

**Macroeconomic conditions and deaths from coronary heart disease**

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## Summary

**Background** Despite some previous study, the relationship between the macroeconomy and mortality remains poorly understood. This study examined how the relative risk (RR) of death from coronary heart disease (CHD) and acute myocardial infarction (AMI) was affected by temporary changes economic conditions.

**Methods** Panel data econometric methods were used to investigate how CHD and AMI mortality risk varied with macroeconomic conditions for residents of the 20 largest states over the 1979 to 1998 period after controlling for fixed state characteristics, general time effects, and state-specific time trends. Mortality and population data were from the Compressed Mortality Files; macroeconomic and demographic information was supplied from other sources.

**Results** A 2.5 percentage point rise in unemployment predicted statistically significant decreases in CHD deaths (RR, 0.981; 95% confidence interval (CI), 0.973-0.990) and AMI mortality (RR, 0.962; CI, 0.953-0.972). The reductions in RR were similar for males, females, whites, and blacks but larger for 20-44 year olds (RR, 0.958 for CHD and 0.942 for AMI) than for persons aged 45-64 (RR, 0.975 and 0.970) or 65 and older (RR, 0.982 and 0.961).

**Conclusions** The risk of death from CHD and AMI falls significantly during temporary downturns, particularly for 20-44 year olds. Between December 2001 and June 2003, the unemployment rate in the United States rose from 3.9 to 6.4 percent. All else equal, this averted over 9,700 CHD deaths annually, including almost 7,300 AMI fatalities. Further research is needed to understand causes of the decrease, including the role of changes in work hours and employment-related stress.

**Keywords** Health, coronary heart disease, AMI, macroeconomic conditions

## **Macroeconomic conditions and deaths from coronary heart disease**

We poorly understand how macroeconomic economic conditions affect mortality. This may seem surprising since widely cited investigations of aggregate time-series data from the 1930s through 1970s indicated worse health during periods of high unemployment.<sup>1-3</sup> However, subsequent research pointed out serious flaws in the analyses<sup>4,5</sup> and studies correcting the problems failed to replicate the findings.<sup>6,7</sup> Instead the estimates were sensitive to the choice of countries and time periods. The lack of robustness probably occurred because any lengthy time-series is likely to contain omitted determinants of health that are spuriously correlated with macroeconomic fluctuations. For instance, the dramatic reductions in unemployment at the end of the great depression (of the 1930s) coincided with improved nutrition and availability of antibiotics.

The U.S. unemployment rate rose from 3.9 to 6.4 percent between December 2000 and June 2003. The analysis below indicates that an increase of this magnitude prevented over 9,700 deaths annually from coronary heart disease (CHD), including almost 7,300 fatalities due to acute myocardial infarction (AMI). CHD and AMI deaths are useful to examine because they are well measured, account for a large share of fatalities from heart disease, the leading cause of overall mortality,<sup>8</sup> and are affected by environmental stressors and lifestyle changes that vary with macroeconomic conditions.<sup>9</sup>

This study improved upon previous research by using panel data techniques well-known in the econometrics literature<sup>10</sup> but less often employed in medical research to fully control for time-varying determinants of death that were national in scope and factors that differed across states but remained fixed over time. Confounding influences that varied over time within-states were also accounted for, although possibly less completely.

## METHODS

### Data and Outcomes

The dependent variables were CHD and AMI death rates in the 20 largest states over the 1979 to 1998 period, using annual data from the Compressed Mortality Files (CMF) provided by the Centers for Disease Control and Prevention.<sup>11, 12</sup> The CMF contain sufficient information to calculate fatality rates for all state residents and for subsamples stratified by race, sex, age, and underlying cause-of-death.

Mortality rates were constructed by dividing the number of deaths from the specified cause by the state population. CHD refers to *International Classification of Diseases, Ninth Revision* [ICD-9]) codes 410 through 414; AMI to ICD-9 code 410. Death rates were separately calculated for males, females, whites, blacks, and three age categories (20-44, 45-64, 65 years and over). Changes in coding methods during the sample period precluded stratified analysis for other race/ethnicity subgroups.

The investigation was limited to the 20 largest states because of small samples sizes for subpopulations in some other states and because unemployment rates frequently were not supplied or were measured with considerable error for small states early in the sample period. The 20 biggest states accounted for almost three-quarters of national CHD and AMI deaths and had very similar mortality patterns to the entire country.

