The Impact of the 2008 Great Recession on Life Expectancy and Income

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Abstract:

The Great Recession was one of the most severe economic crises in U.S. history, triggering a collapse in financial system confidence and disrupting key economic indicators. This study analyzes panel data from 2000 to 2018 to assess the impact of the recession on state-level income per capita and life expectancy. Using Difference-in-Differences and Instrumental Variables models, we compare states with high financial sector exposure to those with lower exposure. While both groups exhibited parallel pre-trends, our results show that treated states experienced a sharper decline in income following the crisis. Interestingly, life expectancy increased in both treated and control states, suggesting that short-term income shocks may not have a direct negative effect on population health. These findings highlight the complexity of the relationship between economic downturns and mortality outcomes.

I. Introduction

Considered one of the most devastating economic downturns in U.S. history, the 2008
Financial Crisis—also known as "the Great Recession"—triggered widespread panic and a
collapse in confidence within the financial system. Its effects varied across states depending on
how much of their GDP was concentrated in the financial sector. This paper leverages that
variation to examine the impact of the Great Recession on both income and life expectancy
across the United States.

Despite a substantial body of literature exploring the relationship between income and
life expectancy, key questions remain—particularly regarding how major economic shocks like
the 2008 crisis influence that relationship. While early researchers hypothesized that the life
expectancy-income gradient might flatten at higher income levels (Reuell, 2016), more recent
studies have shown that longevity continues to increase consistently with income, across the
entire distribution (Reuell, 2016). Understanding how severe financial crises affect this dynamic
is essential for predicting future public health outcomes and informing policy responses.
Adopting a macroeconomic lens to analyze how recessions interact with well-being
measures—such as unemployment, income inequality, and fiscal responses—can further
illuminate the societal consequences of economic shocks and support more effective government
decision-making in future downturns.

For our empirical analysis, we use panel data from all 50 U.S. states spanning from 2001
to 2018, creating a dataset with state-by-year-level observations. Our central objective is to
estimate the causal impact of the 2008 Great Recession on life expectancy. We begin with a
standard Difference-in-Differences (DiD) approach, comparing changes in average life
expectancy between treated and control states—where treatment is defined based on pre-crisis

financial sector exposure, measured as the share of state GDP originating from finance. This method relies on the parallel trends assumption and allows us to estimate the average effect of the recession on health outcomes.

After assessing the overall DiD effect, we turn to a more specific question: Did the income shock caused by the recession drive the observed changes in life expectancy? To address this, we employ an Instrumental Variables Difference-in-Differences (IV DiD) strategy. In this framework, the interaction between a post-2008 indicator and the financial sector exposure variable serves as an instrument for post-recession income, isolating exogenous variation in income resulting from the financial crisis. This IV approach helps mitigate endogeneity concerns, such as reverse causality (e.g., healthier populations earning more) or omitted variable bias (e.g., unmeasured differences in environmental conditions or health behaviors).

Our dependent variable is state-level average life expectancy, chosen for its capacity to reflect long-term health outcomes rather than short-term health shocks. The key explanatory variable is average income-per-capita by state. We also control for healthcare spending, racial composition, gender distribution, and employment levels to account for other factors that might influence life expectancy. Finally, we include state fixed effects to control for time-invariant differences across states, and year fixed effects to adjust for national-level trends, such as federal policy changes or broader economic cycles.

The results indicate that treated and control states followed similar pre-recession trends in both life expectancy and income (Figures 1 and 2). This suggests that both groups were initially affected by the Great Recession in comparable ways. However, our regression tables provide deeper insights into the impact of the recession. Specifically, life expectancy in treated states increased by four months more than in control states after the recession. In contrast, our IV DiD

results show a negative effect on income. This counterintuitive pattern suggests that other factors—such as reduced pollution, changes in lifestyle, or fewer traffic fatalities due to higher unemployment—may have contributed to the observed rise in life expectancy.

The paper is organized as follows: Section 2 provides background on the Great Recession. Section 3 reviews the related literature, focusing on the impact of recessions on mortality rates and the broader relationship between income and life expectancy. Sections 4 and 5 present and refine the empirical model used in our analysis. Section 6 interprets the primary results and explores alternative specifications. Finally, Section 7 concludes the paper.

