Which Groups Benefited Most from the 2006 Massachusetts Health Care Reform?

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Abstract

We study the effects of the 2006 Massachusetts Health Care Reform on health insurance coverage rates. Using a difference-in-differences design, we find that the number of insured individuals decreased by five percentage points, or 60 percent. This decline is primarily driven by low-income and young individuals, whose uninsurance rate declines by 11 and 15 percentage points, respectively. This is consistent with these groups' lower baseline coverage rates and the reforms' expansion of programs to target these groups.

Introduction/Literature Review

The Massachusetts Health Care Reform was established in response to the 2005/6 Deficit Reduction Act passed during the Bush Administration. The Administration wanted to reduce the government budget deficit by sharing the costs of healthcare expenditures with individual states. This led to various state-level healthcare reforms across the country, one of which was Massachusetts. The Massachusetts reform made individuals and families with incomes up to 300% of the Federal Poverty Level (FPL) eligible for subsidies on their health insurance premiums. These subsidies were heterogeneous at 50% intervals. For example, individuals with incomes under 150% of the FPL had their health insurance completely subsidized,and then the subsidies decreased for each 50 percentage point increase in income over the FPL (and were 0 if income is over 300% of the FPL.)

The law established an individual mandate to purchase health insurance and fined individuals up to 50% of the lowest cost premium they qualified for otherwise. It also required employers who have 11 or more employees to pay for their employees' health insurance or face an annual fine of up to $295 per employee. This act was a precursor to the 2010 Affordable Care Act, which attempted to scale the Massachusetts reform at the national level. Other states were also required to adjust their healthcare policies as a result of the Deficit Reduction Act, but no state (besides Vermont which passed their healthcare reform in 2007) was able to achieve close to universal coverage.

Previous literature has discussed the effects of the Massachusetts Health Care reform on healthcare outcomes. This literature has found improved general health outcomes such as Emergency Room admission (Miller 2012, Van der Rees et al 2013), reduced financial difficulties through higher credit scores and reduced likelihood of personal bankruptcy Mazumder and Miller (2016), and increased healthcare access (Miller 2012, Pande et al 2011). Mazumder and Miller (2016) use a triple differences design to control for differential trends in age.

Data description

We supplemented the cpsinsure.dta dataset provided with CPS core data. We do this by adding more detailed data on demographics, insurance outcomes, labour statistics, and education characteristics.

Empirical Strategy

Difference in Differences

Our goal is to estimate the average treatment effect of the treated (ATET) units for health insurance takeup and age. We do this by using a simple difference in differences design where our outcome is Y_{sti}, a dummy variable representing whether individual i in state s at year t has health insurance coverage. We define α_s to be a state fixed effect, δ_t to be a year fixed effect, and δ to be an individual fixed-effect. $Reform_s$ is defined as a binary treatment variable taking value 1 if the state is Massachusetts and taking value 0 if not. The indicator variable simply indicates whether τ is equal to t. We run the regression separately for low-income and young individuals when examining heterogeneous treatment effects.

$$Y_{ist} = \alpha_i + \alpha_s + \delta_t + \sum_{\tau=2001\tau,\neq 2006}^{2013} \beta_\tau \left(\text{Reform}_s \times I(t=\tau)\right) + \epsilon_{ist} \tag{1}$$

We use New Hampshire, Connecticut, Rhode Island, and Maine as our control group. (ie $Reform_s = 0$). We exclude Vermont because it enacted a similar reform to Massachusetts in 2007, which would lead to a negatively biased estimate of health insurance uptake. This represents most states in New England which we expect have similar demographic characteristics to Massachusetts as they are all predominantly white and highly educated relative to the rest of the country. In the below discussion, the outcome variable is the take up of health insurance.

For differences in differences to identifying ATET, we rely on the parallel trends assumption holding between our treated unit and control units in each of our specifications. The parallel trends assumption requires that in the absence of treatment, the trend in the take-up rates of insurance in Massachusetts must be the same as the trend in the take-up rates of insurance in the control group. To examine this, we test pretrends and demonstrate that pretrends are insignificant for each specification. This is shown in Figures 1-4. However, our identifying assumption could be violated if there are time shocks that affect control states more than Massachusetts. An example would be that perhaps the Great Recession in 2008 affected some states more than others. We show that our result is robust to excluding certain states that experienced a larger shock, such as Maine, mitigating this concern.

