009-2017 (panel A) and the BRFSS, 2005-2010 (panel B)
Notes: We restrict the sample to individuals aged between 18 to 64 years. We use the individual sampling weight as a probabilistic weight.
ACA = Affordable Care Act; TN = Tennessee

Table 1. Summary Statistics

	Massachusetts	Other States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks	Synthetic Massachusetts among States with Similar Recession Shocks
	(1)	(2)	(3)	(4)	(5)	(6)
A. Overall Life Satisfaction						
Overall Life Satisfaction	3.39	3.39	3.36	3.36	3.40	3.39
	(.65)	(.63)	(.63)	(.65)	(.63)	(.65)
Pr(Very Dissatisfied)	.01	.01	.01	.01	.01	.01
	(.11)	(.11)	(.10)	(.12)	(.11)	(.12)
Pr(Dissatisfied)	.05	.04	.04	.04	.04	.04
	(.22)	(.21)	(.23)	(.22)	(.21)	(.23)
Pr(Satisfied)	.49	.50	.52	.52	.48	.49
	(.50)	(.50)	(.50)	(.50)	(.50)	(.50)
Pr(Very Satisfied)	.45	.45	.43	.43	.46	.46
	(.49)	(.50)	(.49)	(.50)	(.49)	(.49)
B. Mental Health						
Number of Days of Mental Health Not Good in the Past 30 Days	3.27	3.40	3.27	3.42	3.49	3.64
	(7.93)	(7.67)	(7.93)	(7.93)	(7.92)	(8.26)
C. Other Characteristics						
Age	46.3	45.7	46.7	46.2	45.7	45.8
	(17.0)	(17.2)	(16.9)	(17.1)	(17.1)	(17.2)
Pr(Hispanic)	.08	.14	.11	.10	.04	.05
	(.29)	(.26)	(.23)	(.23)	(.17)	(.18)
Pr(Male)	.47	.49	.47	.48	.48	.48
	(.49)	(.49)	(.49)	(.49)	(.48)	(.48)
Pr(White)	.21	.18	.17	.18	.18	.19
	(.45)	(.41)	(.43)	(.41)	.(41)	(.41)
Number of Children	.72	.82	.75	.78	.80	.80
	(1.05)	(1.09)	(1.03)	(1.05)	(1.07)	(1.08)
Pr(Married)	.56	.59	.57	.57	.60	.61
	(.50)	(.50)	(.50)	(.50)	(.50)	(.49)
Pr(College)	.67	.58	.59	.58	.56	.57
	(.48)	(.49)	(.49)	(.49)	(.48)	(.50)
Pr(Employed)	.63	.61	.61	.62	.61	.62
	(.49)	(.49)	(.49)	(.49)	(.50)	(.50)
Annual Household Income Distribution						
Pr(< $20K)	.13	.19	.18	.17	.19	.18
	(.39)	(.40)	(.38)	(.39)	(.42)	(.41)
Pr($20K - $35K)	.17	.22	.21	.22	.23	.22
	(.39)	(.43)	(.41)	(.42)	(.43)	(.43)
Pr($35K - $50K)	.14	.16	.16	.16	.17	.17
	(.35)	(.38)	(.37)	(.36)	(.38)	(.38)
Pr($50K - $75K)	.18	.17	.17	.18	.17	.18
	(.38)	(.38)	(.38)	(.37)	(.37)	(.37)
Pr(>$75K)	.37	.25	.28	.27	.24	.26
	(.46)	(.41)	(.45)	(.44)	(.40)	(.40)

Data Source: BRFSS, 2005-2010
Note: Numbers in parentheses are standard deviations.