II.   Background

Prior to the recession, the United States experienced a housing bubble—a period of rapid expansion and rising prices in the housing market (Baily, Litan, & Johnson, 2008). This growth began in the 1990s, persisted through the 2001 recession, and peaked in the mid-2000s, with average home prices more than doubling between 1998 and 2006 (Weinberg, 2013). Fueled by historically low interest rates, mortgages became more affordable, boosting demand and driving prices upward. The rising demand for mortgages attracted investors, prompting lenders to compete for customers by loosening credit standards. As a result, high-risk or "subprime" loans were increasingly issued. These were bundled into mortgage-backed securities and sold to investors, further expanding access to credit and inflating housing demand. However, as borrowing surged, many homeowners found themselves unable to repay their loans, ultimately owing more than their homes were worth (McArthur & Edelman, 2017).

The run-up in housing prices was met with a great consequence—home prices eventually fell by over 20% on average across the nation from the first quarter of 2007 to the second quarter

of 2011, sparking confusion and uncertainty about losses on mortgage-related assets (Weinberg, 2013). It also marked a large downturn in broader economic activity, where the decline in overall economic activity steepened sharply in the fall of 2008. GDP fell by around 4.3%, while the unemployment rate more than doubled from less than 5% to 10%. (Weinberg, 2013). Pressures continued to mount in financial markets, particularly in the market for asset-backed commercial paper as investors began to question exposures to subprime mortgages. Furthermore, the bankruptcy of the Lehman Brothers, Bear Stearns acquisition by JPMorgan Chase, and Citigroup, AIG, and Bank of America all seeking support from the Federal Reserve mounted the pressure on the economy and thus also contributed to the beginning of the financial crisis (Weinberg, 2013).

Needless to say, the aftermath of the Great Recession was also quite costly. Economic weakness was still persistent even after the Great Recession ended in 2009, with economic growth being moderate and unemployment rate still being relatively high. In addition, there was a greater emphasis on new financial regulation policies, with the creation of acts such as the Dodd-Frank Act of 2010, which helped also create the Orderly Liquidation Authority (OLA) that allows the Federal Deposit Insurance Corporation to close down institutions if they are believed to pose a risk to the financial system (Weinberg, 2013). In addition, institutions were required to develop 'living wills'—comprehensive plans outlining how they would manage their own resolution in the event of another financial crisis without endangering the financial system (Weinberg, 2013).

As such, providing context and background on the Great Recession is essential to understanding its broader impacts on the U.S. population—particularly when examining the

relationship between income and life expectancy, which is the focus of the remainder of this paper.

III.   Literature Review

Previous studies have examined the relationship between income and life expectancy using a variety of approaches. At the turn of the century, Ruhm (2000) investigated how economic conditions affect health by estimating fixed-effects models using state-level data from 1972 to 1991. Contrary to conventional expectations, Ruhm found an inverse relationship: health outcomes tend to improve during economic downturns. His findings suggest that recessions may create conditions—such as reduced pollution, lower traffic fatalities, and less work-related stress—that ultimately benefit public health.

Building on Ruhm's work, Finkelstein and Notowidigdo (2024) examine the health effects of the Great Recession specifically, incorporating estimates of the "value of statistical life" (VSL) to better understand the mechanisms behind improved health during downturns. They find that not only does life expectancy improve during recessions, but the health benefits are particularly strong for elderly individuals, who are often most vulnerable to economic shocks. Their analysis shows that a one-percentage-point increase in a commuting zone's unemployment rate between 2007 and 2008 led to a 0.5 percent decline in age-adjusted mortality. These declines were especially concentrated among individuals with a high school education or less, but were observed broadly across demographic groups and causes of death—except for cancer, which showed no significant change.

Chetty and Stepner (2016) take a different approach by studying the direct link between income and life expectancy across the U.S. Using a vast dataset of 1.4 billion de-identified tax

records from 1999 to 2014 and mortality data from the Social Security Administration, they estimate life expectancy at age 40, adjusted for race and ethnicity. Their analysis yields four key findings: (1) higher income is strongly associated with greater longevity throughout the income distribution; (2) between 2001 and 2014, gains in life expectancy were far larger among the top 5% of earners than the bottom 5%; (3) life expectancy varies significantly across geographic areas; and (4) for low-income individuals, geographic differences in life expectancy are more strongly correlated with health behaviors (e.g., smoking) than with access to care, environmental quality, income inequality, or labor market conditions.

Beyond the health and income literature, researchers have also considered how the Great Recession may have influenced internal migration patterns, potentially affecting state-level income averages. Conventional wisdom suggests that people are more likely to move away from areas hit hardest by economic downturns. However, Levy, Mouw, and Perez (2018) challenge this assumption. Using data from the American Community Survey, they find that migration out of economically distressed areas declined slightly during the recession—likely due to housing market constraints such as underwater mortgages and falling home values. Using latent class conditional logit models, the authors show that the share of migrants motivated by economic factors remained largely unchanged before and during the crisis, suggesting that fears of large-scale labor migration shifts may be overstated.