Further we require the Stable Unit Treatment Value Assumption (SUTVA) to hold in our sample to insure that treatment effects in Massachusetts are not being biased by any extraneous factors. SUTVA is not violated insurance take up would not be plausibly affected by policy changes in other states. In extension, we need the treatment dummy to be uncorrelated with other unobservables, since this was a federally mandated policy change this is also likely to be satisfied.

We demonstrate through an event study that there was approximately a 0.05 reduction in the proportion of individuals uninsured in Figure 1. In figure 2 we show an approximately 0.05 increase in the proportion of individuals covered by insurance in Massachusetts. In figure 3, we show an approximately 0.11 reduction in the number of uninsured for individuals in the bottom income tercile and no reduction for those in the top income tercile. In figure 4 we show the heterogeneity of healthcare coverage by age. For young individuals, between ages 18-30 inclusive, we observe a 0.12 reduction in the proportion of individuals who are uninsured. This is statistically significant. For old individuals, between ages 50-64 inclusive, we observe a more muted 0.04 reduction in the proportion of individuals who are uninsured, which is initially insignificant, but becomes significant in 2012. The above results demonstrate that the 2006 Massachusetts Health Care Reform led to greater number of people insured, particularly those who are young and poor.

This paper demonstrates that the reform accomplished at least some of what it was intending to do. There was an expansion of health care coverage to those who needed it, the poor, through the enrollment of more low risk young individuals. Consequently the Massachusetts Health Care Reform did what it was intended to- provide nearly universal health coverage. This was unique to the Massachusetts policy and other states which did not implement this policy did not achieve such stellar results.

Python Code

Appendix A: Panel OLS Regression Results

PanelOLS Estimation Summary

Dep. Variable:	not_insured	R-squared:	0.0065
Estimator:	PanelOLS	R-squared (Between):	-0.1946
No. Observations:	26035	R-squared (Within):	0.0031
Date:	Sat, Mar 30 2024	R-squared (Overall):	-0.0982
Time:	21:11:07	Log-likelihood	-6826.2
Cov. Estimator:	Clustered		
		F-statistic:	8.5167
Entities:	6570	P-value	0.0000
Avg Obs:	3.9627	Distribution:	F(15,19437)
Min Obs:	1.0000		
Max Obs:	15.000	F-statistic (robust):	5.6911
		P-value	0.0000
Time periods:	14	Distribution:	F(15,19437)
Avg Obs:	1859.6		
Min Obs:	1071.0		
Max Obs:	2035.0		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
mass_2001	-0.0289	0.0394	-0.7329	0.4637	-0.1062	0.0484
mass_2002	-0.0108	0.0407	-0.2639	0.7918	-0.0906	0.0691
mass_2003	0.0065	0.0408	0.1604	0.8726	-0.0735	0.0866
mass_2004	0.0124	0.0424	0.2931	0.7695	-0.0707	0.0956
mass_2005	0.0484	0.0431	1.1239	0.2611	-0.0360	0.1329
mass_2006	-0.0285	0.0433	-0.6578	0.5107	-0.1134	0.0564
mass_2008	-0.1146	0.0394	-2.9113	0.0036	-0.1918	-0.0374
mass_2009	-0.1185	0.0378	-3.1363	0.0017	-0.1926	-0.0444
mass_2010	-0.1387	0.0377	-3.6742	0.0002	-0.2127	-0.0647
mass_2011	-0.1180	0.0381	-3.0989	0.0019	-0.1926	-0.0434
mass_2012	-0.1860	0.0384	-4.8459	0.0000	-0.2612	-0.1108
mass_2013	-0.1192	0.0373	-3.1912	0.0014	-0.1924	-0.0460
New Hampshire	-0.0645	0.0467	-1.3799	0.1676	-0.1560	0.0271
Rhode Island	0.0044	0.0435	0.1001	0.9203	-0.0810	0.0897
Vermont	-0.0715	0.0379	-1.8889	0.0589	-0.1457	0.0027