Table 2. 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***	0.031***	0.031***	0.031***	0.010***	0.010***	0.021***	0.020***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.001)	(0.001)	(0.002)	(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: *(During: July 2006 to June 2007)*								
MA×During	0.015***	-0.007***	0.004*	0.005	0.003***	0.002**	0.003*	0.004*
	(0.001)	(0.003)	(0.002)	(0.003)	(0.001)	(0.001)	(0.002)	(0.003)
MA×After	0.047***	0.028***	0.031***	0.031***	0.012***	0.012***	0.019***	0.018***
	(0.003)	(0.004)	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(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: *(Post1: 2007 to 2008, Post2: 2009 to 2010)*								
MA×Post1	0.036***	0.031***	0.030***	0.029***	0.008***	0.008***	0.022***	0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.002)	(0.002)
MA×Post2	0.044***	0.031***	0.032***	0.032***	0.013***	0.013***	0.019***	0.019***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.002)	(0.002)	(0.003)	(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 to 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; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 3. Heterogeneous Effects of the Massachusetts Healthcare Reform on Overall Life Satisfaction

A. By Age

Age groups	18 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years
	(1)	(2)	(3)	(4)
MA×Post	0.050***	0.020***	0.037***	0.009**
	(0.007)	(0.005)	(0.004)	(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	$25,000 to $75,000	>=$75,000
	(1)	(2)	(3)
MA×Post	0.058***	0.023***	0.033***
	(0.009)	(0.003)	(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 to 64 years. For the dependent variable, we use categorical responses about overall life satisfaction. For control variables, we use age; age squared; number of children; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 4. 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: *Other Northeastern States*			
MA×Post	0.029***	0.012***	0.018**
	(0.007)	(0.002)	(0.006)
Observations	311,548	311,548	311,548
R-squared	0.07	0.03	0.05
B. Alternative Control Group 2: *States used for Synthetic Massachusetts*			
MA×Post	0.027***	0.010***	0.016***
	(0.006)	(0.002)	(0.005)
Observations	301,651	301,651	301,651
R-squared	0.07	0.03	0.06
C. Alternative Control Group 3: *States with Similar Recession Shocks*			
MA×Post	0.032***	0.008**	0.023***
	(0.006)	(0.003)	(0.003)
Observations	266,524	266,524	266,524
R-squared	0.07	0.03	0.05
D. Alternative Control Group 4: *States used for Synthetic Massachusetts among those with Similar Recession Shocks*			
MA×Post	0.037***	0.009**	0.025***
	(0.003)	(0.003)	(0.001)
Observations	211,077	211,077	211,077
R-squared	0.07	0.03	0.06

Data source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18 to 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; Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel C; and Kentucky, Maryland, Nebraska, and Oklahoma in panel D. 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 5. 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)	(5)
MA×Post	-0.165***	-0.161***	-0.144**	-0.243***	-0.170***
	(0.039)	(0.044)	(0.059)	(0.071)	(0.040)
Observations	2,062,310	404,863	406,150	332,693	269,728
R-squared	0.03	0.03	0.03	0.04	0.04
Control Group	Other 50 States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks	States used for Synthetic Massachusetts Among those with Similar Recession Shocks

Data source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18 to 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); Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4); and Kentucky, Maryland, Nebraska, and Oklahoma in column (5). 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 and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 6. Effects of the 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: *Other 50 States*			
MA×Post	-0.010***	-0.002***	-0.007**
	(0.003)	(0.001)	(0.003)
Observations	662,567	662,567	662,567
R-squared	0.04	0.01	0.04
B. Alternative Control Group 1: *Other Northeastern States*			
MA×Post	-0.0004	-0.002	0.003
	(0.006)	(0.002)	(0.006)
Observations	126,238	126,238	126,238
R-squared	0.04	0.01	0.04
C. Alternative Control Group 2: *States used for Synthetic Massachusetts*			
MA×Post	-0.014	-0.004***	-0.009
	(0.010)	(0.001)	(0.009)
Observations	121,038	121,038	121,038
R-squared	0.04	0.01	0.04
D. Alternative Control Group 3: *States with Similar Recession Shocks*			
MA×Post	-0.022**	-0.003	-0.018**
	(0.007)	(0.002)	(0.006)
Observations	110,869	110,869	110,869
R-squared	0.04	0.01	0.04
E. Alternative Control Group 4: *States used for Synthetic Massachusetts among those with Similar Recession Shocks*			
MA×Post	-0.017*	-0.003	-0.013*
	(0.008)	(0.003)	(0.006)
Observations	90,268	90,268	90,268
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; Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel D; and Kentucky, Maryland, Nebraska, and Oklahoma in panel E. 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; and dummy variables for Hispanic and Caucasian 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 7. Effects of the Massachusetts Healthcare Reform on Overall Life Satisfaction: Triple Difference in Differences Estimation

