

# Uncovering the Pathways Linking Local Economic Conditions, Occupation, and Health <sup>♦</sup>

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This Draft: September 14, 2010

Abstract:

This paper uses ten years of data from the PSID to examine the effects of economic conditions on health status. We expand on current research in this area by focusing on local (county) rather than aggregate (state/nation) conditions, using a panel data set, and examining a pre-mortality outcome (self-reported health status). In contrast with much of the previous literature, we find evidence that self-reported health status is procyclical. Generally the results suggest a reduction in health from each point increase in the unemployment rate that is equivalent to aging between 1-2 years. The results suggest that local measures are preferable and lead to somewhat larger estimates. We then present evidence that these effects are primarily psychologically driven, which is consistent with literature on the effects of macro conditions on mental health and also has implications for using self-reported health status as a measure of physical health.

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<sup>♦</sup> The authors thank Jeremy Green for excellent research assistance.

## **Introduction**

The current economic downturn has focused attention on the potential short term and long term effects of recessions on unemployment, economic growth and stability, population human capital accumulation, and population health. Much of the media focus has been on the potential effects of job loss and home foreclosure. Job loss is typically intertwined with a short term loss of health insurance and increase in unhealthy behaviors (Kapur and Marquis 2003, Deb et al. 2009). Longer term effects have also been shown on future earnings and many health outcomes, such as mortality (Jacobson et al. 1993, Sullivan and von Wachter 2009).

Even those who do not lose their jobs during an economic downturn may also suffer economic and health consequences. In fact, a growing literature has shown a counter-intuitive result in this regard. At the population level, recessions seem to be (temporarily) good for health (Ruhm 2000, 2001, 2003, 2004, 2005 a,b). Recessions have been shown to reduce mortality, especially among young workers and the elderly, in a number of studies across time and countries. Potential explanations of this counterintuitive yet robust finding include that individuals pursue healthier behaviors during recessions, including driving less often (which reduces mortality from automobile accidents), smoking less, and exercising more (Ruhm 2000).

While the relationship between macroeconomic conditions and health has been replicated over time, across countries, and with sophisticated econometric specifications, there are several limitations with current research in this area. First, nearly all current research uses either highly aggregated macroeconomic data (e.g. state-level) and/or repeated cross-sectional data. Thus, the dynamics of the links between local macroeconomic conditions and health are poorly understood. Additionally, repeated cross-sectional data may not allow adequate controls for unobserved individual heterogeneity and dynamics.

Second, in part based on the same data limitations, the prior literature has been particularly focused on mortality as the principal health outcome measures.<sup>1</sup> There

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<sup>1</sup> Exceptions include examinations of obesity (Ruhm 2000, 2005b), smoking (Ruhm 2000, 2005b), alcohol use (Dee 2001, Ruhm 1995), mental health (Charles and DeCicca 2008), health insurance (Cawley and Simon 2005), and, more recently, sleep patterns and time use (Edwards 2008). However, these analyses are often done in order to shed light on the mortality findings.

appears to be little evidence in the literature that examines measures of self-reported health.<sup>2</sup> While this measure has been shown to be important for predicting mortality, it is also useful as a pre-mortality measure that can be used to examine the potential accumulation of effects between macroeconomic conditions and health outcomes, before mortality is observed. Changes in self-reported health may also have its own set of mechanisms. While mortality effects have been shown to be concentrated in automobile accidents due to driving less, the mechanisms for self-reported health status may occur through changes to work hours, working conditions, and other factors.

Two additional limitations with current research include the focus on national or state-level macroeconomic conditions in determining health outcomes<sup>3</sup> and the inability to examine potential mechanisms linking macroeconomic conditions with health outcomes. Datasets that have been used to examine these research questions have not had information on the dynamics of hours of work, occupation (including occupational characteristics such as physical demands and environmental conditions), employment transitions, and pre-determined health status.

These limitations with the literature suggest a need for further analysis of the links between macroeconomic conditions and health status. In this paper, we use ten years of the PSID in order to contribute to this research area. This dataset allows many opportunities, and we will concentrate on (1) narrowing the measure of macroeconomic conditions to focus on county unemployment rates (2) beginning an examination of dynamic responses to macroeconomic conditions and (3) examining the heterogeneity of responses by occupation, region, rural status, attachment to the labor force, socioeconomic status, and other individual characteristics and dynamics.

Our results strongly suggest that more local measures of macroeconomic conditions better capture the relationships of interest, and we find a *procyclical* effect on self reported health status. We also find that the effects of macroeconomic conditions are short-lived but also accumulate over time to reduce health status. Finally, we investigate the mechanisms underlying these procyclical associations and find suggestive evidence that the self-rated health measure is likely conflating physical and mental health status,

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<sup>2</sup> Ruhm (2001) appears to be the exception, though the data is dated (NHIS 1969-1981)

<sup>3</sup> Charles and DeCicca (2008) appear to be a lone exception in this literature in their use of MSA unemployment rates in their analysis.

where mental health effects likely dominate the results. These findings also question the usefulness of the self rated health status measure in some contexts.