Together, these studies provide valuable insights into how income and health outcomes interact and how recessions can disrupt economic and social behaviors. However, most existing work has either focused on the broad association between income and life expectancy, the direct health impacts of recessions, or large-scale migration trends (Ruhm, 2000; Finkelstein & Notowidigdo, 2024; Chetty & Stepner, 2016; Levy et al., 2018). No study has directly

investigated whether states that experienced larger income shocks during the 2008 financial crisis also saw greater changes in life expectancy. This paper seeks to fill that gap by analyzing the relationship between income and life expectancy using a Difference-in-Differences approach, focusing on the financial crisis as a natural experiment to identify causal effects.

IV.   Data

The data for this research project were collected from several reputable sources, including the Bureau of Economic Analysis, the U.S. Mortality Database, and the U.S. Census Bureau. From the Department of Commerce, we obtained data on our primary variable of interest—average income—as well as key control variables such as healthcare expenditure and the number of available jobs in each state. The U.S. Mortality Database provided information on our dependent variable: average life expectancy by state. Finally, the U.S. Census Bureau supplied data on additional control variables, including racial composition and gender ratio across states.

The 2008 Financial Crisis was driven by multiple factors, including the aftermath of the dot-com bubble and the housing market boom—both of which played significant roles in the lead-up to the collapse. To capture these contributing dynamics and broader pre-crisis economic conditions, we selected a study period beginning in 2001. The data extend through 2018 to encompass the post-crisis impacts, recovery efforts, and a complete business cycle. We intentionally excluded data beyond 2018 to avoid the confounding effects of the COVID-19 pandemic, which marked the onset of a separate economic crisis. Our analysis focuses on individual states to examine how the financial crisis affected them differently, particularly those with economies more reliant on the financial sector. This timeframe and state-level approach

allowed us to explore both the impact of recessions on mortality rates and the broader relationship between income and life expectancy.

Table 1 presents the summary statistics for the states included in the sample across key economic and demographic variables. The relatively small standard deviation for life expectancy indicates that most states have similar health outcomes in terms of average lifespan. However, the larger standard deviations observed in income per capita and total jobs highlight significant economic disparities among states. These differences suggest that while life expectancy is relatively stable, income levels and employment opportunities vary widely, potentially influencing health outcomes. Additionally, the mean income per capita exceeds $40,000, but the standard deviation of over $8,700 implies some states fall well below this average, revealing underlying income inequality. Moreover, the average health expenditure per capita is over $7,000, reflecting a substantial public investment in healthcare, though this too varies meaningfully across states. These patterns support prior research indicating that economic resources and access to healthcare are closely linked to life expectancy outcomes. The data suggest that states with greater income and healthcare spending may foster longer, healthier lives, while economic inequality may place certain populations at risk.

V.   Empirical Model

To estimate the impact of the Great Recession on health outcomes, we begin by using the average life expectancy at birth per state as our dependent variable. This measure is standard across countries and states, and it captures long-term well-being by reflecting the cumulative effects of healthcare, socioeconomic status, and environmental conditions from birth onward.

Our first approach uses a standard Difference-in-Differences (DiD) design. We define treatment states as those with a higher share of GDP from the financial sector before the 2008 crisis. Using panel data from 2001 to 2018, we compare changes in life expectancy before and after the recession between treated and control states. This method allows us to estimate the overall effect of the recession on life expectancy, assuming parallel trends.

However, our ultimate goal is to identify the causal effect of income—not just the recession—on life expectancy. Income is likely endogenous in this context: factors such as healthcare systems, education, and living conditions both correlate with income and directly affect health. Including income directly in a single-equation regression would risk bias from reverse causality or omitted variables. To address this, we implement an Instrumental Variables Difference-in-Differences (IV DiD) strategy. In the first stage, we instrument income using an interaction between the treatment dummy (high financial sector exposure) and a post-2008 dummy variable. This interaction captures the exogenous income shock induced by the Great Recession, which disproportionately reduced income in treated states. In the second stage, we regress life expectancy on the predicted income values from the first stage, along with controls.

We control for key variables that affect both income and health: per-capita healthcare expenditure, racial composition (proxied by the proportion of white residents), and the number of available jobs per state. These controls account for differences in medical infrastructure, systemic health disparities, and overall economic activity. Some controls like unemployment rate are excluded due to strong collinearity with job availability and incomplete state-level data over the full time span. While past life expectancy would be an informative control, it is excluded from the baseline model to preserve sample size; however, we include it in robustness checks.

