

Health Insurance and Marriage Behavior: Will Marriage Lock Hold Under Healthcare Reform?

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Abstract

Spousal healthcare coverage can potentially cause “marriage lock” in which couples stay married for the sake of health insurance benefits. However, the “marriage lock” effect may change under healthcare reforms. In this paper, I examine the impact of the 2006 Massachusetts healthcare reform on marriage and divorce decisions. I hypothesize that the individual mandate make people stay/get married to get health insurance, while the exchange markets will the reduce people’s reliance on marriage to get health insurance. Using American Community Survey data, I find that the 2006 healthcare reform increased incentives for marriage in Massachusetts relative to neighboring states. Specifically, the reform appears to have reduced the divorce rate by 0.5 percentage point and increased the marriage rate by 1.4 percentage points. These findings provide evidence that the “marriage lock” effect exists and it changes under healthcare reforms.

Key Words: Marriage Lock, Health Care Reform, Health Insurance Exchanges, Employer Sponsored Health Insurance, Marriage Behavior

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1 Introduction

It is well documented that the reliance on employer-sponsored health insurance (ESI) could cause the so-called “job lock” effect. That is, for the sake of health insurance benefits some individuals choose to stay in jobs that they might otherwise leave (e.g., Madrian (1994) and Gruber and Madrian (2004)). Chen (2018) proposes a related hypothesis called “marriage lock”, arguing that the spousal benefits of ESI may also influence the marriage and divorce decisions. That is, individuals who would otherwise want a divorce may choose to stay in marriage because they are currently covered by their spouse’s ESI and would lose such coverage upon divorce. Thus, this health insurance conundrum could result in the so-called “marriage lock,” due to high premiums in the non-group health insurance market and the possibly prohibitive health costs of being uninsured.

Chen (2018) examines the hypothesis of marriage lock using Medicare eligibility at age 65 to study later life divorce decisions for individuals with the spousal health insurance coverage dependence. Her findings demonstrate that individuals who lack an alternative source of health insurance coverage except through a spouse’s insurance plan are more likely to get divorced after they qualify for Medicare at age 65, suggesting that health insurance coverage could serve as a marriage lock.

Considering the impact of “marriage lock” may change under recent healthcare reforms, in this paper I examine the marriage lock hypothesis via the lens of the 2006 Massachusetts healthcare reform. The Massachusetts healthcare insurance reform law enacted in 2006, is the model of ACA healthcare reform. The law mandates that nearly every resident of Massachusetts obtain a state government-regulated minimum level of healthcare insurance coverage. Furthermore, the law established Massachusetts’s exchange market, the Commonwealth Health Insurance Connector Authority (known as

the Connector), which offers affordable private insurance plans to non-group residents.

Given these two new properties introduced by the reform, which are individual mandate and exchange market, I hypothesize that there could be two different effects on marriage behavior respectively. On one hand, individual mandate may make people more likely to get/stay married. Before the reform, many people especially those who are young and healthy, if they divorce, their first choice could be been uninsured rather than going to the expensive non-group market. However, the individual mandate under the reform roles out this option and it becomes more necessary for those people to get health insurance through their marriage. One the other hand, the new created exchange market brings more affordable and generous health insurance plans to people who used to go to the non-group market. For those people, the availability and affordability of the exchange market will reduce divorce costs and they may be less likely to get/stay married.

In this paper, I use the 2006 Massachusetts health care reform to test the hypothesis and examine which effect dominates in reality. I apply the difference in differences (DID) approach for changes in Massachusetts residents' marriage behavior from 2006, by comparing with neighboring states without such healthcare reform. Available data require that I focus on divorce and marriage levels (i.e., the fraction of the population that is divorced or married), rather than flows of newly divorced and newly married people. My estimates suggest that the incentives for marriage improve under the 2006 Massachusetts healthcare reform; the fraction of the population divorced in Massachusetts has declined by approximately 0.5 ppts since 2006, and the fraction married has increased by approximately 1.4 ppts. The results suggest that the effects of individual mandate may dominate the effects of exchange markets on marriage behavior in Massachusetts from 2006 to 2010. During that period 2006 to 2010, the insurance plans on the health exchange market are still relatively expensive even though government subsidies make

them more affordable. Therefore, individuals whose previous default plan is being uninsured may have an increased incentive to be married in order to obtain coverage from spousal health insurance to avoid the penalty. This is the converse side of marriage lock: remaining or becoming married so as to be eligible for employer sponsored (subsidized) health insurance.

The results shed light on whether the recent health insurance system affects marriage behavior in the United States. Chen (2018) suggests that health insurance coverage may serve as a marriage lock, possibly due to the high cost of health insurance. When alternative cheap or almost free health insurance plans are available, such as Medicare, couples may be more likely to divorce. Under the recent reforms, insurance plans provided on the health exchange markets with government subsidies are more affordable than the previous non-group plans. However, these health exchange insurance plans may still be relatively expensive compared with the ESI health insurance plans despite government subsidies. In addition, the individual mandate of healthcare reform requires nearly everyone including people who previously would like to be uninsured to purchase health insurance coverage or pay a penalty. Thus, marrying or remaining married to someone who is eligible for ESI may be the lowest cost way for those who had not been previously insured to obtain coverage, particularly those who would like to be uninsured rather than go to the non-group market.

This paper studies how healthcare reforms could change people's marriage behavior. The results are of considerable interest to policymakers who promote marriage and marital stability. Furthermore, understanding the effects of individual mandate, allowing spousal coverage through ESI, and changes in the health insurance markets on marriage behavior is becoming increasingly important as the US continues to restructure its healthcare system.

2 Literature Review

A large existing economics literature examines the extent to which health insurance influences individuals' behavior in the labor market. For example, employees who prefer health insurance coverage may be willing to forgo other benefits, job attributes, or wages in order to obtain employer-provided coverage (Rosen, 1986). Many economists and health policy experts examine the job lock effect of ESI on labor market mobility. The classic study by Madrian (1994) estimates that job lock reduces the voluntary turnover rate of those with ESI by 25%, a rate that has been revised down by subsequent studies. Rust and Phelan (1997) study find significant "security value" for individuals to remain employed until they are eligible for Medicare coverage at age 65. Rogowski and Karoly (2000) study the role of health insurance in the retirement decisions of older workers and find that access to post-retirement health insurance has a large effect on retirement. Gruber and Madrian (2004) conclude that health insurance has important effects on both labor force participation and job choice. Some other papers have also empirically analyzed the effects of health insurance coverage on entrepreneurship and self-employment, such as Fairlie, Kapur, and Gates (2011). In addition, evidences of a similar effect of health insurance coverage on welfare recipients suggest that "welfare lock" is statistically significant but relatively small in magnitude (Ellwood and Adams, 1990; Yelowitz, 1995; Livermore, Roche, and Prenovitz, 2009).

In addition, a large body of work on family structures focus on how access to spousal health insurance may affect people's marriage behavior. Buchmueller and Carpenter

(2010) study the response of same-sex couples to the option of receiving health insurance through a spouse's employer to find that lesbians are more likely to have insurance through a spouse's employer and less likely to work full-time. In addition, access to spousal health insurance has been used in several studies on health insurance and job mobility or business creation (Madrian, 1994; Holtz-Eakin, Penrod, and Rosen, 1996; Kapur, 1998; Madrian and Lefgren, 1998; Wellington, 2001).