### **Background Literature**

Empirical investigations of the links between macroeconomic conditions and health have been of growing interest to economists and other social scientists. While there are some antecedents in other literatures (Eyer 1977a,b), Ruhm has produced much of the more recent, compelling evidence of the relationships between macroeconomic conditions and health (Ruhm 2000, 2001, 2003, 2005, 2007, see Ruhm 2004 for a summary)<sup>4</sup>. In particular, much research has focused on mortality, finding procyclical effects.<sup>5</sup> While the Ruhm papers focus mainly on the US, other studies have replicated the main mortality results in other countries (Tapia Granados 2002 (Spain), Neumayer 2004 (Germany), Gerdthán and Ruhm 2004 (23 OECD countries)).

These health effects of economic expansions have also been found in a broad set of health outcomes, apart from mortality. While Ruhm (2000) found increases in mortality when the economy temporarily expands for total mortality as well as 8 of 10 specific causes of death (suicide was an important exception), other aspects of health have also been shown to be countercyclical. Ruhm (2001, 2003) uses pooled NHIS data to show countercyclical health changes with several measures of individual health, including reports of medical problems and an increase in reported number of ailments (acute but not chronic). One exception to this pattern was for mental disorders, which seemed to be procyclical; Charles and DeCicca also find strong patterns of procyclical mental health outcomes.

Ruhm (2000) attributes the rise in mortality during economic expansions to hazardous working conditions, physical demands of employment, and job-related stress due to expansion in hours of working. He lists four reasons that health might decline

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<sup>4</sup> Much of the evidence in the 1980s and earlier did not account for omitted confounding variables. Ruhm (2000) used a panel of states and included state fixed effects to overcome this bias.

<sup>5</sup> While countercyclical relationships between macroeconomic conditions and good health are often found, some exceptions have been reported. Miller et al. (2009) show evidence that mortality rates are procyclical and that the majority of mortality due to state unemployment rates is concentrated among the elderly, who are likely not working. They also show that cyclical changes in mortality among working age individuals is mostly attributable to motor vehicle accidents. The authors also show that national rates affect mortality but not local rates of unemployment.

during temporary upturns: (1) the opportunity cost of time rises<sup>6</sup> (2) health could be an input into the production of goods and services (3) some risky activities may be normal goods (4) in-migration in response to improvements in local conditions could have negative effects.<sup>7</sup>

The first and third reasons have been the subject of the most research in the literature examining mechanisms for the mortality findings. Ruhm (2005b) uses Behavioral Risk Factor Surveillance System (BRFSS) data to show that smoking and excess weight decline during temporary economic downturns while physical activity rises. Ruhm (1995) and Ruhm and Black (2002) show evidence that alcohol consumption decreases during economic contractions, where the main effects are from existing drinkers.

While most of the literature has focused on mortality effects and mechanisms of the mortality effects (e.g. from risky behaviors), less research has focused on alternative pre-mortality health measures. Ruhm (2003) is an exception, with a focus on acute and chronic conditions, medical utilization, and poor health status. However, Ruhm (2003) uses cross sectional data and is not able to explore several work-related mechanisms such as employment, work hours, occupation, or industry.

While there has been a relatively large literature established linking macroeconomic conditions to mortality and associated health behaviors, there are still many limitations to current knowledge in the area. Nearly all of the current research uses highly aggregated data on economic conditions. The current paper will show that local measures of economic contractions are more relevant than aggregated measures used in nearly all of the literature. Additionally, previous research has focused on a somewhat narrow (but important) set of health outcomes, such as mortality and health behaviors (smoking, alcohol use, exercise, etc). There is currently much more limited research that focus on self rated health status. The tradeoff in these outcomes include the subjective nature of self rated health status on one hand, but the advantages of this measure include its links with a broad set of later health outcomes, its status as a pre-cursor to more

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<sup>6</sup> Edwards (2008a) finds that all individuals sleep better when state unemployment is high, as well as caring for the elderly and talking on the phone.

<sup>7</sup> Include Halliday paper here

serious but less frequently observed outcomes (mortality), as well as the ability to compare the magnitude of effects across studies.

This paper extends the research base in increasing our understanding of the likely magnitude as well as the mechanisms between local measures of economic activity and health outcomes. These relationships have substantial public policy interest generally as well as during the current economic downturn. It is also of public policy interest to understand the potential heterogeneity in the effects of economic downturns on health outcomes both to attempt to further understand potential mechanisms as well as allowing the construction of public programs that may reduce any negative impacts on health.

### **Data and Empirical Setup**

In order to examine these research questions, we use data from the public use version of the Panel Study of Income Dynamics (PSID)<sup>8</sup>, a nationally representative longitudinal study of US families that began in 1968 and collects data focused on economic, health and social behavior. We restrict our analysis to the years 1984-1993 because these are the only years that include both county level macro conditions (i.e. unemployment rates) as well as the health outcome (self reported health status). While not uncontroversial, previous research has shown strong evidence that self rated health status contains useful information and is related to mortality (Idler & Kasl, 1995; Idler & Benyamini, 1997). In addition to these necessary variables, this study uses longitudinal information on hours worked, occupation codes, labor income, employment status, and socio-demographic information.