Explicitly, the full model is:

Plain DiD:

$$ex_{st} = \beta_0 + \beta_1 Treat_s + \beta_2 Post_t + \beta_3(Treat_s * Post_t) + X'_{st} + \mu_s + \lambda_t + \varepsilon_{st}$$

IV DiD:

SI: $Income_{st} = \beta_0 + \beta_1 Treat_s + \beta_2 Post_t + \beta_3(Treat_s * Post_t) + X'_{st} + \mu_s + \lambda_t + \upsilon_{st}$

SII: $ex_{st} = \beta_0 + \beta_1 \widehat{Income}_{st} + \beta_2 Treat_s + \beta_3 Post_t + X'_{st} + \mu_s + \lambda_t + \eta_{st}$

In the DiD model, the dependent variable is average life expectancy by state and year (ex_{st}). The key explanatory variables include a treatment indicator for states with above-median financial sector GDP ($Treat_s$), a post-crisis time dummy for years after 2008 ($Post_t$), and their interaction ($Treat_s * Post_t$), which captures the differential effect of the crisis on treated states.

We include several control variables (X'_{st}), such as healthcare spending, employment, racial composition, and gender ratio. State fixed effects (μ_s) control for time-invariant differences across states, while year fixed effects (λ_t) capture national trends and shocks. Standard errors (ε_{st}) are clustered at the state level to account for within-state correlation over time.

To identify the causal role of income, the IV DiD model uses the $Treat_s * Post_t$ interaction as an instrument for state-level income. In the first stage, income ($Income_{st}$) is regressed on the DiD terms and controls. In the second stage, life expectancy (ex_{st}) is regressed on the predicted income values. This approach allows us to isolate the impact of income on life

expectancy, helping to clarify whether income changes were the main driver of observed health outcomes during the recession. As with the DiD model, both stages include the same controls and fixed effects, and standard errors (υ_{st}, η_{st}) are clustered at the state level to ensure robust inference.

Lastly, although we attempt to control for major confounders, some omitted variable bias may remain due to unobserved factors such as diet, physical activity, or environmental exposures. If such factors are positively correlated with income, our second-stage coefficient could be biased upward, capturing not only the effect of income but also these unmeasured variables. Similarly, reverse causality—where healthier populations generate more income—may distort the OLS estimates, further justifying the use of an IV strategy.

Overall, while both the DiD and IV DiD models enhance the credibility of our empirical approach, each has limitations. The DiD model assumes parallel trends between treated and control states, which may not fully hold for all covariates. The IV DiD model strengthens causal inference by addressing endogeneity, but it relies on the strength and validity of the instrument. Additionally, limitations in data availability and residual confounding may still affect our estimates. For these reasons, we interpret the results with caution while recognizing their value in contributing to the broader understanding of how economic shocks shape health outcomes.

VI.   Results

Figure 1 displays the average life expectancy over time for treated and control states. Both groups follow a clear upward trend from 2000 to 2018, with treated states consistently exhibiting higher average life expectancy. Importantly, the trends appear roughly parallel both before and after the 2008 recession. This visual consistency supports the parallel trends

assumption underlying our IV Difference-in-Differences (DiD) strategy. However, the absence of post-2008 divergence suggests that if a treatment effect exists, it is either modest or not immediately observable in raw trends.

Figure 2 plots average income per capita across the same period for treated and control states. As with life expectancy, income levels were higher in treated states throughout the sample period. Yet again, trends between the two groups appear visually parallel, even after 2008. The lack of a clear income shock in the treated group, relative to control states, raises potential concerns about the strength of the treatment assignment. If the Great Recession did not meaningfully differentiate income trajectories across these groups, identifying a causal impact on life expectancy becomes more difficult. Nevertheless, this stability reinforces the plausibility of the parallel trends assumption.

Figure 3 presents a scatter plot of income per capita against life expectancy for treated and control states. Both groups exhibit strong positive slopes, reflecting the well-established income–health gradient. Treated states cluster in the upper-right portion of the graph, with higher income and higher life expectancy, and their trendline is slightly steeper than that of control states. This pattern suggests that states with higher economic resources tend to convert income gains into larger life expectancy improvements. However, because treated states start at a higher baseline for both variables, the results also highlight the importance of controlling for time-invariant differences, which we address using state fixed effects in our regression models.

Figure 4 provides a descriptive overview of state-level life expectancy before and after the 2008 financial crisis. Visually, many states appear to experience modest gains in life expectancy over time, particularly in the Northeast and West. However, gains are less apparent in parts of the South and Midwest. These maps suggest variation in how different regions

responded to the recession and support the motivation for our Difference-in-Differences approach, which compares high and low exposure states over time. They also highlight the importance of analyzing these trends through a more rigorous empirical framework, as simple before-and-after comparisons may overlook confounding factors.