From the literature, it is clear that health insurance has an important influence on many decisions, including retirement, limited job-to-job mobility, entrepreneurship, and self-employment decisions. However, there are limited studies to investigate the effect of health insurance coverage on people's marriage behavior. Chen (2018) examines the hypothesis of marriage lock using Medicare eligibility at age 65 to study later life divorce decisions for individuals with the spousal health insurance coverage dependence. Her findings demonstrate that individuals who lack an alternative source of health insurance coverage except through a spouse's insurance plan are more likely to get divorced after they qualify for Medicare at age 65. Some recent studies have identified the effects of dependent mandate on young adults' marriage behavior. Abramowitz(2016) finds that the ACA mandate leads to fewer young adults' marrying, and Barkowski and McLaughlin (2018) suggests that the effects of the ACA dependent coverage mandate actually depends on the pre-existing state laws.

3 2006 Massachusetts Healthcare Reform

In 2006, Massachusetts had a health care reform with the aim of providing health insurance to nearly all of its residents. The law mandated that nearly every resident of Massachusetts obtain a minimum level of insurance coverage, provided free and subsidized health care insurance for residents earning less than 150% and 300%, respectively, of the federal poverty level (FPL).

For the goal of near-universal coverage, the 2006 Massachusetts reform created a first-in-the-nation individual mandate, which required most residents over 18 to obtain and maintain creditable health coverage, so long as affordable coverage is available to them, or pay penalties. The law approved standards for what is affordable at different income levels and also for what constitutes “minimum creditable coverage”, which is the minimum level of health insurance coverage that residents must have in order to satisfy the requirements of the individual mandate. The Massachusetts Department of Revenue is responsible for enforcing the individual mandate through state income tax returns. With some exceptions, failure to meet the individual mandate could result in losing personal income tax exemption and a fine for each month the individual does not have coverage. The fine was not more than 50 percent of the premium for the least costly insurance plan available meeting the standard for minimum creditable coverage.

The 2006 Massachusetts law also established an independent public health insurance exchange market, called the Connector, to offer affordable non-group insurance plans with subsidies to low-to-moderate income residents. Approximately two-thirds of Massachusetts’s previously-uninsured residents were covered, but few of them used the Connector to buy full-priced insurance. The reform expanded insurance coverage through Medicaid, the state-run federal program designed for low-income people, by approximately 30 percent among nonelderly residents of Massachusetts.

Modeled on legislation passed in Massachusetts in 2006, the ACA healthcare reform

contains many provisions that are similar to that state's reform. Thus, Massachusetts changes undertaken in 2006 provide a novel opportunity for analyzing the impact of a mandated expansion in health insurance coverage as well as an exchange market for affordable non-group health insurance plans.

4 Data

Focusing on the exchange market under the 2006 Massachusetts healthcare reform, I use the 2001–2011 American Community Survey (ACS), which includes households and people representing 1% of the American population for the 11 years from 2001 to 2011. I want to have a clear comparison between the state with healthcare reform and the states without, thus I don't include more recent years in my sample, because the comprehensive ACA healthcare reform law enacted in March 2010 and other states may take steps for ACA healthcare reform as approaching 2014. In addition, I provide a robustness check by restricting the study period to 2009, because recent literature (Akosa Antwi, Moriya, and Simon 2013) suggest that young adults' marriage behavior could potentially have been affected by the ACA dependent coverage mandate nationally starting from 2010.

To study how marriage behavior is affected by the healthcare reform, I use Massachusetts' residents in 2006 (and the only one before the ACA), as the treatment group. I choose New Jersey and Connecticut as the control group because they have the most similar divorce and marriage patterns to Massachusetts before 2006. The ACS data sample that I use has a very large sample size and includes 329,666 observations in Massachusetts, 430,490 observations in New Jersey, and 174,789 observations in Connecticut. Table 1 provides a statistics summary of demographic, employment, and marriage status information.

Because the ACS does not attempt to reinterview the same individuals, my analysis examines the levels of marriage and divorce, not the flow of new divorces and marriages. Following convention, I call these marriage rates and divorce rates, but this needs to be understood as the levels, not flows. Focusing on both marriage and divorce rates, I construct the sample to include all individuals aged 20 to 64 in the treatment and control groups. I do not focus on people aged 65 and older in this analysis because individuals who are eligible for Medicare should not be affected by the reform, which is confirmed by the additional robustness check.

5 Methods

The general approach I take to identify the effect of healthcare reform on marriage behavior is to compare the divorce and marriage rates between the treatment group (i.e., residents of Massachusetts) who had the individual mandate and obtained additional access to health insurance plans in the health insurance exchange market under the 2006 reform and a control group, which did not. I apply the Difference-in-Difference (DID) method to study Massachusetts residents' marriage behavior after the healthcare reform in 2006 and compare it with the resident marriage behavior in New Jersey and Connecticut.

Although there is considerable flexibility in the choice of control groups in a DID estimator, the comparability of the two groups is important to obtain a consistent estimator. The key assumption, which is likely to hold only if the groups are comparable, is that the outcome in treatment and the control group follow the same time trend in the absence of the treatment. Figure 1 provides a description of the variation of divorce and

marriage rates for Massachusetts, New Jersey, and Connecticut from 2001 to 2011.¹ To better conduct the DID method, I choose New Jersey as the control group, the state with the most similar divorce and marriage patterns to Massachusetts before 2006 (as shown in Figure 1) and include Connecticut to the control group to increase the robustness of the analysis. The DID method allows me to consider the pre-existing differences between the treatment and control groups and the general time trend by measuring divorce rates and marriage rates both before and after the implementation of the healthcare reform in the representative sample of both the participating (i.e., Massachusetts) and non-participating states (i.e., New Jersey and Connecticut). In general, I estimate the following DID model:

$$Y_{ist} = \beta_1 + \beta_2 Treat_{is} + \beta_3 Post_{it} + \beta_4 (Treat * Post)_{ist} + \beta_5 X_{ist} + \lambda_t + \delta_s + \varepsilon_{ist} \quad (5.1)$$

where the dependent variable Y_{ist} equals 1 if the individual is getting a divorce in the divorce estimation or if the individual is getting married in the marriage estimation. $Treat_{is}$ is a dummy indicating whether the individual is in the treatment group, that is, a resident of Massachusetts. $Post_{it}$ is a post-treatment dummy indicating whether the year is after 2006. X_{ist} is a vector of demographic characteristics and control variables. δ_s is the state effect, and λ_t is the year dummy. The coefficient on the interaction between Massachusetts residency and the post-time dummy, β_4 , captures the DID estimate of the effect of healthcare reform on Massachusetts residents' marriage behavior.