In Table 1, we present descriptive statistics for our PSID sample. The average health status is 2.5 from a 5-point scale (1=excellent, 5=poor) and eighteen percent report fair or poor health. The average unemployment rate at each level of aggregation was between 6 and 7 percent during this time period—and there is increased variation in the unemployment rate as the measure becomes more localized. The table shows that 65% of the sample is employed in each wave as well as the distribution of occupations in the

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<sup>8</sup> <http://psidonline.isr.umich.edu/>

sample, with 12% professional and 9% manager codes.<sup>9</sup> Average income is approximately 22,000 in 1999 dollars and the average individual worked nearly 1,400 hours (1,840 for those with positive hours)

## **Empirical Methods**

Several research designs will be pursued to examine our research goals with the PSID data. First, this paper will attempt to qualitatively replicate previous findings in the literature by treating the data as a repeated cross-section and using OLS and ordered probit regression analysis to link self-reported health status with local unemployment rates:

$$health_{ist} = \beta_0 + \beta_1 Unemployment_{st} + X_{it} \beta_2 + \lambda_s + \tau_t + \varepsilon_{ist} \quad (1)$$

where state level and year fixed effects are controlled and the unemployment rate is either measured at the state (to replicate previous research) or county levels. The vector of characteristics will contain standard socio-demographic variables to match previous literature, such as age, gender, race, and education, but will also include some potential mechanisms such as employment status, hours worked, and occupational characteristics in some specifications. Likewise, this project will examine the dynamics of unemployment and health, similar to Ruhm (2000)

$$health_{ist} = \beta_0 + \sum_{k=t}^{k=t-n} \delta Unemployment_{sk} + X_{it} \beta_2 + \lambda_s + \tau_t + \varepsilon_{ist} \quad (2)$$

The goal of replicating the specifications in the literature is necessary because no current research has been able to examine both self-reported health status and county level conditions.

Finally, the results will, for the first time in the literature, be separately estimated by potentially important variables such as occupation-type and previous or initial health status as well as examine the potential pathways through changes in hours of work and occupational characteristics.

## **Results**

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<sup>9</sup> The measure of occupation is from the 1990 3-digit census codes. Occupation codes 1-195 are professional, 196-245 are manager, 260-285 are sales, 310-395 are clerical, 401-600 are craftsman, 601-715 are operatives, 740-785 are laborers, 801-824 are farmers, 901-965 are service, 980-984 are homemakers, and 0 are considered not employed.

Before presenting our preferred specifications, we show that self rated health status is *procyclical* using multiple measures of the unemployment rate and examine the importance of measuring macroeconomic conditions at the local versus more aggregated levels. Column 1 of Table 2 shows that a 1 point increase in the national unemployment rate reduces health status by 0.02 units, which is approximately the effect size of aging 1.5 year or reducing education by 1/10 of a year. In column 2, we show that the effect is larger when we control for the national rate but include the county-level unemployment rate. Indeed, it appears that, conditional on the local rate, the national rate is unimportant. We also believe that a simple multicollinearity story is not operative here, as the two unemployment rate variables are correlated at 0.25 in our sample. In Column 3, we instead use the state-level unemployment rate and find a similar effect, however, Column 4 shows that the county rate is more important than this more aggregated rate and increases the coefficient to nearly 2 years of aging. Again, the county and state level variables are correlated at 0.5 in the sample. Column 5 examines the effect of the state unemployment rate with state fixed effects controlled and finds smaller effects. Column 6 shows results including state fixed effects, which does not affect the main findings. As an additional attempt at interpreting the “size” of the coefficient, in the appendix, we present interval regression results following Johnson and Schoeni (2007), where self-rated health is converted to a 100-point scale.<sup>10</sup> The point estimate on a 100-point scale is 1/3 of a point reduction in health status for each 1-point increase in the unemployment rate. Thus, our evidence suggests an association between self rated health status and each measure of economic activity but also shows that the effect of the local rate is larger and likely relevant in predicting measures of self-rated health.

Table 3 shows the baseline results linking county unemployment rates and self rated health status with no state fixed effects in column 1. Columns 2 and 3 vary the level of clustering between individual (column 2) and the preferred state level (column 3) (Bertrand et al. 2004).<sup>11</sup> In unreported results, we also estimate the effects using ordered

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<sup>10</sup> Excellent health is coded as [95,100], very good: [85,94], good [70,84], fair [30,69], and poor [1,29]

<sup>11</sup> Note that while the county unemployment rate is available in the public PSID data, the actual county-level identification code is not available.



probit analysis as well as ordered probit analysis with random effects at the person level;<sup>12</sup> in each case the coefficient is unchanged.

Column 4 of Table 3 examines the contemporaneous effects of county unemployment, controlling for lagged health status and suggests that 50% of the effect is from current effects of macro conditions. Column 5 examines a similar question by controlling for “baseline” health instead of lagged health, where the baseline measure is the first measure available for each individual in the sample and the lag length is controlled in the regression; again the results suggest approximately 50% of the effect of macro conditions is contemporaneous with the measure.

One potential limitation with local measures of the macro economy in comparison to state or national measures is the problem of migration and differential likelihood of exposure to poor economic conditions. At the national level, the endogeneity of exposure to a particular unemployment level is not a concern, but the measure is likely least informative about local processes. At the state level, there is some concern about migration (Kennan and Walker in press), even with the use of state fixed effects, as is typically done. For local rates (e.g county), the tradeoff is between the higher relevance of the measure and the likely greater endogeneity of the macroeconomic measure.

Table 4 presents some evidence of the importance of this concern, where the county rate is associated with exogenous characteristics of individuals. The evidence suggests a slight positive association with Hispanic race (but not black) and an important relationship between education attainment as well as disability status, where higher levels of disadvantage are related to poor economic conditions. While the preferred results control for these exogenous characteristics, the likelihood of unobservable variables that are correlated with both health status and local conditions are relevant when interpreting the main results.

