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HEALTH AND HEALTH BEHAVIORS DURING THE WORST OF TIMES: EVIDENCE FROM THE GREAT RECESSION

Erdal Tekin
Chandler McClellan
Karen Jean Minyard

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ABSTRACT

While previous studies have shown that recessions are associated with better health outcomes and behaviors, the focus of these studies has been on the relatively milder recessions of the late 20th century. In this paper, we examine if the previously established counter-cyclical pattern in health and heath behaviors is held during the Great Recession. Using data from the Behavioral Risk Factor Surveillance System (BRFSS) between 2005 and 2011 and focusing on a wide range of outcomes capturing health and health behaviors, we show that the association between economic deterioration and these outcomes has weakened considerably during the recent recession. In fact, majority of our estimates indicate that the relationship has practically become zero, though subtle differences exist among various sub-populations. Our results are consistent with the evidence emerging from several recent studies that suggests that the relationship between economic activity and health and health behaviors has become less noticeable in the recent years.

Erdal Tekin
Department of Economics
Andrew Young School of Policy Studies
Georgia State University
P.O. Box 3992
Atlanta, GA 30302-3992
and NBER
tekin@gsu.edu

Chandler McClellan
National Bureau of Economic Research
1050 Massachusetts Ave.
Cambridge, MA 02138
chandler.mcclellan@gmail.com

Karen Jean Minyard
Department of Public Management and Policy
and Georgia Health Policy Center
Andrew Young Policy Studies
Georgia State University
P.O. Box 3992
Atlanta, GA 30302-3992
kminyard@gsu.edu

I. Introduction

The recent recession in the United States, commonly referred to as the "Great" Recession, differs significantly from any other recession since World War II and closely resembles the Great Depression, particularly in terms of its severity and duration. It has been four years since the recession ended, but the economy is still recovering from its effects and many millions of Americans continue to live under significant financial strain.[1] The recovery has been particularly sluggish in job creation, with the unemployment rate remaining at a stubbornly high level. As shown in Figure 1, the employment rate fell by 6.3 percent during the Great Recession, the largest decline in employment among the 11 postwar recessions. Moreover, the median family income fell by 6 percent and the poverty rate rose from 12.5 to 15.1 from 2007 to 2010 (DeNavas-Walt, Proctor et al. 2012). There are currently 11.8 million individuals searching for jobs, 4.4 million of whom have been unemployed for more than 27 weeks (Bureau of Labor Statistics 2013).

The fact that the recent economic downturn was both deeper and longer than previous recessions prompts an important question: to what extent has the Great Recession affected health and health behaviors of Americans, and how different was this experience compared to previous recessions? Although there is an extensive literature on the relationship between economic deterioration and health outcomes of individuals, the coverage period of existing studies mostly predate the Great Recession. However, it is not clear whether the findings from these studies can serve as a reliable guide to provide insights into the implications of the Great Recession on the health and health behaviors of Americans for at least three reasons. First, with a significant duration of unemployment and very low prospects of re-employment, which are not matched by

[1] The United States economy officially went into recession in December 2007 and remained in one for 18 months until June 2009 (NBER Business Cycle Dating Committee 2010).

any other recession since the Great Depression, the overall struggles of those who have lost their jobs during the recent crisis might have been quite different from previous recessions. For example, a higher number of individuals have exhausted all of their financial options to cope with joblessness and have fallen into the ranks of poverty. Relatedly, millions of Americans have found themselves in situations that they have not experienced before in terms of the way they handle their economic struggles. For example, the caseload for the Supplemental Nutrition Assistance Program (SNAP) has reached record levels with about one in seven Americans on the program at one point. Consequently, many individuals have been introduced to the stress and stigma associated with being on a welfare program for the first time in their lives. Second, the recent recession was triggered by the collapse of the United States housing market, which caused the housing prices to fall sharply and the foreclosure rates to rise to historically high levels, further devastating the lives of millions of Americans. One in 45 homes (2.23 percent of all housing units) received at least one foreclosure filing in 2010 (Mortgage Bankers Association 2010). Often as a culmination of a period of financial strain, foreclosure represents a major shock to family wealth and a highly stressful event, effects of which may be exacerbated by high unemployment rates during a recession (Currie and Tekin 2012). Third, there has been a sharp decline in the share of population with employer-sponsored health insurance during the Great Recession, driven by the enormous loss of employment during that time (Cawley et al. 2011, Holahan 2011, White and Reschovsky 2012). Between 2007 and 2010, the share of children and working-age adults with employer-sponsored health insurance dropped by 10 percentage points from 63.6 percent to 53.5 percent (White and Reschovsky 2012). According to Cawley et al. (2011), the number of Americans, who lost health insurance during the Great Recession, was about nine times more than the number who lost insurance during the previous [2001] recession.

Fourth, the recession took a particularly significant toll on local health departments across the United States. Although these agencies have faced increasing budgetary challenges since early 2000s, their experience was particularly difficult during the Great Recession, undermining their capacity to provide core public health services that are critical for local communities (Willard et al. 2012). Therefore, it is not clear whether one can extrapolate the conclusions from previous studies to make predictions for the effect of the most recent recession on the health and health behaviors of Americans.

In this paper, we use individual level data from the Behavioral Risk Factor Surveillance System (BRFSS) to examine the relationship between macroeconomic conditions and a range of health risk behaviors of individuals between 2005 and 2011. The outcome measures we consider include modifiable health behaviors pertaining to smoking, alcohol consumption, and physical activity, as well as self-reported physical and mental health. While the BRFSS has been used previously to study the relationship between unemployment and health outcomes of individuals, our study is the first to employ data from the BRFSS to study a large set of outcomes reflecting both health and health behaviors for a period that leads up to, coincides with, and follows the Great Recession. This allows us to shed light into the question as to whether there is something fundamentally anomalous about the recent recession that might have affected the counter-cyclical pattern of health documented during previous recessions.

The cost of health care imposes a significant and increasing burden on the United States economy, comprising about 16 percent of the annual gross domestic product (GDP). If, in fact, the sharp increase in unemployment during the Great Recession is having an adverse effect on health and, thus, is partially responsible for the rise in health care costs, then this information could provide further basis for recent government efforts to reduce the unemployment rate or

mitigate its effects, including the American Jobs Act and expansions in the Unemployment Insurance Program. Finally, this paper also makes a contribution to the wider literature on the effect of stressful life experiences on health.

Unlike most previous studies which rely on aggregate unemployment rate as the proxy for business cycle, we use the percentage of state population who is employed as our primary measure of macroeconomic conditions. This is important because one of the key developments during the Great Recession and its aftermath is the sharp rise in the number people who have left the labor force after losing hope of finding a job. Although the labor force participation rate in the United States has been steadily declining since 2000, this trend has accelerated in the last several years as a result of this development. For example, the labor force participation rate of individuals between ages 25 and 54 declined to 81.1 percent in April of 2013, its lowest level since 1985. Therefore, an analysis relying solely on changes in the unemployment rate may not properly reflect the macroeconomic conditions in a state. For example, an improvement in the economic outlook may cause discouraged workers who have left the labor force to re-enter, leading to an increase in the unemployment rate or a prolonged period of high unemployment. Conversely, a decrease in unemployment may reflect the fact that individuals are leaving the labor market after giving up hope of finding a job, rather than improved economic conditions. However, we also estimate all of our models using state unemployment rate in order to assess whether the conclusions drawn from our analysis are driven by our choice of the measure of macroeconomic conditions.

The rest of the paper is organized as follows. Section II provides a summary of the relevant literature. Section III presents the data used in the analysis and Section IV describes the empirical framework. Section V discusses the results and Section VI concludes the paper.

II. Background

There is a sizeable literature studying the relationship between macroeconomic fluctuations and health. In an influential study, Ruhm (2000) finds that mortality and morbidity in the United States follow a pro-cyclical pattern, i.e., they both worsen when the economy temporarily improves. This finding has largely been confirmed in a series of follow up papers by Ruhm (e.g., Ruhm 2003, Ruhm 2005, Ruhm 2007) and echoed by others as well (Dehejia and Lleras-Muney 2004). To a large extent, a similar pattern is also established for other developed countries (e.g., Neumayer 2004, Granados 2005, Gerdtham and Ruhm 2006, Ásgeirsdóttir et al. 2012).

The motivation to explain the pro-cyclicality in mortality has spawned a wave of research focusing on the relationship between macroeconomic conditions and health behaviors. The majority of this research focus on unemployment rate, usually measured at the state level, and uses data from a number of data sources, including the BRFSS. The overall finding from these studies is that health behaviors mostly improve during economic downturns. The most common explanation offered for this finding is that recessions lead to changes in certain life styles, which are health promoting. In particular, it is argued that work itself is stressful and a reduction in time at work may reduce the prevalence of stress-induced illness as well as making more time available for salutary behaviors, such as exercise and healthy dieting (Catalano, Goldman-Mellor et al. 2011). For example, Ruhm (2005) uses data from the BRFSS between 1987 and 2000 and finds that changes in health behaviors represent a key mechanism for the pro-cyclical variation in mortality and morbidity observed in the literature. In particular, he shows that smoking and excess weight decline during temporary economic downturns, while leisure-time and physical

activity increase. In another study, Ruhm and Black (2002) use data from 1987 to 1999 waves of the BRFSS to show that alcohol consumption decreases in bad economic times. The authors conclude that any stress-induced increases in alcohol consumption during recessions are more than offset by income effects.[2] In a recent paper, Xu (2012) combines health data from the BRFSS between 1984 and 2005 and the National Health Interview Survey (NHIS) between 1976 and 2001 with employment data from the Current Population Survey (CPS) to examine the relationship between wages and hours of work on health behaviors of low-educated individuals. He finds that higher wages and hours of work associated with economic expansions are associated with increased smoking and less physical activity.