We begin by estimating a standard Difference-in-Differences (DiD) model to evaluate the effect of the Great Recession on life expectancy. Table 2 presents results across three model specifications, each progressively adding fixed effects to control for unobserved heterogeneity. In the baseline model, which includes no control variables or fixed effects, the DiD coefficient is 14.10 ($p < 0.001$), indicating a large increase in life expectancy in treated states relative to control states. When control variables are included, the coefficient drops to 7.28 ($p < 0.001$), suggesting that some of the initial effect was driven by the external factors taken into account. In the fully specified model, which also includes control variables and both state and year fixed effects, the coefficient falls further to 4.04 ($p < 0.05$). This final estimate implies that, after accounting for observable controls, state-specific factors, and national time trends, treated states experienced a 4.04-month greater increase in life expectancy following the recession. While statistically significant, this effect size is notably large when compared to typical annual gains in life expectancy, which tend to be around 1–2 months. This raises the possibility that other unobserved factors—such as changes in health behaviors, public health policy, or population mobility—may have also contributed to the observed effect. The declining magnitude of the DiD coefficient across specifications underscores the importance of controlling for both state-level and national-level confounders in interpreting the results.

To further investigate the robustness of our findings, we conducted a series of subgroup analyses and placebo tests. These models allow us to explore whether the impact of the Great

Recession on life expectancy varied meaningfully by geography, income level, or in the absence of a true treatment event.

As part of our robustness checks, Table 4 presents a regional heterogeneity analysis by disaggregating the sample according to U.S. Census regions. We estimate the DiD model separately for the Northeast, South, Midwest, and West to assess whether the impact of the Great Recession on life expectancy varied by geography. The results reveal that the Northeast, South, and West all experienced positive and statistically significant treatment effects, while the Midwest did not. In the Northeast, treated states saw the strongest effect, with life expectancy increasing by approximately 4.44 months ($p < 0.001$) relative to control states after the recession. The South and West also exhibited sizable gains—5.41 and 6.65 months, respectively. By contrast, the Midwest's estimated increase of 1.71 months was not statistically significant ($p = 0.295$), providing little evidence of a meaningful treatment effect in that region.

These regional differences in the DiD coefficients likely reflect structural and demographic variation across regions. For instance, the South and West may have seen larger reductions in pollution, traffic accidents, or job-related stress following the recession—factors that can improve health outcomes. The strong effect in the Northeast could stem from better baseline healthcare infrastructure or greater access to medical services, amplifying the benefits of post-crisis behavioral or environmental changes. In contrast, the Midwest's muted effect may reflect lower exposure to financial-sector shocks or a weaker link between income changes and health outcomes in that region. Overall, these findings suggest that the recession's impact on life expectancy was not uniform and may depend on region-specific economic and public health dynamics.

We also test for treatment heterogeneity by income levels in Table 5. In high-income states, treated states experienced a 4.12-month greater increase in life expectancy (p = 0.014) relative to control states, while the effect in low-income states was smaller (1.55 months) and statistically insignificant (p = 0.345). This suggests that post-recession health benefits were more pronounced in wealthier states, potentially due to stronger healthcare systems or local policy responses.

Finally, we conduct a placebo DiD test using 2005 as a false treatment year (Table 6). Interestingly, the placebo coefficient explains that treated states experienced a 1.56 month greater increase in life expectancy relative to control states post 2005, (p = 0.010), suggesting some pre-treatment differences between groups. While this raises concerns about the parallel trends assumption, the effect is smaller than the main estimate (1.56 vs. 4.06), implying that while bias may be present, it likely does not fully account for our findings.

Because the visual evidence in Figures 1 and 2 shows minimal divergence in trends post-crisis, we next examine whether income per capita itself can explain variation in life expectancy. To do this, we implement an Instrumental Variables Difference-in-Differences (IV DiD) approach. Here, we use pre-crisis financial sector exposure to instrument for post-crisis income shocks. This allows us to better isolate the causal impact of income on life expectancy while accounting for potential endogeneity.

As shown in Table 3, the first-stage regression confirms that financial sector exposure is a strong instrument for post-recession income, with a robust F-statistic of 16.95—above the conventional threshold of 10, but not enough to be considered a very strong instrument. In the second stage, the IV DiD estimate of the effect of income per capita on life expectancy is negative and statistically significant when state fixed effects are included (column 3: −12.36, p <

0.01) and remains negative when also including year fixed effects (column 4: −4.56, p < 0.01).

