ORIGINAL RESEARCH

The Impact of Individual Mandate and Income on Private Health Insurance Enrollment: A State-Level Analysis on Individual Behavior Change

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Introduction: Health insurance, vital for improved health outcomes and reduced financial burdens, faced challenges within the market system due to adverse selection and the risk of a death spiral. This led to the Affordable Care Act (ACA) introducing the Individual Mandate in 2014. After the penalty under the Individual Mandate had been repealed, several states have kept regulative measures to encourage individuals to keep health insurance.

Methods: This study analyzed the impact of individual mandates in four states and D.C. on private health insurance enrollment using pooled cross-sectional data from the Integrated Public Use Microdata Series (IPUMS) USA. The dataset included 4,524,753 non-elderly individuals (ages 19 to 64) from 2019 to 2021. A logistic regression model was employed to estimate the likelihood of having private health insurance, with the individual mandate as a state-level binary variable and income as a continuous predictor. Interaction effects between income and the mandate were examined. To further interpret the results, marginal effects were calculated to quantify the impact of the individual mandate and income on the probability of private health insurance enrollment.

Results: The study revealed a positive association between the individual mandate regulation and increased private health insurance enrollment. Additionally, income exhibited a positive influence on enrollment in private health insurance coverage. Notably, when considering the moderating effect of income, the mandate had a more pronounced impact on lower-income individuals, resulting in a 0.885% decrease in the probability of having private health insurance for every 10k increase in individual income.

Conclusion: The findings highlight that individuals in the mandated states are more likely to have private health insurance, addressing adverse selection issues and stabilizing the health insurance market. However, the mandate disproportionately affects lower-income individuals, suggesting the need for additional financial assistance to sustain enrollment. Policymakers should consider complementary support programs, such as subsidies and cost-sharing reductions, to mitigate financial burdens and ensure broader coverage. Maintaining an individual mandate alongside targeted financial policies can contribute to a more equitable and sustainable healthcare system.

Keywords: individual mandate, Affordable Care Act, health policy, private health insurance enrollment, the uninsured, income effect

Introduction

The essence of insurance is to distribute individual risks within a collective group to minimize risk and uncertainty.[1] Health insurance, for example, reduces financial burdens during health emergencies, leading to improved health outcomes for the insured compared to the uninsured.[2,3] Insured individuals are more likely to receive recommended screenings and care for chronic conditions,[4] while the uninsured face consequences such as diminished quality of life, higher rates of illness and mortality rates, and heightened financial burdens.[5]

However, despite these clear benefits, high premiums and personal attributes may deter individuals, especially the young and healthy, from purchasing health insurance, leading to insurance market failure.[4] Especially in the United States' mixed health insurance system, which primarily reliant on employer-based insurance and some government programs only for certain populations, such as the elderly, the poor, and veterans, it inherently raises some concerns

about the uninsured population with no buffer to medical bills. To address malfunctions in health insurance market, the Affordable Care Act (ACA), effective in January 2014, entailed regulatory measures, the individual mandate, forcing individuals to keep health insurance and imposed penalties on those who do not comply.[3,6–9] Not long after, however, the Tax Cuts and Jobs Act of 2017 repealed the penalty for not having health insurance coverage, which caused the rate of health insurance enrollment to drop significantly from January 2019.[10–13]

However, the federal-level repeal brought selective individual mandate different by state. This shift towards state discretion offers a unique opportunity to explore the effects of policy reform at the state level.[14] However, there is no study on whether the impact of individual mandate on the number of private health insurance enrollments is statistically meaningful after the federal-level repeal and state-specific discretion are applied.

Therefore, this research examines how state-level individual mandate affects individuals to enroll in private health insurance. In addition to that, since diffident income levels could impose different levels of financial constraints on individuals when considering directly purchasing private health insurance from the free market,[15] this research considers the impact of income on private health insurance enrollment and the interacting impact of individual mandate and income on private health insurance enrollment as well.

Literature Review & Hypotheses

The insurance market is susceptible to failure due to factors like moral hazard, adverse selection, and a lack of actuarial experience.[1] Especially, adverse selection is a market failure that occurs due to asymmetric information, when a self-interested party conceals the full disclosure of their health conditions to avoid higher insurance premiums.[1,16,17] This made insurers exposed to considerable amounts of risk for which they are not receiving appropriate compensation in the form of premiums, and they charge higher premiums to all.[1,3] Consequently, it deters individuals from keeping health insurance coverage as it decreases the affordability of health insurance. This will decrease the overall public health outcome.

