Health Insurance Expansions and the Mortality of Older Adults*

Gopi Shah Goda
Stanford University
and NBER

Hannes Schwandt
Northwestern University
and NBER

July 2024

Extended Abstract

Public policy has significantly shaped the evolution of health insurance in the United States. Government programs such as Medicare and Medicaid provide access to health insurance for older, disabled and lower-income individuals; 55 percent of Americans receive health insurance through their employer, which receives favorable tax treatment and results in significant foregone government revenues (Keisler-Starkey, Bunch and Lindstrom, 2023); and the Affordable Care Act (ACA) provides generous subsidies for insurance purchased through nongroup marketplaces that cap the share of income individuals pay for health insurance. All in all, federal subsidies for health insurance were projected to total $1.8 trillion in 2023, or 7 percent of GDP (CBO, 2023).

Given this large public expenditure, the extent to which health insurance improves population health and leads to improved longevity is an important policy question. Indeed, an extensive literature has examined whether health insurance reduces mortality with a variety of populations and identification strategies. However, this literature has not been conclusive.[1] More recent studies have emerged following the Medicaid expansions associated with

*Email: gopi@stanford.edu; hschwandt@northwestern.edu. We would like to thank Bradley Strauss for truely exceptional research assistance. Research reported in this publication was supported by the National Institute on Aging of the National Institutes of Health under Award Number P30AG012810 to the National Bureau of Economic Research. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the NBER.

[1]For example, Card, Dobkin and Maestas (2009) exploit a discontinuity in insurance coverage at age 65 among certain hospital admissions and find that health insurance reduces mortality among this sample and

the Affordable Care Act (ACA), finding evidence of dramatic mortality improvements among low-income adults.[2] These studies use comparable individuals in non-expansion states as a control group and as such identify the effects of Medicaid coverage in expansion states. However, there have also been dramatic increases in health insurance coverage in non-expansion states.

To illustrate this point, Figure 1 shows the share of 55-64 year olds with any health insurance coverage, Medicaid coverage, and health insurance aside from Medicaid between 2008-2019, separately for those living in states that expanded their Medicaid programs ("Expansion States") and those living in states that did not ("Non-Expansion States") from the American Community Survey (ACS).[3] As shown in the figure, while Medicaid coverage among this group increased significantly more in expansion states relative to non-expansion states, the increase in the share with any health insurance was relatively similar across the two groups of states and individuals in non-expansion states experienced much larger gains in other forms of insurance coverage. These large increases were driven by federal subsidies for health insurance through ACA marketplaces, with an estimated 40 percent of the coverage increase after ACA occurring from these premium subsidies (Frean, Gruber and Sommers, 2017; Duggan, Goda and Jackson, 2019; Duggan, Goda and Li, 2020). The share

Goldin, Lurie and McCubbin (2020) find causal evidence that health insurance reduces mortality through a randomized intervention that resulted in higher health insurance rates. On the other hand, Finkelstein and McKnight (2008) find no evidence that the introduction of Medicare reduced mortality, and Black et al. (2017) find no evidence that the health or mortality of the uninsured is worse relative to the insured over the long-term. Evidence on the impact of Medicaid on mortality is similarly mixed. Goodman-Bacon (2018) finds that Medicaid's introduction in the 1960s and 1970s reduced infant and child mortality, and Sommers, Baicker and Epstein (2012) and Sommers (2017) find that Medicaid expansions in New York, Maine and Arizona reduced mortality in those states relative to neighboring states. However, Courtemanche et al. (2023) find no evidence that Medicaid expansions in the late 1990s and early 2000s reduced mortality and the Oregon Health Insurance Experiment did not yield significant reductions in mortality (Finkelstein et al., 2012; Baicker et al., 2013).

[2]Since the Supreme Court ruled that states could decide whether to expand their Medicaid programs to all adults with incomes under 138 percent of the Federal Poverty Line (FPL), many states decided not to expand their Medicaid programs or delayed the expansions. Several studies exploit the adoption and timing of these Medicaid expansions and consistently find evidence that Medicaid expansions dramatically reduced mortality among low-income adults (Miller, Johnson and Wherry, 2021; Wyse and Meyer, 2023) and in population mortality data (Borgschulte and Vogler, 2020).

[3]Note that the totals do not add up to 1 because respondents in the ACS can choose multiple sources of insurance.

of individuals covered by any type of health insurance increased similarly among expansion and non-expansion states. Despite the importance of private health insurance in the United States, which covers almost two thirds of Americans (Keisler-Starkey, Bunch and Lindstrom, 2023), it remains unknown whether this increased coverage improved population health and longevity.

In this paper, we examine whether health insurance expansions among older adults aged 55-64 reduced mortality and estimate instrumental variable effects of health insurance on mortality in this age group. Our research design compares mortality across counties with varying levels of baseline health insurance rates prior to the ACA that in turn experience different increases in health insurance coverage when the ACA is implemented. This empirical strategy thereby allows us to study the effects of increases in insurance coverage in both states that did and did not expand their Medicaid programs. We address issues of differences across high- and low-baseline health insurance coverage areas by using a within-area control group: individuals age 65-74, whose health insurance coverage did not significantly change over the years we examine.

Figure 2 shows how insurance coverage for 55-64 year olds evolved during the ACA among counties with high and low baseline health insurance rates in both expansion and non-expansion states. As in Figure 1, Panel A shows Medicaid coverage, Panel B shows Insurance coverage other than Medicaid and Panel C shows coverage by any source.[4] As shown in the figures, health insurance coverage in counties with low baseline levels of health insurance coverage increased more relative to those with high baseline levels of health insurance coverage after the ACA took effect in 2014. In expansion states, this incremental increase came from larger increases in Medicaid enrollment, while in non-expansion states, it was due to other sources of coverage.

[4]Top and bottom health insurance quartile refer to individuals in counties represented in the ACS that have health insurance among 50-64 year olds in the top and bottom quartiles in 2010-2011, as measured in the Small Area Health Insurance Estimates (SAHIE), which provides health insurance coverage rates for nearly every county in the United States from 2010-2019, with breakdowns by sex, income, and age. The data is derived from the ACS, demographic population estimates, tax returns, SNAP participation, business patterns, CHIP/Medicaid participation, and the 2010 census.

Figure 3 illustrates the reduced form relationship between mortality and health insurance by summarizing the difference in log mortality rates between 65-74 year olds and 55-64 year olds from 2005-2019, separately for counties in the top and bottom quartiles of 50-64 year-old health insurance coverage in 2010-11.[5] As shown in the figure, while differences in log mortality by age in non-expansion states decline relative to trend among the counties with high baseline health insurance coverage after the ACA takes effect, they slightly increased relative to the trend among counties with low baseline health insurance coverage. This indicates an improvement among 55-64 year old mortality relative to 65-74 year olds in non-expansion states.