Dependent Variables	Overall Life Satisfaction (1)	Pr(Very Satisfied or Satisfied) (2)	Pr(Very Satisfied) (3)
A. Control Group: *Other 50 States*			
MA×Post×Non-elderly	0.040***	0.012***	0.027***
	(0.004)	(0.001)	(0.003)
Observations	2,253,388	2,253,388	2,253,388
R-squared	0.06	0.02	0.05
B. Alternative Control Group 1: *Other Northeastern States*			
MA×Post×Non-elderly	0.027***	0.013***	0.013**
	(0.005)	(0.003)	(0.005)
Observations	437,786	437,786	437,786
R-squared	0.06	0.03	0.05
C. Alternative Control Group 2: *States used for Synthetic Massachusetts*			
MA×Post×Non-elderly	0.038***	0.014***	0.024**
	(0.011)	(0.002)	(0.009)
Observations	422,689	422,689	422,689
R-squared	0.06	0.03	0.05
D. Alternative Control Group 3: *States with Similar Recession Shocks*			
MA×Post×Non-elderly	0.052***	0.011***	0.040***
	(0.003)	(0.001)	(0.003)
Observations	377,393	377,393	377,393
R-squared	0.06	0.03	0.05
E. Alternative Control Group 4: *States used for Synthetic Massachusetts among those with Similar Recession Shocks*			
MA×Post×Non-elderly	0.052***	0.012***	0.037***
	(0.004)	(0.001)	(0.004)
Observations	301,345	301,345	301,345
R-squared	0.06	0.03	0.05

Data source: BRFSS, 2005-2010

Notes: 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; Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel D; and Kentucky, Maryland, Nebraska, and Oklahoma in panel E. 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; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table 8. Effects of Other Healthcare Reforms on Health Insurance Coverage and Life Satisfaction

Healthcare Reforms	ACA Medicaid Expansion		Tennessee Medicaid Disenrollment	
Dependent Variables	Pr(Medicaid Coverage)	Overall Life Satisfaction	Pr(Any Coverage)	Overall Life Satisfaction
	(1)	(2)	(3)	(4)
Treat×Post	0.042***	0.052**	-0.063***	-0.029***
	(0.008)	(0.022)	(0.005)	(0.005)
Pre-periods Mean (SD)	0.12	3.74	0.88	3.38
	(0.32)	(0.86)	(0.32)	(0.67)
Observations	17,102,379	107,887	553,785	530,100
R-squared	0.09	0.08	0.15	0.06

Data sources: American Community Survey, 2009 to 2017 for column (1), PSID, 2009-2017 for column (2), and BRFSS, 2005-2010 for columns (3) and (4)

Notes: We restrict the sample to individuals aged 19 to 64 years. For dependent variables, we use dummy variables indicating Medicaid coverage and any health insurance coverage in columns (1) and (3), and categorical responses about overall life satisfaction in columns (2) and (4). For control variables, we use age; age squared; number of children; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. ACA = Affordable Care Act; SD = standard deviation.

Appendix

Table A1. List of States that 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 to 2009
Notes: We restrict the sample to those aged 18 to 4 years. We use the supplemental sampling weight as a probabilistic weight.