There is abundant literature supporting that the individual mandate is to increase health insurance enrollment, spreading the risk of high healthcare costs across a larger pool of people.[8,10,16,18,19] In addition, the individual mandate has a positive effect on enrollment by addressing adverse selection, which occurs due to information asymmetry when individuals with a higher risk of making a claim are more likely to purchase health insurance coverage compared to those with a lower risk.[3,9,16,20–22] For example, Hackmann, Kolstad and Kowalski (2015) found that the premiums and average costs decreased significantly in response to the individual mandate, along with a reduction of adverse effects.[3] Meanwhile, there is research on how the repeal of individual mandate affects the health insurance enrollment rate, and they reported the negative association between the repeal and health insurance enrollment.[11,14,19,23–25] Studies highlight further negative impacts of the repeal of individual mandates such as leading to soaring premiums and causing a substantial increase in the number of newly uninsured.[9,11,20,22]

As mentioned above, findings in the previous literature suggest that the mandate played a significant role in motivating individuals to obtain insurance coverage.[26] Therefore, the individual mandate would be positively associated with regulating people's behaviors by raising the number of individuals having private health insurance.

Hypothesis 1 (H1): Individuals living in the mandated states and D.C. are more likely to enroll in private insurance than ones in the other states without the mandate.

The budget constraints from different income levels would have a critical impact on the purchase.[19] Individuals' income level affects decisions to purchase insurance coverage, choose among health plans, and use health care services.[19,27] Numerous papers have shown that the increase in income decreases the uninsured rate.[28–31] Shi more specifically directed that income was a significant predictor to explain the lack of insurance coverage since low-income people regardless of race and health status were more likely to be uninsured or partially insured.[31] Buchmueller, Cheng, Pham and Staub likewise found that insurance coverage increases along with income.[19] Therefore, the second hypothesis pertains to the income level and assumes that the higher an individual's income, the greater the probability of having private health insurance.

Hypothesis 2 (H2): Individuals with higher incomes would be more likely to purchase private health insurance than those with lower incomes.

Moreover, we wonder if income is such a significant factor in individuals' deciding to keep health insurance, and whether the income level affects the impact of the individual mandate. The effect of the individual mandate on private health insurance enrollment would be modified by the income level and vice versa. However, this research would like to focus only on how the income effect modifies the effect of individual mandates on private health insurance enrollment. The income would have a moderating impact on the association between individual mandate and private health insurance enrollment as well as the direct association with private health insurance enrollment. The different impacts depending on the income level could be examined by creating an interaction term with individual mandate and income level.[32] Therefore, here is the third hypothesis.

Hypothesis 3 (H3): The effect of individual mandate on private health insurance enrollment would be affected (modified) by the income level of individuals.

In addition to that, there was an empirical study showing that the probability of intermediate income group having private health insurance under the individual mandate was statistically meaningful while the impact on low-income and high-income groups was not significant.[33] Statistically significant association for dragging intermediate income groups to purchase more private health insurance shows that individual mandate is effective enough to achieve their goal to redistribute the wealth of higher income group into the insurance pool to make sure they lower the overall premium. As a result, an individual health insurance mandate will forcefully keep individuals in the health insurance group enhancing sustainability and accessibility of quality healthcare and eventually increasing overall public health ensuring a more equitable society.[21] Therefore, we further investigate whether individual mandate would have a bigger impact on specific income groups assumed to have enough income to keep private health insurance compared to the low-income.

Hypothesis 4 (H4): Individual mandate would have a bigger impact on individuals with intermediate income compared to individuals with lower and higher income.

Methods

This research examines the impact of individual mandates on individuals having private health insurance coverage. To examine the hypotheses, this study utilizes pooled cross-sectional data from the Integrated Public Use Microdata Series (IPUMS) USA[34] for the years 2019 to 2021. IPUMS USA provides microdata derived from the US Census and the American Community Survey (ACS), facilitating longitudinal and comparative research on demographic, social, economic, and health. The dataset comprises annually collected, individual-level survey responses, allowing for detailed analysis of population characteristics over time. Since ACA provisions and the individual mandate mainly focus on non-elderly adults, this research restricted the sample to individuals between the ages of 19 to 64 years.[35] Therefore, samples are 4,524,753 non-elderly individuals in 49 states and D.C. in the United States. This research employs logistic regression analyses since the dependent variable is binary. The following are details of dependent, independent, and control variables.

