Macroeconomic Conditions, Health and Government Policy

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July 2006

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Many government policies influence short and medium-run economic performance. Some, such as the monetary and interest rate targets, are explicitly designed to stabilize the economy. Fiscal policy has the potential to play a similar role, although it is not aggressively used for this purpose in the United States. The unemployment insurance and federal income tax systems act as "automatic stabilizers" because they make government spending more expansionary in economic downturns and less so during booms. Other programs, such as the Earned Income Tax Credit (EITC), increase incomes during expansions, when work is easier to find, and so operate in the opposite direction (Edwards, 2005).[1] Spending by local governments also tends to be procyclical, since most states are required to balance their budgets and receive greater tax revenue when the economy is doing well.

These policies have been widely examined. Even when their primary purpose is unrelated to macroeconomic performance, the effects on these economic outcomes are at least partially understood. For instance, extensive research examines how the EITC affects labor supply and consumption decisions (Meyer & Rosenbaum, 2001; Eissa & Hoynes, 2004; Edwards, 2004). However, macroeconomic conditions, and the government policies that affect them, may have unexpected and less studied consequences for population health.

Health is conventionally believed to improve during economic expansions and deteriorate in downturns. Yet the empirical evidence supporting this view is quite weak and comes from studies containing methodological shortcomings that are difficult to remedy. Recent research, using methods that better control for many sources of omitted variables bias, suggests that mortality *decreases* and many aspects of physical (although not necessarily mental) health *improve* when the economy temporarily weakens. This partially reflects reductions in external sources of death, such as traffic fatalities and other accidents, as well as environmental factors like decreases in pollution. However, changes in lifestyles and health behaviors also play a role and the mechanisms for these effects seem less obvious. This chapter summarizes our current knowledge on these issues, beginning with a discussion of the shortcomings of the more extensive analyses using multiple years of data for a single geographic location.

Before proceeding, two points deserve mention. First, a large body of epidemiological research examines how changes in *individual* economic status are related to that person's health. Importantly, there is a great deal of evidence that the unemployed and job losers are relatively unhealthy (Morris, et al., 1994; Ettner, 2000; Gerdtham & Johannesson, 2003). Determining whether such correlations represent causal relationships is a challenge, however, since bad health reduces employment probabilities and these potential selection biases are often not fully accounted for (Bartley, 1996; Goldney, 1997; Stewart, 2001).[2]

The line of study summarized in this chapter asks a different question – namely how macroeconomic (rather than individual) conditions affect health. This research is sometimes criticized as being subject to the "ecological fallacy", whereby individual relationships are difficult to ascertain using aggregate data (Catalano & Bellows, 2005). Such concern is largely misplaced. In particular, while unemployment rates (or similar labor market measures) are often used to *proxy* economic conditions, the effects of the latter need not be restricted to or concentrated among persons changing employment status. For instance, the stress of job loss could induce negative health effects that are more than offset by improvements for workers whose hours or job-related pressures are reduced. In addition, the impact of risk factors such as pollution, traffic congestion, and social isolation are not limited to working-age individuals. Many important consequences of macroeconomic fluctuations are therefore missed when considering only how individual labor market status is correlated with health or mortality.

Second, the diverse dimensions of health may be affected by a variety of mechanisms that have heterogeneous impacts across segments of the population. Macroeconomic conditions therefore need not uniformly affect all aspects of health or sectors of the population. The results summarized in this chapter primarily focus on average population health (with some examination of subgroups) and should not be viewed to provide definitive or universal conclusions.

1. Time Series Analyses

Researchers examining how macroeconomic conditions affect health or mortality have commonly used time-series data. A series of investigations by M. Harvey Brenner (1971, 1973, 1975, 1979, 1987)

have been particularly influential. He obtains evidence that recessions and other sources of macroeconomic instability raise overall mortality and deaths from several specific sources, as well as increasing some health problems (like alcoholism) and admissions to mental hospitals. These findings are controversial. A number of investigators (Kasl, 1979; Gravelle, et al., 1981; Stern, 1983; Gravelle, 1984; Wagstaff, 1985; Cook & Zarkin, 1986) point out serious technical flaws in Brenner's methods including: the choice of lag lengths and covariates, hypothesized pattern of lag coefficients, use of inconsistent and poorly documented data, plausibility of results, and estimation of substantially different specifications across studies without justification or discussion of the robustness of the results.

Studies correcting the problems (Forbes & McGregor, 1984; Cook & Zarkin,1986; McAvinchey, 1988; Joyce & Mocan, 1993) fail to replicate Brenner's findings. Instead, as detailed in Table 1, the results are sensitive to the choice of countries, time periods, and proxies for health. Significantly, most evidence suggests that the contemporaneous effect of economic downturns is to reduce fatalities.

Such "counterintuitive" findings are not new. Research undertaken as early as the 1920s by William Ogburn & Dorothy Thomas (1922) and Thomas (1927) – using U.S. and U.K. data from the late 19th and early 20th centuries – identifies a positive association between macroeconomic activity and total mortality or deaths from several specific causes (with suicides the exception). Joseph Eyer (1977) obtains similar findings using U.S. data from 1870-1975. These correlations hint that fatalities are *procyclical*. While inconclusive, since they control for few other determinants of health, they present a serious challenge to Brenner's hypothesis, and even he has noted that mortality tends to decline during periods of rising unemployment.[3]

Researchers have attempted to correct for many of the aforementioned problems. For instance, Ian McAvinchey (1988) employs statistical rather than ad-hoc methods to choose the lag length and order of the polynomial lag. Theodore Joyce & H. Naci Mocan (1993) and Audrey Laporte (2004) correct for nonstationarity in the time series data.[4] José Tapia Granados (2004) implements spectral analysis and local regression techniques. Ulf Gerdtham & Magnus Johannesson (2005) experiment with multiple business cycle indicators using data on individual, rather than aggregate, mortality risk. Despite these

innovations, the results remain ambiguous. Most research continues to suggest that mortality is procyclical (Laporte, 2004; Tapia Granados, 2004, 2005a) but some studies find countercyclical effects (Gerdtham & Johannesson, 2005), no impact (Joyce & Mocan, 1993), or results that vary across countries (McAvinchey, 1988).