Table 1 provides a summary of the data used in the analysis at the county level, and Table 2 shows regression results. The results table provides the first stage relationship between health insurance expansions and health insurance coverage rates, the reduced form relationship between health insurance expansions and mortality, and the IV results that instrument county health insurance coverage with an interaction term between 1) Post (which equals 1 for years 2014-2019); 2) Young (which equals 1 for ages 55-64); and 3) Initial HI, a continuous variable that measures the county's baseline health insurance coverage among ages 50-64 in 2010-2011. We repeat each of these results with a specification that includes a set of county-level controls for the racial composition, median incomes, and unemployment rates across different groups. These results are estimated at the commuting zone level, where we collapse all county-level data to the commuting zone.

The first stage results show that health insurance expansions from the ACA particularly impacted non-elderly health insurance coverage in areas with low levels of baseline health insurance coverage. Specifically, a county with a 10 percentage point lower rate of baseline health insurance coverage experienced a 3.0 percentage point higher increase in health insurance coverage in the post-ACA period among 55-64 year olds. The reduced form results

[5] We construct age-adjusted log mortality rates from detailed National Center for Health Statistics (NCHS) mortality microdata files that include race, sex, age, education, county of residence, and cause of death and NCHS bridged-race population estimates by single year of age for all counties. Health insurance coverage rates for 50-64 year olds come from the Small Area Health Insurance Estimates (SAHIE).

show that these counties also experienced 1.94 percent lower mortality. Putting these results together, the IV estimates indicate that a 10 percentage point increase in a county's health insurance coverage for this age group led to approximately 6.7 percent lower mortality. Extrapolated to the individual level, these estimates suggest that for an individual without health insurance, the ACA increased the probability of receiving health insurance by 30 percentage points, while the mortality risk was reduced by 19.4 percent. Accordingly, the IV estimate in column (3) indicates that receiving health insurance lowers mortality by 65 percent which is a large effect. Columns (4) to (6) of Table 2 show that the inclusion of a large set of controls leaves the estimates virtually unchanged.

Tables 3 and 4 show the same set of regressions dividing the sample into Medicaid expansion and non-expansion states. These additional results indicate that mortality improvements were much larger among non-expansion states, with IV estimates that are 5-times larger than those in expansion states (-2.8 percent vs. -13.6 percent for a 10 percentage point increase in health insurance coverage). The more pronounced effects observed in non-expansion states may result from the fact that health insurance coverage in the pre-ACA period was generally lower in non-expansion states relative to expansion states; thus, the incremental gains from the ACA's health insurance expansions may have had a larger impact. Another factor could be that states that opted out of expanding Medicaid might also have worse health care access and quality due to factors that are related to but not driven by health insurance coverage.

To sum up, our preliminary analysis provides evidence that the expansion of private health insurance in non-expansion states had even more beneficial impacts on population health than the increases in Medicaid coverage in expansion states. At the same time, potential difficulties remain with the interpretation of our regression results. As Figure 4 shows, all analyzed groups experienced strong positive deviations from prior mortality trends around the time of the ACA. These increases in mortality are very similar among those below and above age 65 and therefore are unlikely to be related to changes in health

insurance coverage. These patterns point to the presence of strong trend changes while the similarity of the trend deviations across age groups suggests that the older cohorts are a useful control group in this setting. At the same time, slight differences in these trend deviations across groups could introduce some bias.

The existing literature is aware of the trend reversals around 2013 which have been observed across racial groups and also in European countries (Schwandt et al., 2021). Some studies suggest that the flattening of mortality improvements is driven by improvements in the treatment of cardiovascular diseases which dramatically reduced mortality from related causes in the earlier years but which were exhausted in the mid 2010s, limiting further mortality improvements(Mehta, Abrams and Myrskylä, 2020). In the appendix, we provide exploratory analysis examining different causes of death, in particular cardiovascular vs. non-cardiovascular mortality. We find some suggestive evidence that health insurance-induced mortality reductions occurred for both cardiovascular and non-cardiovascular mortality, with no evidence of significant differences across the two sources of mortality. In future versions, we intend to explore the causes of death in more detail as well as examine how mortality gains were distributed across different racial and ethnic groups.

References

Baicker, Katherine, Sarah L Taubman, Heidi L Allen, Mira Bernstein, Jonathan H Gruber, Joseph P Newhouse, Eric C Schneider, Bill J Wright, Alan M Zaslavsky, and Amy N Finkelstein. 2013. "The Oregon experiment—effects of Medicaid on clinical outcomes." *New England Journal of Medicine*, 368(18): 1713–1722.

Black, Bernard, José-Antonio Espín-Sánchez, Eric French, and Kate Litvak. 2017. "The Long-Term Effect of Health Insurance on Near-Elderly Health and Mortality." *American Journal of Health Economics*, 3(3): 281–311.

Borgschulte, Mark, and Jacob Vogler. 2020. "Did the ACA Medicaid expansion save lives?" *Journal of Health Economics*, 72: 102333.

Card, David, Carlos Dobkin, and Nicole Maestas. 2009. "Does Medicare save lives?" *The quarterly Journal of Economics*, 124(2): 597–636.

CBO. 2023. "Federal Subsidies for Health Insurance: 2023 to 2033." Congressional Budget Office.

Courtemanche, Charles J, Jordan W Jones, Antonios M Koumpias, and Daniela Zapata. 2023. "Revisiting the Connection Between State Medicaid Expansions and Adult Mortality." National Bureau of Economic Research Working Paper 30818.

Duggan, Mark, Gopi Shah Goda, and Emilie Jackson. 2019. "The Effects of the Affordable Care Act on Health Insurance Coverage and Labor Market Outcomes." *National Tax Journal*, 72(2): 261–322.

Duggan, Mark, Gopi Shah Goda, and Gina Li. 2020. "The Effects of the Affordable Care Act on the Near Elderly: Evidence for Health Insurance Coverage and Labor Market Outcomes." *Tax Policy and the Economy, Volume 35*, 179–223. University of Chicago Press.

Finkelstein, Amy, and Robin McKnight. 2008. "What did Medicare do? The initial impact of Medicare on mortality and out of pocket medical spending." *Journal of public economics*, 92(7): 1644–1668.

Finkelstein, Amy, Sarah Taubman, Bill Wright, Mira Bernstein, Jonathan Gruber, Joseph P Newhouse, Heidi Allen, Katherine Baicker, and the Oregon Health Study Group. 2012. "The Oregon health insurance experiment: evidence from the first year." *The Quarterly Journal of Economics*, 127(3): 1057–1106.

Frean, Molly, Jonathan Gruber, and Benjamin D. Sommers. 2017. "Premium subsidies, the mandate, and Medicaid expansion: Coverage effects of the Affordable Care Act." *Journal of Health Economics*, 53: 72–86.

Goldin, Jacob, Ithai Z Lurie, and Janet McCubbin. 2020. "Health Insurance and Mortality: Experimental Evidence from Taxpayer Outreach." *The Quarterly Journal of Economics*, 136(1): 1–49.

Goodman-Bacon, Andrew. 2018. "Public Insurance and Mortality: Evidence from Medicaid Implementation." *Journal of Political Economy*, 126(1): 216–262.

Keisler-Starkey, Katherine, Lisa N. Bunch, and Rachel A. Lindstrom. 2023. "Health Insurance Coverage in the United States: 2022." U.S. Census Bureau P60-281.