Dependent Variable

The research adopted private health insurance coverage as the dependent variable to estimate the effect of individual mandate on private health insurance enrollment. Private health insurance coverage was measured as binary: 1 if an individual has private health insurance directly purchased from the market; 0 otherwise.

Independent Variable

The individual mandate is a state-level binary variable. The District of Columbia (D.C.), Massachusetts, and New Jersey mandated health insurance coverage as of January 1, 2019, and California, Rhode Island, and Vermont as of January 1, 2020. Therefore, from 2022, five states and D.C. require all eligible residents to provide annual evidence of health

insurance coverage when filing state taxes. Therefore, the four states (California, Massachusetts, Rhode Island, New Jersey) and the D.C. where individual health insurance is mandated are coded 1; 0 otherwise. Individual income consists of a seven-digit numeric code reporting each respondent's total pre-tax personal income or losses from all sources for the previous year. Then, the income variable is further refined by dividing the original income by 10,000. The interaction term between individual mandate and income level was included as one of the explanatory variables.

Control Variables

The following are control variables. Control variables are demographic characteristics[15,19] and other types of health insurance. Cameron and Trivedi discovered an association between private insurance coverage and socioeconomic characteristics, specifically gender, age, and educational attainment.[33] They argue that private insurance is more prevalent among women and older individuals, who tend to utilize healthcare services to a greater extent on average. Additionally, they identified a significant positive association between private insurance and education, suggesting that this association may indicate either heightened health risk awareness among more educated individuals or higher anticipated future income among the well-educated. Therefore, to see the impact of the individual mandate on private insurance enrollment, education, sex, age, marital status, race, and employment status had been controlled as individual characteristics.

More specifically, sex is a binary control variable as the reference of sex is male which is coded as 0 and female as 1. As for marital status, after dropping separated and widowed due to uncertainty of the legal status of the marital condition, married individuals were coded 1, both spouses present or not, and divorced, never married, or single were coded 0. Race is divided into white (1), Black/African American (2), American Indian or Alaska Native (3), Asian and Pacific Islander (4), and Multiracial (5). As for the level of education, the following numerical codes were assigned based on the grade level attended. The level consisted of seven levels from Nursery school/preschool (1), Kindergarten (2), Grade 1–4 (3), Grade 5–8 (4), Grade 9–12 (5), College undergraduate (6), Graduate or professional school (7). Employment status is a binary control variable as unemployed coded 0 and employed coded 1.

Since individuals with other types of insurance coverage are not subject to buying private health insurance, four alternative types of insurance would be controlled. Therefore, health insurance through employer or union, health insurance through Indian Health Services, and Health insurance through TRICARE have been controlled. Public health insurance encompasses Medicaid, Medicare, and Veterans Affairs (V.A). health insurance programs. Although the sample excluded the population aged over 65, certain individuals who have a disability, End-Stage Renal Disease (ESRD), or Amyotrophic Lateral Sclerosis (ALS) are eligible for Medicare before reaching the age of 65. Therefore, public health insurance coverage through Medicare is still included to be controlled. The final model is as follows.

$$\begin{aligned} PrivateHealthInsurance = {} & \alpha + \beta_1 mandate + \beta_2 income\_10k + \beta_3 interaction + \beta_4 race \\ & + \beta_5 education + \beta_6 sex + \beta_7 age + \beta_8 employment + \beta_9 marital \\ & + \beta_{10} Insursance\_public + \beta_{11} Insurance\_employ/unuin \\ & + \beta_{12} Insurance\_indian + \beta_{13} Insurance\_TRICARE + \beta_{14} year \end{aligned}$$

Table 1 shows descriptive statistics of the dataset used in this study. The dataset covers three years, which are 2019, 2020, and 2021. Samples are evenly distributed across these years. As for income levels of individuals, the mean income is $5075 (SD = $7319) in units of 10,000 dollars after adjusting. The interaction term suggests that the relationship between individual mandate and enrollment varies based on income level. The interaction between individual mandate and income level has the mean value of 1.093 (SD = 4.400).