This lack of robustness should not be surprising since any lengthy time-series may contain omitted variables that are spuriously correlated with economic conditions and have a causal effect on health.[5] Consider estimates of:

(1) $$H_t = \alpha + X_t\beta + E_t\gamma + \varepsilon_t,$$

where H measures health or mortality at time t, E indicates macroeconomy conditions, X is a vector of covariates, and ε is an error term. The coefficient of key interest, $\hat{\gamma}$, will be biased if $cov(E_t,\varepsilon_t) \neq 0$, which occurs if there are uncontrolled confounding factors.[6]

A potential solution to this shortcoming of aggregate time series data, proposed by Stanislav Kasl (1979, p. 787), is to conduct "a more refined ecological analysis … [by] taking advantage of local and regional variations in the business cycle as well as in disease rates." In a similar vein, Stern (1983, p. 69) suggests using differencing techniques with panel data to remove the bias associated with time-invariant area effects. Research using such strategies has become increasingly common during the last decade and is the focus of the remainder of this chapter.

<u>2. Pooled Data with Location-Specific Fixed Effects</u>

Many confounding factors can be controlled for using panel data methods on samples containing multiple geographic locations observed at several points in time. Some analyses, including most examining mortality, utilize geographically aggregated data. Others, particularly those focusing on morbidities or behaviors, typically employ individual-level information but with the macroeconomic variables measured over larger areas.

Analyses using aggregate data usually estimate some form of:

(2) $$Y_{jt} = \alpha_j + X_{jt}\beta + E_{jt}\gamma + \lambda_t + \varepsilon_{jt},$$

where Y_{jt} is a health outcome or input at location j and time t, E measures macroeconomic conditions, X is a vector of covariates, α is a location-specific fixed-effect, λ a general time effect, and ε is the regression error term. The corresponding equation with microdata is:

$$(3) \qquad\qquad Y_{ijt} = \alpha_j + X_{ijt}\beta + E_{jt}\gamma + \lambda_t + \varepsilon_{ijt},$$

where i indexes the individual and X is a vector of person-specific covariates.

In these models, the year effects hold constant determinants that differ uniformly across locations over time (such as many changes in medical technologies) and the fixed-effect accounts for those that vary across areas but are time-invariant (like some lifestyle differences between residents of Nevada and Utah). Two potential drawbacks deserve mention. First, some factors fluctuating within locations over time may not be accounted for. This problem can often be minimized by including a vector of location-specific time trends. Second, the consequences of macroeconomic conditions are identified from variations *within* areas, relative to the changes occurring in other locations.[7] This is problematic if the impact of national business cycles (which are absorbed in the general time effects) differ from those of more localized fluctuations.[8] For instance, Olivier Blanchard & Lawrence Katz (1992) emphasize the role of migration flows in response to local macroeconomic conditions. These militate against finding a procyclical variation in mortality, if movers are relatively healthy and relocate into areas with robust economies. However, such a pattern might be induced if population projections (the denominator of estimated mortality rates) do not completely account for this migration.

Unemployment rates are the most common proxy for macroeconomic conditions but others – such as the employment-to-population ratio or growth in real GDP – are sometimes used. The supplementary regressors often include individual or location-specific measures of income, age, education and race/ethnicity. Calendar month effects (with monthly data) or location-specific time trends may be added, and some analyses incorporate lags of the macroeconomic variables or use other methods to capture dynamics of the adjustment process.

3. Total Mortality

Death rates are the main proxy for health in most studies. The use of mortality has several advantages. It represents the most severe negative health outcome, is objective and well measured, and diagnosis does not require access to the medical system (frequently in contrast to morbidity). However, some health conditions (such as arthritis) are generally not life-threatening and so not strongly related to fatalities. Also, relatively small negative health shocks could accelerate the death of frail individuals while having little effect on overall life expectancy or population health.

Table 2 summarizes the results of recent investigations using pooled data and controls for location-specific fixed-effects to examine the relationship between macroeconomic conditions and mortality. Despite differences in samples, time periods and some variation in model specifications, there is widespread evidence of a procyclical fluctuation in fatalities. A 1 percentage point increase in the unemployment rate is typically associated with a 0.3 to 0.5 percent reduction in total mortality, corresponding to an unemployment elasticity of -.02 to -.06 (Ruhm, 2000, 2006; Tapia Granados, 2005b; Johansson, 2004; Lin, 2005; Gerdtham & Ruhm, forthcoming). Eric Neumayer (2004) estimates an even larger 1.1 percent decrease for Germany and Tom Buchmueller et al. (2006) a 0.8 percent drop for France. One exceptional result is Athina Economou et al. (2004); however, since the models estimated include covariates determined by economic conditions (smoking, drinking and pollution), the unemployment coefficients do not indicate the full effect of changes in the macroeconomy.[9]

Limited evidence (Ruhm, 2000; Neumayer, 2004; Ruhm, 2006) suggests a more pronounced cyclical fluctuation for 20-44 than 45-64 year olds, possibly reflecting the younger group's greater involvement in market employment and increased vulnerability to adverse economic shocks. However, fatality rates also change for senior citizens (65 and over), who rarely participate in the labor force, indicating that the effects are not restricted to working age persons. Less is known about whether the fluctuation in mortality risk differs by gender, although the available research (Neumayer, 2004; Tapia Granados, 2005b) suggests that any such disparities are small.

4. Morbidity and Specific Causes of Death

One reason total mortality falls when the economy deteriorates is because driving and consequently motor vehicle fatalities decrease. Christopher Ruhm (2000) estimates that a 1 percentage point increase in unemployment reduces U.S. traffic deaths by 3.0 percent (an unemployment elasticity of –0.21). The corresponding declines predicted for Germany, Spain, France, and OECD countries are 1.3, 2.0, 2.0, and 2.1 percent (Neumayer, 2004; Tapia Granados 2005b; Buchmueller et al., 2006; Gerdtham & Ruhm, forthcoming); Shin-Jong Lin (2005) obtains a strong (and probably implausible) 10.5 percent decrease for Asian-Pacific nations. Other sources of accidental deaths also appear to diminish.

Most studies (Ruhm, 2000; Neumayer, 2003; Lin, 2005; Buchmueller et al., 2006; Gerdtham & Ruhm, forthcoming) identify a procyclical variation in cardiovascular fatalities – the leading source of death – with effect sizes that are similar or larger in percentage terms than for total mortality. Ruhm (2006) indicates especially strong fluctuations for deaths from heart attacks, which is relevant since this risk is particularly responsive to short-term changes in modifiable health behaviors and environmental factors. Economic downturns are also generally predicted to reduce deaths from influenza or pneumonia. Other major sources of mortality are usually estimated to decline but with less consistency across studies. For instance, procyclical variations in fatalities from liver disease and homicide are obtained by Ruhm (2000) and Ruhm & Gerdtham (forthcoming), which contrast with insignificant countercyclical fluctuations by Neumayer (2004) and Buchmueller et al. (2006).