The primary proxy for macroeconomic conditions was the annual state unemployment rate for the civilian noninstitutionalized population aged 16 and over; data were from the Bureau of Labor Statistics Local Area Unemployment Statistics Database.<sup>13</sup> To examine whether changes in incomes or work hours explained a portion of the observed macroeconomic variation in mortality, some specifications added controls for state per capita disposable income, the

percentage of state residents (aged 25 and over) who were not employed, and the fraction who worked at least 60 hours in the week prior to being interviewed. Information on income came from the Bureau of Economic Analysis Regional Accounts data;<sup>14</sup> that on work hours was from the *Current Population Survey Merged Outgoing Rotation Groups, 1979-2001* (CPS-ORG), extract provided by the National Bureau of Economic Research.<sup>15</sup>

### **Analytic Approach**

Since the dependent variables were mortality rates, restricted between zero and one, grouped data logit models were estimated using maximum chi-squared methods. The tables and discussion focus on relative risk (RR), defined as the predicted change in the odds ratio of death due to CHD or AMI resulting from a 2.5 percentage point rise in state unemployment rates. This corresponds to the rise in the national unemployment rate that occurred nationally between December 2000 and June 2003 and is considerably smaller than the fluctuations in many states during the sample period. For example, unemployment in California rose from 6.2% to 9.9% between 1979 and 1982 and then fell to 5.1% in 1989. Ninety-five percent confidence intervals (CI) were calculated and P-values refer to the null hypothesis of no change in RR. The logit estimates were also used to estimate the expected change in the number of national CHD or AMI deaths, based on 2000 year fatalities.<sup>8</sup> All statistical and econometric analysis was conducted using the STATA software package.<sup>16</sup>

Differences in initial and long-term effects of sustained economic downturns were examined using specifications that controlled for unemployment rates in each of the previous five years (as well as the current year), with the impact of a 2.5 percentage point increase in joblessness that persisted for  $n$  years (for  $n$  between 0 and 5) estimated as  $\sum_{k=0}^n \beta_{t-k}$ , for  $\beta_{t-k}$  the

logit coefficient for  $k^{\text{th}}$ -year lag of unemployment. Cumulative predicted changes in RRs (and associated CIs) are reported.

As mentioned, previous analyses of national time-series data were unlikely to have adequately controlled for omitted determinants of mortality. For instance, the sharp fall in AMI fatalities since the early 1980s was partly due to increased use of aspirin therapy, thrombolysis, and other anti-coagulants for acute in-hospital treatment, as well as surgical interventions like cardiac catheterization, percutaneous transluminal coronary angioplasty (PTCA), and (after the mid-1990s) PTCA with stent.<sup>17, 18</sup> Throughout much of the period, these were accompanied by reductions in cardiovascular risk factors like hypertension, hypercholesterolemia, smoking, and consumption of dietary fat.<sup>19, 20</sup> Importantly, the improvements in medical treatment and lifestyles took place during a time of improving macroeconomic conditions – joblessness averaged 8.0% from 1979-1983 versus 5.3% from 1994-1998 – implying a positive correlation between unemployment and CHD mortality, even absent a causal effect.

Using information for multiple states and years permitted the use of methods that better controlled for many potential confounding factors. Specifically, the logit models included vectors of year and state dummy variables, and a state-specific linear time trend. The year regressors held constant all determinants of mortality that were national in scope and varied over time (such as widely dispersed changes in medical practices). The state variables, referred to as “fixed-effects” in the econometrics literature, accounted for characteristics that differed across geographic locations but were fixed over time (like persistent differences in lifestyles, medical infrastructures, or population characteristics). The time trends controlled for factors that changed slowly and continuously over time within states (such as age and education).

## RESULTS

### Descriptive Statistics

Table 1 displays sample averages and standard deviations for variables used in the analysis. Almost 70% of mortality from heart disease (ICD-9 codes 390-398, 402, 404-429) resulted from CHD and about half of the latter was due to AMI. Risk of CHD and AMI fatalities rose sharply with age and was higher for men than women and whites than blacks.

Unemployment increased during the recessions of the early 1980s and early 1990s but otherwise trended down, falling 23% between 1979 and 1998 (from 5.4% to 4.5%). CHD deaths declined 31% over the two decades (from 251.3 to 174.5 per 100,000) and AMI fatalities by 44% (from 134.1 to 75.2 per 100,000). Most of the decreases in mortality were unrelated to the improvement in macroeconomic conditions, highlighting the importance of an analytic approach that controlled for confounding factors.

A key advantage of using data for multiple states and years was that economic conditions evolved independently across locations. As a result, each state represented a separate “experiment” and the effects of the macroeconomy were examined while controlling for many confounding factors that had common influences across states or that differed within but not between states. Consider California and Texas, the two largest states. Figure 1 demonstrates that they had quite different patterns of unemployment: California experienced sharper increases during the early 1980s and early 1990s, while joblessness rose substantially more in Texas during the mid-1980s. CHD and AMI mortality trended down in both states (as for the entire country) but Texas had larger reductions from the late 1970s through late 1980s (when unemployment was rising) and stability thereafter (when joblessness was trending down), whereas deaths continued to decline sharply in California through the late 1980s and early 1990s

(as the economy weakened). Other determinants of mortality, such as variations in medical practices, could have been spuriously correlated with macroeconomic conditions in either state but probably not in both simultaneously, since the patterns of unemployment were so different. The panel data econometric methods exploited these state-specific sources of variation.