As for the demographic characteristics of the sample, the mean age of individuals in the dataset is 41.12 years (SD = 13.61). Education levels vary, with the mean value of 5.702 (SD = 1.964) where higher values represent higher education levels from preschool (1) to college undergraduate (6) and graduate or professional school (7). The gender distribution is roughly balanced, with 51.1% identified as male and 48.9% as female. 61.1% of the sample were married. Employment is prevalent, as 72.3% (SD = 0.448) are employed. 76.0% of individuals identify as white; whereas 24% as non-whites, which could represent a range of racial backgrounds.

Table 1 Descriptive Analysis (N=4,524,753)

Variables	2019 M(SD)	2020 M(SD)	2021 M(SD)	3-Year M(SD)
Insurance_Private	0.115 (0.319)	0.115 (0.320)	0.119 (0.324)	0.116 (0.321)
Mandate	0.184 (0.387)	0.179 (0.383)	0.188 (0.390)	0.185 (0.389)
Income_10k	5.025 (7.234)	4.998 (7.191)	5.187 (7.501)	5.075 (7.319)
Interaction (mandate*income10k)	1.086 (4.353)	1.047 (4.250)	1.137 (4.563)	1.093 (4.400)
Education	5.701 (1.962)	5.728 (1.993)	5.682 (1.941)	5.702 (1.964)
Male	0.508 (0.499)	0.515 (0.499)	0.511 (0.499)	0.511 (0.499)
Married	0.624 (0.484)	0.601 (0.489)	0.606 (0.488)	0.611 (0.487)
Age	41.264 (13.604)	40.974 (13.677)	41.091 (13.553)	41.120 (13.611)
White (Ref. nonwhite)	0.780 (0.413)	0.753 (0.430)	0.744 (0.435)	0.759 (0.427)
Employed	0.740 (0.438)	0.707 (0.455)	0.717 (0.450)	0.723 (0.448)
Insurance_Public	0.659 (0.474)	0.646 (0.478)	0.641 (0.479)	0.649 (0.477)
Insurance_Emp/union	0.156 (0.363)	0.168 (0.373)	0.175 (0.380)	0.166 (0.372)
Insurance_Indian	0.006 (0.079)	0.006 (0.082)	0.006 (0.078)	0.006 (0.080)
Insurance_TRICARE	0.028 (0.165)	0.027 (0.164)	0.027 (0.164)	0.027 (0.164)
Number of Observation	1604031	1314840	1604882	4524753

Results

Table 2 presents the results of the average marginal effect to examine the impact of the individual mandate on the probability of having private health insurance, along with income and interaction with mandate and income. All average marginal effects of independent and control variables are statistically meaningful at a 1% significance level.

Individual mandate has a positive correlation with increased private health insurance enrollment. The probability of an individual living in the states with the individual mandate is 15.2% higher in Model 1 and 19.8% higher in Model 2 than the ones living in the states without the individual mandate. This supports the first hypothesis (H1) that assumes individuals living in the mandated states are more likely to keep individual health insurance compared to the non-mandated states. This further endorses the previous findings that the individual mandate would raise the number of individuals keeping health insurance directly bought from the market.[8,10,16,26,36] Income level has a positive association with driving individuals to keep private health insurance in general. For every 10k increase in individual income, the

Table 2 Average Marginal Effect of the Individual Mandate on Probability of Having Private Health Insurance

Variables	(1) Model 1	(2) Model 2
Mandate (ref: No)	0.152***	0.198***
	(0.00447)	(0.00515)
Income_10k	0.0162***	0.0186***
	(0.000239)	(0.000270)
Interaction (mandate X income10k)		−0.00885***
		(0.000499)
Pseudo R^2	0.2637	0.2638
L.R. x^2	861354.09	861678.56
Observations	4524753	4524753

Notes: Covariates omitted from this table Standard errors in parentheses. State and year have been controlled with fixed effect. Model 1 presents the basic model to show the effect of the insurance mandate policy with control variables. Additionally, Model 2 includes the interaction term between the mandate policy and income level, identifying the average marginal effect of the individual mandate on the probability of having private health insurance by income level. ***p<0.01.

probability of an individual enrolling in private health insurance increases by 1.62% in Model 1 and 1.86% in Model 2. It supports the second hypothesis (H2), assuming that individuals with higher incomes would be more likely to purchase private health insurance compared to the ones with lower incomes.

The impact of individual mandate on individuals to keep private health insurance was different by income level. The mandate has a more profound impact on lower-income individuals, resulting in a 0.885% decrease in the probability of having private health insurance as individual income increases by 10k. This suggests that while both the individual mandate and income level respectively have positive effects on private health insurance enrollment, the influence of the individual mandate on private health insurance enrollment changes in a negative direction as income level rises.