Infant deaths in the U.S. also decrease when the economy weakens. Ruhm (2000) estimates that a 1 percentage point rise in unemployment reduces infant and neonatal mortality by 0.6 percent. Rajeev Dehejia & Adriana Lleras-Muney (2004) predict 0.5, 0.3, and 0.9 percent declines in infant, neonatal, and postneonatal deaths, with larger 0.9, 0.6, and 1.2 percent decreases for blacks. Conversely, infant mortality appears to be unaffected by macroeconomic conditions in Germany (Neumayer, 2004) or OECD countries (Ruhm & Gerdtham, forthcoming), with evidence of a countercyclical pattern for Asia-Pacific nations (Lin, 2005).

The results for suicide and homicide also differ across countries. Ruhm (2000) uncovers a strong countercyclical variation in suicides. Weaker and mixed findings have been obtained by Tapia Granados

(2005b), Gerdtham & Ruhm (forthcoming) and Buchmueller et al. (2006), while the results of Neumayer (2004) and Lin (2005) indicate substantial procyclical fluctuations. The point estimates suggest that homicides increase with the strength of the economy in the United States, Spain and France (Ruhm, 2000; Tapia Granados, 2005b; Buchmueller et al., 2006) but decline for Germany and the OECD (Neumayer, 2004; Gerdtham & Ruhm, forthcoming). Taken together, these results raise the possibility that some health effects of the macroeconomy differ across countries or institutional arrangements, an issue discussed further below.

Severe data restrictions have limited research on morbidity outcomes. One exception is Ruhm (2003), who used information from the 1972-81 National Health Interview Survey (NHIS) to estimate that a 1 percentage point increase in unemployment reduces the fraction of adults (30 and over) with 1 or more medical conditions by 1.5 percent and those with restricted-activity or bed-days during the prior 2 weeks by 1.2 and 1.6 percent. A substantially larger decrease is in predicted for acute than chronic conditions (3.9 versus 1.1 percent), which makes sense since the former will more rapidly respond to changes in behaviors or environmental conditions. The 4.3 and 8.7 percent decreases in the estimated prevalence of ischemic heart disease and intervertebral disk problems are also noteworthy, since these medical problems are linked to stressful or unsafe working conditions (Price & Kompier, forthcoming). They also contrast with a 7.2 percent rise predicted for non-psychotic mental disorders, further emphasizing the distinction between physical and mental health.[10] Finally, the evidence suggests relatively pronounced effects for males, employed persons and those of prime-working age.[11]

5. Income Effects and Dynamics

Worse health during *transient* improvements in the economy does not imply deleterious consequences of *permanent* progress. An important distinction is that temporary growth combines more intensive use of labor and health inputs with existing technologies. Conversely, lasting gains require innovations or expansions in the capital stock that have the potential to ameliorate negative health effects. Health investments are also more likely to be deferred in response to temporary than long-term increases

in work hours and sustained growth permits purchases of consumption goods (like safer cars) that improve health.

There is strong evidence that increased permanent income improves health in developing countries (Pritchett & Summers, 1996). The findings are more ambiguous for industrialized nations, however, where most studies indicate a positive effect but some find that average income is not important and there is conflicting evidence on the role of income *inequality* or macroeconomic conditions at birth.[12]

Several empirical analyses verify differences in the effects of temporary versus permanent changes in income. John Graham et al. (1992) show that growth in the latter (as proxied by real per capita consumption) is associated with reduced mortality in the U.S., whereas increases in the former (measured by reductions in unemployment) raise deaths. Christian Dustmann & Frank Windmeijer (2004) indicate that higher wealth profiles (measured by average incomes over a 12-year period) predict improved health in Germany but that status worsens when wages temporarily increase.

Perhaps because of these diverse effects, the parameter estimates are mixed when national or personal incomes are included as supplementary covariates in the panel data models summarized above. For example, Ruhm (2000) obtains positive and significant income coefficients for total mortality and traffic fatalities but negative and usually insignificant estimates for most other outcomes.   Similarly, Neumayer (2004) uncovers a positive income effect for total mortality and deaths due to cardiovascular disease, cancer, and some external sources but a negative coefficient for influenza/pneumonia fatalities.

It may seem surprising that econometric specifications controlling only for contemporaneous economic conditions are able to detect changes in mortality or morbidity. One reason they can is because the macroeconomic proxies (such as unemployment rates) are highly correlated over time, so that the estimates actually capture the effects of economic influences over a considerable period. A second is that some sources of death (like traffic accidents and infant mortality) have short gestation and quickly respond to economic fluctuations.

For many outcomes, however, we expect the effects of sustained changes in the economy to accumulate over at least some period of time. For example, in models of health capital (Grossman, 1972),

changes in investment flows slowly affect the stock of health, leading to small initial effects that gradually accrue. The results of studies examining dynamics of the adjustment process, while not completely consistent, suggest that this is usually the case. Specifically, the impact of a lasting change in economic conditions grows for at least 1 or 2 years, with subsequent attenuation obtained in some studies (Ruhm, 2000) but not others (Neumayer, 2004; Gerdtham & Ruhm, forthcoming).

Moreover, strong and rapid effects are commonly obtained for causes of death or illness likely to be especially responsive to short-run changes in the economy. The sensitivity of motor vehicle fatalities has already been discussed. Cardiovascular deaths, particularly those due to heart attacks, also increase substantially during good times, consistent with changes in health behaviors and environmental factors described below. A larger macroeconomic fluctuation in acute than chronic health problems is anticipated and observed, as is the small cyclical fluctuation usually (but not always) obtained for cancer fatalities, where behavioral responses seem unlikely to have a large short-run impact.