(a) OLS result for young people

PanelOLS Estimation Summary

Dep. Variable:	not_insured	R-squared:	0.0022
Estimator:	PanelOLS	R-squared (Between):	-0.0793
No. Observations:	30006	R-squared (Within):	-0.0003
Date:	Sat, Mar 30 2024	R-squared (Overall):	-0.0374
Time:	21:11:08	Log-likelihood	2178.0
Cov. Estimator:	Clustered		
		F-statistic:	3.4809
Entities:	6778	P-value	0.0000
Avg Obs:	4.4270	Distribution:	F(15,23200)
Min Obs:	1.0000		
Max Obs:	16.000	F-statistic (robust):	2.5875
		P-value	0.0007
Time periods:	14	Distribution:	F(15,23200)
Avg Obs:	2143.3		
Min Obs:	1028.0		
Max Obs:	2451.0		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
mass_2001	0.0013	0.0256	0.0497	0.9604	-0.0489	0.0515
mass_2002	-0.0024	0.0252	-0.0958	0.9237	-0.0519	0.0470
mass_2003	0.0394	0.0261	1.5099	0.1311	-0.0118	0.0906
mass_2004	0.0180	0.0250	0.7178	0.4729	-0.0311	0.0671
mass_2005	0.0132	0.0265	0.4987	0.6180	-0.0387	0.0652
mass_2006	-0.0051	0.0267	-0.1903	0.8491	-0.0574	0.0472
mass_2008	0.0037	0.0249	0.1482	0.8822	-0.0452	0.0526
mass_2009	-0.0294	0.0236	-1.2416	0.2144	-0.0757	0.0170
mass_2010	-0.0394	0.0237	-1.6622	0.0965	-0.0859	0.0071
mass_2011	-0.0436	0.0246	-1.7733	0.0762	-0.0919	0.0046
mass_2012	-0.0568	0.0229	-2.4843	0.0130	-0.1016	-0.0120
mass_2013	-0.0597	0.0232	-2.5700	0.0102	-0.1053	-0.0142
New Hampshire	-0.0303	0.0324	-0.9338	0.3504	-0.0938	0.0333
Rhode Island	-0.0109	0.0251	-0.4356	0.6631	-0.0600	0.0382
Vermont	-0.0078	0.0268	-0.2904	0.7715	-0.0603	0.0447

(b) OLS result for old people

PanelOLS Estimation Summary

Dep. Variable:	not_insured	R-squared:	0.0021
Estimator:	PanelOLS	R-squared (Between):	-0.1819
No. Observations:	180839	R-squared (Within):	0.0012
Date:	Sat, Mar 30 2024	R-squared (Overall):	-0.0414
Time:	21:12:13	Log-likelihood	-1.633e+04
Cov. Estimator:	Clustered		
		F-statistic:	24.352
Entities:	7563	P-value	0.0000
Avg Obs:	23.911	Distribution:	F(15,173248)
Min Obs:	1.0000		
Max Obs:	59.000	F-statistic (robust):	12.624
		P-value	0.0000
Time periods:	14	Distribution:	F(15,173248)
Avg Obs:	1.292e+04		
Min Obs:	6708.0		
Max Obs:	1.438e+04		

Parameter Estimates

	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
mass_2001	0.0056	0.0107	0.5208	0.6025	-0.0154	0.0266
mass_2002	-0.0092	0.0109	-0.8410	0.4003	-0.0306	0.0122
mass_2003	0.0138	0.0111	1.2389	0.2154	-0.0080	0.0356
mass_2004	0.0190	0.0123	1.5426	0.1229	-0.0051	0.0430
mass_2005	0.0045	0.0116	0.3879	0.6981	-0.0182	0.0271
mass_2006	-0.0142	0.0116	-1.2260	0.2202	-0.0369	0.0085
mass_2008	-0.0485	0.0106	-4.5605	0.0000	-0.0694	-0.0277
mass_2009	-0.0457	0.0107	-4.2860	0.0000	-0.0666	-0.0248
mass_2010	-0.0495	0.0104	-4.7722	0.0000	-0.0698	-0.0292
mass_2011	-0.0341	0.0109	-3.1287	0.0018	-0.0555	-0.0128
mass_2012	-0.0703	0.0105	-6.6811	0.0000	-0.0909	-0.0497
mass_2013	-0.0607	0.0106	-5.7311	0.0000	-0.0814	-0.0399
New Hampshire	-0.0089	0.0125	-0.7107	0.4773	-0.0333	0.0156
Rhode Island	-0.0329	0.0113	-2.9069	0.0037	-0.0551	-0.0107
Vermont	-0.0143	0.0104	-1.3709	0.1704	-0.0347	0.0061

(c) **Main OLS results**

PanelOLS Estimation Summary

Dep. Variable:	not_insured	R-squared:	0.0006
Estimator:	PanelOLS	R-squared (Between):	0.0297
No. Observations:	30705	R-squared (Within):	-0.0004
Date:	Sat, Mar 30 2024	R-squared (Overall):	0.0111
Time:	20:37:22	Log-likelihood	1.513e+04
Cov. Estimator:	Clustered		
		F-statistic:	0.9957
Entities:	6816	P-value	0.4562
Avg Obs:	4.5048	Distribution:	F(15,23861)
Min Obs:	1.0000		
Max Obs:	16.000	F-statistic (robust):	0.8202
		P-value	0.6559
Time periods:	14	Distribution:	F(15,23861)
Avg Obs:	2193.2		
Min Obs:	814.00		
Max Obs:	2597.0		