Mehta, Neil K, Leah R Abrams, and Mikko Myrskylä. 2020. "US life expectancy stalls due to cardiovascular disease, not drug deaths." *Proceedings of the National Academy of Sciences*, 117(13): 6998–7000.

Miller, Sarah, Norman Johnson, and Laura R Wherry. 2021. "Medicaid and mortality: new evidence from linked survey and administrative data." *The Quarterly Journal of Economics*, 136(3): 1783–1829.

Schwandt, Hannes, Janet Currie, Marlies Bär, James Banks, Paola Bertoli, Aline Bütikofer, Sarah Cattan, Beatrice Zong-Ying Chao, Claudia Costa, Libertad González, et al. 2021. "Inequality in mortality between Black and White Americans by age, place, and cause and in comparison to Europe, 1990 to 2018." *Proceedings of the National Academy of Sciences*, 118(40): e2104684118.

Sommers, Benjamin D. 2017. "State Medicaid Expansions and Mortality, Revisited: A Cost-Benefit Analysis." *American Journal of Health Economics*, 3(3): 392–421.

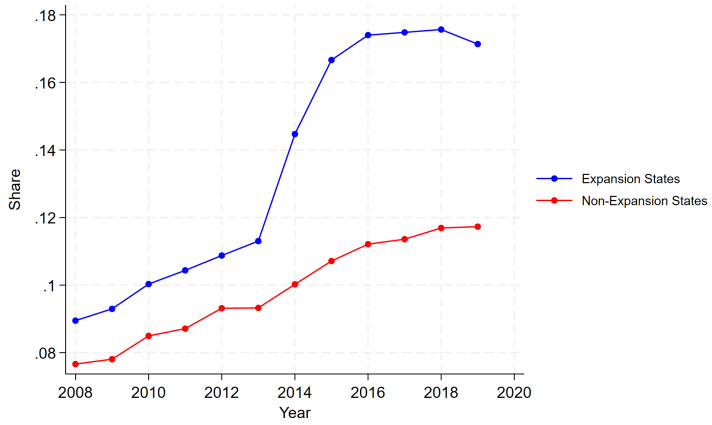
Sommers, Benjamin D, Katherine Baicker, and Arnold M Epstein. 2012. "Mortality and access to care among adults after state Medicaid expansions." *New England Journal of Medicine*, 367(11): 1025–1034.

Wyse, Angela, and Bruce Meyer. 2023. "Saved By Medicaid: New Evidence on Health Insurance and Mortality from the Universe of Low-Income Adults." Working Paper.

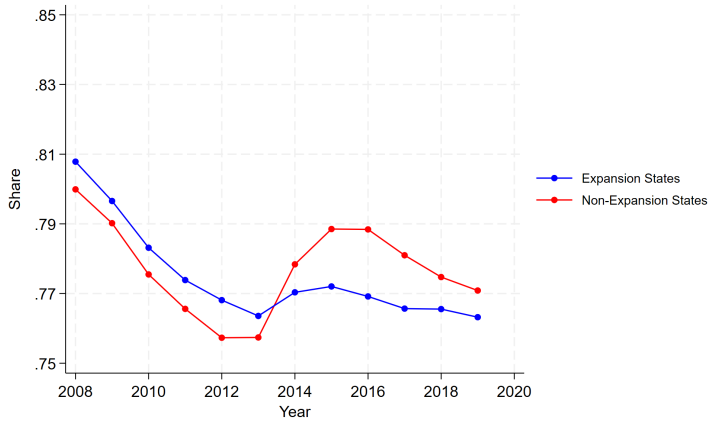
1 Figures

Figure 1: Health Insurance Coverage for 55-64 Year Olds by Source of Coverage and Expansion Status, 2008-2019

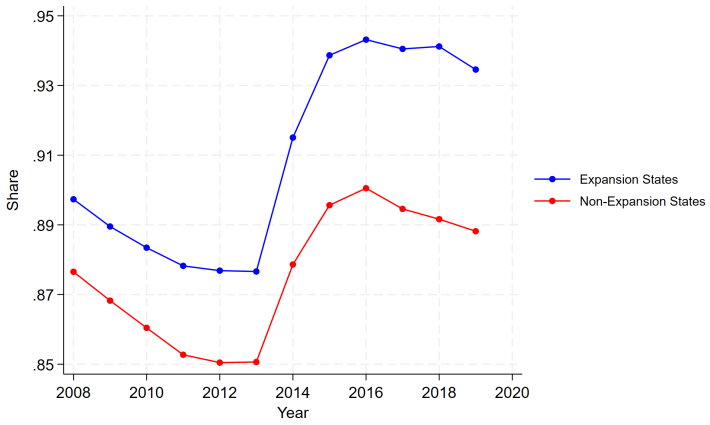
Panel A: Share Covered by Medicaid



Panel B: Share Covered by Insurance other than Medicaid



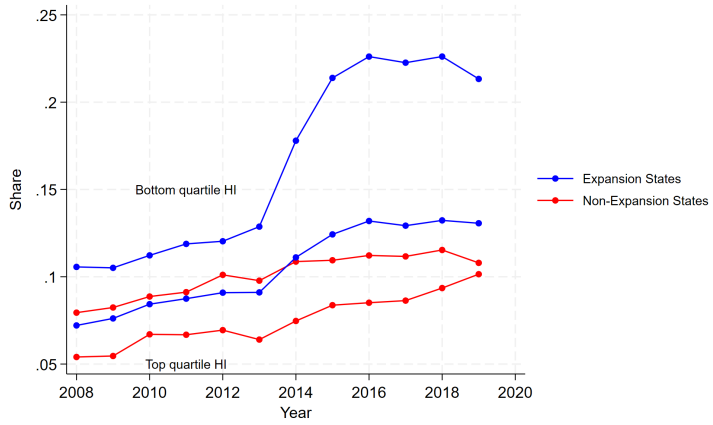
Panel C: Share Covered by Any Insurance



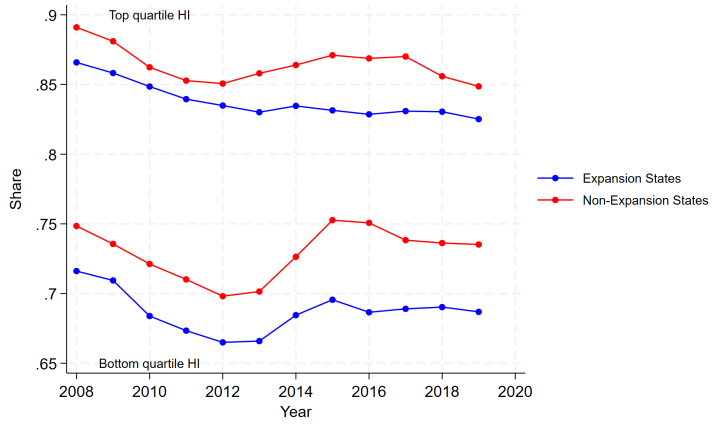
Notes: Author's calculations using American Community Survey, 2008-2019. Medicaid coverage indicated by presence of Medicaid, Medical Assistance, or any other kind of government-assistance plan for those with low incomes or a disability at time of interview. Insurance other than Medicaid includes employer-provided insurance, privately-purchased insurance, Medicare, TRICARE or other military care, or Veterans Administration-provided insurance. Totals do not add up to 1 because respondents in the ACS can choose multiple sources of insurance.