Studies using data sources other than the BRFSS usually reach similar conclusions, although the consensus appears to be less robust. For example, Ettner (1997) uses data from the 1988 National Health Interview Survey (NHIS) and finds that non-employment significantly reduces both alcohol consumption and dependence symptoms, possibly due to an income effect. Ásgeirsdóttir et al. (2012) examine the effect of the October 2008 economic crisis in Iceland on a range of health behaviors and find that the crisis led to reductions in health-compromising behaviors, including smoking, heavy drinking, consumption of sugared soft drinks and fast food, and indoor tanning. Furthermore, they document that the crisis reduced consumption of fruits and vegetables, but increased consumption of fish oil and getting recommended hours of sleep. The authors argue that these behavioral changes are explained by increases in prices during the crisis. On the other hand, Bockerman et al. (2007) explore the relationship between weight and economic conditions using Finnish data from the period of 1978-2002. They find that

[2] In contrast, Dee (2001) finds that the prevalence of binge drinking is strongly counter-cyclical using data from the BRFSS over the period of 1984-1995. Ruhm and Black (2002) offer a number of explanations for the contradictory finding in Dee (2001), including the relatively small number of states contained in the BRFSS in early years and the lack of sampling weights in the analysis performed in Dee (2001).

improvement in economic conditions measured by the regional unemployment rates results in a decrease in Body Mass Index (BMI). Similarly, Charles and DeCicca (2008) use data from the NHIS for the years 1997-2001 to document evidence of a pro-cyclical relationship for weight-related health and mental health among men.

Most recently however, several studies have documented that the pro-cyclical relationship between macroeconomic conditions and mortality obtained in earlier studies has weakened and even reversed when the analysis period is extended to recent years. For example, Ruhm (2013) revisits the aggregate mortality and unemployment relationship using data from multiple sources over the period between 1976 and 2009, paying particular attention to whether the relationship has changed over time. One of his main conclusions is that mortality has shifted over time from being strongly pro-cyclical to being largely unrelated to macroeconomic conditions. Although this paper technically covers the time window of the 2007-2009 recession, its focus is primarily on mortality. Furthermore, the proxy for business cycle used in this study is average annual state unemployment rate, which, for reasons explained earlier, may not be the most ideal measure to capture the statewide macroeconomic conditions during the Great Recession. Stevens et al. (2011) find that the negative relationship between the state unemployment rate and total mortality obtained in the period from 1978 to 1991 diminishes when the analysis period is extended through 2006. The authors conclude that the overall effect of the business cycle on mortality may not be as large as previously believed. In another recent paper, McInerney and Mellor (2012) examine the relationship between recessions and seniors' health and health behaviors using data from the Medicare Beneficiary Survey. They find that the relationship between unemployment and mortality of the elderly is negative if the analysis period is 1976-1991, but positive if the analysis period is 1994-2008.

It is important to note that the existing evidence is largely built on information that predates the Great Recession.[3] Hurd and Rohwedder (2010) analyze responses from an internet survey to summarize the experience and expectations of households during the Great Recession on a number of measures, including housing, stock market, spending, retirement, unemployment, and health between November 2008 and May 2009. They find that the percentage of people who rated their health as fair or poor initially declined but then showed no trend afterwards. Using a cross-national dataset, Lusardi et al. (2010) show that the use of routine nonemergency medical care has decreased at a higher rate in the United States than in Great Britain, Canada, France, and Germany. While these studies are suggestive of a negative link between the Great Recession and health and health care utilization, none has the explicit focus on the impact of macroeconomic conditions such as unemployment or employment rate on health and health behaviors.

III. Data

The Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System (BRFSS) is an on-going health survey system tracking the health conditions and risk behaviors in the United States since 1984. Steadily expanding from 15 states in 1984, the BRFSS is a representative telephone survey that currently provides coverage of all 50 states and the District of Columbia. Over the course of each year, the BRFSS contacts over 200,000 individuals to create a repeated annual cross section. The present study focuses on the period from 2005 to

[3] One exception is Macy et al. (2013), who use data from a county in Indiana to study the health behaviors of individuals between 2005 and 2011. They find that while participants in the study reported improved levels of health behaviors overall after the economic downturn as compared to the pre-recession levels, a higher level of financial strain was associated with less engagement in healthy behaviors, including making health-based decisions about food, exercising frequently, and abstaining from smoking. However, the study is based on a single county with a relatively small sample (n=3,984) of predominantly white (96 percent) and well-educated (97 percent with a high school degree and 51.4 percent with a college degree).

2011, for which the sample size totals over 1.7 million individuals, over 900,000 of which are in the labor force. The analysis sample is limited to individuals in the labor force and ages 25 to 55. After excluding missing observations on key variables, we have a total sample of 849,594 observations. Note that the analysis sample differs slightly based on the number of observations in the outcome variable.

Measures of Macroeconomic Conditions

Our primary measure of economic conditions is based on the percentage of individuals employed at the state level. In particular, we construct the average percentage of the civilian non-institutionalized state population (aged 16 and over) employed during the three months ending with the survey month.[4] This measure is obtained from the Local Area Unemployment Statistics (LAUS) of the Bureau of Labor Statistics (BLS). As shown in Table 1, the average state employment rate is 61 percent in our sample. We chose to average this measure over a three month period because contemporaneous values might not reflect the true economic conditions in a state, but rather capture the very short-term fluctuations. Nevertheless, we also estimate our models using one-month-lagged measures of these variables. These results produced estimates that are very similar to those presented in this paper and are available from the authors upon request. For the sake of consistency with the previous literature, we also estimate all of our models using the conventional measure of economic conditions defined as the average state unemployment rate during the three months ending with the survey month. As shown in Table 1, the average state unemployment rate is 7 percent during our analysis period.

[4] These measures closely follow those employed by Ruhm (2005).

Outcome Variables

Topics included in the BRFSS provide an extensive overview of a respondent's current health, health history, and health behaviors. Current health questions range from the broad ones, such as ones asking about general health, to specific ones, such as questions asking if the respondent snores. Included in this range are questions regarding smoking and drinking behavior, stress, and mental health. Overall, the BRFSS gives a detailed picture of health and health care in the United States. In addition to detailed health questions, the BRFSS provides information on the typical demographic characteristics of its respondents.

We focus on smoking behavior as the first domain of outcomes in our study. The "Current Smoker" outcome is an indicator variable equal to one if the respondent is a current smoker, and zero otherwise. The BRFSS provides information on the smoking behavior based on whether the respondent smokes daily, some days, is a former smoker, or has never smoked. The current smoker variable indicates whether the respondent smokes daily or some days. Similarly, "Daily Smoker" indicates whether the respondent smokes every day. In the past, smoking has typically been considered a normal good and has exhibited a pro-cyclical pattern (Bobak, Jha et al. 2000, Ruhm 2000). However, the prevalence of tobacco use has changed dramatically in the United States in the past few decades and emerging evidence suggests that smoking might have shifted from being normal good to an inferior good (Cheng and Kenkel 2010, Kenkel, Schmeiser et al. 2011). As shown in Table 1, about 50 percent of our sample reports being a current smoker and 15 percent reports being a daily smoker.

Our next set of outcomes is related to alcohol consumption. Specifically, we examine three measures of alcohol use: current drinker, binge drinker, and chronic alcohol use. The outcome of "Current Drinker" measures overall alcohol use, with any reported use over the past

month resulting in a value of 1. Binge drinking behavior is measured by an indicator which takes on the value of 1 if the respondent drank more than five servings of alcohol in one sitting during the previous month, and zero otherwise. Finally, the "Chronic Drinking" outcome is also a binary indicator variable that equals 1 if the respondent reports to have had 60 or more drinks during the past month, zero otherwise.

The evidence on alcohol use during the economic cycle is also mixed. A number of studies have found pro-cyclical effects (Ruhm and Black 2002, Johansson et al. 2006) while others have found no relationship (Ogwang and Cho 2009) or even an increase in alcohol use during economic turmoil (Cotti et al. 2013). While the evidence on overall alcohol use is mixed, it has been suggested that heavy and light drinkers might exhibit a heterogeneous response to poor economic conditions, with heavy drinkers reducing consumption and light drinkers slightly increasing consumption (Ruhm and Black 2002). Overall "Current Drinkers," which equals one if the respondent has had an alcoholic beverage in the past 30 days, stands at about 63.8 percent of the population, while the prevalence of heavier drinking, as measured by binge drinking and chronic drinking, is at 20 percent and 8.6 percent of the sample, respectively.

Beyond changes in consumption patterns of potentially harmful products, the economic cycle can also affect physical activity patterns and dieting. We examine this potential channel through the "Physical Activity" and "Obesity" outcomes. In the BRFSS, the respondents are asked: "During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?" If the respondent reported any physical activity in the past 30 days other than that which he or she does while working, we defined a "Physical Activity" indicator that takes on the value of one, and zero otherwise. Similarly, the "Overweight," "Obese," and "Severely Obese" outcomes are

indicator variables equal to one if the respondent's self-reported height and weight result in a Body Mass Index greater than 25, 30, and 35, respectively.[5] As shown in Table 1, approximately 81 percent of sample respondents report having engaged in physical activity, while 30 percent of our sample is obese and 68 percent are overweight. The proportion of our sample who is severely obese is about 14 percent.

The outcome variables thus far have measured potential channels through which the business cycle can affect health. Our next set of outcomes measures the respondent's reported health directly. The first, the outcome of "Healthy" captures the respondent's overall general health at the time of the interview. While the original response is a categorical variable on a Likert scale from 1 to 5, we condense respondent's answers to a binary variable equal to 1 if the respondent is in very good or excellent health, and zero otherwise. Likewise, the outcomes of "Excellent Health" and "Poor Health" are indicators if the respondent reports being in excellent or poor health, respectively. The next two outcomes focus on the respondent's mental well-being, which includes stress, depression, and problems with emotions over the 30 days preceding the interview. These outcomes are measured by indicator variables equal to 1 if the respondent reports poor mental health for more than 10 or 20 days in the past month, and zero otherwise. About 92 percent of our respondents are in either good or excellent health. The proportions of our sample in excellent and poor health are 23 percent and 1.4 percent, respectively. About 13 percent of our sample report having mental health problems for at least 10 days in the past 30 days, while seven percent report having such problems for at least 10 days during that period.

Finally, we supplement our analysis with a set of explanatory variables on age, gender, race and ethnicity, marital status, education, and income levels. The BRFSS reports income

[5] Body Mass Index is calculated as the ratio of weight in kilograms and height in meters squared.

categories of: 1) Under $10,000; 2) $10,000-$14,999; 3) $15,000-$19,999; 4) $20,000-$24,999; 5) $25,000-$34,999; 6) $35,000-$49,000; 6) $50,000-$74,999; and 7) $75,000 and over. For estimation purposes, the respondent's income is first assumed to be the midpoint of the categories or 150% of the top category and is then converted to 2010 dollars using the all items CPI. Finally, weighted incomes are averaged by state of residence and 36 demographic groups stratified by gender (male and female), age group (25-29, 30-34, 35-39, 40-44, 45-49, and 50-55) and educational level (Less than high school, high school or some college, and college). Descriptive statistics for the health behaviors and all of our covariates are presented in Table 1.