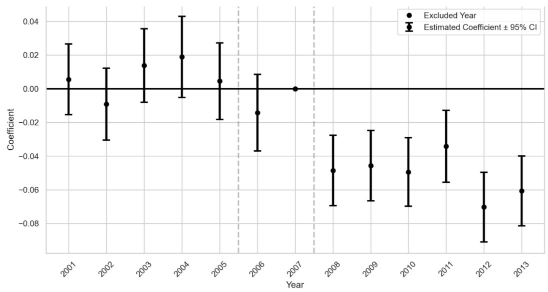
Parameter Estimates

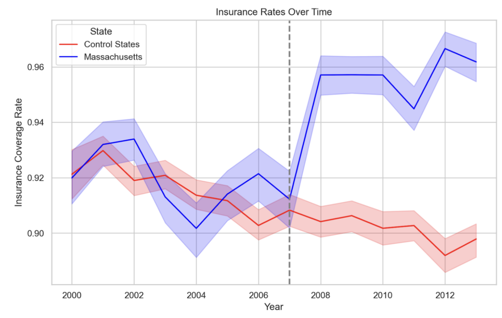
	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
mass_2001	0.0285	0.0151	1.8898	0.0588	-0.0011	0.0580
mass_2002	0.0108	0.0147	0.7345	0.4627	-0.0180	0.0396
mass_2003	0.0043	0.0148	0.2874	0.7738	-0.0248	0.0333
mass_2004	0.0151	0.0146	1.0320	0.3021	-0.0136	0.0437
mass_2005	0.0246	0.0145	1.6997	0.0892	-0.0038	0.0529
mass_2006	-0.0064	0.0145	-0.4436	0.6573	-0.0348	0.0219
mass_2008	-0.0014	0.0136	-0.1053	0.9161	-0.0280	0.0252
mass_2009	0.0056	0.0139	0.4065	0.6844	-0.0216	0.0329
mass_2010	0.0056	0.0135	0.4157	0.6776	-0.0208	0.0320
mass_2011	0.0055	0.0149	0.3665	0.7140	-0.0237	0.0346
mass_2012	-0.0017	0.0137	-0.1275	0.8985	-0.0286	0.0251
mass_2013	0.0091	0.0142	0.6406	0.5218	-0.0188	0.0370
New Hampshire	0.0056	0.0193	0.2886	0.7729	-0.0323	0.0434
Rhode Island	0.0042	0.0148	0.2807	0.7790	-0.0249	0.0333
Vermont	0.0112	0.0169	0.6613	0.5084	-0.0220	0.0444

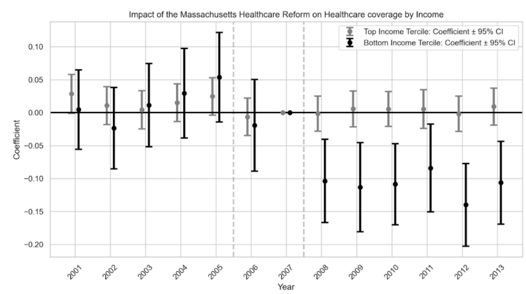
(d) Extra OLS result

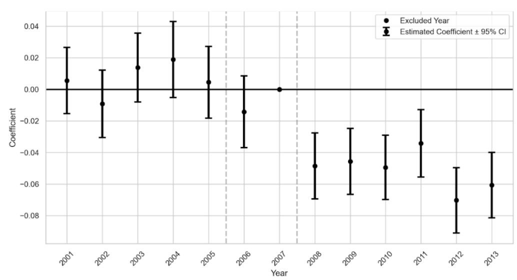
Appendix B: Event Study Plots

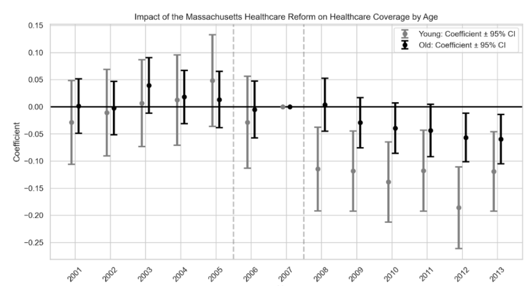
Plots labeled (1-4) in ascending order. Coefficients are regression coefficients from the specification in the main text.











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