### **Mortality Declines When Labor Markets Weaken**

Table 2 displays the predicted effect of a 2.5 percentage point increase in state unemployment rates on CHD and AMI mortality risk, and on changes in the expected number of deaths (from the 2000 year base level). Deteriorating economic conditions were associated with statistically significant reductions in CHD fatalities (RR, 0.981; CI, 0.973 – 0.990) and even larger declines in AMI deaths (RR, 0.962; CI, 0.953 – 0.972). The decreases in relative risk almost exactly correspond to percentage changes in predicted fatality rates (e.g. an RR of 0.981 corresponds to a 1.9 percent reduction in CHD mortality) and imply 9,718 fewer deaths from CHD (CI, 5,420 – 9,140) annually, including a drop of 7,289 AMI fatalities (CI, 5,420 – 9,140).

The findings were robust to changes in model specification. Virtually identical effects were predicted when state-specific time trends were excluded or with the addition of controls for age, education, and industry of employment. Marginally stronger impacts were obtained when the death rates were age-adjusted (RR, 0.957; CI, 0.942 – 0.971 for CHD and 0.925; 0.908 – 0.942 for AMI), suggesting that the use of crude mortality rates provided conservative estimates of the decline in mortality associated with deteriorating macroeconomic conditions.

### **Reductions in Deaths are Widespread**

The remainder of Table 2 summarizes results for subgroups stratified by sex (male vs. female), race (white vs. black), and age (20-44, 45-64, 65 and older). The decreases in relative risk were similar for males, females, whites, and blacks (although smaller populations imply less

precise estimates for minorities). Bigger declines were predicted for 20-44 year olds (RRs of 0.919 for CHD and 0.888 for AMI) than 45-64 year olds (RRs of 0.951 and 0.940) or persons 65 and older (RRs of 0.963 and 0.923), although the CIs overlap and the large share of CHD fatalities involving senior citizens implied that the largest number of deaths were averted for them.

### **Income and Work Hours**

Work hours and incomes fall during economic downturns. Controls for average per capita disposable income and the fraction of state residents (aged 25 and above) not employed and working 60 or more hours per week were therefore added to test whether these factors might explain some of the macroeconomic fluctuations in mortality. Incomes were negatively related to CHD deaths and unrelated to AMI fatalities, implying that mortality did not decline during bad times because of reduced incomes. Mixed evidence was obtained for work hours. An increase in the proportion of nonworking adults was associated with significantly (insignificantly) higher risk of CHD (AMI) mortality but a decrease in the fraction with long work hours predicted reductions in CHD fatalities and no change in AMI deaths. Importantly, adding these controls strengthened, rather than attenuating, the effect of a 2.5 point increase in unemployment (RR, 0.968; CI, 0.959 – 0.978 for CHD and 0.956; 0.945 – 0.968 for AMI), indicating that other factors were responsible for most of the macroeconomic effects.

### **Adjustment Paths**

The initial and longer-run effects of persistent changes in economic conditions could differ. For instance, the impact of many health inputs (e.g. lifestyle behaviors or environmental threats) accumulate over time<sup>21</sup> and individuals have greater ability to make adjustments to protect their health in the long-run than initially. These issues are examined in Table 3, which

displays the adjustment to a sustained 2.5 point rise in unemployment. No important sex or race differences were uncovered, so findings for these subgroups are not shown. Figure 2 details the adjustment path over the first five years, with solid lines showing RRs and dotted lines the CIs; the results (RRs only) are separately broken for the three age categories in Figure 3.

The predicted fall in CHD mortality accompanying a persistent economic downturn dissipated over time: the RR (CI) was 0.972 (0.960 – 0.984) in the year unemployment increased, 0.982 (0.970 – 0.994) two years later, and 1.005 (0.994 – 1.015) after five years. Conversely, the decrease in AMI deaths was larger and more lasting: the RR (CI) was 0.955 (0.940 – 0.970), 0.969 (0.953 – 0.984), and 0.963 (0.951 - 0.976) after 0, 2, and 5 years.

This overall pattern concealed sharp age disparities. The reduction in CHD fatality risk was initially relatively modest for 20-44 year olds (RR, 0.975; CI, 0.942 – 1.008) but considerably stronger after two years (RR, 0.952; CI, 0.920 – 0.984) and remained near this level thereafter. By contrast, the maximum reduction in RR occurred one year after the rise in unemployment for 45-64 year olds (RR, 0.970; CI, 0.954-0.986) and two years later for persons 65 and over (RR, 0.979; CI, 0.967 – 0.991). The accumulation of macroeconomic effects was even more pronounced when considering the AMI fatalities of 20-44 year olds: the RR (CI) was 0.972 (0.930 – 1.014) in the year of rising joblessness, 0.945 (0.904 – 0.985) after two years, and 0.915 (0.880 – 0.950) after five years. This compared to RRs (CIs) of 0.962 (0.942 – 0.982), 0.979 (0.959 – 0.999) and 0.961 (0.944 – 0.979) after zero, two, and five years for 45-64 year olds and 0.965 (0.950 – 0.979), 0.963 (0.950 – 0.977), and 0.950 (0.938 – 0.962) for persons 65 and older.