#### *Dynamics*

Several papers have also undertaken analyses of the dynamics of the health effects of macroeconomic changes. For example, Ruhm (2001) finds evidence of accumulation of effects over a two-year period. In Table 5, we examine up to four-year lags of the county level unemployment rates. These results must be interpreted with care, as the

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<sup>12</sup> This analysis was accomplished using the “regoprobit” command in Stata.

correlation in adjacent years of the rate is above 0.75 for our sample. With this issue in mind, our results are suggestive of lagged effects up to four years. However, as we include more lags, the sample size is reduced, and our results suggest an issue with the changing composition of our sample due to including a four year lag (but not two or three).

### *Mechanisms*

We next examine potential mechanisms for the main results in Table 6. Column 1 reports the baseline estimates. Column 2 adds employment status dummies; the coefficient is reduced by about 25%. Column 3 then controls for occupation dummies, which produce a minor reduction in the coefficient. Column 4 adds exposure to working conditions by adding the hours of work per year to the regression. Finally, we include annual income measures and show another non-trivial reduction in the coefficient, which is in contrast to Ruhm (2001), who finds an increase in the health effects after holding income constant. These results suggest that occupation and income are potential mechanisms relating economic conditions and health. However, 50% of the baseline coefficient is left unexplained by our controls, indicating additional pathways.

A separate mechanism we investigate has implications for the interpretation of our primary results. Initially considered as a falsification exercise, we investigate whether the *future* rate of unemployment might affect self-rated health status. Table 7 shows that, controlling for the current unemployment rate, the future unemployment rate captures nearly the full effect on health reported in previous tables. We suspect the most plausible explanation for this strong effect lies with our measure of health—the subjective self rated health status assessment. Many researchers have demonstrated the fluidity of this measure and question what it is capturing. Our results are consistent with the interpretation that self rated health status contains a strong psychological/mental health component. Indeed, if we suppose that the measure is a combination of physical and mental health status, then our earlier estimates are likely lower bound effects. That is, if we assume that the evidence of countercyclical physical health outcomes from Ruhm and other researchers is correct, then our measure of self-rated health likely conflates the countercyclical physical health effects and the procyclical mental health effects. Columns 2 and 3 in Table 7 suggest larger effects on the unemployed than the employed,

but it is difficult to decompose if these differences can be attributed to larger mental health effects or smaller physical health effects (or both). The results are consistent with those in Charles and DeCicca (2008), who find larger reductions of mental health for disadvantaged individuals.

### *Heterogeneous Effects*

Much of the literature shows that the effects of macroeconomic conditions on health vary by the characteristics of the individuals. For example, Ruhm (2001) finds larger effects for males, employed individuals, and prime-working age individuals. In Table 8, we stratify the contemporaneous unemployment rate results by gender, race, age, occupation, and year. The results suggest no differences by gender (not shown), but that white individuals are more heavily affected than non-white—in contrast, Charles and DeCicca (2008) find larger effects on mental health for blacks. Interestingly, we find stronger results for the youngest group (under 20) but no effects for ages 20-30 or over 60. We also find effects for working age individuals between 30-60, following Ruhm (2001). When we stratify the results by occupation, we find larger effects for professional and manager occupations as well as operatives. On the other hand, we find weaker evidence for those in potentially higher stress jobs (physically and mentally) including sales and laborers. Finally, we find some evidence that the effects are smallest in the mid 1980s and larger in the late 80s and early 90s.

### **Conclusions**

In this paper, we extend the literature linking macroeconomic conditions and health outcomes. Using the PSID allows one of the few longitudinal investigations on this question. We focus attention on self-rated health status measures and local measures of economic conditions (county level unemployment rate) over a 10 year period. In contrast to previous literature that examined mortality and several health behaviors, we find evidence that self-rated health status is procyclical. Generally the results suggest a reduction in health from each point increase in the unemployment rate that is equivalent to aging between 1-2 years. The results also suggest that local measures are preferable and lead to somewhat larger estimates. In order to further examine the sources of these

procyclical health effects we pursue two sets of potential mechanisms. We find that 50% of the effects on self rated health status can be explained by occupational characteristics (occupational class, income, hours of work). We then show evidence that *future* unemployment rates affect our health measure (self rated health) and suggest that these findings are consistent with the conceptualization of self rated health as a combination of physical and mental health. In this light, our results suggest that previous results showing a procyclical effect on mental health measures may instead be a psychological reaction to future bad economic times. These results have implications for calculating the full effects and dynamics of economic cycles on population physical and mental health as well as for interpreting measures of self rated health status found in many datasets.