Table 3 presents the average marginal effect of the individual mandate on the probability of having private health insurance by incorporating demographic and socioeconomic variables. Sociodemographic factors were found to influence private health insurance enrollment as well. First, education level played a positive role in driving individuals to have private health insurance as the probability of individuals getting higher education to have private health insurance

Table 3 Average Marginal Effect of the Individual Health Insurance Mandate on Probability of Having Private Health Insurance

Variables	(1) Model 1	(2) Model 2
Mandate (ref: No)	0.152***	0.198***
	(0.0045)	(0.0051)
Income_10k	0.0162***	0.0186***
	(0.0002)	(0.0003)
Interaction (mandate*income10k)		-0.00885***
		(0.0005)
Race 2, Black/African American	−0.449***	-0.446***
	(0.0062)	(0.0062)
Race 3, American Indian or Alaska Native	−0.925***	-0.925***
	(0.0214)	(0.0214)
Race 4, Asian and Pacific Islander	0.321***	0.322***
	(0.0061)	(0.0061)
Race 5, Multiracial	−0.656***	-0.659***
	(0.0054)	(0.0054)
Education	0.178***	0.178***
	(0.0009)	(0.0009)
Male	−0.221***	-0.223***
	(0.0035)	(0.0035)
Age	0.021***	0.021***
	(0.0002)	(0.0002)
Employed	0.250***	0.248***
	(0.0039)	(0.0039)
Married	0.219***	0.219***
	(0.0042)	(0.0042)
Insurance_Public (ref: No)	−2.217***	-2.220***
	(0.0056)	(0.0056)
Insurance_Emp/union (ref: No)	−3.190***	-3.191***
	(0.0042)	(0.0042)
Insurance_Indian (ref: No)	−0.483***	-0.480***
	(0.0290)	(0.0291)
Insurance_TRICARE (ref: No)	−1.800***	-1.802***
	(0.0116)	(0.0116)

(*Continued*)

Table 3 (Continued).

Variables	(1) Model 1	(2) Model 2
Pseudo R^2	0.2637	0.2638
L.R. x^2	861354.09	861678.56
Observations	4524753	4524753

Notes: Standard errors in parentheses. State and year have been controlled with fixed effect. Model 1 presents the basic model to show the effect of the insurance mandate policy with control variables. Additionally, Model 2 includes the interaction term between the mandate policy and income level, identifying the average marginal effect of the individual mandate on the probability of having private health insurance by income level. ***$p<0.01$.

increases by 17.8% both in Model 1 and in Model 2. Marriage status had a positive association with private health insurance enrollment, as married individuals were 21.9% more likely to keep private health insurance both in Model 1 and in Model 2 compared to non-married individuals. The private insurance enrollment rate differs by gender, as females were 22.1% in Model 1 and 22.3% in Model 2 more likely to maintain private health insurance compared to males. Black/African Americans were 44.9% in Model 1 and 44.6% in Model 2 less likely to have private health insurance compared to white Americans. In addition, Native Americans were 92.5% in Model 1 and in Model 2 less likely to have private insurance respectively compared to the white. However, Asians and Pacific Islanders were 32.1% and 32.2% more likely to keep private health insurance in Model 1 and Model 2 respectively compared to the white. The employed were 25.0% in Model 1 and 24.8% in Model 2 more likely to have private health insurance than the unemployed, possibly because the employment status is related to income and better financial status for affording the premiums.

Having other types of health insurance coverage had negative associations with private health insurance enrollment throught the marketplace because of no further need to purchaseprivate health insurance through the marketplace. More specifically, an individual with employer and union-paid insurance is 319.0% in Model 1 and 319.1% in Model 2 less likely to have private health insurance compared to the ones without health insurance. The one with public health insurance is 221.7% in Model 1 and 222.0% in Model 2 less likely to have private health insurance through the marketplace compared to the ones without health insurance. Having Indian Health Services and TRICARE are also negatively associated with private health insurance enrollment through the marketplace.