## **DISCUSSION**

A 2.5 percentage point increase in the unemployment rate, equivalent to the change that occurred in the United States between December 2000 and June 2003, was estimated to prevent over 9,700 CHD deaths annually, including almost 7,300 AMI fatalities. The decline in relative risk was similar for males, females, whites, and blacks but larger for 20-44 year olds than older adults, particularly for sustained downturns. Such reductions may seem surprising since many researchers have hypothesized that health worsens in bad times due to the stress associated with economic insecurity.<sup>22, 23</sup> However, some recent evidence suggests that physical health improves and mortality declines during periods of economic weakness.<sup>24-27</sup>

There are several reasons why CHD and AMI mortality might fall when the economy deteriorates. First, health may be an input into the production of goods and services. For example, job stress, a risk factor for CHD and AMI<sup>28, 29</sup>, may lessen when employment declines and some joint products of economic activity – like air pollution and long work hours – increase coronary artery disease.<sup>30-32</sup> Second, risky activities such as heavy drinking and smoking are reduced during temporary economic downturns, although for reasons that remain poorly understood.<sup>33, 34</sup> Third, decreases in the probability of working long hours could make it easier for individuals to undertake time-intensive health-producing activities such as exercise and consumption of a healthy diet<sup>33, 35</sup>, while access to medical care might rise if persons employed less intensively find it easier to schedule medical appointments for themselves or dependents.<sup>36</sup> However, mixed results were obtained for work hours and CHD fatalities decreased in bad economic times despite rather than because of accompanying decline in incomes. This latter finding was expected given considerable evidence that permanent income growth improves health<sup>37, 38</sup> (although the opposite result has sometimes obtained for industrialized countries<sup>39</sup> or cardiovascular deaths<sup>40</sup>).

The rapid response of CHD and AMI mortality to macroeconomic conditions is consistent with strong effects of changes in other short-term factors such as greater heart attack risk on Mondays<sup>41</sup>, during the winter months<sup>42</sup>, or within one day of a rise air pollution<sup>43</sup>. Reductions in mortality during *transitory* downturns need not, however, imply negative effects of lasting economic progress. Temporary contractions involve less intensive use of labor and health inputs with existing technologies, whereas permanent growth results from technological or productivity improvements that allow adjustments to ameliorate any costs to health. Also, while unemployment rates were used as the proxy for macroeconomic conditions, this does not imply that the health benefits of economic downturns are concentrated among job losers. Instead, layoffs could have induced stress, income reductions, and loss of health insurance that had negative effects, even while average CHD risk fell.

The relatively strong effects obtained for 20-44 year olds were expected, since this age group was most involved in the labor force and directly affected by the macroeconomy. However, the risk of CHD and AMI mortality risk fell in bad times for senior citizens (who rarely worked) as well. Although there are plausible explanations for such "spillovers" (e.g. adult children may have found it easier to schedule medical visits for dependent parents when the economy weakened), no evidence was provided on these possibilities.

Three additional limitations of the analysis deserve mention. First, the panel data econometric techniques may not have fully controlled for confounding factors associated with sudden or irregular changes occurring within states (such as temporary bursts of immigration). Second, different findings might have been obtained using macroeconomic proxies other than unemployment rates or for countries with different institutional environments or health care

systems than the United States. Third, better identification of the mechanisms causing the effects is needed.

Notwithstanding these caveats, the findings suggest that clinicians should be alert to the possibility of increased risk of CHD and other health problems during robust economic periods, particularly among patients whose employment hours, pace of work or job stress have increased, and for those who are particularly vulnerable to air pollution or other negative by-products of an improving economy. The results also further highlight the importance of monitoring modifiable CHD risk factors such as obesity, smoking, and physical inactivity that increase during temporary upturns.

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**Table 1:**  
**Summary Information on Variables Used in Analysis**

<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>
<i>Mortality Rates (ICD-9 codes)</i>		
Coronary Heart Disease (410-414)	212.1	55.2
Acute Myocardial Infarction (410)	101.9	28.4
<i>Group-Specific CHD Mortality Rates</i>		
Males	227.2	61.5
Females	197.8	52.3
Whites	229.6	60.8
Blacks	132.2	31.6
20-44 Year Olds	8.4	2.1
45-64 Year Olds	172.6	56.1
≥ 65 Years Old	1,426.8	302.1
<i>Group-Specific AMI Mortality Rates</i>		
Males	116.0	36.7
Females	88.7	21.9
Whites	110.4	30.6
Blacks	60.8	16.5
20-44 Year Olds	4.9	1.8
45-64 Year Olds	102.9	42.1
≥ 65 Years Old	656.2	152.8
<i>Other Variables</i>		
State Unemployment Rate	6.6%	1.9%
Per Capita Disposable Income (\$1988)	\$21,309	\$4,476
Not Employed (previous week)	41.3%	3.8%
Worked ≥ 60 Hours (previous week)	4.8%	1.0%
State Population (in 1000's)	9,316	5,978