¹ In general, northeastern states have lower divorce rates because their citizens are more highly educated and tend to marry at older ages than do people in other regions. New Jersey, New York, and Massachusetts are among the wealthier states in the nation, and economic stability also contributes to marital stability. Thus, I graph divorce and marriage rates for seven states: New York, New Jersey, Connecticut, Vermont, Maine, and New Hampshire. I find that New Jersey has the most similar pattern to Massachusetts regarding both marriage and divorce rates and Connecticut is the second most similar.

To take account that the healthcare reform may have differentially affected the marriage behavior of residents across different subgroups, I study the variation of the effects among subgroups as well. Because there might be an effect at the subgroup level (i.e., state clustering), I first follow the one step method to control for potential clustering of errors to estimate the Eicker-White clustered standard errors at the group level. However, the standard asymptotic arguments for the consistency of clustered standard errors may not apply with the small number of groups in this paper's context; I still run the risk of underestimating standard errors and over-rejecting the null hypothesis using the one-step approach. Therefore, I adopt the two-step estimator suggested by Donald and Lang (2007) and make the generous assumption that unobserved cluster effects are drawn from a homoskedastic normal distribution.

To implement the two-step estimator, I first regress the outcome variables on all individual-level variables and a full set of group dummies or a full set of interaction terms involving group dummies. In the second stage, the estimated coefficients from these group dummies or a full set of dummies for the group-related interaction terms are used as the dependent variables with all group level variables as the independent variables. I calculate the resulting standard errors from this second-stage model considering the group component. Together with the second-stage coefficients, these form t statistics that have a t distribution when the number of groups is small. In sum, the first-stage regression produces estimates of the group level means after considering the variation in the other individual controls. In the second stage, I estimate how much of this variation in these estimated group-level means is predicted by variation in groups.

6 Results

Difference-in-Difference Estimates and State-Specific Time Trend

Specifications 1 and 4 respectively show the one-step OLS and two-step estimators for the DID estimation results of the divorce rates in Table 2 and marriage rates in Table 3, between Massachusetts and New Jersey. The divorce estimates in Table 2 show that the interactions between Massachusetts residency and the post year dummy are negative and statistically significant for all specifications, suggesting that individuals are approximately 0.5 ppts less likely to be divorced in Massachusetts under the 2006 health care reform.

The marriage estimates in Table 3 show that the interaction between Massachusetts residency and the post year dummy of 2006 is positive and statistically significant across specifications. In Specification 4, the two-step estimator for the interaction term suggests an approximate 1.5 ppts increase in the marriage rate in Massachusetts since 2006. This suggests that providing additional access to health insurance coverage in the health insurance exchange market encouraged marriage for residents of Massachusetts under the 2006 Massachusetts Health Care Reform.

In Specification 2 of Tables 1 and 2, I allow for a state-specific time trend in estimating Equation 5.1, which provides slightly larger and generally consistent estimates as the results from other specifications. In general, these results show that individuals are approximately 1.5 ppts more likely to be married and 0.5 ppts less likely to be divorced in Massachusetts in the years following the implementation of the health reform as compared with the years marked by the absence of the healthcare reform. The signs, magnitudes, and significant levels of the coefficients are stable between different specifications.

Figures 2 and 3 depict the year variations in divorce and marriage, respectively. The divorce patterns in Figure 2, as well as the marriage patterns in Figure 3, are similar for

Massachusetts and New Jersey before 2006. However, the divorce and marriage patterns for Massachusetts changed significantly after 2006 relative to those of New Jersey. Figure 2 shows that Massachusetts's divorce rate is generally higher than New Jersey's, but the difference between the two states reduced significantly after 2006. Similarly, Figure 3 shows that Massachusetts's marriage rate is generally lower than New Jersey's, but that this rate increased in Massachusetts after 2006. Figures 2 and 3 suggest that healthcare reform has not had a one-time effect that occurred in 2006 alone but a permanent effect on marriage behavior after 2006.

As the model part indicates, the results suggest that Massachusetts residents are more likely to get and stay married under the healthcare reform. The 2006 Massachusetts Healthcare Reform not only provides additional access to affordable health insurance coverage in the exchange market, but also brings pressure in the form of the individual mandate, which requires nearly all residents to either purchase health insurance coverage if they meet minimum standards or pay a hefty tax fine if affordable coverage is available to them and they do not enroll.² In that case, individuals who would choose to be uninsured previously are more likely to get or stay married to obtain coverage from the spouses.

In conclusion, health insurance coverage may serve as a marriage lock, whereas the price of health insurance is the key to this lock. When there are free or cheap health insurance plans available, such as Medicare, couples can escape from marriage (Chen (2018)); in contrast, when an individual mandate requires nearly everyone to purchase

² The tax penalties for being uninsured as of 2011 are as follows: for individuals between the ages of 18 and 26 with incomes above \$32,496 who do not have health insurance, the penalty is \$72 per month. For people 27 or older with incomes above \$32,496, the penalty increases to \$101 per month. Penalties are doubled for two parent families, in which both are uninsured. Individuals with incomes of less than \$16,248 per year and families with incomes of less than \$33,084 (based on a family of four) are exempt from the tax penalty.

health insurance coverage and the health exchange market can only provide people with relatively expensive health insurance plans, people may lock themselves into marriage to get covered by spousal health insurance.

Another possibility for improving marriage incentives under healthcare reform may be explained by a report released by the Oregon Health Insurance Experiment.³ This broad research program is expected to yield insights into the effects of expanding public health insurance. This study indicates that enrollment in Medicaid substantially increases the use of healthcare services, lowers rates of depression, reduces financial strain, and improves self-reported health and well-being. Thus, people under the healthcare reform have increased incentives for marriage, probably because health insurance coverage can make them feel happier, less stressed, and more optimistic about their health status; furthermore, health insurance coverage may also provide them a sense of security from financial hardship, as suggested by the Oregon study. For all these reasons, expanding health insurance coverage can increase the incentives for marriage under the healthcare reform.

Connecticut Added to Control Group

The estimation results for adding Connecticut to the control group in Specifications 3 and 5 in Tables 1 and 2 are somewhat similar. Specification 3 reports the regular OLS estimates with robust standard errors clustered at the state level, and Specification 5 reports the two-step estimates. Similar to the results in other specifications, the coefficients on the interaction between Massachusetts residency and post year dummy of 2006 are positive for marriage rates and negative for divorce rates, both of which are

³ The Oregon Health Insurance Experiment, an outgrowth of Oregon's 2008 lottery to allocate Medicaid slots to eligible residents, released their second year of results in May 2013. Evidence using the randomized controlled design showed that Medicaid coverage generated no statistically significant improvements in measured physical health outcomes in the first 2 years, but did generate increased healthcare use, higher rates of diabetes detection and management, lower rates of depression, and lower financial strain.

statistically significant under the one-step OLS estimation. However, the two-step estimate for the divorce estimation in Specification 5 of Table 2 is no longer significant. The coefficient estimates imply that the probability of marriage has increased approximately 1.2 ppts and that the probability of divorce has decreased approximately 0.4 ppts in Massachusetts since the operation of the health exchange market started in 2006.