These counterintuitive results suggest that, once accounting for unobserved heterogeneity and time trends, higher income is associated with a decline in life expectancy. One possible explanation for this surprising result is a violation of the excludability restriction. If, for instance, financial-sector-heavy states also experienced changes in stress levels, housing markets, or public services that independently influenced health outcomes, this would bias the second-stage estimates. Additionally, the negative coefficient may reflect omitted variable bias or measurement error in income data, rather than a true negative causal relationship. The contrast between the OLS and IV estimates highlights the difficulty of isolating income's effect on health in observational settings and calls for caution in interpreting the IV results as fully causal.

In sum, the extended results indicate that the 2008 financial crisis had a measurable and positive impact on life expectancy in certain U.S. states. This effect appears strongest in higher-income states and specific regions, such as the Northeast. However, the IV results complicate the causal interpretation by revealing potential inconsistencies and suggesting that income may not be the sole driver. Taken together, the findings highlight the nuanced and regionally contingent relationship between economic shocks and population health.

VII.   Conclusion

The Great Recession not only had devastating impacts during its term, but also had substantial long-term effects. We first estimated a standard Difference-in-Difference (DiD) model. The results show that treated states experienced an approximately four-month greater increase in life expectancy compared to control states following the recession (Table 2). However, this must be interpreted cautiously, as the effect size is comparatively large compared

to usual gains in life expectancy. Furthermore, we used the DiD model to conduct a regional heterogeneity analysis, examining the Northeast, South, Midwest, and West separately to assess whether the impact of the Great Recession on life expectancy varied across regions. As shown in Table 4, the Northeast, South, and West all exhibited positive and statistically significant treatment effects, while the Midwest showed no significant effect. This variation may reflect regional differences in factors such as reduction in pollution, traffic accidents, or job-related stress, while the Midwest may have experienced lower financial-sector exposure or a weaker link between income and health. In our IV model, we found a counterintuitive result: higher income was associated with a decline in life expectancy. This may signal a violation of the excludability restriction, suggesting that the instrument affects life expectancy through channels other than income, thereby biasing the second-stage estimates. Consequently, the IV results complicate the causal interpretation from our DiD model by illustrating potential inconsistencies, but underscore the complex relationship between economic shocks and population health.

There are several reasons that may explain the increase in life expectancy. First, recessions induce declines in air pollution, as there are decreases in factors such as industrial activity, electricity generation, and transportation (Finkelstein and Notowidigdo, 2024). This could help reduce deaths of lower-income individuals and the less educated, who may be disproportionately exposed to greater levels of air pollution overall. Federal stimulus and social safety nets such as the American Recovery and Reinvestment Act of 2009 played a large role in mitigating the recession's impact that helped to preserve existing jobs, create new ones, and also provide temporary relief (Weinberg, 2013). As such, these protective measures helped stabilize household incomes and cushioned the adverse effects of income loss on mortality.

Our findings suggest several important policy considerations for future economic crises, though they should be interpreted with some caution due to limitations in data and identification strategies. First, investments in public health infrastructure and environmental regulation should be prioritized, as reductions in pollution may have contributed to the observed improvements in life expectancy during the recession. Second, expanding social safety nets—such as unemployment insurance, healthcare access, and direct financial assistance—can help buffer the health impacts of income shocks. Finally, because the gains in life expectancy were more pronounced in wealthier and better-resourced states, targeted support for lower-income and underserved regions is essential to promote equity in health outcomes during future downturns. While our results are suggestive rather than definitive, they offer valuable insight into how economic crises intersect with public health and highlight potential areas for policy intervention.

VII. References

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VIII.   Appendix

Primary Results:

<u>Figure 1:</u>

Mean Life Expectancy of Treated and Control States Across the Years (2000 - 2018)
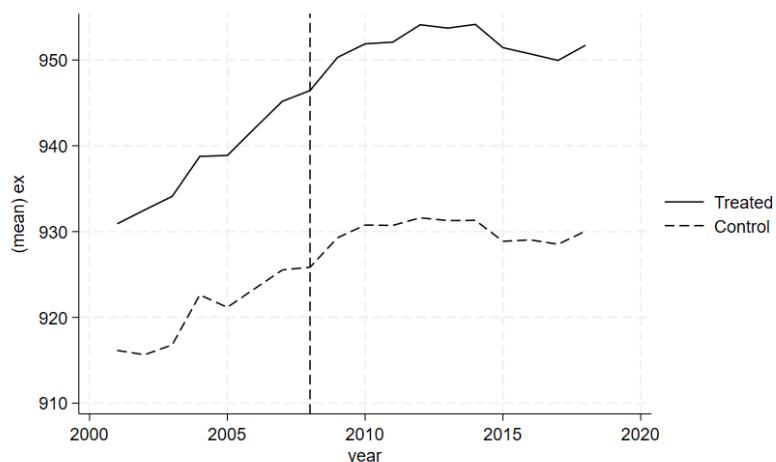