IV. Empirical Framework

We estimate a series of regressions that relate changes in health behaviors to state macroeconomic conditions along with a vector of individual level characteristics. Specifically, our basic empirical analysis is in the following form:

$$H_{ismy} = \alpha_0 + \alpha_1 E_{ismy} + \mathbf{X}_{ismy}\alpha_2 + \mu_s + \delta_m + \lambda_y + \varepsilon_{ismy}\,, \qquad (1)$$

Where H_{ismy} is one of our outcome measures for individual *i* living in state *s* interviewed in month *m* of year *y* and $\mathbf{X}_{ismy}$ is a vector of individual characteristics. The variable of interest is E_{ismy}, one of the two measures of state level macroeconomic conditions.

In equation (1), we also include state fixed effects, μ_S, which account for permanent differences across states that may also be correlated with both economic conditions and health behaviors, such as lifestyles associated with weather patterns, persistent smoking propensities, and state infrastructures on health care and education. Note that the identification of α_1 in equation (1) comes from within state variation in economic conditions over time, rather than

fluctuations across states. The δ_m is a vector of month fixed effect, which accounts for the seasonality in some of the health behaviors such as physical activity (Ruhm 2005). Finally, we control for year fixed effects, λ_y, which capture nationwide trends and shocks that may influence health behaviors, such as national fluctuations in food and cigarette prices, calorie content in national chain restaurants, the reduction in payroll tax in 2010, and federal regulations related to health. Finally, ε_{ismy} is an idiosyncratic random error term. We estimate linear probability models using Ordinary Least Squares (OLS) and report robust standard errors clustered at the state and month, assuming that observations are independent across states and months but not within states in a given month (Ruhm 2005).[6] All the regressions are weighted using the BRFSS sampling weights.

Equation (1) accounts for unobserved heterogeneity correlated with both economic conditions and health behaviors through the set of time variant characteristics gauged by $\mathbf{X}_{ismy}$ and time-invariant factors captured by μ_s. In some specifications, we further control for confounding factors that may trend linearly by adding a vector of state-specific linear time trends. Adding state-specific linear time trends help us account for unobserved factors that vary within states over time, such as social norms related to health behaviors like smoking and exercise. These trends also help us control for other state level time-varying factors such as changes in health care delivery services that closely follow tax revenues.

V. Results

Table 2 presents the estimates from a version of equation (1) with state employment rate averaged over the three months leading up to the interview month. The point estimates on

[6] Estimation of the models via probit yielded quantitatively similar marginal effects.

employment rate from a specification that controls for month, year, and state fixed effects are displayed in column I. In column II, we add state-specific linear time trends to those fixed effects in column I. Note that both sets of specifications include a vector of individual characteristics listed above. Robust standard errors clustered at the state and month level are shown in parentheses. To focus our attention on the question of interest and economize on space, we only present the estimates on the state employment rate in Table 2. The full set of results for the specifications in columns I and II are shown in Appendix Tables 1A and 1B, respectively. As shown in these tables, the estimates on individual characteristics are consistent with those obtained in the relevant literature. For example, males are more likely to consume alcohol regularly and engage in binge and chronic drinking than females. They are also more likely to be overweight, but less likely to be obese. Being married is associated with less smoking and drinking, and less likelihood of being obese. Married individual are also less likely to have mental health problems and more likely to be in excellent physical health. Similarly, higher education is associated with being healthier, both physically and mentally, less smoking, more drinking alcohol, but less binge drinking. Income is positively associated with smoking and drinking, except for excessive drinking, suggesting that both smoking and drinking are normal goods. There is also evidence to indicate that income is positively associated with being severely obese. Regarding outcomes of self-reported physical and mental health, income appears to be positively related to physical health, but negatively related to mental health. The positive association for physical health may reflect improved access to health care services associated with better income, while the negative association for mental health may be explained by the increased stress that is likely associated with a stronger labor force attachment among people with higher income.

Turning back to the employment rate estimates in Table 2, the emerging picture is that the effects are very small in magnitude and mostly estimated without much precision. One exception to the lack of statistical significance is the probability of binge drinking, which appears to vary pro-cyclically. However, the point estimate is still too small to have any significant implications. Specifically, binge drinking is associated with a 0.0023 percentage point decrease in response to a one percentage point drop in the state percentage of the population employed. To the extent that income is properly captured by the state household income averaged over the BRFSS respondents with the same sex, age, and education, it is unlikely that this small but statistically significant effect is explained by a drop in income resulting from loss of employment. However, the models do not account for changes in relative prices of alcoholic beverages or cost of medical care if employer-based health insurance is curtailed (Ruhm 1995). In fact, estimating the same specifications without controlling for income did not cause any appreciable change in the estimates on employment rate, suggesting that psychological factors are likely to be more important than economic factors in explaining the relationship between economic conditions and drinking. These psychological factors may work in the direction of reducing heavy drinking if employment itself is a stressful activity for many individuals (Wilsnack and Wilsnack 1992, Tekin 2004). The pro-cyclical pattern in binge drinking is also consistent with the presumably reduced social interactions with peers from work and activities, such as dining out, which is likely reduced during economic downturns. But again, for all practical purposes, we can interpret the relationship between binge drinking and state employment rate to be zero.

Another statistically significant estimate is on the probability of physical exercise, which grows by about 0.005 percentage point in response to a one point drop in state employment rate.

This result is consistent with increased leisure time associated with deteriorating economic conditions. However, it is yet again too small in magnitude to have any meaningful implications. In fact, all of the other estimates pertaining to health behaviors are both small in magnitude and statistically insignificant.

Regarding health outcomes, the estimate sizes are again too small economically and are practically zero. In terms of statistical significance, there appears to be an increase in the probability of poor health associated with declining economic conditions as measured by reduced state employment rate. Specifically, the probability of being in poor health increases by about 0.00067 percentage point in response to a one point drop in state employment rate. This estimate translates into an effect size of 4.8 percent increase in the likelihood of poor health. This result is interesting in the sense that although individuals seem to improve their health behaviors during economic downturns, they have a sense of declining overall health at the same time. This finding may be explained by the reduced health care utilization as individuals may stop taking medications because they cannot afford them, or stop going to the doctor for preventive care. While physical health appears to have a pro-cyclical pattern, the results suggest that mental health is counter-cyclical. The estimates are positive on both the probabilities of having poor mental health for more than 10 days and 20 days during the past 30 days, but it is only statistically significant for the former. The point estimate indicates that the probability of having poor mental health for more than 10 days in the past 30 days decreases by 0.0017 percentage point in response to a one point drop in the state employment rate. This estimate translates into an effect size of approximately 1.3 percent.

The results in Column II are from a specification that adds state-specific linear time trends to the specification in Column I. Adding these trends causes a few noticeable changes to

the estimates in Column I. Among the outcomes representing health behaviors, all of the coefficients that are imprecisely estimated in Column I continue to be insignificant in Column II, although some of them switch signs. In addition, binge drinking is no longer significant once we control for state-specific linear time trends. The disappearance of statistical significance of the estimate on binge drinking is due to an increase in standard error because the point estimate remains similar. The estimate on physical exercise remains negative and statistically significant although the point estimate is reduced modestly. Specifically, the likelihood of physical exercise increases by 0.0039 percentage points in response to a one point increase in the state employment rate, which translates into an effect size of half a percentage point (0.0039/0.808). This is again a very small effect for practical purposes.

Regarding self-reported health outcomes, the estimate on the probability of having excellent physical health increases and becomes statistically significant when state-specific trends are included in the model. Individuals are now 0.0031 percentage point less likely to be in excellent physical health when the state employment rate drops by one percentage point, implying an effect size of about 1.3 percent. Consistent with this result, being in poor health is associated with a 0.0011 percentage point (or 0.8 percent) increase when state employment rate drops by one percentage point. Interestingly, the estimates on having mental health problems become zero when state-specific trends are accounted for.

The results from the estimation of equation (1) with state unemployment rate are presented in Table 3. Similar to Table 2, results are presented in two columns with the estimates from specifications without controlling for state-specific linear trends are displayed in Column I and those with trends are displayed in Column II. Focusing on the estimates in Column II, they are again small in magnitude and mostly insignificant, suggesting that state unemployment rate

has minor effects on health and health behaviors. Focusing on statistically significant estimates, binge drinking is associated with a 0.0037 percentage point (or 1.8 percent) decrease in response to a one percentage point increase in state unemployment rate. Again, all other estimates on health behaviors are practically zero both economically and statistically. Turning to estimates on physical and mental health, estimates are again small and imprecise, except for poor health. The estimate on this variable implies that being in poor health increases by 0.001 percentage point (or 7 percent). Similar to Table 2, neither of the estimates on mental health problems is precisely estimated.

In summary, the results in Tables 2 and 3 indicate that economic deterioration as measured by decreased employment or increased unemployment at the state level leads to poor physical health, while no association is detected for mental health. Regarding health behaviors, the evidence suggests that most of these behaviors improve during economic deterioration, although the magnitudes of the effects are very small and practically zero in majority of the cases.

Heterogeneous Effects

The general tone of the evidence discussed so far indicates that the economic deterioration experienced during the most recent recession did not lead to robust improvements in health behaviors as documented in previous studies focusing on earlier recessions. Rather, our findings suggest that the counter-cyclical pattern in health behaviors have largely disappeared during the period overlapping with the Great Recession. However, the results presented in Tables 2 and 3 assume that the effects of state employment and unemployment are experienced equally by all demographic groups. Such an assumption may obscure potentially dramatic differences in

the severity of cyclical impacts for different groups. In fact, there is evidence to suggest that the difficulties experienced by individuals indeed differed depending on the demographic group to which they belong (Hoynes et al. 2012). For example, men experienced significantly larger job loss during the recession than women, but recovery in male employment has been more rapid (Kochhar 2011). Furthermore, the impacts of the Great Recession have been felt most strongly for men, black and Hispanic workers, and low-education worker (Hoynes et al. 2012). Therefore, an important question to consider is whether and to what extent these differences experienced by various demographic groups exacerbate or mitigate the disparities in health and health behaviors across majority and minority populations. To shed light into this question, we estimate the models for the impact of state employment and unemployment rates on health and health behaviors separately by various sub-population groups. Tables 4A-C provide estimates of the impact of state employment rate by race and ethnicity, gender, and education, respectively. For each group, we present estimates from specifications both with and without state-specific linear trends, but we focus our discussion on the estimates from the specification with trends.