## **References**

- Bertrand, M., Duflo, E., Mullainathan, S., 2004. How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics* 119 (1), 249–276.
- Boone, Jan and Jan C. van Ours (2006). “Are Recessions Good for Workplace Safety?” *Journal of Health Economics*, 25: 1069-1093
- Cawley, John and Kosali I. Simon (2005). “Health Insurance Coverage and the Macroeconomy.” *Journal of Health Economics* 24: 299-315
- Charles, Kerwin Kofi and Philip DeCicca. (2008). “Local Labor Market Fluctuations and Health: Is There A Connection and for whom? *Journal of Health Economics*
- Edwards, Ryan. (2008). “American Time Use Over the Business Cycle.” Working Paper
- Edwards, Ryan D. (2008b). “Who Is Hurt by Procyclical Mortality?” *Social Science and Medicine*, 67: 2051-2058
- Eyer, J. 1977a. “Prosperity as a Cause of Death.” *International Journal of Health Services* 7: 125–50.
- Eyer, J. 1977b. “Does Unemployment Cause Death Rate Peak in Each Business Cycle? Multifactor Model of Death Rate Change.” *International Journal of Health Services* 7:625–62.
- Fletcher, Jason M., Jody L. Sindelar, and Shintaro Yamaguchi. (in press). “Cumulative Effects of Job Characteristics on Health.” *Health Economics*
- Gerdtham, Ulf-G and Magnus Johnnesson. (2003). “A Note on the Effect of Unemployment on Mortality.” *Journal of Health Economics*, 22: 505-518
- Gerdtham, U.G., Ruhm, C.J., 2004. Deaths Rise in Good Economic Times: Evidence from the OECD. Mimeo, Lund University.
- Idler, Ellen L. and Yael Benyamini. 1997. “Self-Rated Health and Mortality: A Review of Twenty-Seven Community Studies” *Journal of Health and Social Behavior*, 38(1), 21-37
- Idler, Ellen L. and Stanislav V. Kasl. 1995. “Self-Ratings of Health: Do They Also Predict Functional Ability” *Journals of Gerontology: Social Sciences*, 50(6), s344-s353.
- Kennan, John and James Walker (in press). “The Effect of Expected Income on Individual Migration Decisions.” *Econometrica*

Miller, Douglas L. Marianne E. Page, Ann Huff Stevens, and Mateusz Filipski.(2009). “Why Are Recessions Good for Your Health?” *American Economic Review Papers and Proceedings*, 99 (2): 122-127

Neumayer, E., 2004. Recessions lower (some) mortality rates: evidence from Germany. *Social Science and Medicine* 58 (6), 1037–1047.

Ruhm, C.J., 1995. Economic conditions and alcohol problems. *Journal of Health Economics* 14 (5), 583–603.

Ruhm, Christopher J. 2000. “Are Recessions Good for Your Health?” *Quarterly Journal of Economics*, 115(2): 617–50.

Ruhm, Christopher J. 2001. “Economic Expansions are Unhealthy: Evidence from Microdata.” NBER Working Paper 8447

Ruhm, Christopher J. 2003. “Good Times Make You Sick.” *Journal of Health Economics*, 22(4): 637–58.

Ruhm, Christopher J. 2004. “Macroeconomic Conditions, Health and Mortality.” NBER Working Paper 11007

Ruhm, Christopher J. 2005a. “Mortality Increases During Economic Upturns.” *International Journal of Epidemiology*, 34(6): 1206–11.

Ruhm, Christopher J. 2005b. “Healthy Living in Hard Times.” *Journal of Health Economics*, 24: 341-363

Ruhm, Christopher J. 2007. “A Healthy Economy Can Break Your Heart.” *Demography* 44(4):829–848.

Ruhm, Christopher J. 2008. “Macroeconomic Conditions, Health, and Government Policy.” In *Making Americans Healthier: Social and Economic Policy as Health Policy*, ed. Robert F. Schoeni, James S. House, George A. Kaplan, and Harold Pollack, 173–200. New York: Russell Sage Foundation.

Tapia Granados, J.A., 2002. Death Rates and Business Cycle Fluctuations in Spain at the End of the 20th Century: Further Empirical Evidence of Mortality Increase During Economic Expansions. Mimeo, New School University.

Tables

Table 1  
Descriptive Statistics: PSID 1984-1993

Variable	Obs	Mean	Std Dev	Min	Max
Health	109347	2.48	1.14	1	5
Poor Health	109347	0.18	0.39	0	1
National Unemployment Rate	109347	6.56	0.77	5.3	7.5
State Unemployment Rate	109347	6.99	1.89	2.12	14.52
County Unemployment Rate	109347	6.32	2.48	1	33
Age	109347	35.96	20.10	4	101
Female	109347	0.52	0.50	0	1
Black	109347	0.29	0.45	0	1
Asian	109347	0.00	0.06	0	1
Hispanic	109347	0.04	0.20	0	1
American Indian	109347	0.01	0.08	0	1
Other	109347	0.01	0.09	0	1
Education	109347	12.13	2.99	1	17
Baseline Health = Very Good	109347	0.31	0.46	0	1
Baseline Health = Good	109347	0.26	0.44	0	1
Baseline Health = Fair	109347	0.12	0.32	0	1
Baseline Health = Poor	109347	0.05	0.21	0	1
Baseline Health Status	109347	2.38	1.13	1	5
First Year in Survey	109347	1985.42	2.47	1984	1993
Employed	109347	0.65	0.48	0	1
Income	66773	22566.00	28669.00	-151890	715814
Hours/Year	109342	1396.27	1046.50	0	5840
Disabled	109282	0.19	0.39	0	1
Employed	109347	0.65	0.48	0	1
Professional	109236	0.12	0.32	0	1
Manager	109236	0.09	0.28	0	1
Sales	109236	0.03	0.18	0	1
Clerical	109236	0.11	0.31	0	1
Craftsman	109236	0.09	0.29	0	1
Operative	109236	0.10	0.30	0	1
Laborer	109236	0.03	0.16	0	1
Farmer	109236	0.01	0.11	0	1
Service	109236	0.09	0.29	0	1
Home Maker	109236	0.01	0.09	0	1
Not Employed	109236	0.31	0.46	0	1