6. Why Does Health Improve When the Economy Deteriorates?

Lifestyle changes explain some of the health improvements occurring during economic downturns. Alcohol consumption has been most widely studied. Using data for 1975-1988, Ruhm (1995) shows that drinking and alcohol-involved vehicle fatalities vary procyclically.[13] Supporting evidence has been provided by both earlier and later studies (O'Neill, 1984; Evans & Graham, 1988; Wagenaar & Streff, 1989; Freeman, 1999). Since moderate alcohol use is linked to health benefits (Gaziano, et al., 1993; Thun, et al., 1997), reductions in drinking might imply *less* healthy lifestyles. However, this does not appear to be the case. Ruhm & William Black (2002) analyze microdata from the Behavioral Risk Factor Surveillance System (BRFSS), and demonstrate that the variation in overall consumption results reflects movements between heavy and light alcohol use, rather than between recreational drinking and abstaining.[14]

Limited research suggests that other behaviors also become healthier in bad times. Ruhm's (2005) analysis of the 1987-2000 BRFSS indicates that severe obesity, smoking, and physical inactivity fall, with larger (percentage) decreases in multiple health risks.[15] Using the same data over a longer

period (1984-2002), Jonathan Gruber & Michael Frakes (2006) verify the decline in smoking. As with drinking, these variations appear to be dominated by changes at the intensive rather than extensive margins.[16]

The evidence is more ambiguous for population subgroups or countries other than the United States. Temporary wage reductions are associated with increased exercise in Germany (Dustmann & Windmeijer, 2004) but some of Petri Böckerman et al.'s (2004) specifications indicate a *countercyclical* pattern of bodyweight among Finnish adults (with no relationship in other models). Jeff DiSimone (2004) obtains a procyclical variation in obesity for high school boys (but not girls) in the U.S., partly due to changes in physical activity. Dehejia & Lleras-Muney (2004) find that pregnant women consume less alcohol in bad times but with mixed results for smoking (decreasing for blacks but not whites).

The improvements in health occur despite reductions in medical care. Routine medical checkups and screening tests (mammograms, pap smears and digital rectal exams) are less often received during downturns (Ruhm, 2000) and both doctor visits and hospital episodes decrease (Ruhm, 2003). On the other hand, Germano Mwabu (1988) and Jessica Vistnes & Vivian Hamilton (1995) report a negative relationship between employment and the utilization of medical care, and, pregnant women obtain earlier and more extensive prenatal care in bad economic times (Dehejia & Lleras-Muney, 2004).

One possibility is that health gets better because increases in non-market "leisure" time make it less costly for individuals to undertake health-producing activities such as exercise and cooking meals at home.[17] More generally, if health is time-intensive, the demand for both health and the inputs producing it are likely to rise when time prices fall (Grossman, 1972). This may help to explain the decrease in smoking, an activity that is not time-intensive but is harmful to health. Indirect evidence linking time prices to obesity has been provided for both adults (Chou et al., 2004) and children (Anderson et al., 2003; Ruhm, 2004).[18] However, direct evidence on how work hours affect health outcomes is mixed. Edvard Johansson's (2004) analysis of 23 OECD countries indicates that hours are negatively related to total mortality. Conversely, Ruhm (2005) finds that employment hours are positively related to smoking,

excess body weight and physical inactivity among U.S. adults; Ruhm (2006) fails to uncover a relationship between hours and heart attack deaths.

Many researchers argue that recessions worsen health by raising the stress associated with economic insecurity (Brenner & Mooney, 1983; Catalano & Dooley, 1983; Fenwick & Tausig, 1994). However, population-wide measures are unavailable and a complementary literature emphasizes job-related stress (Baker, 1985; Karasek & Theorell, 1990; Fenwick & Tausig, 1994; Price & Kompier, forthcoming), which may decline in bad times as hours and possibly the pace of work decrease.

As mentioned, health is likely to be an input into short-run increases in the production of goods and services. Most obviously, hazardous working conditions and the physical exertion of employment could have negative effects, particularly when job hours are extended during economic expansions (Sokejima & Kagamimori, 1998; Kivimäki, et al., 2002, Liu et al., 2002). The extra work hours also reduce sleep (Biddle & Hamermesh, 1990), which is linked to increased stress, decreased alertness, higher injury risk and elevated rates of obesity and physiological or psychological symptoms (Maruyama et al., 1995; Cooper et al., 1997; Gangwisch & Heymsfield, 2004). The already high injury rates in the cyclically sensitive construction and manufacturing sectors may be exacerbated by increased hiring of inexperienced workers and production speedups (Catalano, 1979; Robinson, 1988; Booker et al., 1997). Finally, some joint products of economic activity, like pollution and traffic congestion, may present particular health risks pronounced for vulnerable sectors of the population – such as infants or senior citizens – who do not work (Clancy et al., 2002; Chay & Greenstone, 2003; Peters et al., 2004). These groups may also be especially adversely affected if the migration induced by economic expansions increases social isolation or loss of community support (Eyer, 1977; Tapia Granados, 2004).

7. Future Research Questions and Data Needs

People become less happy when the economy temporarily weakens (Di Tella et al., 2003) and their mental health may deteriorate. However, contrary to popular belief, most aspects of their physical health appear to improve and mortality decreases. Some of this can be easily explained. Health benefits are associated with declining pollution, and driving and the associated risk of traffic fatalities are reduced.

However, sources of the decreases in many other types of morbidity and mortality are less well understood and deserve further study.

Individuals adopt healthier lifestyles in bad times but for reasons that are not yet clear. Some risky behaviors (drinking for example) decline when incomes fall but the latter generally has a protective effect on health. Although time-intensive health investments (such as exercise) are plausibly easier to undertake when working fewer hours, the empirical evidence is mixed. Subsequent research needs to confirm these patterns and better identify the mechanisms underlying them.

Future investigations need to document the extent to which the effects of macroeconomic conditions differ across population groups and explain the sources of these disparities. Previous research (Ruhm, 2000, 2003. 2006; Neumayer, 2004; Tapia Granados, 2005b) generally indicates that subpopulations with the greatest exposure to labor market fluctuations (like prime-age individuals, males and blacks) are most affected by the macroeconomy. However, the results are not entirely consistent – for example, senior citizens often exhibit larger responsiveness than those who are slightly younger – and many important questions remain. For instance, it would be interesting to identify groups whose health does not fluctuate or varies relatively little with economic conditions.

Most microdata samples are too small to provide good answers to these questions. Vital statistics on mortality cover the entire population but lack demographic detail beyond age at death, race/ethnicity, and geographic location. Some recent investigations illustrate the promise of other data sources. For instance, Ryan Edwards (2006) utilizes information from the National Longitudinal Mortality Study to examine death rates for subsamples stratified by sex, race, age, occupation and socioeconomic status.[19] An in-depth investigation of health behaviors may be possible using the BRFSS, which has large samples and reasonable demographic information. Similarly, the NHIS supplies detailed information on morbidity and has been used in previous research (Ruhm, 2003; Charles & DeCicca, 2006). However, the public-use versions generally provide limited geographic information and health problems are self-reported, where clinical assessments would be more accurate.