Table A2. 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***	0.027***	0.026***	0.006***	0.007***	0.021***	0.021***
	(0.003)	(0.004)	(0.003)	(0.001)	(0.001)	(0.002)	(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 to 64 years. For dependent variables, we use categorical responses about life satisfaction in columns (1) to (3) and dummy variables indicating very satisfied or satisfied in columns (4) and (5) and indicating very satisfied in columns (6) and (7). 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table A3. The Effects of the Massachusetts' Health Reform on Overall Life Satisfaction: Using an Alternative Definition of the "During" Period (April 2006 to 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***	-0.012***	0.003	0.003	0.004***	0.003**	0.002	0.003
	(0.001)	(0.003)	(0.003)	(0.004)	(0.001)	(0.001)	(0.002)	(0.003)
MA×After	0.051***	0.025***	0.031***	0.030***	0.013***	0.013***	0.018***	0.018***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.003)	(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 to 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; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table A4. Heterogeneous Effects of the Massachusetts Healthcare Reform on Health Insurance Coverage

A. By Age

Age groups	18 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years
	(1)	(2)	(3)	(4)
MA×Post	0.053***	0.029***	0.034***	0.035***
	(0.005)	(0.004)	(0.004)	(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 to $75,000	>=$75,000
	(1)	(2)	(3)
MA×Post	0.093***	0.060***	0.010***
	(0.005)	(0.003)	(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 to 64 years. For dependent variable, we use a dummy variable indicating any health insurance coverage. In all specifications, we control for state- and year-fixed effects; age; age squared; number of children; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Table A5. State Weights in Synthetic Massachusetts

A. Whole states

State	Weight	State	Weight
Alabama	0	Montana	0
Alaska	0	Nebraska	0
Arizona	0	Nevada	0
Arkansas	0	New Hampshire	0
California	0	*New Jersey*	*0.165*
Colorado	0	New Mexico	0
Connecticut	*0.267*	*New York*	*0.169*
Delaware	0	North Carolina	0
District of Columbia	*0.011*	North Dakota	0
Florida	0	Ohio	0
Georgia	0	Oklahoma	0
Hawaii	0	Oregon	0
Idaho	0	Pennsylvania	0
Illinois	0	*Rhode Island*	*0.281*
Indiana	*0.005*	South Carolina	0
Iowa	0	South Dakota	0
Kansas	0	Tennessee	0
Kentucky	*0.012*	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	*Wisconsin*	*0.014*
Missouri	*0.076*	Wyoming	0

B. States with Similar Recession Shocks

State	Weight
Kentucky	0.422
Louisiana	0
Maryland	0.111
Nebraska	0.403
Oklahoma	0.064
Vermont	0

Data source: BRFSS, 2005-2010.
Notes: We restrict the sample to individuals aged 18 to 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; and dummy variables for Hispanic ethnicity, gender, and white, and fixed effects for marital status, education, income category, and labor force status.

Table A6. Ordered Logit Estimation of the Effects of the Massachusetts Healthcare Reform on Overall Life Satisfaction

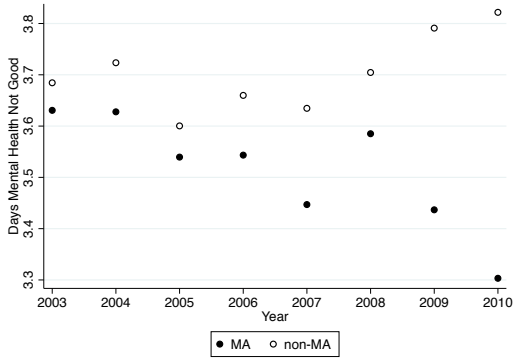
Dependent Variables	Overall Life Satisfaction				
	(1)	(2)	(3)	(4)	(5)
MA×Post	0.10***	0.09***	0.09***	0.10***	0.11***
	(0.01)	(0.03)	(0.02)	(0.02)	(0.01)
Observations	1,590,821	311,548	301,651	259,028	211,077
Control Group	Other 50 States	Other Northeastern States	States used for Synthetic Massachusetts	States with Similar Recession Shocks	States used for Synthetic Massachusetts Among those with Similar Recession Shocks