Looking at the gender specific results in Table 4A, health behaviors appear to be similarly related to state employment rate despite significant differences in lifestyles across races. Except for a few cases, the estimates are again mostly small in size and statistically insignificant. It is also clear that the counter-cyclical nature of physical exercise observed in Table 2 is driven entirely by whites with no effects found among blacks and Hispanics. This may be indicative of better availability of and access to community amenities, such as parks and gyms in white neighborhoods than minority neighborhoods. On the other hand, there appears to be no detectable relationship between self-reported physical and mental health and employment rate among whites, while blacks are the group whose general health deteriorates during economic

contractions. In particular, the probability of being in good or excellent health decreases by 0.0075 percentage points (about 0.9 percent) when state employment drops by one percentage point. Focusing on the upper end of the health distribution, a one percentage point drop in state employment rate is associated with a 0.0113 percentage point (or 5.5 percent) decrease in the likelihood of being in excellent physical health. While statistically significant, these magnitudes do not appear to be large enough to account for much of the existing disparities in health between blacks and whites. Regarding mental health problems, it appears to be the Hispanic populations who are most affected by economic downturns, while the association is weak and imprecisely estimated for whites and blacks. On the one hand, the probability of having mental health problems for at least 20 days in the past month goes up by 0.0085 percentage point when state employment rate increases by one percentage point. This estimate translates into an effect size of approximately 12 percent, which is not trivial. On the other hand, Hispanics are also the demographic group that appears to suffer physical health problems during economic deterioration. The likelihood of this group reporting poor health increases by 0.0036 percentage point (15.7 percent) in response to a one percentage point decrease in state employment rate. This finding is consistent with Hoynes et al. (2012) who document that Hispanics were particularly hit hard during the Great Recession. The counter-cyclical nature of mental health may be explained by the increases in job-related stress associated with increased employment, while the pro-cyclical pattern of physical health may reflect better access to health care associated with insurance coverage.

Next, we present results by gender in Table 4B. These results suggest that economic deterioration, as measured by a drop in state employment rate, would have a positive impact on the probability of physical exercise among males and a negative impact on the probability of

binge drinking among females. To the extent that males suffered more significant employment losses during the Great Recession, this group may have experienced a larger increase in their non-market leisure time, which would allow them to engage in more physical exercise. Regarding the outcomes of health, the effects of the Great Recession appear to have been felt only on females. Specifically, females face a 0.0044 percentage point (1.8 percent) decrease in being in excellent health and a 0.0015 percentage point (10 percent) increase in being in poor health in response to a one-percentage point drop in state employment rate.

Finally, we present results separately for those with a college degree and a high school degree in Table 4C. If improved health behaviors during recession result from decreased job-related stress or increased leisure time, then the effects may be felt more strongly among groups with better education, who should have a higher labor force attachment (Ruhm, 2005). Our results are not supportive of this hypothesis in general. Among the outcomes of health behaviors, the only outcome with a statistically significant estimate for either group is physical exercise, which follows a counter-cyclical pattern for both college and high school educated individuals. However, the estimates are larger for high school educated individuals than college educated ones. For example, a one percentage point drop in state employment rate leads to an increase in the likelihood of physical exercise among college educated individuals by 0.41 percent and among high school educated individuals by 1.4 percent. Regarding health outcomes, the only group that appears to have been affected in terms of physical health are those with a high school degree, whose probability of being in poor health goes up and probability of being in excellent health goes down when the economy deteriorates. There is also some evidence of pro-cyclical pattern for mental health among college educated individuals.

Tables 5A-5C present estimates on the state unemployment rate by race/ethnicity, gender, and education. Race and ethnicity specific results presented in Table 5A suggest that the only group that appears to have been affected in terms of health behaviors by changes in unemployment rate during the Great Recession is Hispanics. In particular, a one percentage point increase in state unemployment rate is associated with a 0.013 percentage point reduction in both being a current drinker and binge drinking. This estimate translates into 2.4 and 6.2 percent decreases in being a current drinker and binge drinking, respectively. Regarding health outcomes, there appears to be a pro-cyclical pattern among whites and counter-cyclical pattern among Hispanics for mental health, which is consistent with the employment rate estimates presented in Table 4A.

Overall, thee gender specific results displayed in Table 5B are again largely consistent with the employment rate counterparts presented in Table 4B. Specifically, there is a positive relationship between unemployment rate and physical exercise for males and a negative relationship between drinking for females. Interestingly, the coefficient estimates for these outcomes are similar in magnitude between the results in Tables 4B and 5B.

Finally, Table 5C presents results separately for those with a college degree and a high school degree. Regarding the outcomes of health behaviors, physical exercise appears to be pro-cyclical for both college and high school educated individuals, although the estimate is not statistically significant for high school educated individuals when state-specific trends are controlled for. There also appears to be a negative relationship between binge drinking and state unemployment rate among high school educated individuals - a finding not observed in the specification with state employment rate. Focusing on health outcomes shown at the bottom of

Table 5C, none of the estimates pertaining to physical and mental health are estimated with much precision. Moreover, the effect sizes are too small to have any meaningful implications.

Relationship between Individual Unemployment and Health and Health Behaviors

The preceding discussion pertains to the relationship between the economic conditions facing individuals at the state level and their health and health behaviors. These economic conditions are captured by the state employment and unemployment rates averaged over the three months prior to the survey date. Implicitly assumed in this approach is that fluctuations in economic conditions in a state have an equal effect on every individual living in that state, holding the characteristics of individuals constant. One way to relax this assumption is to estimate models of the relationship between unemployment at the individual level and health. However, estimating unbiased effects of one's own unemployment on health is a difficult task. Biased estimates can come from two sources of endogeneity. The first, statistical endogeneity, is caused by unobserved factors that are correlated with both unemployment and outcomes of health and health behaviors. For example, rates of time preference would affect both an individual's labor market decision and health behaviors such as physical exercise or dietary decisions. Estimates of the relationship between unemployment and health outcomes that do not take into account of this type of endogeneity would be biased. The second source of endogeneity, structural endogeneity, comes from the potential reverse causality from health outcomes to unemployment. For example, poor health may contribute to poor labor market productivity, which may then lead to unemployment. The structural endogeneity is likely to be a less serious problem for the analysis of the Great Recession because the recession was sudden, sharp, and certainly not caused by a health crisis in the country. Studying the effect of economic conditions

at the aggregate level on individual level health is less prone to either types of endogeneity because individual level unobservables are likely correlated with state economic conditions to a lesser extent. Similarly, individual experiences of poor health are less likely to influence a state's overall economic conditions.

In an attempt to provide insights into the effect of unemployment and health outcomes at the individual level, we estimate a version of equation (1) replacing state unemployment rate by individual unemployment. This analysis is feasible since BRFSS contains information on the respondent's own job search status. However, these estimates are likely to be biased due to endogeneity problems explained above. We attempt to address these problems by employing a two-stage least squares (2SLS) model. The 2SLS model requires an instrumental variable, which should be correlated with an individual's experience of unemployment, but is not correlated directly with his/her health outcomes. One potential candidate for an instrumental variable is the state unemployment rate. The validity of state unemployment rate as an instrument hinges on two conditions. The first condition, also known as the first stage, requires that state's unemployment rate is a good predictor of an individual's own unemployment. This condition is easily satisfied in our case. Specifically, in a regression of the individual unemployment on state unemployment rate along with all the explanatory variables in equation (1), the estimate on state unemployment rate is 0.01155 with a p-value of 0.0001. The second condition requires that state unemployment rate can influence health outcomes only through affecting individual unemployment. Although not directly testable, we argue that this is not an unreasonable assumption, especially after controlling for state fixed effects and state-specific trends.

The results using individual level information on unemployment are shown in Table 6. In Column I, we present the Ordinary Least Squares estimates from a specification using a binary

indicator of unemployment as the treatment variable. More specifically, the binary indicator of unemployment takes on the value of one if the individual reports searching for a job at the time of the interview and zero otherwise. Based on this definition, 10.37 percent of our sample is unemployed. Finally, we present two sets of 2SLS models, which uses state unemployment rate as an instrument for the individual unemployment status. Specifically, Column II presents the 2SLS estimates from a specification that controls for month, year, and state fixed effects and Column III adds state-specific linear time trends to this list. It is important to note that the estimates in Table 6 are not directly comparable to those estimates in Table 3 because the treatment variable is a binary indicator of the status of individual unemployment in the former, while it is state unemployment rate in the latter.

The estimates in Column I draw a mixed picture regarding the effects on health behaviors. On the one hand, being unemployed is associated with increased smoking and being obese and severely obese. On the other hand, it is associated with decreased drinking, except for chronic drinking, physical exercise, and being overweight. In contrast to the mixed evidence on health behaviors, the estimates on health outcomes consistently indicate that being unemployed is associated with poor physical and mental health.

When we account for the endogeneity of the status of individual unemployment using variation in the state unemployment rate, the evidence becomes much more consistent, implying a negative relationship between being unemployed and health behaviors across all outcomes. It is important to note that the estimates on being unemployed in the two smoking models and physical exercise switch sign and remain statistically significant. The estimates in Column III suggest that being unemployed is associated with a 26 percentage point decrease in the probability of being a current drinker and a 37 percentage point decrease in the probability of

binge drinking. Regarding health outcomes, the only estimate that is estimated with statistical precision is poor health indicating that being unemployed is associated with a 9.8 percentage point increase in being in poor physical health. While the effect sizes are not directly comparable, the estimates in Table 6 consistent with the picture that have emerged from the previous tables that economic difficulties, if anything, are associated with improved health behaviors but deteriorating health.

VI. Conclusions

While the effects of economic conditions on health and health behaviors have been well-studied, the consequences of the most recent recession on these outcomes are not well-understood. This lack of understanding is primarily due to existing studies relying data that predate the recent recession. However, evidence obtained from those studies may not be a proper guide to understanding the effect of the recent recession on health outcomes and health behaviors because the labor market difficulties of individuals experienced during the recent recession were much more severe from those in most previous recessions.

In this study, we examine the impacts of macroeconomic conditions as measured by state employment and unemployment rates on a large set of health behaviors and health outcomes using data from the BRFSS between 2005 and 2011. Our results indicate that the evidence for the counter-cyclical pattern documented for heath behaviors in the literature is very weak for the Great Recession. In particular, while we find some evidence for a positive relationship between economic deterioration and reduced drinking and increased physical exercise, the magnitudes of these effects are practically zero.