Economic downturns appear to be accompanied by reductions in problem alcohol use, heavy smoking and complete physical inactivity, rather than movements from recreational drinking or light smoking to abstinence and from irregular to regular exercise. We do not yet know why. One possibility is that individuals with the least healthy lifestyles respond most to changes in economic incentives (like income and time prices). Most theoretical models, however, predict changes at the extensive as well as intensive margins. Careful investigation of this issue requires longitudinal information but the samples in most otherwise appropriate panel data sets (such as the *National Longitudinal Surveys* and *Panel Study of Income Dynamics*) are probably too small to undertake more than rudimentary analysis.

We poorly understand the role of job stress and work intensity in explaining macroeconomic fluctuations in health. Some research cited in this chapter (Johansson, 2004; Ruhm, 2005, 2006) controls for work hours, as a proxy for time prices. One feasible extension would be to disentangle the impact of hours conditional on employment from variations in the employment-to-population ratio.[20] A more ambitious endeavor would investigate the role of changes in work intensity and job stress, controlling for hours and employment rates. The data requirements are daunting, however, since we currently lack representative information on either of these.

This represents only a partial listing of important topics for future research. We also need more complete answers to questions on which preliminary analysis has been conducted. For instance, how long (if ever) does it take for a persistent improvement in the economy to lead to better health? How important are changes in behaviors (like drinking, smoking and exercise) relative to variations in environmental factors (such as pollution and traffic congestion) in explaining the macroeconomic relationships? Do mental and physical health move in the opposite direction and, if so, why? As mentioned, existing investigations have been severely constrained by the information sources currently available. An ideal data set for this analysis would provide sufficient detail on demographic, geographic and individual health characteristics to permit multi-level modeling that untangles the diverse and potentially opposing effects of economic conditions on assorted aspects of physical and mental health. It would cover a lengthy time period and, in the best case, provide longitudinal data on a large and representative panel of individuals

and families. For the foreseeable future, researchers will need to make due with sources containing some but not all of these characteristics.

8. Implications for Policy

Evidence that health worsens in boom times indicates that economic progress need not have uniformly beneficial effects; however, it does *not* justify contractionary macroeconomic policies. Recessions have overwhelmingly negative consequences, even if they do not harm physical health. Moreover, prior research has not examined whether economic expansions and contractions have asymmetric effects (for instance, whether downturns improve health by less than booms cause it to deteriorate). Unless they do, a mean-preserving change in the variance of macroeconomic performance will have no net effect on long-term health.

On the other hand, the findings indicate that some previous advocates (such as Brenner, 1984) have overly enthusiastically cited an assumed procyclical variation in health in arguing for macroeconomic stabilization policies. Moreover, the most important overall lesson for policy-makers may be that it is an error to assume that transient economic improvements have strongly favorable effects on mortality or morbidity. Instead, they probably are associated with worse health. The results, moreover, illustrate that the large epidemiological literature emphasizing negative consequences of individual unemployment provides, at most, a partial indication of the overall consequences of economic downturns.

Interventions designed to reduce the negative health effects of expansions are likely to be microeconomic, rather than macroeconomic, in nature and vary with the health problem addressed. Deleterious consequences resulting from negative by-products of higher output, such as increases in pollution or traffic congestion, might be addressed by raising the cost of these activities during good times.[21] Policies designed to automatically have these effects, without the need for specific government intervention, may be particularly useful. For instance, allocating traffic enforcement funds as a fixed percentage of government revenues implies that larger amounts would be available during expansions,

when tax collections increase. Similarly, the use of market-based pollution permits would raise emission costs in good times, as the pollution demand curve shifts to the right.

Economic incentives and public health initiatives could reduce the frequency and negative consequences of unhealthy behaviors. It may be politically infeasible for law-makes to enact increases in "sin taxes" (for example, on alcohol and tobacco) during economic upturns, when finances are flush. However, one step in this direction might be to switch from unit taxes (specified in nominal terms per unit) to ad valorem taxation (set as a percentage of the price), since the real value of the former will fall during expansionary periods that are accompanied by inflation, whereas the latter are automatically indexed and will increase further if robust conditions raise relative demand for the taxed goods. This could be accompanied by public health campaigns that emphasize the existence, nature, and methods of preventing health risks. Eligibility for government-funded health insurance programs (like Medicaid) could also be modified to reduce the likelihood that individuals lose coverage when obtaining jobs. The cost of such policies is made more affordable by increases in the government revenues received during peak periods.

Policies could also be implemented to promote healthier employment and reduce the stress or physical demands of work. For instance, additional economic incentives could encourage employer-sponsored health promotion activities and employee assistance programs. Restrictions on overtime or the enactment of mandatory (and longer) vacations might also be considered, although such initiatives generally receive only limited support in the United States.

Finally, broader patterns of government involvement in the economy may be important. Amartya Sen (2001) emphasizes the long-run health benefits of using extra income to support poverty alleviation, public expenditures on medical care, and "support-led" processes giving priority to social services such as basic education. There is interesting, but not yet fully conclusive, evidence of stronger macroeconomic effects in countries with relatively weak social safety nets. For example, Gerdtham & Ruhm (forthcoming) find that the procyclical fluctuations in mortality is smallest in counties with high levels of public social expenditure (as a percentage of GDP); both they and Buuchmueller, et al. (2006) show

larger variations in later periods, generally characterized by more flexible labor markets.[22] This result, if

verified by future research, suggests several possible mechanisms and mitigating factors relating

macroeconomic conditions to health. For example, workers may have greater motivation to engage in

healthy lifestyles that reduce the risk of job loss during bad economic times (when new employment is

particularly hard to obtain). Such incentives may be muted in countries with generous social welfare

systems or strong job protections, since both the likelihood and consequences of involuntary layoffs will

be reduced. Employment hours and the pace of work may exhibit smaller cyclical fluctuations in less

flexible labor markets, possibly mitigating the negative health consequences of economic booms. A full

articulation of the policy implications of such results are likely to be complex and multi-faceted, and will

certainly need to await substantial additional research.