Table 2  
The Effects of Macroeconomic Conditions on Health:  
Differences by Level of Aggregation

Outcome	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS
Fixed Effects?	None	None	Year	Year	Year/State	Year/State
Column	1	2	3	4	5	6
National Rate	0.018*** (0.007)	-0.000 (0.007)				
County Rate		0.022*** (0.004)		0.023*** (0.004)		0.020*** (0.004)
State Rate			0.016** (0.007)	0.002 (0.008)	0.005 (0.005)	-0.003 (0.005)
Age	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.002)	-0.009*** (0.002)	-0.009*** (0.002)	-0.009*** (0.002)
Age-squared/100	0.027*** (0.002)	0.027*** (0.002)	0.027*** (0.002)	0.027*** (0.002)	0.026*** (0.002)	0.026*** (0.002)
Female	0.234*** (0.024)	0.231*** (0.024)	0.233*** (0.024)	0.231*** (0.024)	0.235*** (0.023)	0.234*** (0.023)
HH Head	0.166*** (0.027)	0.163*** (0.027)	0.167*** (0.027)	0.164*** (0.027)	0.169*** (0.025)	0.168*** (0.025)
Black	0.259*** (0.035)	0.255*** (0.034)	0.259*** (0.034)	0.255*** (0.034)	0.233*** (0.025)	0.231*** (0.024)
Asian	0.053 (0.146)	0.061 (0.144)	0.056 (0.145)	0.061 (0.144)	0.068 (0.139)	0.071 (0.138)
Hispanic	0.140*** (0.042)	0.132*** (0.042)	0.138*** (0.042)	0.130*** (0.042)	0.124*** (0.039)	0.119*** (0.039)
Am Indian	0.228*** (0.085)	0.225*** (0.084)	0.231*** (0.086)	0.225** (0.084)	0.196** (0.077)	0.190** (0.075)
Other	0.111 (0.076)	0.102 (0.075)	0.111 (0.076)	0.104 (0.074)	0.105 (0.073)	0.099 (0.071)
Education	-0.117*** (0.003)	-0.114*** (0.003)	-0.116*** (0.003)	-0.114*** (0.002)	-0.113*** (0.003)	-0.112*** (0.002)
Constant	-26.079*** (5.592)	23.889*** (4.889)	3.356*** (0.073)	3.289*** (0.065)	3.311*** (0.055)	3.210*** (0.048)
Observations	109347	109347	109347	109347	109347	109347
R-squared	0.219	0.221	0.220	0.221	0.227	0.228

Notes: Standard errors clustered at state level.



Table 3  
The Effects of Macroeconomic Conditions on Health Status:  
Cumulative and Contemporaneous Effects

Outcome	SRHS	SRHS	SRHS	SRHS	SRHS
Fixed Effects?	Year	Year/State	Year/State	Year/State	Year/State
Column	1	2	3	4	5
County Rate	0.024*** (0.002)	0.019*** (0.002)	0.019*** (0.004)	0.007*** (0.002)	0.009*** (0.002)
Age	-0.009*** (0.001)	-0.009*** (0.001)	-0.009*** (0.002)	-0.005*** (0.001)	-0.002*** (0.001)
Age-squared/100	0.027*** (0.002)	0.026*** (0.002)	0.026*** (0.002)	0.012*** (0.001)	0.010*** (0.001)
Female	0.231*** (0.018)	0.234*** (0.018)	0.234*** (0.023)	0.076*** (0.008)	0.053*** (0.011)
HH Head	0.164*** (0.018)	0.168*** (0.018)	0.168*** (0.025)	0.059*** (0.011)	0.052*** (0.013)
Black	0.256*** (0.015)	0.231*** (0.017)	0.231*** (0.024)	0.099*** (0.012)	0.105*** (0.015)
Asian	0.062 (0.121)	0.071 (0.116)	0.071 (0.138)	0.025 (0.063)	-0.000 (0.081)
Hispanic	0.132*** (0.030)	0.119*** (0.031)	0.119*** (0.039)	0.035 (0.026)	0.033 (0.034)
Am Indian	0.225*** (0.080)	0.190** (0.081)	0.190** (0.075)	0.112* (0.057)	0.112 (0.079)
Education	-0.114*** (0.002)	-0.112*** (0.002)	-0.112*** (0.002)	-0.047*** (0.001)	-0.047*** (0.002)
Lagged Health				0.589*** (0.006)	
Baseline Health=Very Good					0.521*** (0.013)
Baseline Health=Good					1.017*** (0.020)
Baseline Health=Fair					1.688*** (0.033)
Baseline Health=Poor					2.337*** (0.065)
Constant	3.293*** (0.042)	3.191*** (0.045)	3.191*** (0.037)	1.395*** (0.030)	-0.171 (5.407)
Observations	110147	109347	109347	90638	109347
R-squared	0.222	0.228	0.228	0.497	0.466

Notes: Standard Errors Clustered at State Level in columns 1 and 3-5 and individual level in column 2. "Other" race control not shown.