DID Estimates for Different Subgroups

I also focus on various effects of the 2006 Massachusetts Healthcare Reform on different income, education and age subgroups. Table 4 reports the main effects for two income subgroups who would be affected by the healthcare reform: 150% to 300% of the FPL and above 300% of the FPL. The main effects refer to the DID coefficients on interaction terms among Massachusetts residency dummy and post 2006 dummy for each income subgroups. Each cell is from a separate regression. Specification 1 reports regular OLS estimates with robust standard errors clustered at the state level, and Specification 2 controls for the state-specific time trend. In addition, the two-step estimates that adjust for standard errors are reported in Specification 3. The estimates in Table 4a show that the effects of the healthcare reform on divorce are pronounced mostly for individuals between 150% and 300% of the FPL with relatively low income who are not eligible for Medicare. Individuals between 150% and 300% of the FPL are approximately 1.1 ppts less likely to be divorced in the years following the implementation of the healthcare reform in Massachusetts as compared with before. In contrast, individuals in the subgroups that make above 300% of FPL are not significantly affected in their divorce decisions by the healthcare reform.

In Table 4b, I find that the most pronounced effect of the healthcare reform on marriage is still for individuals in the category of 150-300% of the FPL, that is, people

with relatively low incomes who are not eligible for Medicaid or free health care under the reform. Those individuals are approximately 2.6 ppts more likely to be married in the years following the implementation of the healthcare reform in Massachusetts than prior. Again, people who are above 300% of FPL are not significantly affected in their marriage decisions by healthcare reform.

I then consider that income could change due to the reform, as Shi (AJHE, 2016) finds income manipulation around 300% FPL and 150% FPL due the Massachusetts healthcare reform. However, the data is repeated cross-section data, which doesn't allow me to track the flow of those key variables. Thus, I use educational attainment as an alternative but not perfect measure. The results are reported in Table 5. I divide the sample into three education attainment subgroups, which are people less than high school, high school graduates, and people with at least some college. Both the divorce estimates and the marriage estimates have the same sign as previous estimates, though the magnitudes and significances vary across specifications. Generally speaking, the divorce estimations suggest that the high school graduate's subgroup has the largest magnitude, while people with less than high school and at least some college have relatively smaller effects under the reform.

In addition, I capture the effects of the changes in marriage behavior for different age groups associated with the healthcare reform. According to my hypothesis, some people especially for those young and healthy may choose to be uninsured before the reform instead of going to non-group market, thus the effects of individual mandate are dominating for them. When people get older, the demand of health insurance increase and the effect of individual mandate should get smaller with age. To test this hypothesis, I divide the sample into several age groups, age 20 to 29, age 30 to 39 and age 40 to 55. I restrict the sample to individuals aged 20 to 55, since people aged 55 to 64 have several

other factors, such as retirement, pension, social security and health insurance coverage which may influence their marriage decision. For example, Chen (2018) studies the effects of approaching age 65 for Medicare on elderly couple's divorce decisions.

Table 6 shows the possible effects of the healthcare reform on divorce and marriage among these three age groups. The main effects in Table 6 refer to the DID coefficients on interaction terms among Massachusetts residency dummy and post 2006 dummy for each age subgroups. Specification 1 reports regular OLS estimates with robust standard errors clustered at the state level and Specification 2 controls for the state-specific time trend. In addition, the two-step estimates to adjust for standard errors are reported in Specification 3. Consistent with my hypothesis, the results suggest that the 2006 healthcare reform seems to have the greatest and most significant effect on marriage behavior for young individuals. And the magnitude and significance level of the effects decrease for the subgroup aged 40-55, as those people have an increasing demand of healthcare and the individual mandate has a smaller effect on them.

Elderly Population Estimates as a Placebo Test

Furthermore, I estimate a regression as a placebo test that only includes people aged 65 and older in the sample who already have access to Medicare health insurance coverage to test whether there are still significant changes in the divorce and marriage rates in Massachusetts after 2006.

Tables 7a and 7b report estimates of divorce and marriage rates in Massachusetts compared with the control state, New Jersey, for people aged 65 and above. In Table 7a, the coefficient on the interaction between Massachusetts residency and post year dummy of 2006 is negative for divorce rates estimation; however, it is not statistically significant. Thus, there is no significant change in the divorce rate in Massachusetts compared with the control state for those aged 65 and above. The estimates in Table 7b report that

Massachusetts residents aged 65 and older are approximately 0.7 ppts more likely to be married in the years following the implementation of the healthcare reform than prior. However, the two-step estimate in Specification 3 is not significant either. Generally speaking, the large reduction in magnitude and statistical significance level suggest that health insurance exchanges probably have very little effect on marriage behavior for people who already have Medicare health insurance coverage.

Study Period from 2001 to 2009 as a Robustness Check

Lastly, some recent literature (Akosa Antwi, Moriya, and Simon 2013) suggest that young adults' marriage behavior could potentially have been affected by the ACA dependent coverage mandate nationally starting from 2010. Thus, I restrict the study period to 2009 as a robustness check. Table 8a and Table 8b reports the main results on marriage behavior remain robust when the study period is restricted to 2009. The results suggest that the dependent coverage mandate are probably not the main driver of the increased incentives of marriage in Massachusetts.

7 Conclusion

I focus on how marriage behavior changes with the healthcare system using Massachusetts as the treatment group, which has had a healthcare reform since 2006. I find that the 2006 healthcare reform in Massachusetts reduces divorce rates by approximately 0.5 ppt and increases marriage rates by approximately 1.4 ppts. Although small, because of the large samples, used these estimates are precisely estimated to be different from zero.

My estimates suggest that health insurance coverage could serve as a marriage lock and that the price of health insurance could be the key. When there are cheap or almost

free health insurance plans available such as Medicare (Chen 2018), couples may be more likely to escape from marriage. In contrast, the healthcare reform not only introduces a more affordable health insurance market i.e. the exchange market, but also brings the pressure of individual mandate. Therefore, individuals who lose their “uninsured” options may have an increased incentive to be married in order to obtain coverage from spousal health insurance under the healthcare reform. This is the converse side of job lock: remaining or becoming married so as to be eligible for employer sponsored (subsidized) health insurance.

Table 1: Summary Statistics

variable	mean	sd	min	max
<i>Marriage Status</i>				
divorced	0.0900	0.290	0	1
married	0.600	0.490	0	1
<i>Employment and Income</i>				
Personal Income	48825	64028	-20000	1.200e+06
Employed	0.750	0.430	0	1
Employer Sponsored Health Insurance	0.350	0.480	0	1
<i>Demographic characteristics</i>				
Age	42.84	12.27	20	64
Female	0.520	0.500	0	1
Disability	0.590	0.490	0	1
Number of Children	0.860	1.110	0	9
<i>Education</i>				
Less than high school	0.390	0.490	0	1
High school graduate	0.130	0.340	0	1
Some college	0.0900	0.280	0	1
College graduate and higher	0.400	0.490	0	1

Note: Source: ACS 2001-2011. N=760,156. Age Range: 20-64.