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<table>
<tr><td colspan="4" align="center">**Table 1:**
Estimated Effects of Economic Conditions on Mortality Using a Single Time Series of Macroeconomic Data</td></tr>
</table>

Study	Sample	Major Findings	Comments
Ogburn & Thomas (1922)	U.S., 1870-1920	Trend deviations in mortality, tuberculosis deaths and infant mortality are positively correlated with macro-economic conditions (R = 0.57, 0.32 and 0.42). Suicides are countercyclical (R = -0.74). Similar estimates obtained in models with lags or 9-year moving averages.	Macroeconomic conditions proxied by 9 series on prices, industrial production, railroad activity, employment, imports and bank clearings.
Thomas (1927)	U.K., 1854-1913	Trend deviations in mortality, infant mortality and deaths from excessive alcoholism are positively correlated with macroeconomic conditions (R = 0.30, 0.28 and 0.38). Suicides are countercyclical (R = -0.50). Similar estimates in models with lags. Results fairly stable across subperiods, reducing likelihood of omitted variables bias.	Macroeconomic conditions proxied by 9 series on prices, industrial production, railroad activity, unemployment, exports and bank clearings. Total mortality excludes epidemic diseases.
Brenner (1971)	U.S., 1900-67; New York, 1915-67	Countercyclical variation in detrended heart disease mortality and lagged macroeconomic conditions in New York data. Countercyclical variation also obtained for U.S. data using a different specification (current not lagged economic conditions).	Specifications apparently chosen to maximize strength of countercylical variation. Little detail on results provided.
Brenner (1973)	New York, 1914-60	Trend deviations in first admissions to mental hospitals negatively correlated with changes in manufacturing employment for entire period and subperiods.	Confounding factors not controlled for. *Lead* as well as lagged employment included.
Brenner (1975)	U.S., 1933-73	Cirrhosis mortality positively related to lagged unemployment (with a maximum effect after 2 years) and possibly to long-run per capita income.	Specifications and sample time periods are not consistent across parts of analysis.
Eyer (1977)	U.S., 1870-1975	Procyclical variation in total mortality (with key role for motor vehicle & other accidents) and influenza deaths. Countercyclical variation in suicides. Possible causes are social stress and uprooting of communities due to migration and because of increased work hours and overtime.	Same macroeconomic series as Ogburn & Thomas (1922). Analysis is descriptive and includes examining economic conditions during 24 separate death rate peaks & declines.
Brenner (1979)	England & Wales, 1936-76	Polynomial distributed lag of unemployment (trend growth in per capita income) positively (negatively) correlated with total and age-specific mortality. Strongest unemployment effects at lags of 1 or 2 years but inconsistent lag pattern (such as stronger effect for 5 year lag than in years 3 and 4).	Models include highly correlated covariates (like. annual and medium-term income changes), making interpretation difficult.
Gravelle et al. (1981)	U.K., 1922-76	Replicates Brenner's (1979) results for 1936-76 data but finds no significant unemployment effect for longer (1922-76) period and subperiods. Model is not structurally stable across periods. Results are not consistent with Brenner's claim that the peak unemployment effect occurs after around 2 years; no consistent pattern of lagged unemployment coefficients in unconstrained models.	Similar specification to Brenner (1979) but using more consistent unemployment series and controlling for GDP rather than disposable income.
Forbes & McGregor (1984)	Scotland, 1956-78	No consistent evidence of an unemployment effect on either total male mortality or deaths from ischemic heart disease. Positive impacts for some age groups and specifications, negative predicted effects for others. Similar inconsistency controlling for long-term unemployment. Income effects generally small and insignificant.	Models include 5 or 10-year unemployment lags and control for real per-capita health service expenditure and 3 real per-capita income variables (long-run trend, deviations from it, short-run change).
Brenner	9 Indust-	Heart disease mortality negatively related to per capita	Up to 18 year lags included,

(1987)	rialized Nations, 1951-80	GDP and positively correlated with unemployment and business failure rates. Strongest effects typically observed with a lag of around 2 years.	reducing degrees of freedom and making it very difficult to interpret plausibility of results.
McAv- inchey (1988)	5 Euro- pean Nations, 1959-82	The effects of unemployment vary across countries, with reductions in overall mortality predicted in 7 of 10 cases. Optimal lag lengths vary substantially and are often much shorter than those used in previous studies. The data also generally do not support the previous use of a second degree polynomial for Almond lag specifications.	Econometric methods incorporate goodness-of-fit criteria using corrections for lost degrees of freedom and order of polynomial lag. Sample years vary slightly across countries.
Joyce & Mocan (1993)	Tennesse, 1970-88	Using monthly data cyclical and structural unemployment are either uncorrelated or negatively related to the frequency of low birthweight (LBW). The data pass 2 diagnostic tests for absence of omitted variables bias: 1) lagged LBW does not predict current unemployment; 2) leads of unemployment do not predict current LBW.	Unemployment decomposed into permanent/transitory components – which proxy structural/cyclical unemploy- ment. VAR methods used to estimate relationship between unemployment and health.
Laporte (2004)	U.S., 1948-96	Increased unemployment associated with reductions in overall mortality; long-run effect is twice as large as short-run impact. Increases in GDP correlated with lower mortality in long-run but not short-run. Models estimated using Hendry error correction mechanism, with first differences in mortality regressed on first differences in regressors plus lag of the dependent and independent variables.	Variables are non-stationary and integrated of degree one, so commonly used trend/cycle decomposition is not appropriate.
Tapia Granados (2004)	Sweden, 1800- 1998	From 1800-80, bad harvests were associated with higher mortality. Since 1910, deaths have been procyclical (with a 1-2 year lag), although of smaller magnitude after the 1950s.	Uses time-series methods including cross-correlations, spectral analysis, and local regressions.
Tapia Granados (2005a)	U.S., 1900-96	Mortality is positively correlated to cyclical increases in real GDP, manufacturing production and weekly work hours and negatively related to unemployment. Results are generally similar across sex, age and race-ethnicity groups. Procyclical variation is found for deaths from cardiovascular, liver and renal diseases, pneumonia and influenza and traffic accidents but not cancer. Suicides are countercyclical.	Time-series methods compare deviations from trend in dependent and independent variables. Effects tend to be stronger when proxying macroeconomic conditions by unemployment rates than other indicators.
Gerdtham & Johan- nesson (2005)	Swedish Microdata for 1980- 96	Significant countercyclical variation in male mortality is found for 4 macroeconomic indicators (notification rate, capacity utilization rate, confidence indicator, change in GDP). An insignificant procyclical (countercyclical) fluctuation is obtained for the unemployment rate (deviation of GDP from trend). Among women, an almost significant procyclical variation is found using the unemployment rate and deviation of GDP from trend; small/insignificant estimates were obtained for the other 4 macroeconomic indicators.	Almost all of the secular decline in male mortality occurs during first 8 years of the period (most in the first 4), raising concern that omitted variables are confounded with the macroeconomic effects.
Note: R is the correlation coefficient.			