Table 4  
Associations between Macro Conditions and Individual Characteristics

Outcome	SRHS	Age	Female	Black	Hispanic	Education	Disabled
Fixed Effects	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State
Column	1	2	3	4	5	6	7
County Unemployment Rate	0.038*** (0.006)	-0.407* (0.211)	0.002 (0.001)	0.006 (0.007)	0.004** (0.002)	-0.171*** (0.019)	0.006*** (0.001)
Constant	2.204*** (0.050)	41.235*** (2.028)	0.527*** (0.009)	0.281*** (0.040)	0.004 (0.014)	13.325*** (0.145)	0.155*** (0.010)
Observations	117262	117262	117262	113241	115115	114379	117188
R-squared	0.032	0.059	0.002	0.261	0.104	0.061	0.006

Notes: Standard Errors Clustered at State Level. No additional controls are used.

Table 5  
The Dynamic Effects of Local Macroeconomic Conditions

Outcome	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS
Fixed Effects	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State
Column	1	2	3	4	5	6	7	8	9
County Rate	0.019*** (0.004)	0.016*** (0.003)	0.020*** (0.004)	0.017*** (0.004)	0.020*** (0.004)	0.018*** (0.004)	0.022*** (0.005)	0.006* (0.004)	0.012* (0.006)
County Rate (1 lag)		0.005* (0.003)		-0.001 (0.004)		0.001 (0.004)		0.003 (0.006)	
County Rate (2 lag)				0.006* (0.003)		-0.001 (0.004)		-0.001 (0.004)	
County Rate (3 lag)						0.006* (0.003)		0.003 (0.003)	
County Rate (4 lag)								0.005* (0.003)	
Constant	3.191*** (0.037)	3.237*** (0.045)	3.249*** (0.041)	3.240*** (0.062)	3.259*** (0.055)	3.180*** (0.071)	3.164*** (0.065)	2.947*** (0.075)	3.048*** (0.064)
Observations	109347	90638	90638	71697	71697	55058	55058	40323	40323
R-squared	0.228	0.233	0.233	0.235	0.235	0.242	0.242	0.257	0.256

Notes: Standard Errors Clustered at State Level, Same controls as Table 2.

Table 6  
The Effects of Local Macroeconomic Conditions on Health: Mechanisms

Outcome	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS
Fixed Effects	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State
Specification	Baseline	Employment Status	Occupation	Hours	Income	Income Sample
Column	1	2	3	4	5	6
County Rate	0.019*** (0.004)	0.015*** (0.003)	0.014*** (0.003)	0.013*** (0.003)	0.008** (0.004)	0.009** (0.004)
Age	-0.009*** (0.002)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Female	0.234*** (0.023)	0.189*** (0.020)	0.138*** (0.019)	0.119*** (0.019)	0.106*** (0.020)	0.119*** (0.020)
HH Head	0.168*** (0.025)	0.147*** (0.021)	0.145*** (0.022)	0.154*** (0.022)	0.139*** (0.019)	0.137*** (0.018)
Black	0.231*** (0.024)	0.198*** (0.021)	0.169*** (0.020)	0.164*** (0.019)	0.186*** (0.022)	0.189*** (0.022)
Hispanic	0.119*** (0.039)	0.114*** (0.033)	0.102*** (0.030)	0.101*** (0.030)	0.110** (0.043)	0.111** (0.044)
Education	-0.112*** (0.002)	-0.093*** (0.002)	-0.086*** (0.002)	-0.085*** (0.002)	-0.079*** (0.003)	-0.081*** (0.003)
Status=Temp Laid Off		0.358*** (0.030)	0.343*** (0.027)	0.318*** (0.027)	0.342*** (0.046)	0.345*** (0.046)
Status=Looking for Work		0.178*** (0.025)	-0.065** (0.029)	-0.105*** (0.028)	-0.114*** (0.036)	-0.109*** (0.035)
Status=Retired		0.514*** (0.041)	0.269*** (0.036)	0.176*** (0.034)	0.114*** (0.041)	0.121*** (0.041)
Status=Disabled		1.517*** (0.040)	1.269*** (0.031)	1.171*** (0.029)	1.124*** (0.050)	1.130*** (0.050)
Status=Housewife		0.286*** (0.022)	0.039 (0.026)	-0.043* (0.025)	-0.084** (0.033)	-0.083** (0.033)
Status=Student		0.037 (0.032)	-0.183*** (0.044)	-0.251*** (0.045)	-0.243*** (0.047)	-0.235*** (0.047)
Work Hours (100s/year)				-0.009*** (0.001)	-0.007*** (0.001)	-0.008*** (0.001)
Current Income (\$1,000s)					-0.021*** (0.004)	
Constant	3.191*** (0.037)	2.878*** (0.037)	3.350*** (0.053)	3.489*** (0.056)	3.022*** (0.123)	3.043*** (0.123)
Observations	109347	109347	103503	103498	60990	60990
R-squared	0.228	0.282	0.291	0.293	0.304	0.303

Notes: Standard Errors Clustered at State Level, Same controls as Table 2, Omitted controls: Asian, Indian, Age-squared