Discussion

For a deeper understanding on the moderate impact of income level on the association between the individual mandate and private health insurance enrollment, the study ran the average marginal effects. Figure 1 shows that the average marginal effects of the individual mandate on the probability of having private health insurance across different income levels with 95% confidence intervals (CIs). The negative slope indicates that the effect of the individual mandate on private health insurance enrollment decreases as income increases. At lower income levels, the mandate has a small positive or negligible impact on the probability of private health insurance enrollment. However, as income increases, the impact of the mandate becomes more negative, meaning that higher-income individuals are less affected by the mandate in terms of increasing insurance uptake.

Thereupon, the third hypothesis (H3), which assumed the effect of the individual mandate would be modified by the income, has been supported by showing the decreasing its impact as the income level increases. The effect diminishes and turns negative as income rises, suggesting that higher-income individuals might already have private insurance, and they get relatively little pressure to comply with the mandatory regulation. Policy implications suggest that additional financial incentives or subsidies may be necessary to ensure sustained enrollment among lower-income populations, given their higher responsiveness to policy interventions.

Given the decrease in the impact of the individual mandate as income increases, the fourth hypothesis, suggesting a greater impact on individuals with intermediate income, is not supported by the result. The mandate has the largest
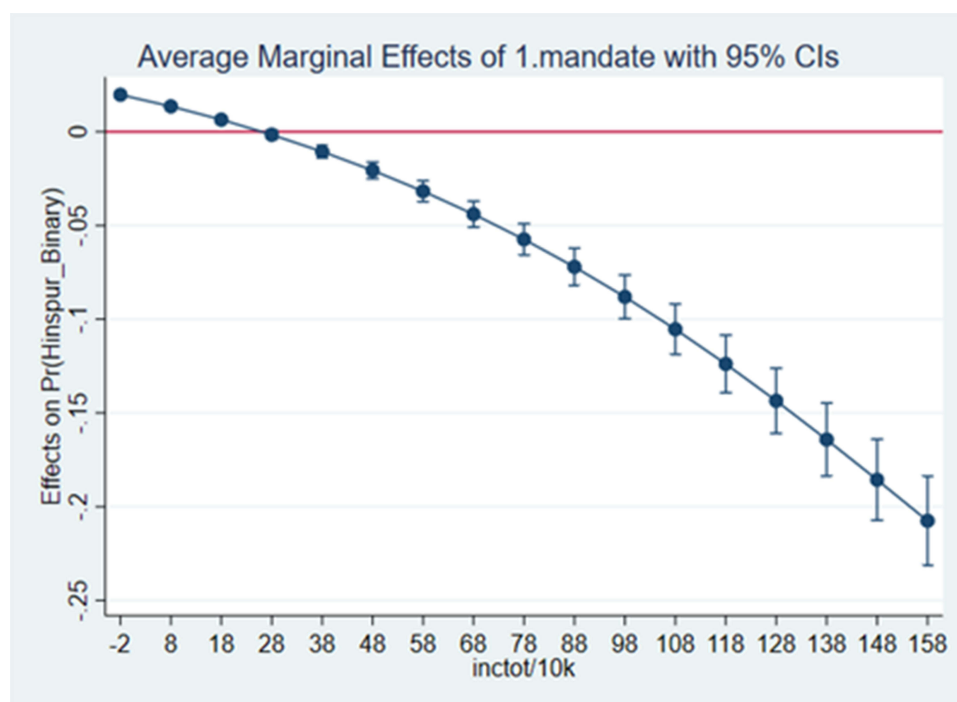
Figure 1 The average marginal effect of the mandate on the probability of individual enrollment depends on income level with 95% confidence intervals.

positive effect on lower-income individuals, meaning they are more responsive to mandatory health insurance requirements. Since the impact of individual mandate gradually decreases as the income gets bigger, the mandate has the biggest impact on the lower income compared to the intermediate or the higher individuals.

Considering the biggest impact on the low-income population, we emphasize the necessity of the complementary policy to support the low income to sustain health insurance. There are supporting policies for low-income individuals to purchase private health insurance either through excluding those whose lowest-cost insurance option costs more than 8% of income[6] or providing subsidies to support purchasing health insurance in the Marketplace. However, since each state has control over the complementary policy for comprehensive health insurance enrollment, the states or policymakers should also take legitimate financial assistance or additional incentives into account for low-income individuals to mitigate the further negative impact of income disparity by additional spending on purchasing health insurance. By doing so, states can preserve the positive effects of the mandate and sustain greater access to healthcare for all individuals.