Additionally, we show that the current recession has had differential impacts on several subpopulations. For example, the only effect that is detected on physical exercise comes from white males. We also find evidence that Hispanics are essentially the only group who suffered health problems both physically and mentally. Furthermore, college educated individuals appear to have fared better than those with a high-school degree in terms of physical health, which is consistent with the hypothesis that college educated individuals may have better access to health care services. On the other hand, better educated individuals appear to experience more mental health problems, which may explained by the possibility that economic deterioration may take a bigger mental toll on individuals who have a higher opportunity cost of job loss.

Overall, our findings are consistent with the evidence emerging from several recent studies that suggest that the counter-cyclical nature of health and health behaviors may be weakening. While our analysis cannot provide a definitive explanation for this pattern, we consider this an important avenue for future research.

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Figure 1

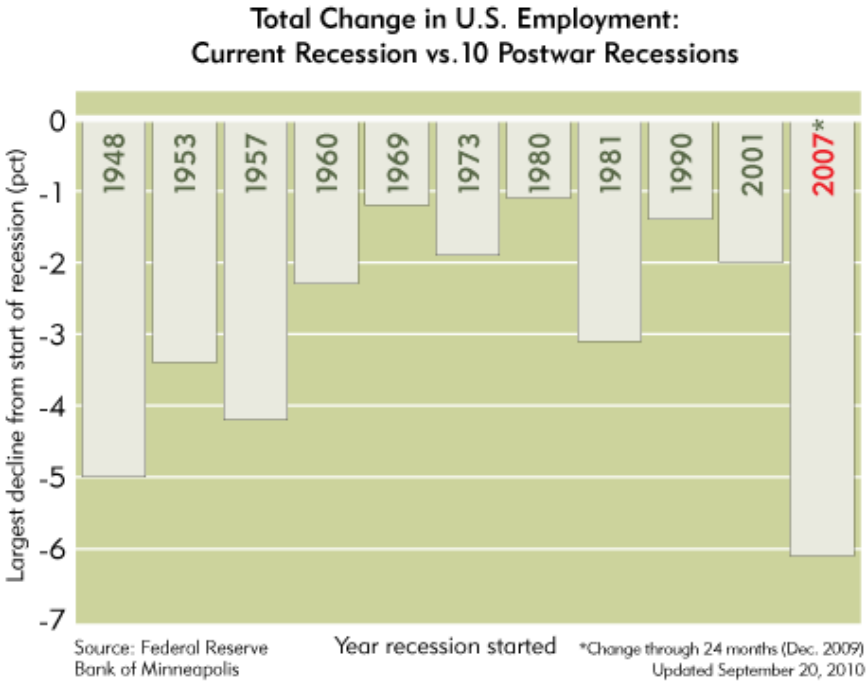
Total Change in U.S. Employment:
Current Recession vs.10 Postwar Recessions
Largest decline from start of recession (pct)
0
-1
-2
-3
-4
-5
-6
-7
1948
1953
1957
1960
1969
1973
1980
1981
1990
2001
2007*
Source: Federal Reserve Bank of Minneapolis
Year recession started
*Change through 24 months (Dec. 2009)
Updated September 20, 2010

Table 1: Descriptive Statistics

Variable	N	Mean	Standard Deviation
Outcomes			
Current Smoker	849,594	0.502	0.500
Daily Smoker	849,594	0.148	0.355
Current Drinker	836,540	0.638	0.481
Binge Drinking	849,594	0.203	0.402
Chronic Drinking	849,594	0.086	0.280
Physical Activity	843,997	0.808	0.394
Overweight	849,594	0.676	0.468
Obese	849,594	0.295	0.456
Severely Obese	849,594	0.136	0.343
Healthy	847,509	0.921	0.270
Excellent Health	849,594	0.233	0.422
Poor Health	849,594	0.014	0.118
Mental10: Poor Mental Health>10 days/month	849,594	0.130	0.336
Mental20: Poor Mental Health>20 days/month	849,594	0.071	0.257
Explanatory Variables			
State Employment Rate	849,594	0.610	0.037
State Unemployment Rate	849,594	0.070	0.018
Age	849,594	40.767	8.597
Male	849,594	0.540	0.498
Married	849,594	0.679	0.467
Divorced	849,594	0.096	0.295
Widowed	849,594	0.010	0.100
Other Marital Status [a]	849,594	0.422	0.422
Less Than High School [a]	849,594	0.044	0.206
High School	849,594	0.241	0.428
Some College Education	849,594	0.268	0.443
College	849,594	0.447	0.497
White	849,594	0.783	0.412
Black	849,594	0.129	0.335
Other Race [a]	849,594	0.088	0.283
Mean Income	849,594	68,495.53	20,884.32

Note: Data are from 2005 to 2011 years of the BRFSS.
[a] Omitted category.

Table 2: The Effect of State Employment Rate on Health and Health Behaviors

Outcome	(I)	(II)
Current Smoker	0.089	-0.074
	(0.107)	(0.137)
Daily Smoker	0.018	-0.055
	(0.079)	(0.123)
Current Drinker	0.151	0.222
	(0.113)	(0.169)
Binge Drinking	0.234**	0.214
	(0.117)	(0.167)
Chronic Drinking	-0.004	0.020
	(0.117)	(0.145)
Physical Exercise	-0.469***	-0.386**
	(0.124)	(0.174)
Overweight	-0.052	-0.032
	(0.119)	(0.170)
Obese	-0.015	0.085
	(0.131)	(0.207)
Severely Obese	0.036	0.125
	(0.095)	(0.134)
Healthy	0.109	0.002
	(0.073)	(0.116)
Excellent Health	0.109	0.314**
	(0.106)	(0.153)
Poor Health	-0.067**	-0.113**
	(0.031)	(0.046)
Mental Health Problems > 10 days	0.174*	-0.011
	(0.100)	(0.134)
Mental Health Problems > 20 days	0.065	-0.005
	(0.075)	(0.109)
Month Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
State-Specific Linear Trends	No	Yes

Notes: Standard errors are clustered at the state and month. A *, **, and *** indicate that the estimate is statistically significance at the 90^{th}, 95^{th}, and 99^{th} percent level of confidence, respectively. The number of observations are 849,594 in models of current smoker, daily smoker, binge drink, chronic drink, overweight, obese, severely obese, excellent health, poor health, mental health>10 days, and mental health>20 days, 843,997 in physical exercise, 836,540 in current drinker, and 847,509 in general health.

Table 3: The Effect of Unemployment Rate on Health and Health Behaviors

Outcome	(I)	(II)
Current Smoker	-0.310***	-0.151
	(0.116)	(0.136)
Daily Smoker	-0.150*	-0.081
	(0.085)	(0.115)
Current Drinker	-0.058	-0.272*
	(0.099)	(0.165)
Binge Drinking	-0.267***	-0.378**
	(0.101)	(0.147)
Chronic Drinking	0.101	0.052
	(0.124)	(0.143)
Physical Exercise	0.563***	0.219
	(0.125)	(0.152)
Overweight	0.117	0.112
	(0.136)	(0.182)
Obese	-0.010	0.011
	(0.133)	(0.206)
Severely Obese	-0.074	0.028
	(0.098)	(0.143)
General Health	-0.048	-0.006
	(0.074)	(0.099)
Excellent Health	0.039	-0.071
	(0.112)	(0.165)
Poor Health	0.085***	0.101**
	(0.030)	(0.045)
Mental Health Problems > 10 days	-0.123	0.031
	(0.098)	(0.129)
Mental Health Problems > 20 days	-0.006	0.047
	(0.074)	(0.092)
Month Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
State Fixed Effects	Yes	Yes
State-Specific Linear Trends	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90^{th}, 95^{th}, and 99^{th} percent level of confidence, respectively. The number of observations are 849,594 in models of current smoker, daily smoker, binge drink, chronic drink, overweight, obese, severely obese, excellent health, poor health, mental health>10 days, and mental health>20 days, 843,997 in physical exercise, 836,540 in current drinker, and 847,509 in general health.

Table 4A: The Effect of Employment Rate on Health and Health Behaviors – By Race and Ethnicity

Outcome	Whites	Whites	Blacks	Blacks	Hispanic	Hispanic
Current Smoker	0.254**	0.201	-0.293	-0.688	0.022	-0.686
	(0.113)	(0.152)	(0.315)	(0.475)	(0.352)	(0.548)
Daily Smoker	0.169*	0.131	-0.211	-0.403	0.033	-0.325
	(0.093)	(0.135)	(0.265)	(0.393)	(0.259)	(0.390)
Current Drinker	0.270**	0.246	0.173	0.123	-0.071	0.168
	(0.121)	(0.189)	(0.360)	(0.539)	(0.417)	(0.556)
Binge Drinking	0.268**	0.206	0.256	0.266	0.028	-0.100
	(0.120)	(0.171)	(0.278)	(0.385)	(0.404)	(0.638)
Chronic Drinking	0.090	0.043	0.125	-0.030	-0.330	-0.074
	(0.092)	(0.117)	(0.191)	(0.277)	(0.392)	(0.534)
Physical Exercise	-0.427***	-0.384**	-0.010	-0.523	-0.735	-0.054
	(0.113)	(0.149)	(0.364)	(0.499)	(0.510)	(0.814)
Overweight	-0.012	-0.132	0.104	0.292	-0.340	-0.232
	(0.123)	(0.194)	(0.316)	(0.528)	(0.404)	(0.627)
Obese	-0.003	-0.050	-0.314	0.201	0.192	0.278
	(0.128)	(0.189)	(0.418)	(0.565)	(0.466)	(0.835)
Severely Obese	-0.030	-0.111	-0.093	0.176	0.347	0.871
	(0.090)	(0.136)	(0.284)	(0.387)	(0.314)	(0.550)
General Health	0.011	-0.082	0.579***	0.746**	0.256	0.039
	(0.062)	(0.097)	(0.224)	(0.355)	(0.331)	(0.512)
Excellent Health	0.156	0.195	0.449	1.131*	-0.244	0.427
	(0.109)	(0.168)	(0.328)	(0.581)	(0.282)	(0.425)
Poor Health	-0.030	-0.036	-0.103	-0.257**	-0.141	-0.363*
	(0.024)	(0.040)	(0.083)	(0.120)	(0.123)	(0.202)
Mental Health Problems > 10 days	-0.048	-0.151	0.442*	0.456	1.267***	0.740
	(0.090)	(0.141)	(0.252)	(0.351)	(0.347)	(0.506)
Mental Health Problems > 20 days	-0.105	-0.165	0.171	0.131	0.852***	0.846**
	(0.068)	(0.103)	(0.197)	(0.284)	(0.305)	(0.406)
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. The average number of observations range from 69,275 for Hispanics to 644,680 for Whites. All regressions are weighted using sampling weights provided by the BRFSS.