Table 7  
Effects of Future Macro Conditions on Self Rated Health Status

Outcome	SRHS	SRHS	SRHS
Sample	Full	Employed	Unemployed
Column	1	2	3
County Rate	0.004 (0.002)	0.004 (0.003)	-0.002 (0.004)
Future County Rate	0.019*** (0.002)	0.013*** (0.003)	0.024*** (0.005)
Age	-0.008*** (0.001)	-0.006*** (0.002)	0.004 (0.002)
Age-squared/100	0.025*** (0.002)	0.023*** (0.002)	0.008*** (0.003)
Female	0.232*** (0.019)	0.201*** (0.021)	0.057* (0.032)
HH Head	0.162*** (0.019)	0.101*** (0.022)	0.293*** (0.031)
Black	0.241*** (0.018)	0.228*** (0.018)	0.181*** (0.032)
Asian	0.082 (0.121)	0.193 (0.128)	-0.265 (0.220)
Hispanic	0.136*** (0.035)	0.118*** (0.040)	0.156*** (0.054)
Am Indian	0.188** (0.090)	0.206** (0.093)	0.163 (0.147)
Other	0.054 (0.081)	0.014 (0.077)	0.118 (0.149)
Education	-0.109*** (0.003)	-0.087*** (0.003)	-0.108*** (0.004)
Constant	3.124*** (0.047)	2.835*** (0.055)	3.302*** (0.079)
Observations	88073	57669	30404
R-squared	0.234	0.136	0.211

Notes: Standard Errors Clustered at State Level

Table 8  
Effects of Macro conditions on Health: Stratified by Individual Characteristics

Outcome	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS	SRHS
Fixed Effects	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State	Year/State
Sample	Full	White	Black	Hispanic	Age <20	Age 20-30	Age 30-45	Age 45-60	Age > 60	Not Employed	Employed
Column	1	2	3	4	5	6	7	8	9	10	11
County Rate	0.019*** (0.004)	0.021*** (0.004)	0.010* (0.005)	0.008 (0.008)	0.027*** (0.004)	0.001 (0.003)	0.013** (0.005)	0.023*** (0.007)	-0.000 (0.006)	0.017*** (0.005)	0.014*** (0.003)
Constant	3.191*** (0.037)	3.274*** (0.048)	3.020*** (0.089)	3.132*** (0.227)	2.013*** (0.297)	1.755** (0.691)	2.575*** (0.619)	0.683 (1.713)	1.980 (1.318)	3.416*** (0.075)	2.979*** (0.058)
Observations	109347	71894	31871	2953	26501	17602	33507	15748	15666	34218	71034
R-squared	0.228	0.217	0.218	0.173	0.195	0.092	0.144	0.221	0.170	0.197	0.132
Sample	Disabled	Professional	Manager	Sales	Clerical	Craftsman	Operative	Laborer	Farmer	Service	Homemaker
County Rate	0.016*** (0.005)	0.017*** (0.006)	0.025*** (0.008)	0.004 (0.014)	0.011** (0.005)	0.007 (0.005)	0.016** (0.007)	0.003 (0.010)	0.012 (0.014)	0.009 (0.008)	0.008 (0.023)
Constant	4.104*** (0.114)	2.754*** (0.151)	2.686*** (0.115)	2.890*** (0.286)	2.746*** (0.154)	3.106*** (0.118)	2.861*** (0.106)	2.903*** (0.279)	3.143*** (0.390)	2.917*** (0.138)	2.655*** (0.403)
Observations	20337	13108	9590	3728	11742	10152	10961	3047	1410	10354	926
R-squared	0.182	0.115	0.104	0.110	0.089	0.119	0.113	0.128	0.285	0.123	0.232
Sample	1985	1986	1987	1988	1989	1990	1991	1992	1993		
County Rate	0.005 (0.006)	0.006 (0.005)	0.018** (0.008)	0.025*** (0.006)	0.025** (0.011)	0.026*** (0.006)	0.030*** (0.005)	0.023*** (0.005)	0.027*** (0.006)		
Constant	3.027*** (0.064)	3.028*** (0.071)	2.949*** (0.087)	2.829*** (0.084)	2.939*** (0.091)	3.192*** (0.119)	3.344*** (0.050)	3.445*** (0.055)	3.454*** (0.060)		
Observations	9122	9863	10337	9141	8686	13898	13751	14329	14484		
R-squared	0.274	0.260	0.242	0.255	0.262	0.217	0.211	0.206	0.204		

Notes: Standard Errors Clustered at State Level, Same controls as Table 2



Appendix Tables

Table 1A:  
The Effects of Local Macroeconomic Conditions on Health  
Interval Regression Results

Outcome	SRHS	SRHS
Fixed Effects	Year	Year/State
County Rate	-0.366*** (0.041)	-0.301*** (0.046)
Age	0.251*** (0.021)	0.242*** (0.022)
Age-squared/100	-0.574*** (0.029)	-0.564*** (0.029)
Female	-3.827*** (0.335)	-3.789*** (0.338)
HH Head	-3.371*** (0.335)	-3.397*** (0.337)
Black	-3.859*** (0.262)	-3.398*** (0.299)
Asian	-0.691 (1.953)	-0.734 (1.873)
Hispanic	-1.883*** (0.533)	-1.716*** (0.551)
Am Indian	-3.294** (1.476)	-2.734* (1.491)
Other	-2.011* (1.202)	-1.884 (1.241)
Education	2.025*** (0.046)	1.989*** (0.047)
Constant	63.675*** (0.822)	65.422*** (1.608)
Observations	110147	103611

Notes: Standard Errors Clustered at State Level