<u>Figure 2:</u>

Mean Income per Capita for Treated and Control States Across the Years (2000 - 2018)
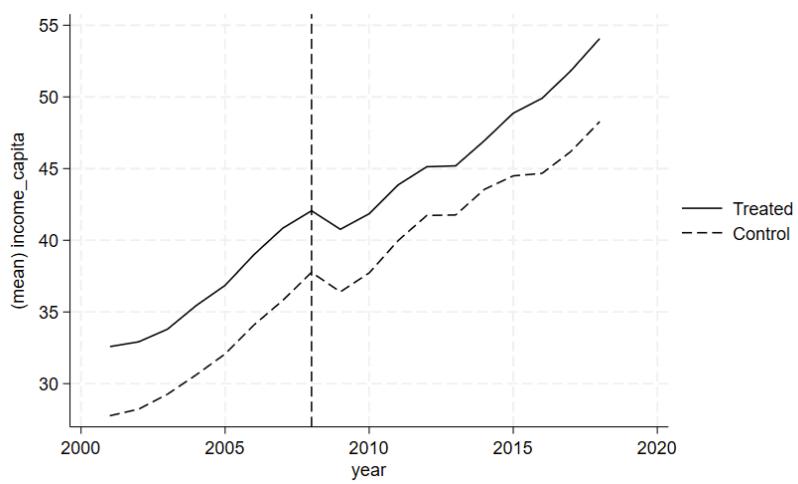
Figure 3:

Mean Life Expectancy and Mean Income Per Capita for Treated and Control States
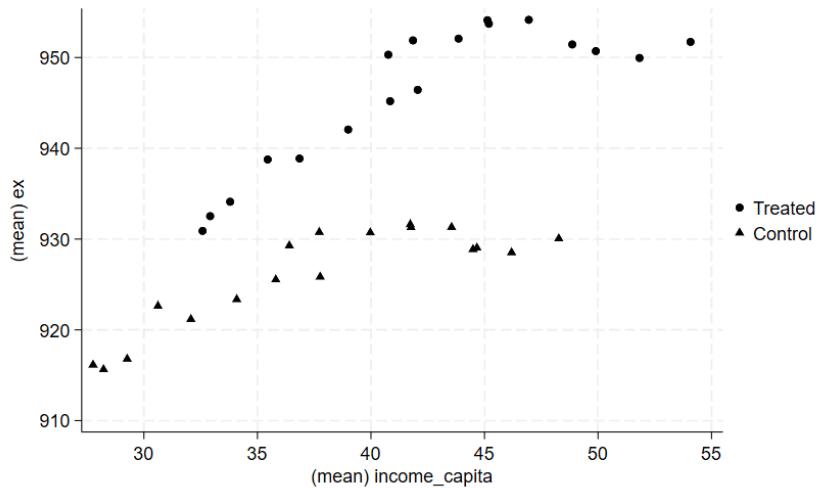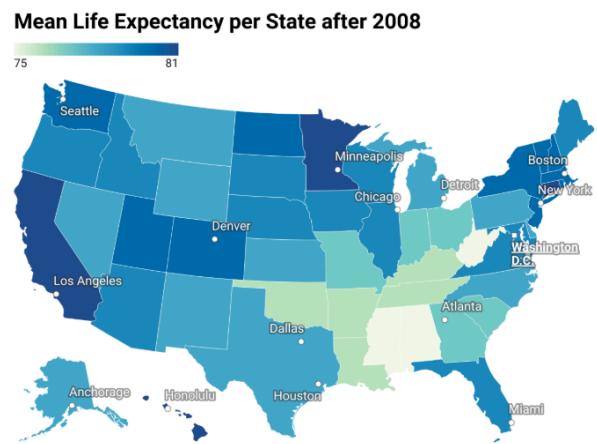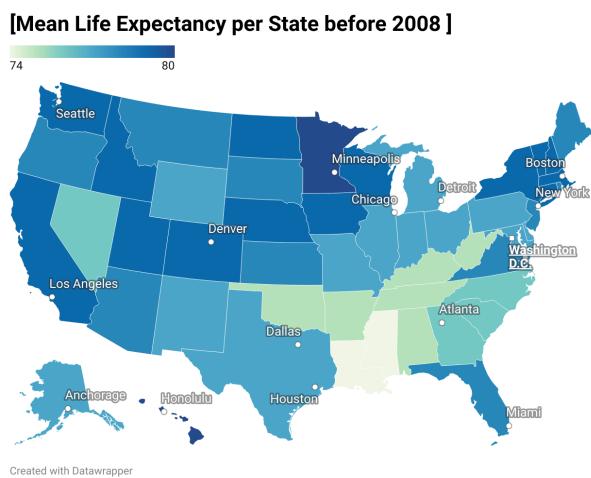
Figure 4:

Mean Life Expectancy Before & After 2008

Table 1:

Summary Statistics

	Treated	Control
	mean	mean
Income Capita	42329.25	37798.20
	(8696.82)	(8094.80)
Expectancy	78.84	77.17
	(1.30)	(1.65)
Finance Pct	22.63	16.11
	(5.11)	(2.12)
Health Capita	7207.33	6787.88
	(1867.19)	(1608.76)
White Ratio	80.28	81.62
	(13.70)	(9.68)
Jobs	4217068.49	2858020.12
	(4425009.93)	(2989927.05)
N	468	432

Table 2:

Difference-in-Differences Model

		w/ CV	w/ CV, State FE	w/ CV, State, Year FE
	Life Expectancy	Life Expectancy	Life Expectancy	Life Expectancy
DiD	14.104***	7.278***	6.860***	4.036**
	(0.987)	(1.019)	(1.051)	(1.295)
Income Capita		0.311	0.158	-0.028
		(0.181)	(0.177)	(0.186)
Health Capita		0.001	0.001	-0.000
		(0.001)	(0.001)	(0.001)
White Ratio		-0.008	-0.512	-0.370
		(0.215)	(0.611)	(0.503)
Jobs		0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)
Constant	931.960***	908.364***	950.774***	945.074***
	(2.461)	(19.477)	(53.381)	(43.153)
Observations	900	900	900	900

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3:

IV Regression (rescaled income by 1000)

	ex	w/ CV	w/ CV, State FE	w/ CV, State, Year FE
		ex	ex	ex
income_capita	2.408***	10.201***	-12.356***	-4.558***
	(0.138)	(1.829)	(4.571)	(1.165)
health_capita		-0.037***	0.051***	0.010***
		(0.007)	(0.018)	(0.003)
white_ratio		0.783***	-1.815*	-0.594
		(0.139)	(1.088)	(0.363)
jobs		-0.000***	0.000***	0.000***
		(0.000)	(0.000)	(0.000)
Constant	839.731***	736.072***	1051.680***	977.393***
	(5.663)	(28.296)	(88.288)	(32.064)
Observations	900	900	900	900

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

F-Stat for IV Regression

Robust $F_{(1,829)}$
16.947

Secondary Results:

Table 4:

Difference-in-Differences for each region

	West Life Expectancy	South Life Expectancy	Northeast Life Expectancy	Midwest Life Expectancy
DiD	6.648*	5.407**	4.443***	1.707
	(2.50)	(3.16)	(6.47)	(1.10)
Health Capita	-0.00299	0.00158	-0.00161	-0.000644
	(-1.23)	(1.02)	(-1.63)	(-0.58)
White Ratio	-0.796	-0.217	-3.177*	0.592
	(-0.48)	(-0.75)	(-3.33)	(0.41)
Jobs	0.00000188*	0.00000229***	0.00000819***	0.00000298
	(2.38)	(4.70)	(8.69)	(0.43)
Constant	972.1***	937.5***	1194.8***	871.2***
	(7.28)	(37.83)	(14.70)	(6.06)
Observations	288	234	162	216

t statistics in parentheses
$^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 5:

Heterogeneity Model for High Income and Low Income for States

	High Income Life Expectancy	Low Income Life Expectancy
DiD	4.124*	1.554
	(2.66)	(0.96)
Health Capita	-0.000931	-0.00353
	(-0.78)	(-1.85)
White Ratio	-0.157	-0.824
	(-0.52)	(-0.86)
Jobs	0.00000274**	0.00000455***
	(2.97)	(4.34)
Constant	939.8***	985.3***
	(33.38)	(12.47)
Observations	450	450

t statistics in parentheses
$^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$

Table 6:

Placebo Test for 2005

	Placebo Life Expectancy
DiD Placebo	1.558*
	(2.68)
Health Capita	0.00217
	(1.61)
White Ratio	-1.298
	(-1.60)
Jobs	0.00000206*
	(2.07)
Constant	1015.0***
	(14.01)
Observations	350

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$