Table 4B: The Effect of Employment Rate on Health and Health Behaviors – By Gender

Outcome	Male	Male	Female	Female
Current Smoker	0.202	-0.113	-0.038	-0.003
	(0.180)	(0.242)	(0.108)	(0.158)
Daily Smoker	0.074	-0.144	-0.048	0.064
	(0.125)	(0.194)	(0.092)	(0.156)
Current Drinker	0.139	0.165	0.160	0.308
	(0.156)	(0.255)	(0.143)	(0.206)
Binge Drinking	0.232	0.174	0.222**	0.262*
	(0.184)	(0.283)	(0.108)	(0.145)
Chronic Drinking	0.022	-0.107	-0.032	0.168
	(0.157)	(0.209)	(0.109)	(0.138)
Physical Exercise	-0.645***	-0.689***	-0.263*	-0.020
	(0.176)	(0.251)	(0.145)	(0.193)
Overweight	-0.047	0.002	-0.067	-0.107
	(0.163)	(0.253)	(0.139)	(0.217)
Obese	0.161	0.264	-0.230	-0.147
	(0.197)	(0.310)	(0.146)	(0.231)
Severely Obese	-0.014	0.129	0.090	0.106
	(0.132)	(0.190)	(0.111)	(0.167)
General Health	0.042	-0.174	0.190**	0.215
	(0.123)	(0.178)	(0.094)	(0.150)
Excellent Health	-0.057	0.211	0.310**	0.441**
	(0.158)	(0.226)	(0.132)	(0.197)
Poor Health	-0.061	-0.085	-0.075*	-0.146**
	(0.045)	(0.072)	(0.040)	(0.057)
Mental Health Problems > 10 days	0.152	0.107	0.204*	-0.149
	(0.147)	(0.197)	(0.117)	(0.170)
Mental Health Problems > 20 days	-0.013	0.041	0.159*	-0.063
	(0.104)	(0.158)	(0.096)	(0.137)
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. There are an average of 351,855 observations for males and 496,258 for females. All regressions are weighted using sampling weights provided by the BRFSS.

Table 4C: The Effect of Employment Rate on Health and Health Behaviors – By Education

Outcome	College	College	High School	High School
Current Smoker	0.168	-0.008	-0.192	-0.442
	(0.119)	(0.173)	(0.226)	(0.332)
Daily Smoker	0.013	-0.017	-0.162	-0.311
	(0.082)	(0.142)	(0.183)	(0.298)
Current Drinker	0.257	0.104	-0.202	-0.189
	(0.159)	(0.253)	(0.226)	(0.336)
Binge Drinking	0.287*	0.015	0.119	0.234
	(0.153)	(0.209)	(0.214)	(0.302)
Chronic Drinking	-0.010	-0.044	-0.060	0.193
	(0.101)	(0.137)	(0.221)	(0.274)
Physical Exercise	-0.313**	-0.361*	-1.011***	-0.979***
	(0.139)	(0.214)	(0.209)	(0.345)
Overweight	-0.071	-0.113	-0.159	0.222
	(0.166)	(0.264)	(0.217)	(0.322)
Obese	-0.013	0.091	-0.172	0.079
	(0.156)	(0.239)	(0.228)	(0.366)
Severely Obese	0.130	0.157	-0.104	0.160
	(0.118)	(0.164)	(0.172)	(0.274)
General Health	0.078	-0.058	0.257	0.197
	(0.074)	(0.120)	(0.180)	(0.252)
Excellent Health	0.150	0.395	0.075	0.422*
	(0.166)	(0.289)	(0.165)	(0.243)
Poor Health	-0.005	0.022	-0.139**	-0.272**
	(0.026)	(0.043)	(0.066)	(0.116)
Mental Health Problems > 10 days	0.098	-0.194	0.407**	0.207
	(0.107)	(0.165)	(0.201)	(0.292)
Mental Health Problems > 20 days	0.008	-0.235**	0.252	0.260
	(0.077)	(0.113)	(0.165)	(0.249)
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. There are an average of 360,496 observations for College and 258,987 for High School. All regressions are weighted using sampling weights provided by the BRFSS.

Table 5A: The Effect of Unemployment Rate on Health and Health Behaviors – By Race and Ethnicity

Outcome	Whites	Whites	Blacks	Blacks	Hispanic	Hispanic
Current Smoker	-0.426***	-0.193	0.154	0.298	-0.341	-0.313
	(0.119)	(0.141)	(0.301)	(0.416)	(0.291)	(0.551)
Daily Smoker	-0.303***	-0.190	0.085	0.175	-0.090	0.016
	(0.099)	(0.125)	(0.288)	(0.343)	(0.242)	(0.433)
Current Drinker	-0.124	-0.235	-0.341	-0.612	-0.368	-1.326***
	(0.123)	(0.184)	(0.385)	(0.541)	(0.324)	(0.508)
Binge Drinking	-0.238**	-0.251	-0.234	-0.459	-0.536	-1.297**
	(0.115)	(0.163)	(0.286)	(0.336)	(0.349)	(0.572)
Chronic Drinking	-0.017	0.001	0.095	0.219	0.177	-0.252
	(0.102)	(0.115)	(0.231)	(0.314)	(0.322)	(0.574)
Physical Exercise	0.439***	0.212	-0.118	0.319	0.706	-0.325
	(0.112)	(0.154)	(0.379)	(0.492)	(0.480)	(0.703)
Overweight	0.072	0.064	0.076	-0.001	0.165	0.338
	(0.138)	(0.190)	(0.306)	(0.483)	(0.345)	(0.590)
Obese	-0.089	-0.064	0.159	-0.488	0.054	0.685
	(0.147)	(0.209)	(0.461)	(0.535)	(0.383)	(0.815)
Severely Obese	-0.077	0.051	-0.118	-0.496	-0.066	0.267
	(0.100)	(0.141)	(0.324)	(0.399)	(0.258)	(0.540)
General Health	-0.029	0.051	-0.495*	-0.451	-0.123	-0.244
	(0.061)	(0.092)	(0.262)	(0.355)	(0.263)	(0.413)
Excellent Health	-0.059	-0.020	-0.122	-0.355	0.484*	0.024
	(0.111)	(0.161)	(0.362)	(0.528)	(0.257)	(0.443)
Poor Health	0.030	0.024	0.166*	0.236**	0.126	0.365
	(0.026)	(0.041)	(0.086)	(0.114)	(0.099)	(0.234)
Mental Health Problems > 10 days	0.071	0.173	-0.145	-0.193	-1.060***	-0.695
	(0.097)	(0.131)	(0.291)	(0.400)	(0.262)	(0.450)
Mental Health Problems > 20 days	0.142**	0.212**	-0.144	-0.201	-0.517**	-0.559*
	(0.071)	(0.097)	(0.238)	(0.303)	(0.231)	(0.331)
Month Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. The average number of observations range from 69,275 for Hispanics to 644,680 for Whites. All regressions are weighted using sampling weights provided by the BRFSS.

Table 5B: The Effect of Unemployment Rate on Health and Health Behaviors – By Gender

Outcome	Male	Male	Female	Female
Current Smoker	-0.473***	-0.218	-0.100	-0.058
	(0.173)	(0.209)	(0.118)	(0.167)
Daily Smoker	-0.231*	-0.062	-0.045	-0.099
	(0.128)	(0.179)	(0.100)	(0.145)
Current Drinker	-0.025	-0.182	-0.078	-0.365*
	(0.158)	(0.256)	(0.116)	(0.191)
Binge Drinking	-0.342**	-0.457*	-0.165*	-0.300**
	(0.167)	(0.243)	(0.098)	(0.141)
Chronic Drinking	0.035	0.173	0.179	-0.085
	(0.159)	(0.193)	(0.120)	(0.145)
Physical Exercise	0.693***	0.460**	0.417***	-0.050
	(0.172)	(0.224)	(0.143)	(0.195)
Overweight	0.209	0.223	-0.021	-0.066
	(0.183)	(0.259)	(0.162)	(0.225)
Obese	-0.133	-0.026	0.123	0.037
	(0.203)	(0.297)	(0.144)	(0.215)
Severely Obese	0.024	0.162	-0.195*	-0.142
	(0.147)	(0.195)	(0.105)	(0.176)
General Health	0.009	0.075	-0.113	-0.095
	(0.107)	(0.141)	(0.091)	(0.129)
Excellent Health	0.258	0.045	-0.217	-0.190
	(0.164)	(0.236)	(0.151)	(0.206)
Poor Health	0.089**	0.111*	0.081*	0.087
	(0.044)	(0.067)	(0.042)	(0.054)
Mental Health Problems > 10 days	-0.089	-0.066	-0.166	0.146
	(0.135)	(0.175)	(0.133)	(0.181)
Mental Health Problems > 20 days	0.053	0.030	-0.076	0.069
	(0.093)	(0.135)	(0.103)	(0.135)
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. There are an average of 351,855 observations for males and 496,258 for females. All regressions are weighted using sampling weights provided by the BRFSS.