Note: The sample covered the 1979-1998 time period and included the 20 states with the largest populations (California, New York, Texas, Florida, Pennsylvania, Illinois, Ohio, Michigan, New Jersey, North Carolina, Georgia, Virginia, Massachusetts, Indiana, Missouri, Tennessee, Wisconsin, Washington, Maryland, and Minnesota). Sample statistics were calculated weighting the cells by state-year populations (except that the state population was not weighted). Mortality rates were per 100,000 population. The percent "not employed" or working ≥ 60 hours referred to persons aged 25 and over in the week prior to the Current Population Survey.

**Table 2: Estimated Effect of 2.5% Point Rise in Unemployment on CHD and AMI Mortality**

Group	# Deaths (in 2000)	Change in Mortality Risk		
		Relative Risk	Deaths Averted	P-Value
<b>Coronary Heart Disease</b>				
All	512,204	0.981 (0.973 – 0.990)	9,718 (5,315 – 14,083)	<.0001
Males	260,574	0.979 (0.971 – 0.988)	5,392 (3,171 – 7,595)	<.0001
Females	254,630	0.983 (0.974 – 0.993)	4,197 (1,751 – 6,619)	.0009
Whites	455,400	0.980 (0.972 – 0.988)	9,190 (5,475 – 12,874)	<.0001
Blacks	51,265	0.985 (0.967 – 1.000)	771 (-139 – 1,665)	.0977
20-44 Years Old	8,536	0.958 (0.938 – 0.980)	355 (175 – 531)	<.0001
45-64 Years Old	72,627	0.975 (0.965 – 0.986)	1,787 (1,048 – 2,519)	<.0001
≥ 65 Years Old	463,896	0.982 (0.974 – 0.989)	8,437 (4,853 – 11,993)	<.0001
<b>Acute Myocardial Infarction</b>				
All	192,898	0.962 (0.953 – 0.972)	7,289 (5,420 – 9,140)	<.0001
Males	100,306	0.962 (0.952 – 0.972)	3,819 (2,783 – 4,843)	<.0001
Females	92,592	0.963 (0.953 – 0.974)	3,379 (2,403 – 4,344)	<.0001
Whites	170,584	0.961 (0.952 – 0.971)	6,595 (5,004 – 8,170)	<.0001
Blacks	19,112	0.958 (0.938 – 0.978)	805 (421 – 1,181)	<.0001
20-44 Years Old	3,542	0.942 (0.916 – 0.969)	205 (110 – 296)	<.0001
45-64 Years Old	31,890	0.970 (0.957 – 0.982)	971 (563 – 1,374)	<.0001
≥ 65 Years Old	157,414	0.961 (0.952 – 0.970)	6,113 (4,688 – 7,524)	<.0001

Note: See note on table 1. Table shows the predicted effect of a 2.5 percentage point rise in the state unemployment rate on the odds-ratio of CHD or AMI mortality risk and on the reduction in the number of deaths nationally from the specified source, compared to actual levels in 2000. The p-value refers to the null hypothesis of no change in relative risk. All models included vectors of state and year dummy variables and state-specific linear time trends. The sample included the 20 largest states, based on population, and covers the time period 1979-1998 (n=400). Odds ratios and deaths averted were calculated from logit models, estimated using minimum chi-squared methods; 95 percent confidence intervals are shown in parentheses.

**Table 3:**  
**Predicted Effect of a Sustained 2.5 Percentage Point Drop in**  
**Unemployment on CHD and AMI Mortality Risk**

<b>Group</b>	<b>Year Unemployment Falls</b>	<b>Two Years Later</b>	<b>Five Years Later</b>
<b>Coronary Heart Disease</b>			
<b>Full Sample</b>	0.972 (0.960–0.984)	0.982 (0.970–0.994)	1.005 (0.994–1.015)
<b>20-44 Year Olds</b>	0.975 (0.942–1.008)	0.952 (0.920–0.984)	0.955 (0.926–0.983)
<b>45-64 Year Olds</b>	0.973 (0.957–0.989)	0.978 (0.962–0.994)	0.983 (0.969–0.997)
<b>≥ 65 Year Olds</b>	0.983 (0.971–0.995)	0.979 (0.967–0.993)	0.992 (0.982–1.002)
<b>Acute Myocardial Infarction</b>			
<b>Full Sample</b>	0.955 (0.940–0.970)	0.969 (0.953–0.984)	0.963 (0.951–0.976)
<b>20-44 Year Olds</b>	0.972 (0.930–1.014)	0.945 (0.904–0.985)	0.915 (0.880–0.950)
<b>45-64 Year Olds</b>	0.962 (0.942–0.982)	0.979 (0.959–0.999)	0.961 (0.944–0.979)
<b>≥ 65 Year Olds</b>	0.965 (0.950–0.979)	0.963 (0.950–0.977)	0.950 (0.938–0.962)

Note: See note on table 2. Table displays the predicted change in relative risk resulting from a 2.5 percentage point drop in unemployment that was sustained for the specified number of years. Changes in RR were estimated from logit models that controlled for unemployment rates in the current and previous five years, as well as state and year dummy variables, and state-specific linear time trends. The 95% confidence intervals are shown in parentheses.