Figure 2: Health Insurance Coverage for 55-64 Year Olds by Source of Coverage, Expansion Status, and Health Insurance Quartile, 2008-2019

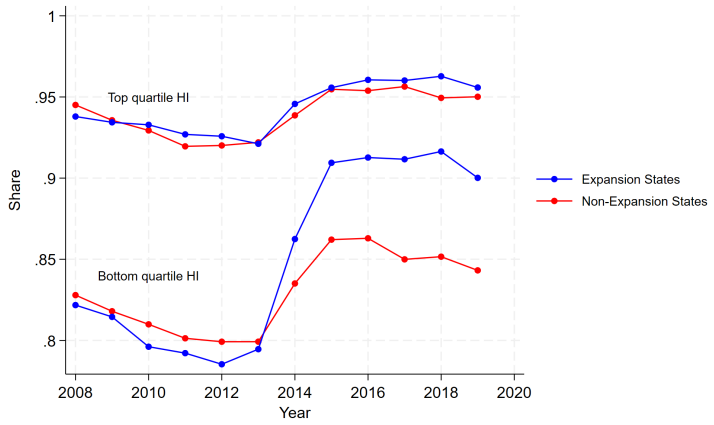
Panel A: Share Covered by Medicaid



Panel B: Share Covered by Insurance other than Medicaid

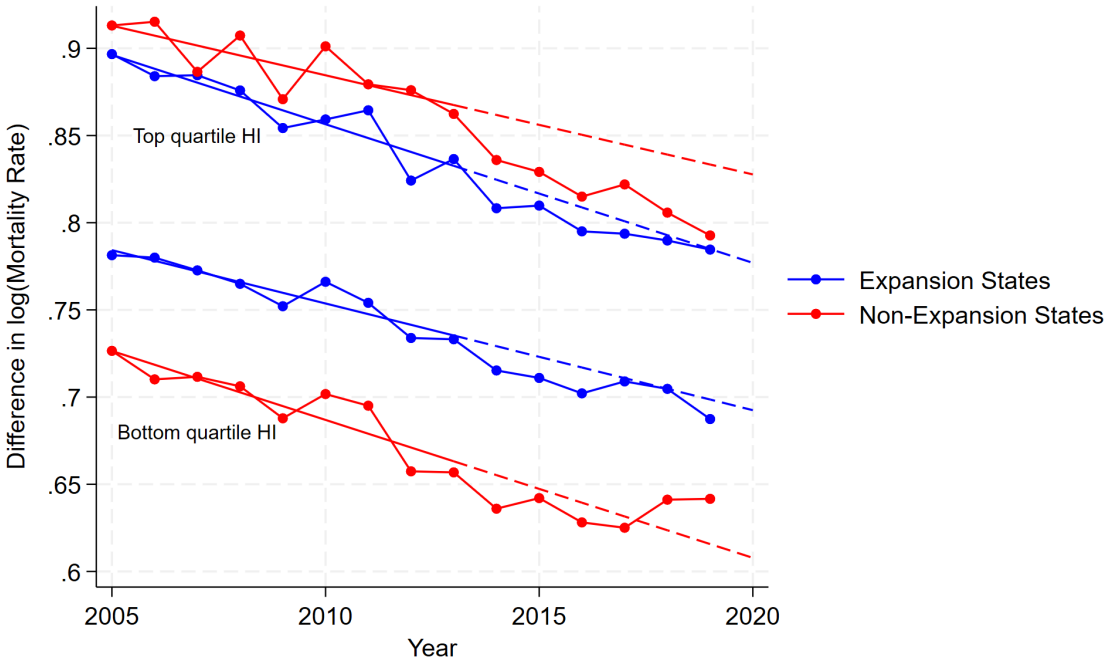


Panel C: Share Covered by Any Insurance



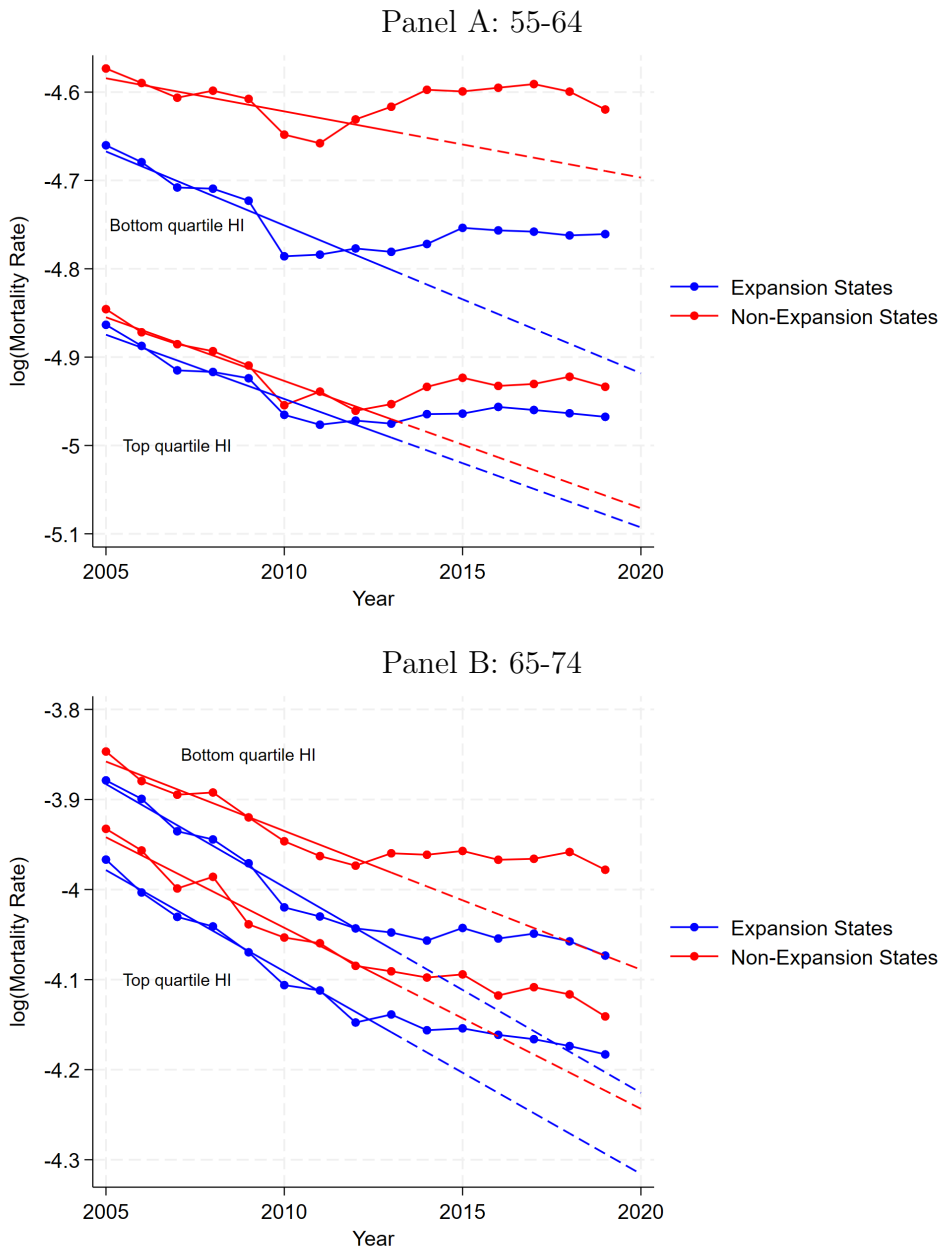
Notes: Author's calculations using American Community Survey, 2008-2019. Medicaid coverage indicated by presence of Medicaid, Medical Assistance, or any other kind of government-assistance plan for those with low incomes or a disability at time of interview. Insurance other than Medicaid includes employer-provided insurance, privately-purchased insurance, Medicare, TRICARE or other military care, or Veterans Administration-provided insurance. Totals do not add up to 1 because respondents in the ACS can choose multiple sources of insurance. Counties in bottom and top health insurance quartile determined by county ranking in Small Area Health Insurance Estimates, 2010-2011 for health insurance among 50-64 year olds.