Table 5C: The Effect of Unemployment Rate on Health and Health Behaviors – By Education

Outcome	College	College	High School	High School
Current Smoker	-0.420***	-0.235	-0.104	-0.095
	(0.143)	(0.182)	(0.215)	(0.322)
Daily Smoker	-0.220**	-0.162	0.035	0.018
	(0.093)	(0.141)	(0.177)	(0.269)
Current Drinker	-0.095	-0.071	-0.022	-0.356
	(0.166)	(0.265)	(0.201)	(0.312)
Binge Drinking	-0.350**	-0.185	-0.300	-0.620**
	(0.164)	(0.211)	(0.192)	(0.286)
Chronic Drinking	0.100	0.118	0.060	-0.256
	(0.114)	(0.151)	(0.210)	(0.238)
Physical Exercise	0.477***	0.524***	0.835***	0.304
	(0.138)	(0.193)	(0.224)	(0.337)
Overweight	0.172	0.093	0.292	-0.036
	(0.191)	(0.264)	(0.196)	(0.307)
Obese	-0.001	-0.145	0.120	0.127
	(0.169)	(0.242)	(0.220)	(0.369)
Severely Obese	-0.137	-0.083	0.043	0.223
	(0.123)	(0.164)	(0.181)	(0.274)
General Health	-0.057	0.106	-0.080	-0.134
	(0.084)	(0.108)	(0.170)	(0.217)
Excellent Health	-0.018	-0.171	0.140	-0.189
	(0.173)	(0.278)	(0.165)	(0.240)
Poor Health	0.023	0.002	0.155**	0.185
	(0.024)	(0.035)	(0.070)	(0.120)
Mental Health Problems > 10 days	-0.115	0.123	-0.228	-0.204
	(0.107)	(0.178)	(0.176)	(0.266)
Mental Health Problems > 20 days	-0.034	0.161	-0.057	-0.110
	(0.076)	(0.106)	(0.150)	(0.213)
Month Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes
State-Specific Linear Trends	No	Yes	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. There are an average of 360,496 observations for College and 258,987 for High School. All regressions are weighted using sampling weights provided by the BRFSS.

Table 6: The Effects of Individual Unemployment on Health and Health Behaviors

Outcome	Individual Unemployment	2SLS	2SLS
Current Smoker	0.111***	-0.269***	-0.148
	(0.004)	(0.101)	(0.136)
Daily Smoker	0.090***	-0.130*	-0.080
	(0.003)	(0.073)	(0.113)
Current Drinker	-0.070***	-0.050	-0.261*
	(0.004)	(0.085)	(0.156)
Binge Drinking	-0.012***	-0.231***	-0.370**
	(0.003)	(0.085)	(0.146)
Chronic Drinking	0.009***	0.087	0.051
	(0.002)	(0.107)	(0.140)
Physical Exercise	-0.023***	0.488***	0.209
	(0.004)	(0.114)	(0.146)
Overweight	-0.015***	0.101	0.110
	(0.003)	(0.118)	(0.180)
Obese	0.013***	-0.009	0.011
	(0.003)	(0.115)	(0.202)
Severely Obese	0.014***	-0.064	0.027
	(0.002)	(0.086)	(0.140)
General Health	-0.100***	-0.042	-0.006
	(0.003)	(0.065)	(0.098)
Excellent Health	-0.050***	0.033	-0.069
	(0.003)	(0.097)	(0.161)
Poor Health	0.039***	0.074***	0.098**
	(0.002)	(0.026)	(0.046)
Mental Health Problems > 10 days	0.134***	-0.107	0.031
	(0.004)	(0.086)	(0.126)
Mental Health Problems > 20 days	0.094***	-0.005	0.046
	(0.003)	(0.064)	(0.090)
Month Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes
State-Specific Linear Trends	No	No	Yes

Notes: Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively. The number of observations are 849,594 in models of current smoker, daily smoker, binge drink, chronic drink, overweight, obese, severely obese, excellent health, poor health, mental health>10 days, and mental health>20 days, 843,997 in physical exercise, 836,540 in current drinker, and 847,509 in general health.

Appendix Table 1A: The Effect of State Employment Rate on Health and Health Behaviors – Full Results Without Trends

Variable	Current Smoker	Daily Smoker	Current Drinker	Binge Drink	Chronic Drink	Physical Exercise	Over weight	Obese	Severely Obese	General Health	Excellent Health	Poor Health	Mental Health Problems > 10 days	Mental Health Problems > 20 days
Employment Rate	0.089	0.018	0.151	0.234**	-0.004	-0.469***	-0.052	-0.015	0.036	0.109	0.109	-0.067**	0.174*	0.065
	(0.107)	(0.079)	(0.113)	(0.117)	(0.117)	(0.124)	(0.119)	(0.131)	(0.095)	(0.073)	(0.106)	(0.031)	(0.100)	(0.075)
Age	-0.002***	-0.001***	-0.003***	-0.005***	-0.000	-0.002***	0.004***	0.002***	0.000***	-0.003***	-0.003***	0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.027***	0.011***	0.116***	0.131***	0.069***	0.040***	0.157***	-0.009***	-0.060***	-0.000	-0.012***	-0.001*	-0.052***	-0.026***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Married	-0.116***	-0.085***	-0.016***	-0.056***	-0.027***	0.031***	0.019***	-0.012***	-0.024***	0.045***	0.037***	-0.009***	-0.058***	-0.039***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Divorced	0.035***	0.036***	0.012***	0.003	0.003	0.000	-0.011***	-0.032***	-0.033***	0.007**	0.011***	0.003***	0.011***	0.010***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)
Widowed	0.020**	0.020***	-0.041***	-0.013**	-0.007	-0.004	0.012	0.001	-0.009	-0.010	0.005	0.006*	0.045***	0.032***
	(0.008)	(0.007)	(0.009)	(0.007)	(0.005)	(0.008)	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)	(0.003)	(0.007)	(0.005)
High-school	-0.092***	-0.093***	0.028***	0.015*	-0.009	0.091***	-0.030***	-0.045***	-0.046***	0.093***	0.020***	-0.016***	-0.056***	-0.045***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
Some College	-0.165***	-0.160***	0.081***	-0.001	-0.028***	0.172***	-0.031***	-0.054***	-0.054***	0.130***	0.054***	-0.021***	-0.067***	-0.054***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.008)	(0.009)	(0.007)	(0.006)	(0.008)	(0.002)	(0.006)	(0.005)
College	-0.327***	-0.309***	0.092***	-0.007	-0.043***	0.232***	-0.135***	-0.168***	-0.119***	0.112***	0.114***	-0.020***	-0.127***	-0.096***
	(0.013)	(0.012)	(0.016)	(0.014)	(0.010)	(0.013)	(0.013)	(0.015)	(0.012)	(0.010)	(0.013)	(0.004)	(0.009)	(0.008)
White	0.075***	0.087***	0.132***	0.067***	0.017***	0.077***	-0.019***	-0.011***	-0.011***	0.059***	0.038***	-0.006***	0.017***	0.007***
	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
Black	0.009**	0.020***	0.014**	-0.026***	0.004	0.018***	0.103***	0.100***	0.043***	0.031***	0.018***	-0.004***	0.005	-0.001
	(0.005)	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.001)	(0.003)	(0.003)
Income	0.103***	0.138***	0.157***	-0.053**	-0.017	0.031	0.014	0.032	0.044***	0.198***	0.110***	-0.024***	0.028*	0.028**
	(0.024)	(0.019)	(0.025)	(0.021)	(0.016)	(0.021)	(0.024)	(0.025)	(0.017)	(0.020)	(0.022)	(0.006)	(0.015)	(0.012)
Constant	0.389***	0.280***	0.374***	0.204***	0.076	0.826***	0.493***	0.291***	0.187***	0.664***	0.115*	0.066***	0.162**	0.109**
	(0.068)	(0.050)	(0.072)	(0.075)	(0.074)	(0.077)	(0.076)	(0.084)	(0.060)	(0.047)	(0.067)	(0.020)	(0.064)	(0.048)
Observations	849,594	849,594	836,540	849,594	849,594	843,997	849,594	849,594	849,594	847,509	849,594	849,594	849,594	849,594
R-squared	0.093	0.084	0.069	0.055	0.031	0.065	0.056	0.029	0.024	0.074	0.034	0.013	0.028	0.020

Notes: Regressions also include month, year, and state fixed effects. Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively.

Appendix Table 1B: The Effect of State Employment Rate on Health and Health Behaviors – Full Results with Trends

Variable	Current Smoker	Daily Smoker	Current Drinker	Binge Drink	Chronic Drink	Physical Exercise	Over weight	Obese	Severely Obese	General Health	Excellent Health	Poor Health	Mental Health Problems > 10 days	Mental Health Problems > 20 days
Employment	-0.074	-0.055	0.222	0.214	0.020	-0.386**	-0.032	0.085	0.125	0.002	0.314**	-0.113**	-0.011	-0.005
Rate	(0.137)	(0.123)	(0.169)	(0.167)	(0.145)	(0.174)	(0.170)	(0.207)	(0.134)	(0.116)	(0.153)	(0.046)	(0.134)	(0.109)
Age	-0.002***	-0.001***	-0.003***	-0.005***	-0.000	-0.002***	0.004***	0.002***	0.000***	-0.003***	-0.003***	0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.027***	0.011***	0.116***	0.131***	0.069***	0.040***	0.157***	-0.009***	-0.060***	-0.000	-0.012***	-0.001*	-0.052***	-0.026***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Married	-0.116***	-0.085***	-0.016***	-0.056***	-0.027***	0.031***	0.018***	-0.012***	-0.024***	0.045***	0.037***	-0.009***	-0.058***	-0.039***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Divorced	0.035***	0.036***	0.012***	0.003	0.003	0.000	-0.011***	-0.032***	-0.033***	0.007**	0.011***	0.003***	0.011***	0.011***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)
Widowed	0.020**	0.020***	-0.041***	-0.013**	-0.007	-0.004	0.012	0.001	-0.009	-0.009	0.005	0.006*	0.045***	0.032***
	(0.008)	(0.007)	(0.009)	(0.007)	(0.005)	(0.008)	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)	(0.003)	(0.007)	(0.005)
High-school	-0.092***	-0.093***	0.028***	0.015*	-0.009	0.090***	-0.030***	-0.045***	-0.046***	0.093***	0.020***	-0.016***	-0.055***	-0.045***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
Some College	-0.165***	-0.160***	0.081***	-0.001	-0.028***	0.171***	-0.031***	-0.054***	-0.054***	0.130***	0.054***	-0.021***	-0.067***	-0.054***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.008)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
College	-0.327***	-0.309***	0.092***	-0.007	-0.044***	0.230***	-0.135***	-0.168***	-0.119***	0.112***	0.114***	-0.020***	-0.127***	-0.096***
	(0.013)	(0.012)	(0.016)	(0.014)	(0.010)	(0.013)	(0.013)	(0.015)	(0.012)	(0.010)	(0.013)	(0.004)	(0.009)	(0.008)
White	0.075***	0.087***	0.132***	0.067***	0.017***	0.077***	-0.019***	-0.011***	-0.011***	0.059***	0.038***	-0.006***	0.016***	0.007***
	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
Black	0.009**	0.020***	0.014**	-0.026***	0.004	0.019***	0.103***	0.100***	0.043***	0.031***	0.018***	-0.004***	0.005	-0.001
	(0.005)	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.001)	(0.003)	(0.003)
Income	0.103***	0.138***	0.158***	-0.053**	-0.016	0.033	0.014	0.032	0.044***	0.198***	0.110***	-0.023***	0.027*	0.027**
	(0.024)	(0.019)	(0.025)	(0.021)	(0.016)	(0.021)	(0.024)	(0.025)	(0.017)	(0.020)	(0.022)	(0.006)	(0.014)	(0.012)
Constant	0.389***	0.280***	0.374***	0.204***	0.076	0.826***	0.493***	0.291***	0.187***	0.664***	0.115*	0.066***	0.162**	0.109**
	-0.068	-0.05	-0.072	-0.075	-0.074	-0.077	-0.076	-0.084	-0.06	-0.047	-0.067	-0.02	-0.064	-0.048
Observations	849,594	849,594	836,540	849,594	849,594	843,997	849,594	849,594	849,594	847,509	849,594	849,594	849,594	849,594
R-squared	0.093	0.084	0.069	0.055	0.031	0.065	0.056	0.029	0.024	0.074	0.034	0.013	0.028	0.02

Notes: Regressions also include month, year, state fixed effects, and state-specific trend. Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively.