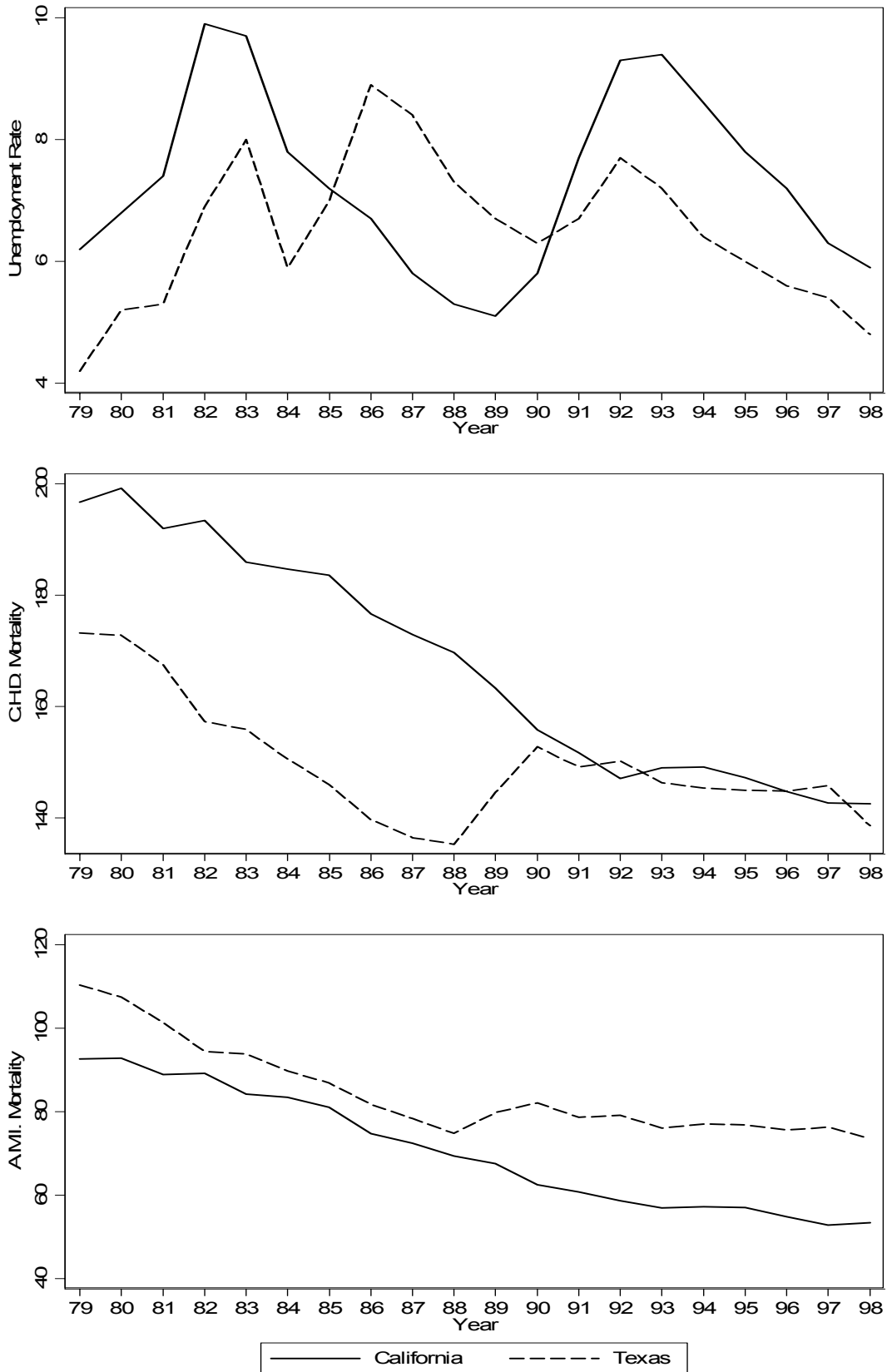
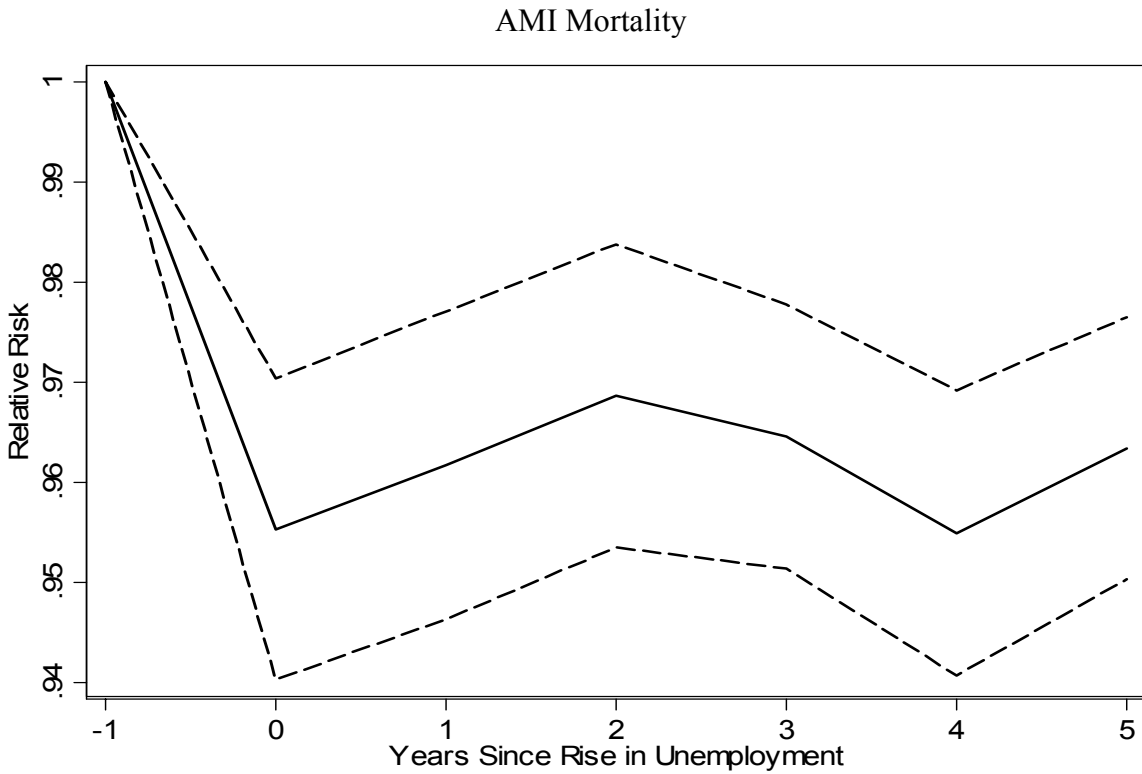
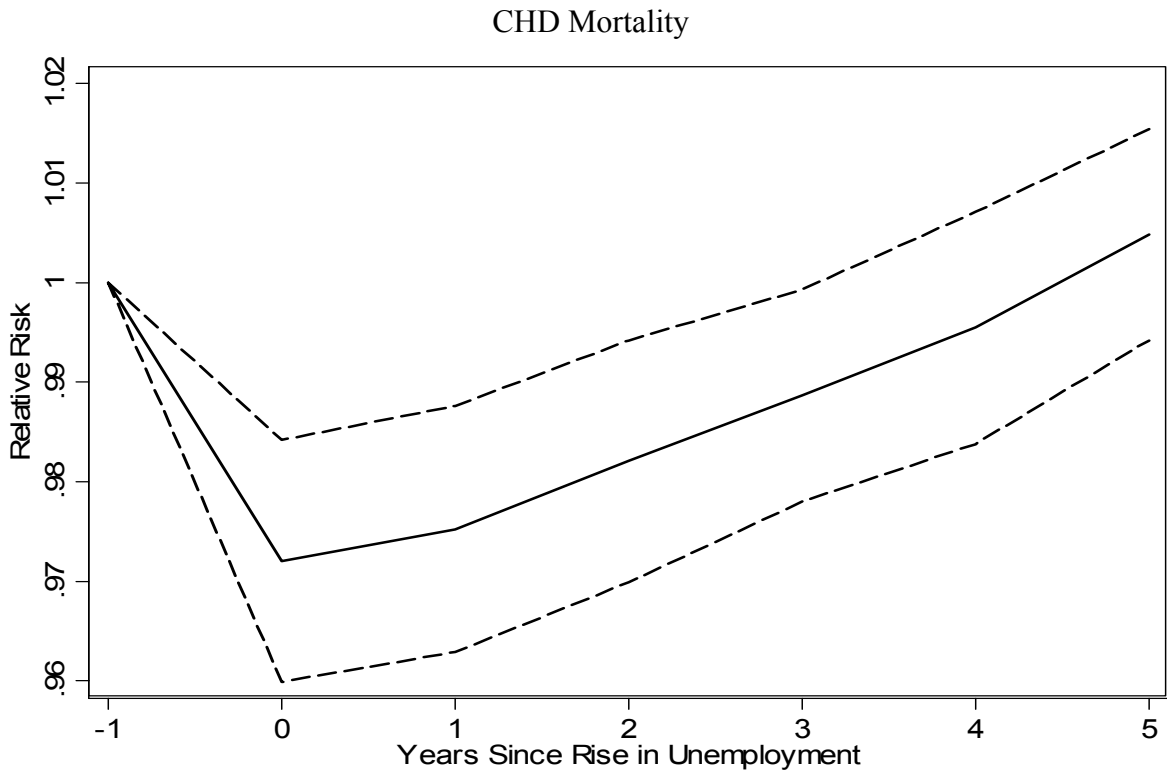
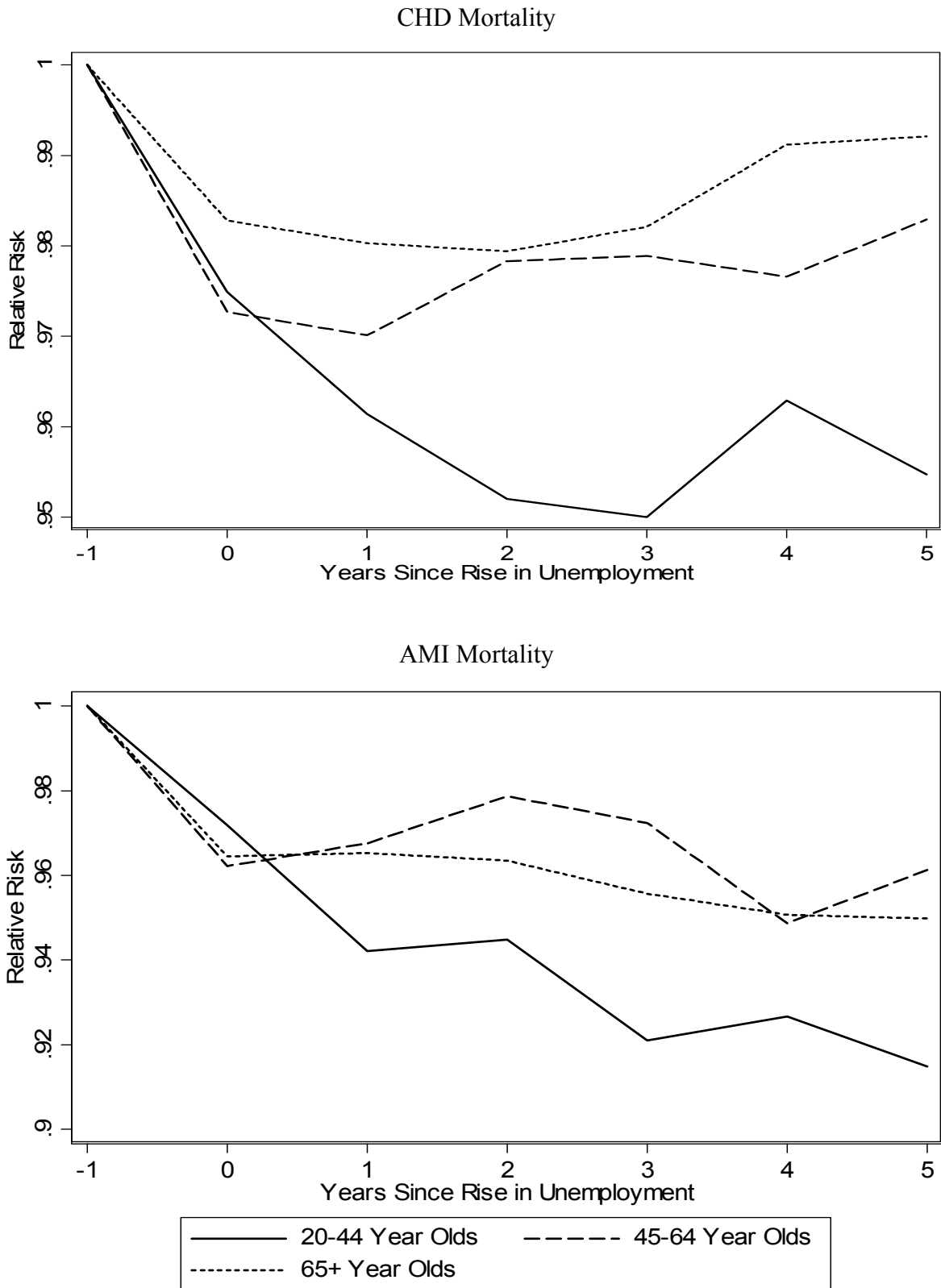


Figure 1: Unemployment and Mortality Rates in California and Texas



**Figure 2: Effect of a Sustained 2.5 Percentage Point Rise in Unemployment on CHD and AMI Mortality**



**Figure 3: Effect of a Sustained 2.5 Percentage Point Rise in Unemployment on Age-Specific CHD and AMI Mortality**

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