Figure 3: Difference in 65-74 and 55-64 Log Mortality by Expansion Status and Health Insurance Quartile, 2005-2019



Notes: Author's calculations using National Center for Health Statistics (NCHS) mortality microdata files, 2005-2019. Mortality rates are age-adjusted. Counties in bottom and top health insurance quartile determined by county ranking in Small Area Health Insurance Estimates, 2010-2011 for health insurance among 50-64 year olds.

Figure 4: Log Mortality by Age, Expansion Status, and Health Insurance Quartile, 2008-2019



Notes: Author's calculations using National Center for Health Statistics (NCHS) mortality microdata files, 2005-2019. Mortality rates are age-adjusted. Counties in bottom and top health insurance quartile determined by county ranking in Small Area Health Insurance Estimates, 2010-2011 for health insurance among 50-64 year olds.

2 Tables

Table 1: Summary Statistics

	55-64	65-74
Pre-period (2010-2013)		
log(Mortality rate)	-4.70	-3.92
	(0.31)	(0.25)
Health insurance rate	0.85	1.00
	(0.05)	(0.00)
Post-period (2015-2019)		
log(Mortality rate)	-4.62	-3.92
	(0.33)	(0.26)
Health insurance rate	0.90	1.00
	(0.04)	(0.00)
Income		
log(Overall median household income)	10.70	10.70
	(0.24)	(0.24)
log(White non-Hispanic median household income)	10.78	10.78
	(0.23)	(0.23)
log(Black median household income)	10.30	10.30
	(0.51)	(0.51)
log(Hispanic median household income)	10.49	10.49
	(0.47)	(0.47)
Demographics		
Share of county population that is white non-Hispanic	0.78	0.78
	(0.20)	(0.20)
Share of county population that is Black	0.09	0.09
	(0.15)	(0.15)
Share of county population that is Hispanic	0.08	0.08
	(0.13)	(0.13)
Share of county population that has a bachelor's degree	0.20	0.20
	(0.09)	(0.09)
Unemployment Rate		
County unemployment rate	0.09	0.09
	(0.04)	(0.04)
White non-Hispanic county unemployment rate	0.08	0.08
	(0.03)	(0.03)
Black county unemployment rate	0.17	0.17
	(0.18)	(0.18)
Hispanic county unemployment rate	0.11	0.11
	(0.11)	(0.11)

Notes: Data at the county-level. Income data by county and race and share of county population by race and unemployment rates by race from Social Explorer from 2019. Mortality data from NCHS mortality microdata files.

Table 2: Effect of Health Insurance on Mortality: First Stage, Reduced Form and IV Estimates

	No Controls			Additional Controls		
	(1) HI	(2) Mort	(3) Mort (IV)	(4) HI	(5) Mort	(6) Mort (IV)
postXyoungXinitialHI	-0.295***	0.194***		-0.294***	0.189***	
	(0.080)	(0.044)		(0.081)	(0.044)	
postXyoung	0.312***	-0.128***	0.077***	0.311***	-0.124***	0.076***
	(0.071)	(0.037)	(0.010)	(0.071)	(0.037)	(0.010)
initialHIXpost	0.001	-0.170***	-0.169***	0.000	-0.168***	-0.168***
	(0.001)	(0.054)	(0.050)	(0.001)	(0.054)	(0.050)
initialHIXyoung	0.929***	-0.830***	-0.220	0.777***	-0.451**	0.049
	(0.056)	(0.167)	(0.170)	(0.148)	(0.224)	(0.182)
Post	-0.001	0.130***	0.130***	-0.000	0.128***	0.128***
	(0.001)	(0.046)	(0.043)	(0.001)	(0.046)	(0.043)
Young	-0.943***	-0.040	-0.659***	-1.238***	0.873*	0.076
	(0.048)	(0.148)	(0.164)	(0.136)	(0.466)	(0.485)
HI			-0.657***			-0.644***
			(0.180)			(0.178)
youngXshareWhite				-0.032	-0.085	-0.105
				(0.026)	(0.111)	(0.091)
youngXshareBlack				-0.098**	0.006	-0.057
				(0.043)	(0.096)	(0.083)
youngXshareHispanic				-0.094*	-0.114	-0.175**
				(0.051)	(0.108)	(0.083)
youngXincomeOverall				-0.006	-0.028	-0.033
				(0.032)	(0.097)	(0.089)
youngXincomeWhite				0.033	-0.108	-0.087
				(0.036)	(0.107)	(0.098)
youngXincomeBlack				0.006	-0.008	-0.004
				(0.005)	(0.019)	(0.017)
youngXincomeHispanic				0.009	0.035	0.040*
				(0.007)	(0.024)	(0.022)
youngXunemployedOverall				-0.045	1.331*	1.302*
				(0.312)	(0.784)	(0.701)
youngXunemployedWhite				0.157	0.018	0.119
				(0.318)	(0.842)	(0.735)
youngXunemployedBlack				0.034*	-0.199***	-0.177***
				(0.021)	(0.071)	(0.064)
youngXunemployedHispanic				0.121***	-0.259**	-0.181*
				(0.045)	(0.105)	(0.093)
youngXshareCollege				-0.002	-0.083	-0.084
				(0.031)	(0.115)	(0.101)
Constant	1.000***	-4.028***		1.000***	-4.027***	
	(0.001)	(0.005)		(0.001)	(0.004)	
Observations	4611	4611	4611	3838	3838	3838
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9626995626134301	.9828630542171312	.9777074179623291	.9688339257357942	.9857434384051585	.9813400795632992