Table 2: Difference in Difference Estimates of Divorce Rates Under the 2006 Massachusetts Healthcare Reform from 2001 to 2011

Whether the Individual is Divorced	OLS			Two-Step Estimator	
	(1)	(2)	(3)	(4)	(5)
Treat Group (MA Residency)	.0104** (.0004)	.0102** (.0003)	.0104*** (.0019)	.0104*** (.0025)	.0036 (.0029)
Post Year (Year >=2006)	.0023*** (.0001)	.1045** (.0041)	.0925** (.0036)	.0046*** (.0013)	.0037* (.0018)
Treat Group* Post Year (MA Residency) * (Year>=2006)	-.0039** (.0002)	-.0069** (.0003)	-.0042*** (.0027)	-.0046** (.0019)	-.0037 (.0040)
Personal Income	6.64e-08*** (9.19e-10)	.6.46e-08*** (9.43e-10)	5.78e-08*** (4.98e-09)	4.66e-07*** (5.91e-09)	4.77e-08*** (4.97e-09)
Education Level	-.0037* (.0006)	-.0037* (.0006)	-.0039*** (.0001)	-.0029*** (.0002)	-.0039*** (.0001)
Gender	.0290** (.0009)	.0290* (.0009)	.0289*** (.0006)	.0440*** (.0007)	.0305*** (.0006)
Race	.0042*** (.0002)	.0010 (.0004)	-.0011*** (.0002)	.0042*** (.0002)	.0008*** (.0002)
Disability	.0045 (.0014)	.1944** (.0069)	.0136*** (.0013)	.0045*** (.0014)	.0108*** (.0013)
Employment	-.0250 (.0008)	-.0220 (.0052)	.0236*** (.0007)	-.0250*** (.0008)	.0276*** (.0007)
Employer Sponsored Health Insurance	-.0836*** (.0014)	-.0061*** (.0006)	-.0064*** (.0010)	-.0836*** (.0015)	-.0248*** (.0011)
Citizenship	-.0252*** (.0012)	-.0059 (.0022)	-.0074*** (.0010)	-.0252*** (.0011)	-.0050*** (.0010)
Number of Children	-.0673*** (.0003)	-.0097*** (.0001)	-.0095*** (.0003)	-.0673*** (.0003)	-.0086*** (.0003)
Age	.0062*** (.0001)	.0047** (.0003)	.0047*** (.0001)	.0062*** (.0001)	.0049*** (.0001)
Year Effect	Yes	Yes	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes	No	No
Connecticut Added to Control Group	No	No	Yes	No	Yes

Note: Source: ACS 2001-2011. N=760,156. Age Range: 20-64. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. The dependent variable is a dummy variable that equals 1 if the individual is divorced. For Specification for the two-step estimator, the estimates for the first three key independent variables are reported from the second step, and all others estimates are reported from the first step.

Table 3: Difference in Difference Estimates of Marriage Rates Under the 2006 Massachusetts Healthcare Reform

Whether the Individual is Married	OLS			Two-Step Estimator	
	(1)	(2)	(3)	(4)	(5)
Treat Group (MA Residency)	-.0205*** (.0001)	-.0174*** (.0001)	.0184*** (.0011)	-.0215*** (.0051)	.0152** (.0032)
Post Year (Year >=2006)	-.0282*** (.0004)	-.2345** (.0057)	-.2336*** (.0025)	-.2170** (.0033)	-.0242*** (.0031)
Treat Group* Post Year (MA Residency) * (Year>=2006)	.0133** (.0004)	.0150** (.0006)	.0124*** (.0014)	.0145** (.0069)	.0124*** (.0044)
Personal Income	4.66e-07*** (6.34e-09)	4.66e-07*** (6.31e-09)	4.62e-07*** (5.06e-09)	4.66e-07*** (5.91e-09)	4.63e-07*** (5.06e-09)
Education Level	.0029 .0008	.0029 (.0008)	.0032*** (.0002)	.0029*** (.0002)	.0032*** (.0001)
Gender	-.0440* (.0070)	-.0440* (.0070)	-.0431*** (.0006)	-.0440*** (.0007)	-.0431*** (.0007)
Race	.0042* (.0005)	.0042* (.0005)	.0040*** (.0002)	.0042*** (.0002)	.0040*** (.0002)
Disability	-.0045 (.0039)	-.0045 (.0039)	-.0030** (.0013)	-.0045*** (.0014)	.0030** (.0013)
Employment	.0250** (.0020)	.0250** (.0021)	.0254** (.0007)	.0250*** (.0008)	-.0253*** (.0007)
Employer Sponsored Health Insurance	.0831* (.0084)	.0836* (.0084)	.0854*** (.0014)	.0836*** (.0015)	.0855*** (.0014)
Citizenship	.0251** (.0012)	.0252** (.0018)	.0267*** (.0011)	.0252*** (.0012)	.0264*** (.0011)
Number of Children	.0673*** (.0001)	.0673*** (.0001)	.0668*** (.0003)	.0673*** (.0003)	.0667*** (.0003)
Age	.0062** (.0002)	.0062** (.0002)	.0062*** (.0001)	.0062*** (.0001)	.0070*** (.0001)
Year Effect	Yes	Yes	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes	No	No
Connecticut Added to Control Group	No	No	Yes	No	Yes

Note: Source: ACS 2001-2011. N=760,156. Age Range: 20- 64. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. The dependent variable is a dummy variable that equals 1 if the individual is married. For Specification for the two-step estimator, the estimates for the first three key independent variables are reported from the second step, and all others estimates are reported from the first step.

Table 4: Difference in Difference Estimates for Marriage Behavior by Income Groups Under the 2006 Massachusetts Healthcare Reform

a: Main Effects of The Healthcare Reform on Divorce	OLS		Two-Step Estimator
	(1)	(2)	(3)
150 -300% FPL	-.0091** (.0005)	-.0040 (.0074)	-.0111** (.0046)
Above 300% FPL	-.0025** (.0000)	-.0070** (.0029)	-.0023 (.0023)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

b: Main Effects of The Healthcare Reform on Marriage	OLS		Two-Step Estimator
	(1)	(2)	(3)
150-300% FPL	.0216*** (.0004)	.0129** (.0076)	.0257** (.0102)
Above 300% FPL	.0062*** (.0001)	.0054* (.0031)	.0066 (.0040)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

Note: Source: ACS 2001-2011. N=760,156. Age Range: 20-64. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. Each cell is from a separate regression. The dependent variable in divorce estimation is a dummy variable that equals 1 if the individual is divorced, and the dependent variable in marriage estimation is a dummy variable that equals 1 if the individual is married; the main independent variables include Massachusetts residency dummy, post 2006 dummy, income penalty group dummy, and their interaction terms. The DID coefficients on interaction terms among Massachusetts residency dummy and post 2006 dummy are indicated on the row label as the main effects. All specifications include controls for age, income, education, gender, race, disability, years married, times married, number of children, health insurance coverage, and other interaction terms.