Data source: BRFSS, 2005-2010

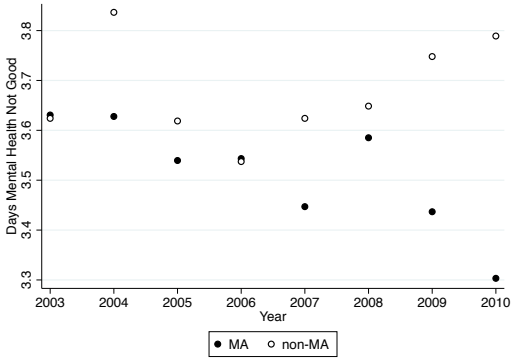
Notes: We restrict the sample to individuals aged 18 to 64 years. For the control group, we use all states except for Massachusetts in column (1). As alternative control groups, we use northeastern states in column (2); Connecticut, District of Columbia, Indiana, Kentucky, Missouri, New Jersey, New York, Rhode Island, and Wisconsin in column (3); Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in column (4); and Kentucky, Maryland, Nebraska, and Oklahoma in column (5). 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; and 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. ***, **, and * represent $p<0.01$, $p<0.05$, and $p<0.1$, respectively. MA = Massachusetts.

Figure A1. Trends of Mental Health

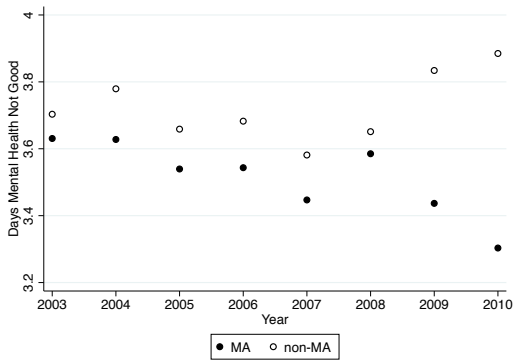
A. All other 50 states



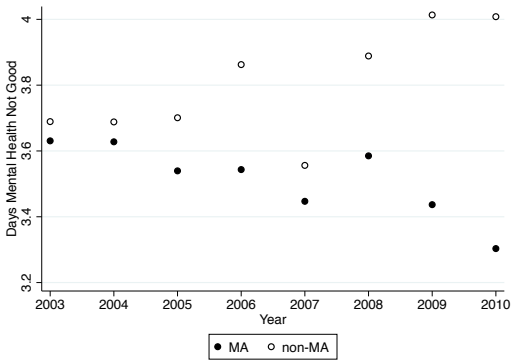
B. Northeastern States



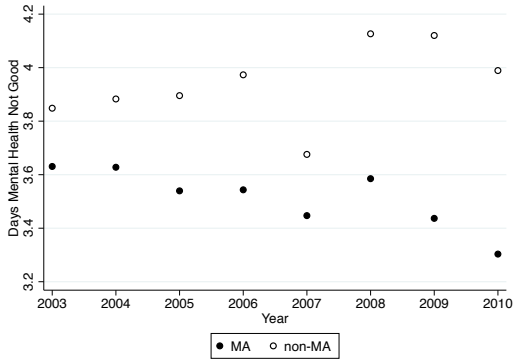
C. States used for synthetic Massachusetts



D. States with similar recession shocks



E. States used for synthetic Massachusetts Among States with Similar Recession Shocks



Data source: BRFSS, 2005-2010

Notes: We restrict the sample to individuals aged 18 to 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; Kentucky, Louisiana, Maryland, Nebraska, Oklahoma, and Vermont in panel D; and Kentucky, Maryland, Nebraska, and Oklahoma in panel E. We use the individual sampling weight as a probabilistic weight.