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Table 3: Effect of Health Insurance on Mortality for Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort	(3) Mort (IV)	(4) HI	(5) Mort	(6) Mort (IV)
postXyoungXinitialHI	-0.503***	0.139***		-0.502***	0.133***	
	(0.084)	(0.049)		(0.086)	(0.050)	
postXyoung	0.506***	-0.087**	0.053***	0.505***	-0.082*	0.052***
	(0.074)	(0.042)	(0.006)	(0.076)	(0.044)	(0.006)
initialHIXpost	0.001	-0.106*	-0.105**	0.000	-0.101*	-0.101*
	(0.002)	(0.058)	(0.053)	(0.001)	(0.057)	(0.052)
initialHIXyoung	0.838***	-0.552**	-0.321	0.621***	-0.039	0.126
	(0.125)	(0.229)	(0.227)	(0.149)	(0.151)	(0.129)
Post	-0.001	0.073	0.073	-0.000	0.069	0.069
	(0.002)	(0.049)	(0.045)	(0.000)	(0.049)	(0.045)
Young	-0.863***	-0.286	-0.524**	-0.907***	1.454***	1.213***
	(0.110)	(0.203)	(0.206)	(0.166)	(0.412)	(0.402)
HI			-0.276***			-0.265***
			(0.080)			(0.081)
youngXshareWhite				0.011	-0.190***	-0.188***
				(0.014)	(0.056)	(0.052)
youngXshareBlack				-0.024	0.064	0.058
				(0.043)	(0.101)	(0.096)
youngXshareHispanic				-0.090**	-0.098	-0.122*
				(0.037)	(0.076)	(0.069)
youngXincomeOverall				-0.066*	-0.016	-0.034
				(0.038)	(0.120)	(0.109)
youngXincomeWhite				0.086**	-0.250*	-0.227*
				(0.039)	(0.134)	(0.121)
youngXincomeBlack				-0.002	0.062***	0.062***
				(0.006)	(0.020)	(0.018)
youngXincomeHispanic				0.003	0.023	0.024
				(0.006)	(0.027)	(0.024)
youngXunemployedOverall				-0.411	1.913**	1.805**
				(0.395)	(0.793)	(0.759)
youngXunemployedWhite				0.262	-1.883**	-1.813**
				(0.369)	(0.854)	(0.808)
youngXunemployedBlack				-0.012	-0.081	-0.084
				(0.023)	(0.077)	(0.070)
youngXunemployedHispanic				0.150***	-0.265**	-0.225**
				(0.048)	(0.112)	(0.102)
youngXshareCollege				0.025	-0.061	-0.055
				(0.035)	(0.091)	(0.081)
Constant	1.000***	-4.081***		1.000***	-4.081***	
	(0.001)	(0.007)		(0.001)	(0.005)	
Observations	1834	1834	1834	1600	1600	1600
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9709797911244218	.9914707562444157	.9894508681054351	.9792205149118666	.9938107753088069	.9922524920155422

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Table 4: Effect of Health Insurance on Mortality for Non-Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort	(3) Mort (IV)	(4) HI	(5) Mort	(6) Mort (IV)
postXyoungXinitialHI	-0.241***	0.321***		-0.240***	0.323***	
	(0.071)	(0.071)		(0.072)	(0.071)	
postXyoung	0.252***	-0.228***	0.108***	0.252***	-0.229***	0.110***
	(0.061)	(0.059)	(0.023)	(0.062)	(0.059)	(0.023)
initialHIXpost	-0.000	-0.210**	-0.211**	0.000	-0.216**	-0.216***
	(0.001)	(0.090)	(0.082)	(0.000)	(0.091)	(0.082)
initialHIXyoung	0.992***	-1.028***	0.295	0.866***	-1.139***	0.026
	(0.008)	(0.250)	(0.378)	(0.035)	(0.324)	(0.361)
Post	0.000	0.166**	0.166**	0.000	0.170**	0.170**
	(0.001)	(0.077)	(0.070)	(0.000)	(0.078)	(0.071)
Young	-0.997***	0.133	-1.196***	-1.244***	0.005	-1.669**
	(0.006)	(0.216)	(0.389)	(0.097)	(0.533)	(0.698)
HI			-1.333***			-1.345***
			(0.479)			(0.483)
youngXshareWhite				0.118***	0.208	0.367**
				(0.031)	(0.184)	(0.183)
youngXshareBlack				0.121***	0.109	0.272*
				(0.034)	(0.141)	(0.149)
youngXshareHispanic				0.085***	-0.014	0.101
				(0.029)	(0.158)	(0.153)
youngXincomeOverall				0.052*	-0.140	-0.070
				(0.027)	(0.134)	(0.124)
youngXincomeWhite				-0.030	0.111	0.070
				(0.023)	(0.132)	(0.123)
youngXincomeBlack				0.001	-0.045*	-0.044**
				(0.002)	(0.023)	(0.021)
youngXincomeHispanic				0.000	0.067**	0.068**
				(0.004)	(0.030)	(0.027)
youngXunemployedOverall				0.124	0.776	0.942
				(0.125)	(0.863)	(0.808)
youngXunemployedWhite				-0.204	1.445*	1.171
				(0.131)	(0.874)	(0.817)
youngXunemployedBlack				0.023	-0.133	-0.102
				(0.015)	(0.114)	(0.100)
youngXunemployedHispanic				0.052**	-0.091	-0.021
				(0.021)	(0.147)	(0.130)
youngXshareCollege				-0.003	-0.108	-0.112
				(0.014)	(0.127)	(0.113)
Constant	1.000***	-3.969***		1.000***	-3.966***	
	(0.001)	(0.007)		(0.001)	(0.005)	
Observations	2777	2777	2777	2238	2238	2238
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9892027281384395	.9832915387547134	.9776525811683575	.9907589326876054	.9892242450177881	.9859250050376094

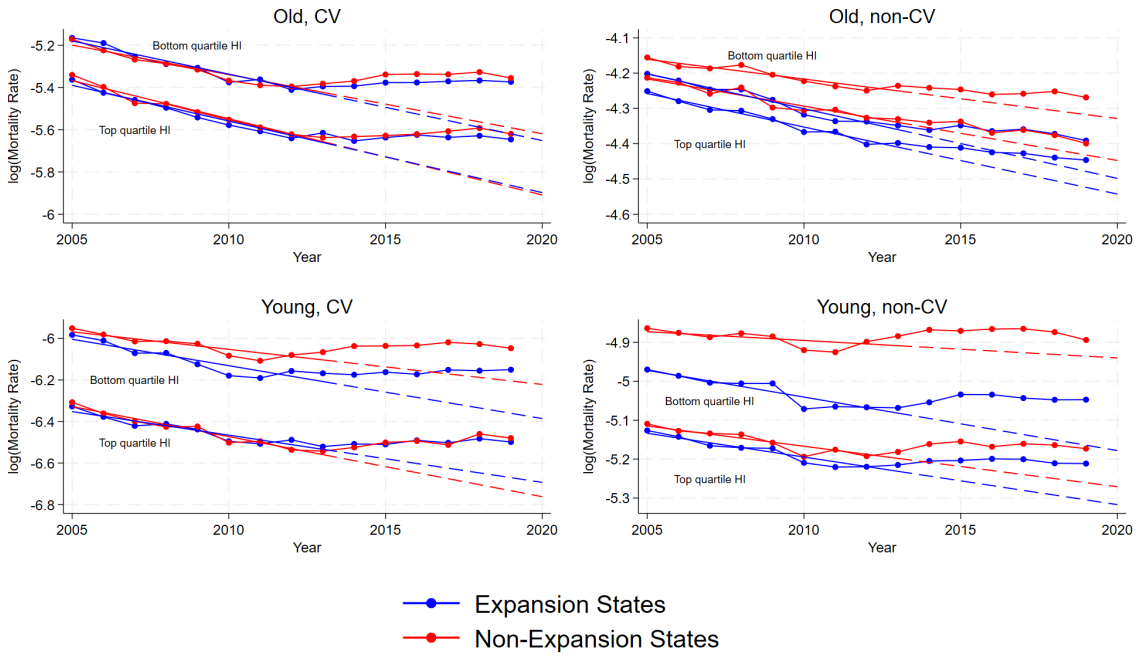
Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for non-expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Figure A.1: Log Mortality by Age, Expansion Status, Mortality Type, and Health Insurance Quartile, 2008-2019: Cardiovascular Mortality and Non-Cardiovascular Mortality