Table 5: Difference in Difference Estimates for Marriage Behavior by Education Level Groups Under the 2006 Massachusetts Healthcare Reform

a: Main Effects of The Healthcare Reform on Divorce	OLS		Two-Step Estimator
	(1)	(2)	(3)
Less than high school	-0.0021 (.0002)	-0.0048* (.0002)	-0.0025 (.0025)
High school graduate	-0.0034 (.0004)	-0.0185* (.0009)	-0.0001 (.0028)
At least some college	-0.0031** (.0000)	-0.0095** (.0001)	-0.0022 (.0014)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

b: Main Effects of The Healthcare Reform on Marriage	OLS		Two-Step Estimator
	(1)	(2)	(3)
Less than high school	.0111* (.0003)	.0123** (.0047)	.0099** (.0046)
High school graduate	.0125* (.0003)	.0098 (.0070)	.0171 (.0104)
At least some college	.0147* (.0006)	.0175*** (.0038)	.0127* (.0044)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

Note: Source: ACS 2001-2011. N=760,156. Age Range: 20-64. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. Each cell is from a separate regression. The dependent variable in divorce estimation is a dummy variable that equals 1 if the individual is divorced, and the dependent variable in marriage estimation is a dummy variable that equals 1 if the individual is married; the main independent variables include Massachusetts residency dummy, post 2006 dummy, income penalty group dummy, and their interaction terms. The DID coefficients on interaction terms among Massachusetts residency dummy and post 2006 dummy are indicated on the row label as the main effects. All specifications include controls for age, income, education, gender, race, disability, years married, times married, number of children, health insurance coverage, and other interaction terms.

Table 6: Difference in Difference Estimates for Marriage Behavior by Age Groups Under the 2006 Massachusetts Healthcare Reform

a: Main Effects of The Healthcare Reform on Divorce	OLS		Two-Step Estimator
	(1)	(2)	(3)
Age 20-29	-.0020*** (.0000)	-.0045* (.0024)	-.0023 (.0023)
Age 30-39	-.0012* (.0002)	-.0037 (.0048)	-.0007 (.0027)
Age 40-55	-.0004 (.0004)	-.0017 (.0079)	-.0020 (.0022)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes
b: Main Effects of The Healthcare Reform on Marriage	OLS		Two-Step Estimator
	(1)	(2)	(3)
Age 20-29	.0142** (.0006)	.0122*** (.0046)	.0155** (.0065)
Age 30-39	.0125** (.0007)	.0097* (.0057)	.0141* (.0077)
Age 40-55	.0061* (.0001)	.0073 (.0070)	.0094 (.0061)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

Note: Source: ACS 2001-2011. N=619,285. Age Range: 20-55. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. Each cell is from a separate regression. The dependent variable in divorce estimation is a dummy variable that equals 1 if the individual is divorced, and the dependent variable in marriage estimation is a dummy variable that equals 1 if the individual is married; the main independent variables includes Massachusetts residency dummy, post 2006 dummy, and their interaction terms. The DID coefficients on interaction terms among Massachusetts residency dummy, and post 2006 dummy are indicated on the row label as the main effects. All specifications include controls for age, income, education, gender, race, disability, years married, times married, number of children, health insurance coverage, and other interaction terms.

Table 7: Robustness Check of Marriage Behavior for People Aged 65 and Older Between Massachusetts and New Jersey

a: Main Effects of The Healthcare Reform on Divorce	OLS		Two-Step Estimator
	(1)	(2)	(3)
Treat Group (MA Residency)	.0077*** (.0016)	.0080** (.0034)	.0078** (.0024)
Post Year (>=2006)	.0176*** (.0051)	.1061*** (.0039)	.0174* (.0079)
Treat Group* Post Year (MA Residency) * (>=2006)	-.0008 (.0022)	-.0012 (.0038)	-.0010 (.0039)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes
b: Main Effects of The Healthcare Reform on Marriage	OLS		Two-Step Estimator
	(1)	(2)	(3)
Treat Group (MA Residency)	-.0130*** (.0024)	-.0130*** (.0034)	-.0132** (.0055)
Post Year (>=2006)	-.3308*** (.0127)	-.3333*** (.0159)	-.3327*** (.0197)
Treat Group* Post Year (MA Residency) * (>=2006)	.0071** (.0026)	.0072* (.0040)	.0070 (.0044)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

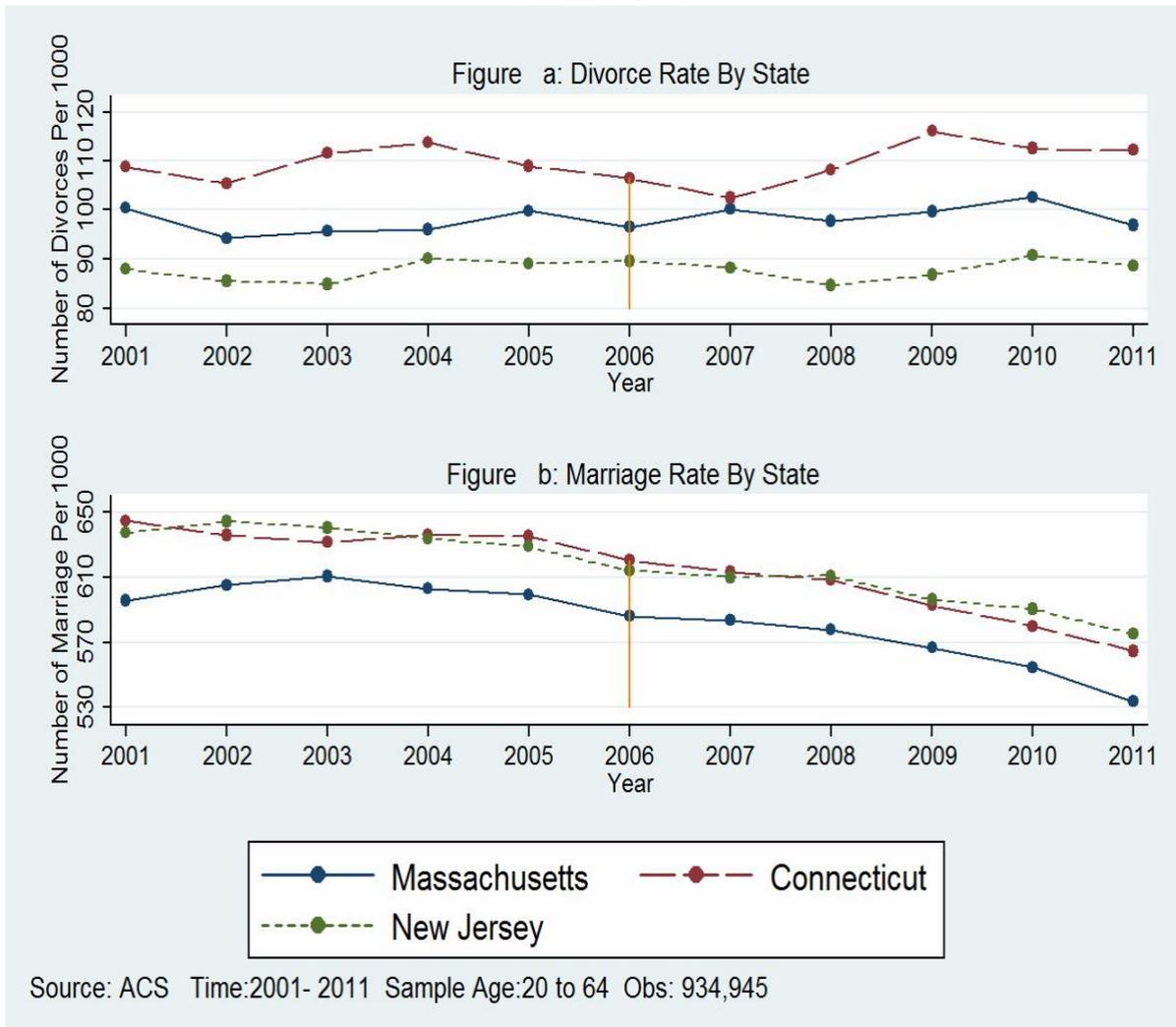
Note: Source: ACS 2001-2011. N= 197,644. Age Range: 65 and up. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. The dependent variable in divorce estimation is a dummy variable that equals 1 if the individual is divorced, and the dependent variable in marriage estimation is a dummy variable that equals 1 if the individual is married. All specifications include controls for age, income, education, gender, race, disability, years married, times married, number of children, and health insurance coverage.