There are several limitations to acknowledge in this study. First, since the period of analysis is limited; therefore, it is difficult to see the effect of preexisting insurance status and its disruption on the association between individual mandate and private insurance enrollment. Second, this study did not consider the continuity or disruption of insurance coverage in the analysis. Therefore, it cannot cover the impact of changes in insurance status as well as coverage during the short term of being uninsured in between the coverages due to unemployment or retirement. Third, the population of this study was limited to individuals between the age of 19–64 to only include the target population of the individual mandate; therefore, the effects of the individual mandate on the children and elderly population are unknown. Fourth, this study does not account for detailed information regarding individuals' health status or healthcare utilization. Thus, future studies should incorporate these factors to develop a more comprehensive model for analyzing the impact of the insurance mandate policy. Additionally, this study has limitations in generalizing the results outside the US healthcare system, as it is inherently influenced by the unique characteristics of the US healthcare insurance system and the dynamics of state policies within federalism. However, this does not significantly undermine the study's findings, as many countries face similar policy challenges when balancing private and public insurance mechanisms. Future studies may expand discussions with comparative analyses of other countries that have a mixed private and public insurance system or a significant reliance on employer-based insurance plans.

Additionally, a further possible research area is the impact of the individual mandate on the quality of care and compares health outcomes from mandate states with those from non-mandate states. Since the goal of increasing enrollment in health insurance is to enhance overall public health outcomes by improving access to care, it is worthwhile to see whether the individual mandate positively impacts the quality of care and health outcomes. Moreover, it would also be meaningful to see how the individual health insurance mandate affects preventable hospitalization. Furthermore, along with the concept of moral hazard, which relates to individuals potentially engaging in riskier behaviors due to the relief of having health insurance coverage, exploring the strength and direction of the potential impact of the individual mandate would also be meaningful.

Conclusion

This research examined the impact of the individual mandate on private health insurance enrollment by comparing states with and without such mandatory regulations. The analytic results suggest that an individual mandate is necessary to improve healthcare accessibility and affordability of health insurance. It provides empirical evidence on the role of the coercive mandate policy in influencing insurance enrollment. This study highlights the critical role of the individual mandate in increasing private health insurance enrollment and ensuring a more equitable healthcare system.

The result shows that individuals living in the states with the mandate are more likely to have private health insurance than those in non-mandated states. The positive association between individual mandates and private health insurance enrollment highlights the benefits of addressing adverse selection problems and the death spiral in the health insurance market. In addition, an individual's income level is also positively associated with individual health insurance enrollment. However, the interaction term between individual mandate and income negatively impacted individuals' health insurance enrollment, suggesting that the mandate affects low-income individuals more than those with high income to purchase private health insurance. Socio-demographically, individuals who are more educated, married, female, and white are more likely to keep private health insurance. The employed were 25.0% in Model 1 and 24.8% in Model 2 more likely to have private health insurance than the unemployed, possibly because the employment status is related to income and better financial status for affording the premiums. Other types of health insurance coverage had a negative association with private health insurance enrollment for no need to pay the premium for private health insurance.

By demonstrating a significant association between the mandate and enrollment rates, particularly among lower-income individuals, this research reinforces existing evidence on the importance of policy-driven interventions in health insurance markets. While the individual mandate effectively increases private health insurance coverage, its diminishing influence as income rises suggests the need for targeted policy approaches. The broader implication is that while mandates are useful in ensuring widespread coverage, additional financial support mechanisms are essential to sustain enrollment, particularly among low-income populations.

Given the pronounced impact of the mandate on lower-income individuals, policymakers should consider complementary assistance programs financially and institutionally to sustain private health insurance enrollment. While subsidies and marketplaces such as Federally Facilitated Marketplace (FFM) exist, the implementation varies by state, leading to disparities in healthcare accessibility. To mitigate the financial burden on low-income individuals, states should explore additional incentives, such as alternative cost-sharing reductions to enhance affordability. Furthermore, expanding outreach and education about available financial assistance could help maximize the mandate's effectiveness. In the long run, maintaining some form of individual mandate at the state level, coupled with inclusive financial assistance policies, can contribute to a more sustainable and equitable healthcare system for all.

Ethics Approval and Consent to Participate

The Florida State University IRB staff determined that the proposed activity is not research involving human subjects as defined by DHHS and/or FDA regulations. Please refer to the FSU IRB determination on Submission ID: STUDY00005043.

Disclosure

The authors report no conflicts of interest in this work.

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