Notes: Author's calculations using National Center for Health Statistics (NCHS) mortality microdata files, 2005-2019. Mortality rates are age-adjusted. Counties in bottom and top health insurance quartile determined by county ranking in Small Area Health Insurance Estimates, 2010-2013 for health insurance among 50-64 year olds.

Appendix A: Additional Tables and Figures

Table A.1: Effect of Health Insurance on Cardiovascular Mortality for Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort, CV	(3) Mort, CV (IV)	(4) HI	(5) Mort, CV	(6) Mort, CV (IV)
postXyoungXinitialHI	-0.503***	0.237		-0.502***	0.243	
	(0.084)	(0.169)		(0.086)	(0.167)	
postXyoung	0.506***	-0.195	0.042**	0.505***	-0.201	0.043**
	(0.074)	(0.148)	(0.019)	(0.076)	(0.146)	(0.019)
initialHIXpost	0.001	-0.254*	-0.253**	0.000	-0.255*	-0.255**
	(0.002)	(0.131)	(0.119)	(0.001)	(0.132)	(0.120)
initialHIXyoung	0.838***	-0.290	0.104	0.621***	0.103	0.404***
	(0.126)	(0.184)	(0.247)	(0.149)	(0.232)	(0.146)
Post	-0.001	0.230**	0.230**	-0.000	0.231**	0.231**
	(0.002)	(0.114)	(0.104)	(0.000)	(0.115)	(0.105)
Young	-0.863***	-0.573***	-0.978***	-0.907***	2.278***	1.839***
	(0.110)	(0.155)	(0.246)	(0.166)	(0.398)	(0.415)
HI			-0.470*			-0.484*
			(0.282)			(0.279)
youngXshareWhite				0.011	-0.219*	-0.213**
				(0.014)	(0.111)	(0.102)
youngXshareBlack				-0.024	0.366**	0.354**
				(0.043)	(0.158)	(0.146)
youngXshareHispanic				-0.090**	-0.066	-0.109
				(0.037)	(0.113)	(0.108)
youngXincomeOverall				-0.066*	0.028	-0.004
				(0.038)	(0.104)	(0.098)
youngXincomeWhite				0.086**	-0.353***	-0.311***
				(0.039)	(0.096)	(0.094)
youngXincomeBlack				-0.002	0.025	0.024
				(0.006)	(0.026)	(0.023)
youngXincomeHispanic				0.003	0.027	0.028
				(0.006)	(0.037)	(0.033)
youngXunemployedOverall				-0.411	0.167	-0.032
				(0.395)	(0.858)	(0.870)
youngXunemployedWhite				0.262	-0.555	-0.428
				(0.369)	(0.822)	(0.823)
youngXunemployedBlack				-0.012	0.166	0.161
				(0.023)	(0.110)	(0.098)
youngXunemployedHispanic				0.150***	-0.224	-0.151
				(0.048)	(0.178)	(0.167)
youngXshareCollege				0.025	-0.014	-0.001
				(0.035)	(0.118)	(0.105)
Constant	1.000***	-5.530***		1.000***	-5.530***	
	(0.001)	(0.009)		(0.001)	(0.007)	
Observations	1829	1829	1829	1599	1599	1599
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9709797161581353	.9827863316284623	.9765794474859366	.9792207429711642	.9867834453695512	.9819332043506391

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Table A.2: Effect of Health Insurance on Non-Cardiovascular Mortality for Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort, non-CV	(3) Mort, non-CV (IV)	(4) HI	(5) Mort, non-CV	(6) Mort, non-CV (IV)
postXyoungXinitialHI	-0.503***	0.095*		-0.502***	0.086	
	(0.084)	(0.054)		(0.086)	(0.055)	
postXyoung	0.506***	-0.041	0.055***	0.505***	-0.033	0.054***
	(0.074)	(0.047)	(0.008)	(0.076)	(0.048)	(0.008)
initialHIXpost	0.001	-0.048	-0.048	0.000	-0.041	-0.041
	(0.002)	(0.057)	(0.052)	(0.001)	(0.057)	(0.052)
initialHIXyoung	0.838***	-0.626**	-0.467**	0.621***	-0.060	0.047
	(0.126)	(0.275)	(0.219)	(0.149)	(0.185)	(0.141)
Post	-0.001	0.014	0.014	-0.000	0.008	0.008
	(0.002)	(0.048)	(0.044)	(0.000)	(0.048)	(0.044)
Young	-0.863***	-0.205	-0.369*	-0.907***	1.155**	1.000**
	(0.110)	(0.244)	(0.193)	(0.166)	(0.468)	(0.452)
HI			-0.189*			-0.171*
			(0.103)			(0.102)
youngXshareWhite				0.011	-0.189***	-0.187***
				(0.014)	(0.053)	(0.050)
youngXshareBlack				-0.024	0.031	0.027
				(0.043)	(0.115)	(0.107)
youngXshareHispanic				-0.090**	-0.091	-0.106
				(0.037)	(0.080)	(0.072)
youngXincomeOverall				-0.066*	-0.023	-0.035
				(0.038)	(0.142)	(0.131)
youngXincomeWhite				0.086**	-0.217	-0.203
				(0.039)	(0.158)	(0.146)
youngXincomeBlack				-0.002	0.070***	0.069***
				(0.006)	(0.021)	(0.019)
youngXincomeHispanic				0.003	0.023	0.023
				(0.006)	(0.028)	(0.026)
youngXunemployedOverall				-0.411	2.189**	2.119**
				(0.395)	(0.952)	(0.901)
youngXunemployedWhite				0.262	-2.082**	-2.037**
				(0.369)	(1.009)	(0.944)
youngXunemployedBlack				-0.012	-0.157*	-0.159*
				(0.023)	(0.090)	(0.082)
youngXunemployedHispanic				0.150***	-0.256*	-0.231*
				(0.048)	(0.131)	(0.124)
youngXshareCollege				0.025	-0.111	-0.107
				(0.035)	(0.099)	(0.089)
Constant	1.000***	-4.352***		1.000***	-4.352***	
	(0.001)	(0.007)		(0.001)	(0.005)	
Observations	1829	1829	1829	1599	1599	1599
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9709797161581353	.9891411618741529	.986384293176703	.9792207429711642	.9916919262328637	.9894944472401594