Appendix Table 2A: The Effect of State Employment Rate on Health and Health Behaviors – Full Results

Variable	Current Smoker	Daily Smoker	Current Drinker	Binge Drink	Chronic Drink	Physical Exercise	Over weight	Obese	Severely Obese	General Health	Excellent Health	Poor Health	Mental Health Problems > 10 days	Mental Health Problems > 20 days
Unemployment	-0.310***	-0.150*	-0.058	-0.267***	0.101	0.563***	0.117	-0.010	-0.074	-0.048	0.039	0.085***	-0.123	-0.006
Rate	(0.116)	(0.085)	(0.099)	(0.101)	(0.124)	(0.125)	(0.136)	(0.133)	(0.098)	(0.074)	(0.112)	(0.030)	(0.098)	(0.074)
Age	-0.002***	-0.001***	-0.003***	-0.005***	-0.000	-0.002***	0.004***	0.002***	0.000***	-0.003***	-0.003***	0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.027***	0.011***	0.116***	0.131***	0.069***	0.040***	0.157***	-0.009***	-0.060***	-0.000	-0.012***	-0.001*	-0.052***	-0.026***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Married	-0.116***	-0.085***	-0.016***	-0.056***	-0.027***	0.031***	0.019***	-0.012***	-0.024***	0.045***	0.037***	-0.009***	-0.058***	-0.039***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Divorced	0.035***	0.036***	0.012***	0.003	0.003	0.000	-0.011***	-0.032***	-0.033***	0.007**	0.011***	0.003***	0.011***	0.010***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)
Widowed	0.020**	0.020***	-0.041***	-0.014**	-0.007	-0.004	0.012	0.001	-0.009	-0.010	0.005	0.006*	0.045***	0.032***
	(0.008)	(0.007)	(0.009)	(0.007)	(0.005)	(0.008)	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)	(0.003)	(0.007)	(0.005)
High-school	-0.092***	-0.093***	0.028***	0.015*	-0.009	0.091***	-0.030***	-0.045***	-0.046***	0.093***	0.020***	-0.016***	-0.056***	-0.045***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
Some College	-0.165***	-0.160***	0.081***	-0.001	-0.028***	0.172***	-0.031***	-0.054***	-0.054***	0.130***	0.054***	-0.021***	-0.067***	-0.054***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.008)	(0.009)	(0.007)	(0.006)	(0.008)	(0.002)	(0.006)	(0.005)
College	-0.327***	-0.308***	0.092***	-0.007	-0.043***	0.231***	-0.135***	-0.168***	-0.119***	0.112***	0.114***	-0.020***	-0.127***	-0.096***
	(0.013)	(0.012)	(0.016)	(0.014)	(0.010)	(0.013)	(0.013)	(0.015)	(0.012)	(0.010)	(0.013)	(0.004)	(0.009)	(0.008)
White	0.075***	0.087***	0.132***	0.067***	0.017***	0.077***	-0.019***	-0.011***	-0.011***	0.059***	0.038***	-0.006***	0.017***	0.007***
	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
Black	0.009**	0.020***	0.014**	-0.026***	0.004	0.018***	0.103***	0.100***	0.043***	0.031***	0.018***	-0.004***	0.005	-0.001
	(0.005)	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.001)	(0.003)	(0.003)
Income	0.103***	0.138***	0.157***	-0.053**	-0.017	0.032	0.014	0.032	0.044***	0.198***	0.110***	-0.023***	0.028*	0.028**
	(0.024)	(0.019)	(0.025)	(0.021)	(0.016)	(0.021)	(0.024)	(0.025)	(0.017)	(0.020)	(0.022)	(0.006)	(0.014)	(0.012)
Constant	0.461***	0.299***	0.472***	0.364***	0.069***	0.503***	0.455***	0.282***	0.213***	0.735***	0.182***	0.019***	0.278***	0.151***
	(0.015)	(0.013)	(0.009)	(0.007)	(0.009)	(0.011)	(0.011)	(0.009)	(0.008)	(0.008)	(0.009)	(0.003)	(0.007)	(0.006)
Observations	849,594	849,594	836,540	849,594	849,594	843,997	849,594	849,594	849,594	847,509	849,594	849,594	849,594	849,594
R-squared	0.093	0.084	0.069	0.055	0.031	0.065	0.056	0.029	0.024	0.074	0.034	0.013	0.028	0.020

Notes: Regressions also include month, year, and state fixed effects. Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively.

Appendix Table 2B: The Effect of State Employment Rate on Health and Health Behaviors – Full Results with Trends

Variable	Current Smoker	Daily Smoker	Current Drinker	Binge Drink	Chronic Drink	Physical Exercise	Over weight	Obese	Severely Obese	General Health	Excellent Health	Poor Health	Mental Health Problems > 10 days	Mental Health Problems > 20 days
Unemployment	-0.151	-0.081	-0.272*	-0.378**	0.052	0.219	0.112	0.011	0.028	-0.006	-0.071	0.101**	0.031	0.047
Rate	(0.136)	(0.115)	(0.165)	(0.147)	(0.143)	(0.152)	(0.182)	(0.206)	(0.143)	(0.099)	(0.165)	(0.045)	(0.129)	(0.092)
Age	-0.002***	-0.001***	-0.003***	-0.005***	-0.000	-0.002***	0.004***	0.002***	0.000***	-0.003***	-0.003***	0.001***	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.027***	0.011***	0.116***	0.131***	0.069***	0.040***	0.157***	-0.009***	-0.060***	-0.000	-0.012***	-0.001*	-0.052***	-0.026***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
Married	-0.116***	-0.085***	-0.016***	-0.056***	-0.027***	0.031***	0.018***	-0.012***	-0.024***	0.045***	0.037***	-0.009***	-0.058***	-0.039***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Divorced	0.035***	0.036***	0.012***	0.003	0.003	0.000	-0.011***	-0.032***	-0.033***	0.007**	0.011***	0.003***	0.011***	0.011***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)
Widowed	0.020**	0.020***	-0.041***	-0.013**	-0.007	-0.004	0.012	0.001	-0.009	-0.009	0.005	0.006*	0.045***	0.032***
	(0.008)	(0.007)	(0.009)	(0.007)	(0.005)	(0.008)	(0.008)	(0.008)	(0.007)	(0.006)	(0.006)	(0.003)	(0.007)	(0.005)
High-school	-0.092***	-0.093***	0.028***	0.015*	-0.009	0.090***	-0.030***	-0.045***	-0.046***	0.093***	0.020***	-0.016***	-0.055***	-0.045***
	(0.008)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.007)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
Some College	-0.165***	-0.160***	0.081***	-0.001	-0.028***	0.171***	-0.031***	-0.054***	-0.054***	0.130***	0.054***	-0.021***	-0.067***	-0.054***
	(0.009)	(0.008)	(0.009)	(0.008)	(0.006)	(0.008)	(0.008)	(0.009)	(0.007)	(0.006)	(0.007)	(0.002)	(0.006)	(0.005)
College	-0.327***	-0.309***	0.092***	-0.007	-0.044***	0.230***	-0.135***	-0.168***	-0.119***	0.112***	0.114***	-0.020***	-0.127***	-0.096***
	(0.013)	(0.012)	(0.016)	(0.014)	(0.010)	(0.013)	(0.013)	(0.015)	(0.012)	(0.010)	(0.013)	(0.004)	(0.009)	(0.008)
White	0.075***	0.087***	0.132***	0.067***	0.017***	0.077***	-0.019***	-0.011***	-0.011***	0.059***	0.038***	-0.006***	0.016***	0.007***
	(0.003)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
Black	0.009**	0.020***	0.014**	-0.026***	0.004	0.019***	0.103***	0.100***	0.043***	0.031***	0.018***	-0.004***	0.005	-0.001
	(0.005)	(0.004)	(0.006)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)	(0.003)	(0.004)	(0.001)	(0.003)	(0.003)
Income	0.103***	0.138***	0.158***	-0.053**	-0.016	0.033	0.014	0.032	0.044***	0.198***	0.110***	-0.023***	0.027*	0.027**
	(0.024)	(0.019)	(0.025)	(0.021)	(0.016)	(0.021)	(0.024)	(0.025)	(0.017)	(0.020)	(0.022)	(0.006)	(0.014)	(0.012)
Constant	0.685***	0.591***	0.174	0.009	-1.010***	0.467***	0.489***	0.061	0.298***	0.730***	0.100	0.034	0.386***	0.133**
	(0.094)	(0.109)	(0.108)	(0.103)	(0.186)	(0.111)	(0.137)	(0.173)	(0.070)	(0.189)	(0.119)	(0.029)	(0.102)	(0.055)
Observations	849,594	849,594	836,540	849,594	849,594	843,997	849,594	849,594	849,594	847,509	849,594	849,594	849,594	849,594
R-squared	0.094	0.085	0.070	0.056	0.031	0.066	0.056	0.029	0.024	0.074	0.034	0.013	0.028	0.020

Notes: Regressions also include month, year, state fixed effects, and state-specific trend. Standard errors are clustered at the state and month level. A *, **, and *** indicate that the estimate is statistically significance at the 90th, 95th, and 99th percent level of confidence, respectively.