		Table 2: Estimates of Consequences of Macroeconomic Conditions on Mortality Using Longitudinal Data with Location-Specific Fixed Effects		
Study	**Sample**	**Major Findings**		**Comments**
Ruhm (2000)	50 states and District of Columbia, 1972-91	*Significant Unemployment Effects* ALL: -0.5% [-.04]; 20-44 year olds: -2.0% [-.14]; 65+ year olds: -0.3% [-.02]; CVD: -0.5% [-.03]; FLU: -0.7% [-.05]; VEHICLE: -3.0% [-.21]; EXTERNAL: -1.7% [-.11]; suicide: 1.3% [.09]; homicide: -1.9% [-.13]; INFANT: -0.6% [-.04]; NEONATAL: -0.6% [-.04]. *Insignificant Effects* 45-64 year olds: 0.0%; CANCER: 0.0%; LIVER: -0.4%. Dynamic models generally yield larger medium-run than short- or long-run impacts. Income effects are mixed and inconsistent.		All models control for percent of state population in specified age, race/ethnicity, education, and marital status groups. Similar results obtained using EP ratio or change in payroll employment as alternative macroeconomic proxies, or including state-specific time trends.
Dehejia & Lleras-Muney (2004)	U.S. Vital Statistics Records, 1975-99, and other sources	*Significant Unemployment Effects* INFANT: -0.5% [-.03]; NEONATAL: -0.3% [-.02]; POSTNEO: -0.9% [-.06]. Stronger effects for blacks (-0.9%, -0.6%, -1.2%) than whites (-0.3%, -0.1%, -0.7%). Decreased infant mortality for blacks primarily results from fertility selection; reductions in risky behaviors during pregnancy play a greater role for whites.		Weaker effects obtained in models without trends. Fertility selection proxied by parent's education, age and marital status. Risky pregnancy behaviors include smoking, drinking, lack of prenatal care.
Econo-mou et al., (2004)	13 EU countries, 1977-96	*Significant Unemployment Effects* ALL: 0.3% [.02]; 45-54 year olds: 0.5% [.04]; 55-64 year olds: 0.5% [.05]; ISCHEMIC; 0.8% [.07]; CANCER: 0.2% [.02]; suicide: 0.9% [.08]; homicide: 1.5% [.14]. *Insignificant Effects* Males: 0.2%; females: 0.1%; 25-34 year olds: -0.4%; 35-44 year olds: 0.3%; 65-74 year olds: 0.1%; 75-84 year olds: -0.1%; VEHICLE: 3.0%.		Results difficult to interpret because models control for covariates (smoking, drinking, caloric intake, hospitalization and sometimes pollution levels) that are determined by macroeconomic conditions.
Johansson (2004)	23 OECD countries, 1960-97	*Significant Unemployment Effects* ALL: -0.4%; -0.3% for observations with information on work hours. Total mortality is negatively associated with per capita incomes and work hours.		Same sample and specification as Gerdtham & Ruhm (forth-coming), except for addition of work hours in some models.
Neumayer (2004)	16 German states, 1980-2000	*Significant Unemployment Effects* ALL: -1.1%; females: -1.3%; males: -0.9%; 20-45 year olds: -1.1%; 65+ year olds: -1.2%; CVD: -1.8%; FLU: -3.1%; VEHICLE: -1.3%; suicide: -1.4%. *Insignificant Effects* 45-64 year olds: -0.5%; CANCER: -0.1%; LIVER: 0.4%; homicide: 0.3%; EXTERNAL: 1.7%; INFANT: 0.2%; NEONATAL: -1.9%. Dynamic models generally yield larger effects in long-run than initially. Income effects are mixed and inconsistent.		Most specifications correspond to Ruhm (2000). Standard errors corrected for heteroscedasticity and autocorrelation. Models control for personal income, age and percent foreign. Similar results using real GDP growth as macroeconomic proxy.
Tapia Granados (2005b)	50 Spanish provinces, 1980-97	*Significant Unemployment Effects* All: -0.3% [-.06]; females: -0.3% [-.04]; males: -0.2% [-.06]; CANCER: -0.1% [-.02]; infectious disease: -0.7% [-.14]; VEHICLE: -2.0% [-.38]. *Insignificant Effects* CVD: -0.1%; suicide: 0.5%; homicide: -0.3%		Models control for age structure and per capita GDP. Similar results obtained using EP ratio as macroeconomic proxy. Inclusion of state-specific trends attenuates effects.
Lin (2005)	8 Asia-Pacific Countries, 1976-2001	*Significant Unemployment Effects* Total Mortality: -0.7% [-.03]; CVD: -2.0% [-.07]; VEHICLE: -10.5% [-.37]; infant: 2.1% [.08]; suicide: 6.7% [.24]; CANCER: 2.5% [.09]. Income effects are mixed.		Models control for population age structure, percent male and rural, number of physicians and hospital beds, public health expenditures and country-specific time trends. Weaker effects in recent years.
Buch-	96 French	*Significant Unemployment Effects* All: -0.8% [-.08]; CVD: -		Models control for age structure.

mueller, et al. (2006)	départe-ments, 1982-2002	1.0% [-.11]; CANCER: -1.1% [-.11]; VEHICLE: -2.0% [-.21]; non-vehicle accidents: -2.5% [-.26]. *Insignificant Effects* LIVER: 0.3%; suicide: -0.5%; homicide: -0.6%.	Stronger effects in smaller areas, later time periods (when labor markets became more flexible).
Ruhm (2006)	20 largest states, 1978-1997	*Significant Unemployment Effects on AMI* ALL: -1.3% [-.09]; 20-44 year olds: -2.3% [-.15]; 45-64: -0.9% [-.06]; 65+ year olds: -1.4% [-.09]. Larger long-run than short-run effects for 20-44 year olds but not older individuals.	Macroeconomic effects similar across sex; possibly larger for whites than blacks. Mixed effects for income and work hours.
Gerdtham & Ruhm (forth-coming)	23 OECD countries, 1960-97	*Significant Unemployment Effects* ALL: -0.4% [-.02]; CVD: -0.4% [-.02]; LIVER: -1.8% [-0.10];VEHICLE: -2.1% [-.12]; EXTERNAL: -0.8% [-.04]. *Insignificant Effects* CANCER: 0.1%; FLU: -1.1% [-.05]; suicide: 0.4%; homicide: 1.1%; INFANT: -0.2%. Dynamic models yield larger (smaller) long-run than initial effects for total mortality, FLU and LIVER (CVD, VEHICLE). Stronger effects found for countries with weak social safety nets. Income effects are mixed.	Models control for age structure of population, percent male and include country-specific time trends. Weaker macroeconomic effects on total mortality obtained without trends; stronger effects for large countries and in more recent years.