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Table A.3: Effect of Health Insurance on Cardiovascular Mortality for Non-Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort, CV	(3) Mort, CV (IV)	(4) HI	(5) Mort, CV	(6) Mort, CV (IV)
postXyoungXinitialHI	-0.241***	0.304***		-0.240***	0.307***	
	(0.071)	(0.108)		(0.072)	(0.108)	
postXyoung	0.252***	-0.244***	0.074**	0.252***	-0.245***	0.077***
	(0.061)	(0.089)	(0.029)	(0.062)	(0.090)	(0.030)
initialHIXpost	-0.000	-0.236	-0.237*	0.000	-0.250	-0.250*
	(0.001)	(0.153)	(0.139)	(0.000)	(0.154)	(0.141)
initialHIXyoung	0.992***	-0.878***	0.373	0.866***	-0.882**	0.226
	(0.008)	(0.326)	(0.387)	(0.035)	(0.356)	(0.379)
Post	0.000	0.233*	0.233*	0.000	0.243*	0.243**
	(0.001)	(0.131)	(0.119)	(0.000)	(0.132)	(0.120)
Young	-0.997***	-0.021	-1.279***	-1.245***	0.515	-1.077
	(0.006)	(0.279)	(0.411)	(0.097)	(0.663)	(0.943)
HI			-1.261**			-1.279**
			(0.579)			(0.584)
youngXshareWhite				0.119***	-0.008	0.144
				(0.031)	(0.215)	(0.214)
youngXshareBlack				0.122***	0.013	0.169
				(0.034)	(0.184)	(0.187)
youngXshareHispanic				0.086***	-0.232	-0.123
				(0.029)	(0.186)	(0.178)
youngXincomeOverall				0.052*	-0.166	-0.099
				(0.027)	(0.149)	(0.135)
youngXincomeWhite				-0.030	0.076	0.037
				(0.023)	(0.140)	(0.126)
youngXincomeBlack				0.001	-0.039	-0.038*
				(0.002)	(0.024)	(0.021)
youngXincomeHispanic				0.000	0.073**	0.074**
				(0.004)	(0.033)	(0.029)
youngXunemployedOverall				0.124	0.616	0.775
				(0.125)	(0.953)	(0.879)
youngXunemployedWhite				-0.205	1.781*	1.519*
				(0.131)	(0.927)	(0.856)
youngXunemployedBlack				0.023	-0.247	-0.217
				(0.015)	(0.159)	(0.143)
youngXunemployedHispanic				0.052**	-0.301	-0.234
				(0.021)	(0.185)	(0.170)
youngXshareCollege				-0.003	-0.146	-0.150
				(0.014)	(0.132)	(0.116)
Constant	1.000***	-5.439***		1.000***	-5.435***	
	(0.001)	(0.008)		(0.001)	(0.006)	
Observations	2750	2750	2750	2231	2231	2231
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9892048240484618	.9716788183719821	.9580249488948012	.9907616070238464	.9802036542038374	.9710507926157741

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for non-expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.

Table A.4: Effect of Health Insurance on non-Cardiovascular Mortality for Non-Expansion States

	No Controls			Additional Controls		
	(1) HI	(2) Mort, non-CV	(3) Mort, non-CV (IV)	(4) HI	(5) Mort, non-CV	(6) Mort, non-CV (IV)
postXyoungXinitialHI	-0.241***	0.322***		-0.240***	0.323***	
	(0.071)	(0.085)		(0.072)	(0.084)	
postXyoung	0.252***	-0.219***	0.118***	0.252***	-0.219***	0.119***
	(0.061)	(0.070)	(0.024)	(0.062)	(0.070)	(0.024)
initialHIXpost	-0.000	-0.192**	-0.192***	0.000	-0.195**	-0.195***
	(0.001)	(0.080)	(0.072)	(0.000)	(0.080)	(0.073)
initialHIXyoung	0.992***	-1.085***	0.238	0.866***	-1.213***	-0.049
	(0.008)	(0.236)	(0.417)	(0.035)	(0.331)	(0.393)
Post	0.000	0.137**	0.137**	0.000	0.138**	0.138**
	(0.001)	(0.068)	(0.061)	(0.000)	(0.069)	(0.062)
Young	-0.997***	0.188	-1.142***	-1.245***	-0.114	-1.787**
	(0.006)	(0.204)	(0.426)	(0.097)	(0.539)	(0.701)
HI			-1.333***			-1.344***
			(0.496)			(0.500)
youngXshareWhite				0.119***	0.257	0.417**
				(0.031)	(0.184)	(0.184)
youngXshareBlack				0.122***	0.140	0.304**
				(0.034)	(0.136)	(0.147)
youngXshareHispanic				0.086***	0.045	0.160
				(0.029)	(0.159)	(0.156)
youngXincomeOverall				0.052*	-0.127	-0.058
				(0.027)	(0.135)	(0.128)
youngXincomeWhite				-0.030	0.115	0.074
				(0.023)	(0.135)	(0.128)
youngXincomeBlack				0.001	-0.047*	-0.046**
				(0.002)	(0.025)	(0.023)
youngXincomeHispanic				0.000	0.066**	0.066**
				(0.004)	(0.031)	(0.029)
youngXunemployedOverall				0.124	0.740	0.907
				(0.125)	(0.899)	(0.843)
youngXunemployedWhite				-0.205	1.390	1.116
				(0.131)	(0.921)	(0.861)
youngXunemployedBlack				0.023	-0.099	-0.068
				(0.015)	(0.118)	(0.104)
youngXunemployedHispanic				0.052**	-0.031	0.039
				(0.021)	(0.151)	(0.134)
youngXshareCollege				-0.003	-0.109	-0.114
				(0.014)	(0.133)	(0.118)
Constant	1.000***	-4.232***		1.000***	-4.230***	
	(0.001)	(0.007)		(0.001)	(0.005)	
Observations	2750	2750	2750	2231	2231	2231
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	None	None	None	Additional	Additional	Additional
Rsquared	.9892048240484618	.9801275489559119	.9739875183275434	.9907616070238464	.9864012205348651	.9824993257553971

Standard errors in parentheses

Uses 55-64 HI rates from SAHIE data, 65-74 HI rates are set to 1. Includes period 1/2/3 HI and mortality data, only for non-expanders.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: Regressions at the commuting zone level using data from 2012-2019, excluding 2014. Initial health insurance measured as of 2010-2011 for 50-64 year olds. Post is an indicator variable that equals 1 for years 2015-2019, young is an indicator variable that equals 1 for ages 55-64. IV results instrument health insurance rate with post X young X initial HI.