Table 8: Robustness Check of Marriage Behavior under MA Healthcare Reform from 2001 to 2009

a. Whether the Individual is Divorced	OLS		Two-Step
	(1)	(2)	(3)
Treat Group (MA Residency)	.0092*	.0122*	-.0030**
	(.0004)	(.0004)	(.0010)
Post Year (Year >-2006)	.0478*	.0486	.0013
	(.0035)	(.0044)	(.00101)
Treat Group* Post Year (MA Residency) * (Year>=2006)	-.0013*	-.0030*	-.0013
	(.0001)	(.0001)	(.0015)
b. Whether the Individual Married	OLS		Two-Step
	(1)	(2)	(3)
Treat Group (MA Residency)	-.0192**	-.0161***	-.0202***
	(.0001)	(.0021)	(.0023)
Post Year (Year >-2006)	-.231*	-.227***	-.0104***
	(.0113)	(.0040)	(.0024)
Treat Group* Post Year (MA Residency) * (Year>=2006)	.0094**	.0112***	.0104**
	(.0000)	(.0027)	(.0034)
Year Effect	Yes	Yes	Yes
State-Specific Time Trend	No	Yes	Yes

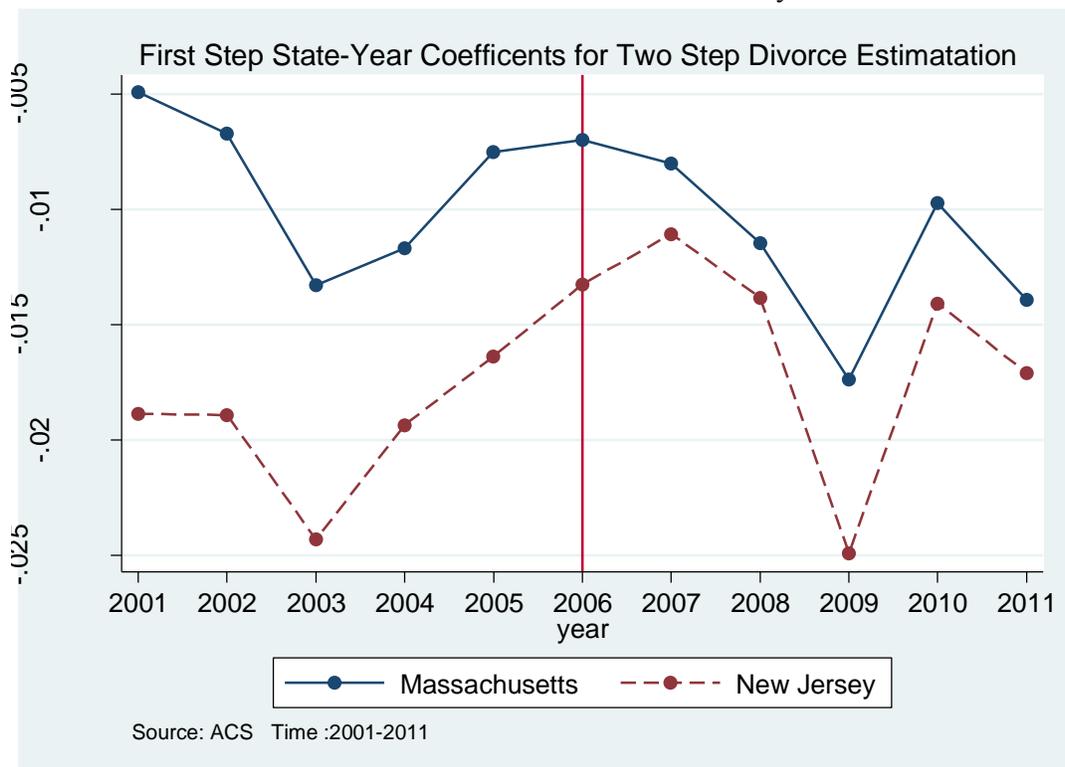
Note: Source: ACS 2001-2009. N= 576,090. Age Range: 20-64. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively. Control variables include age, number of children, personal income, education level, gender, race, disability, employment, ESI, citizenship, whether spouse is employed and whether the spouse has ESI. Standard errors for OLS regressions are robust, clustered by state and shown in parentheses. The dependent variable is a dummy variable that equals 1 if the individual is divorced/married.

Figure 1: Divorce Rates and Marriage Rates for Massachusetts, New Jersey, and Connecticut



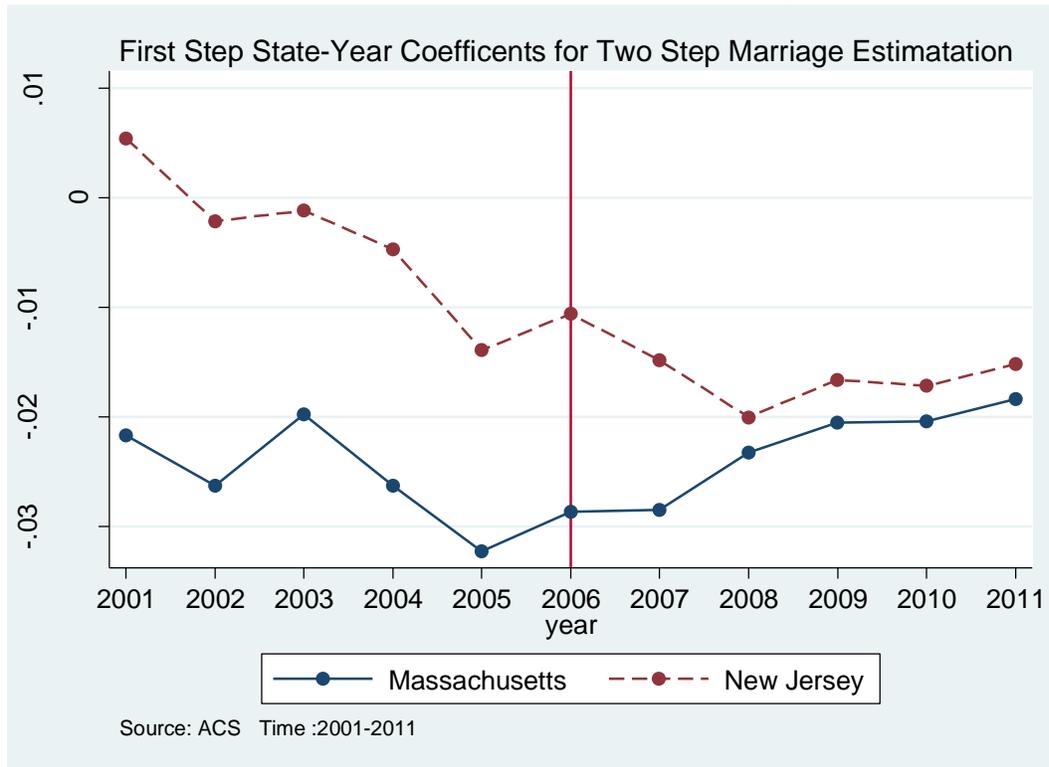
Note: Divorce rate is defined as the number of divorced individuals per 1000 population in Figure 3a, and marriage rate is defined as the number of married individuals per 1000 population in Figure 3b. Individuals in the sample are between the ages of 20 and 64. Data source is American Community Survey (ACS) 2001-2011 and N=934,945.