Abbreviations: ALL – total mortality; CVD – cardiovascular disease; ISCHEMIC – ischemic heart disease; AMI – acute myocardial infarction; CANCER – malignant neoplasms; FLU – pneumonia and influenza; LIVER – chronic liver disease; VEHICLE – motor vehicle; EXTERNAL – external causes/accidents other than from motor vehicles; INFANT – infant deaths (in first year); NEONATAL – neonatal deaths (in first 28 days) POSTNEO – post-neonatal deaths (29 days through end of first year); EP ratio – employment-to-population ratio.

Note: Unemployment effects refer to predicted impact of a 1 percentage point increase, with elasticities in brackets. Unless otherwise noted, all models control for location-specific fixed effects and general time effects. Significant effects refer to those where the null hypothesis of no effect is rejected at the 0.05 level.

[1] Many government policies also influence long-run macroeconomic performance.

[2] Pekka Martikainen & Tapani Valkonen (1996) find that the positive association between unemployment and subsequent mortality weakens when macroeconomic conditions deteriorate, consistent with the stronger health selection during good times.

[3] For example, he states "the zero-lag relationship between unemployment and mortality rates is actually inverse" (Brenner, 1995, p. 232). Presumably for this reason, his later research postulates that the negative health effects begin 2 or 3 years after the economy declines and persist for a decade or more (Brenner, 1995). However, the analyses rarely provide sufficient information to verify this lag structure and other researchers (Gravelle et al., 1981; McAvinchey, 1988) find little support for it. More generally, since business cycles typically last around 4 years, a 2 or 3 year lag implies that the most negative health consequences roughly coincide with the economic peak. It is also hard to imagine a process where the effects of downturns continue for more than a decade (up to 18 years in some of Brenner's models), given that several business cycles occur during the intervening years.

[4] The commonly used decomposition of macroeconomic variables into trends and deviations from them is not appropriate with nonstationary series.

[5] For example, much of the variation in unemployment during the 4 decades (beginning in the 1930s) covered by Brenner's early research resulted from dramatic reductions in joblessness following the great depression. Over this same period, mortality declined due to improved nutrition and increased availability of antibiotics.

[6] Efforts have been made to examine whether such omitted variables cause bias when using time series data. Hugh Gravelle et al. (1981) find that their model is not structurally stable across time periods, with confounding factors a likely source of the instability. Conversely, Tapia Granados (2005a) obtains similar results across periods. Joyce and Mocan show that lagged values of low birth weight (their health outcome) fail to predict present unemployment rates and that future unemployment does not predict current low birth weight. Violation of either condition would suggest omitted variables bias.

[7] There must be substantial independent economic fluctuations across locations over time for this strategy to improve on standard time-series analysis. This condition is generally met. For instance, Ruhm (2000) documents the relatively low R^2 between the unemployment rate in almost all states and the national rate.

[8] "Cyclical" variations and "macroeconomic" effects therefore refer to changes within areas rather than at the national level and terms like "recessions" are used loosely to indicate deterioration in local economic conditions, rather than reflecting technical definitions based on changes in national GDP.

[9] Their control for hospitalizations is even more problematic, since these are an indicator of health status.

[10] Using MSA-level data from the 1997-2001 NHIS, Kerwin Charles & Philip DeCicca (2006) provide further evidence of a procyclical variation in mental health (measured by a 6-item psychological distress scale), in contrast to physical status. One innovative feature is that they stratify the sample by ex-ante employment probabilities (as well as by race and education).

[11] For example, a 1 percentage point increase in unemployment is associated with 1.9, 1.3, 4.2, 1.5, and 2.8 percent reductions in the probability that 30-55 year olds have medical conditions, chronic ailments, acute morbidities, restricted activity days and bed-days. Charles & DeCicca (2006) similarly find stronger fluctuations for persons whose employment is most likely to be affected by the macroeconomy.

[12] James Smith (1999), Angus Deaton (2003), or Gerdtham & Johannesson (2004) provide useful reviews. See Ralph Catalano (2002) and Gerard van den Berg et al. (2006) for somewhat conflicting evidence on the impact of macroeconomic conditions at birth.

[13] A 1 standard deviation (2.1 percentage point) increase in the unemployment reduces predicted drinking by 1.3 percent and traffic fatalities by almost 7 percent.

[14] Two earlier studies examined these issues with microdata. Susan Ettner's (1997) analysis of the 1988 National Health Interview Survey concluded that alcohol consumption and dependence are procyclical; Thomas Dee (2001), using data from the 1984-95 BRFSS, obtained the contradictory result that economic downturns are associated with reductions in overall and heavy drinking but a higher likelihood of binge consumption.

[15] Obesity declines due to the aforementioned reductions in physical inactivity and because diets become healthier (Ruhm, 2000).

[16] Charles & DeCicca (2006) also provide suggestive evidence of declining obesity during economic downturns but little consistent indication of effects on other health behaviors (smoking, drinking, and physical activity. However, statistical power may be limited since the National Health Interview Survey data they analyze covers just 5 years (1997-2001).

[17] Income reductions during cyclical downturns have mixed effects, being linked to decreases in obesity, alcohol use, and heavy drinking (Freeman, 1999; Ruhm, 2002; Ruhm, 2005) but growth in smoking and physical inactivity (Ruhm, 2005; Gruber & Frakes, 2006).

[18] Shin-Yi Chou et al. (2004) indicate that obesity is negatively related to the time price of (calorie-rich) prepared food and positively correlated with that of cooking (lower-calorie) meals at home. Patricia Anderson et al. (2003) and Ruhm (2004) show that child obesity is positively associated with maternal employment, particularly for high socioeconomic status families.

[19] His results vary but, provide some indication of larger procyclical fluctuations in mortality for vulnerable population groups.

[20] I thank Michael Grossman for this suggestion.

[21] My thinking on these issues has benefited greatly from the discussion in Edwards (2005).

[22] However, Neumayer (2004) provides evidence of sizable macroeconomic effects for Germany, a country with strong social protections.