Figure 2: First Step State-Year Coefficients for Divorce Estimation Between Massachusetts and New Jersey



Note: Data source is American Community Survey (ACS) 2001-2011, and individuals in the sample are between ages 20 and 64. The treatment state is Massachusetts, and the control state is New Jersey. The “Mean State Effects by Year” are the estimates for the coefficient of the interaction terms between state and year from the first step by using the two-step estimation method.

Figure 3: First Step State-Year Coefficients for Marriage Estimation between Massachusetts and New Jersey



Note: Data source is American Community Survey (ACS) 2001-201, and individuals in the sample are between ages 20 to 64. The treatment state is Massachusetts, and the control state is New Jersey. The “Mean State Effects by Year” are the estimates for the coefficient of the interaction terms between state and year from the first step by using the two-step estimation method.

References

- Abramowitz, Joelle. 2016. "Saying, 'I Dont': The Effect of the Affordable Care Act Young Adult Provision on Marriage." *Journal of Human Resources* 51 (4):933–60.
- Akosa Antwi, Yaa, Asako S. Moriya, and Kosali Simon. 2013. "Effects of Federal Policy to Insure Young Adults: Evidence from the 2010 Affordable Care Act's Dependent Coverage Mandate." *American Economic Journal: Economic Policy* 5 (4):1–28.
- Barkowski, Scott and McLaughlin, S. Joanne, (2018), "In Sickness and in Health: The Influence of State and Federal Health Insurance Coverage Mandates on Marriage of Young Adults in the USA", working paper
- Becker, Gary S., (1981), *A Treatise on the Family*. Cambridge, MA: Harvard University Press.
- Becker, Gary S., Elisabeth M. Landes, and Robert T. Michael, (1977), "An Economic Analysis of Marital Instability," *Journal of Political Economy*, 85(6), 1141–1187.
- Buchmueller Thomas and Christopher S. Carpenter, (2010), "Disparities in Health Insurance Coverage, Access, and Outcomes for Individuals in Same-Sex Versus Different-Sex Relationships, 2000–2007," *American Journal of Public Health*, 100(3), 489–495.
- Chen, Tianxu, (2018), "Health Insurance Coverage and Marriage Behavior: Is There Evidence of Marriage Lock?", working paper.
- Donald, Stephen G., and Kevin Lang, (2007), "Inference with Difference-in-Differences and Other Panel Data," *The Review of Economics and Statistics*, MIT Press, 89(2), 221–233.
- Eibner, Christine, Federico Girosi, Carter C. Price, Amado Cordova, Peter S. Hussey, Alice Beckman, Alice and Elizabeth A. McGlynn, (2010), *Establishing State Health Insurance Exchanges: Implications for Health Insurance Enrollment, Spending, and Small Businesses*. Santa Monica, CA: RAND Corporation.
- Ellwood, David and E. Kathleen Adams, (1990), "Medicaid Mysteries: Transitional Benefits, Medicaid Coverage, and Welfare Exits," *Health Care Financing Review*, (Annual Supplement), 119–31.
- Fairlie, Robert W., Kanika Kapur, and Susan Gates (2011), "Is Employer-Based Health Insurance a Barrier to Entrepreneurship?" *Journal of Health Economics*, 30(1), 146–162.
- Gruber, Jonathan and Brigitte C. Madrian (2004), "Health Insurance, Labor Supply and Job Mobility: A Critical Review of the Literature," In *Health Policy and the Uninsured*, Catherine McLaughlin (Ed.), 97–178. Washington, D.C.: Urban Institute Press.
- Holtz-Eakin, Douglas, John R. Penrod, Harvey S. Rosen, (1996), "Health Insurance and the Supply of Entrepreneurs," *Journal of Public Economics*, 62(1–2), 209–235.

- Kapur, Kanika, (1998), “The Impact of Health on Job Mobility: A Measure of Job-Lock,” *Industrial and Labor Relations Review*, 51(2), 282-298.
- Livermore, Gina, Allison Roche, and Sarah Prenovitz, (2009), “Work Activity and Use of Employment Supports under the Original Ticket to Work Regulations: SSI and DI Beneficiaries with Work-Related Goals and Expectations,” Washington, D.C.: Mathematica Policy Research.
- Madrian, Brigitte C., (1994), “Employment-Based Health Insurance and Job Mobility: Is There Evidence of Job-Lock?” *The Quarterly Journal of Economics*, 109(1), 27–54.
- Madrian, Brigitte C. and Lars John Lefgren. 1998. “The Effect of Health Insurance on Transitions to Self Employment,” unpublished paper (University of Chicago)
- Rogowski Jeanette A. and Lynn A. Karoly, (2000), “Health Insurance and Retirement Behavior: Evidence from the HRS,” *Journal of Health Economics*, 19(4), 529-539.
- Rosen, Sherwin, (1986,) “Prizes and Incentives in Elimination Tournaments,” *American Economic Review*, 76(4), 701-715.
- Rust, John and Christopher Phelan, (1997), “How Social Security and Medicare Affect Retirement Behavior in a World of Incomplete Markets,” *Econometrica*, Econometric Society, 65(4), 781-832.
- Shi, Julie, (2016), “Income Responses to Health Insurance Subsidies: Evidence from Massachusetts,” *American Journal of Health Economics*, Vol. 2, No. 1, pp. 96–124
- The Affordable Care Act: Improving Incentives for Entrepreneurship and Self-Employment.
- U.S. Government Accountability Office (2013), Range of Health Insurance Premiums in 2013. July 23. <http://www.gao.gov/assets/660/656121.pdf>
- Wellington, Alison J., (2001), “Health Insurance Coverage and Entrepreneurship,” *Contemporary Economic Policy*, 19(4), 465-478.
- Yelowitz Aaron S., (1995), “The Medicaid Notch, Labor Supply and Welfare Participation: Evidence from Eligibility Expansions,” *Quarterly Journal of Economics*, 110(4), 909-939.