

WHY DO MORE PEOPLE DIE DURING ECONOMIC EXPANSIONS?

BY ANN HUFF STEVENS, DOUGLAS L. MILLER, MARIANNE PAGE, AND MATEUSZ FILIPSKI*

Introduction

Consider this seeming paradox: when economic times are good, deaths in the United States increase. The reasons for this economic impact on mortality are not well understood, but the negative health effects of over-work, stress, and work-related behavior are often cited as culprits. However, this explanation is not completely persuasive, because other evidence shows that losing a job when the economy sours causes individuals' health to deteriorate.¹ If that were the case, it would seem that, during good economic times, mortality would *decline*. These conflicting theories about the effect of individuals' work on their own health suggest that the mechanisms driving the unemployment-mortality link are more complex.

This *brief*, adapted from a recent paper, departs from earlier studies suggesting individuals' own work behavior causes the unemployment-mortality link and summarizes an empirical scavenger hunt to find an alternative explanation.² A key initial finding is that most of the additional deaths due to a falling unemployment rate occur among the elderly, particularly elderly women. Since the elderly are usually retired, factors unrelated to their work are most likely to explain rising mortality. And since the elderly use medical services more as they age, the health care labor force is a logical place to search for clues.

The first section of this *brief* discusses the prior research on the relationship between declining unemployment and rising death rates and tests it using new sources of data. The second section explains a process of elimination that isolates additional deaths among the elderly as the main reason for rising death rates during good economic times. The conclusion is that an expanding economy generates a greater scarcity of front-line caregivers in nursing homes, which may cause more deaths among the elderly.

The Unemployment-Mortality Link

Research conducted a decade ago first documented the core relationship: the death rate rises during periods of low unemployment rates, and it falls when the unemployment rate goes up.³ Economists and health researchers have tried to explain this finding by looking at changes in the behavior of individuals that would affect their health. During boom times, when more people are employed, job-related stress may increase obesity and smoking. High employment and long hours on the job also limit individuals' ability to find time for diet and exercise, causing health to

* The authors are all with the University of California, Davis. Ann Huff Stevens is an economics professor and director of the Center for Poverty Research. Douglas L. Miller is an assistant professor of economics. Marianne Page is a professor of economics. Mateusz Filipski is a postdoctoral scholar in the agricultural and resource economics department. This *brief* is adapted from a longer working paper published by the National Bureau of Economic Research, Stevens et al. (2011).

deteriorate. Economists explain this effect, which seems intuitive, by saying that individuals reallocate their time to accommodate their jobs – and away from leisure and healthy living practices.⁴

But other factors may be involved that are unrelated to individuals' own work behaviors. One example is that motor vehicle accidents increase when unemployment is low, likely the result of more economic activity and driving during economic booms. Such accidents, however, are relatively rare and so cannot come close to fully accounting for the overall cyclical-ity of deaths. Perhaps, instead, broader job-market effects can better explain why deaths increase when unemployment falls. Before searching for the underlying cause, it is necessary to test the basic link between the death rate and the unemployment rate that was established in earlier research.

The research study underlying this *brief* uses a more complete set of data to test the unemployment-mortality relationship. It also analyzes a longer time period than prior research – 1978 through 2006 – to include recent economic booms and increases in longevity.⁵ The dependent variable is each state's mortality rate in a given year, using a new and improved measure contained in the Vital Statistics data at the National Centers for Disease Control and Prevention.⁶ The main independent variable is each state's unemployment rate in a given year, using data from the U.S. Bureau of Labor Statistics.⁷ The rich Vital Statistics dataset includes death rates by age, gender, and cause of death that allow a more detailed exploration of how changes in unemployment affect death rates.

After first replicating the results of prior research, the analysis then tried variations on the basic equation, changing the time period and the mortality measure and testing the equation using regressions both unweighted and weighted by state-year population.⁸ The results of this exercise confirmed that the core relationship holds: a falling unemployment rate leads to a higher mortality rate.⁹

Finding the Cause of the Unemployment-Mortality Link

Having confirmed the unemployment-mortality link, the next step is to search for alternative explanations for its cause. Three related questions may help provide an answer. First, is the rise in the mortality rate concentrated among a particular population, for example, by gender or age? Second, can we learn anything about where the deaths occur, namely health

care facilities? And, third, could the impact of falling unemployment rates somehow affect the quality of health services for vulnerable populations?

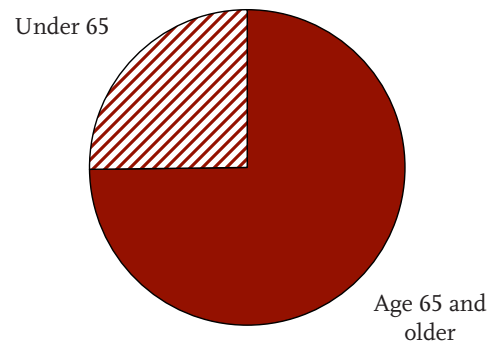
Elderly Women Prove Key

The search begins by testing alternatives to the traditional hypothesis that higher employment erodes health and increases mortality. New regression analyses again use the unemployment rate as the key explanatory variable, but they test whether these rate changes affect deaths differently for different gender and age groups. The findings provided the first clue that the effect of individuals' own employment status on their health was not driving mortality changes.

First, men and women were analyzed separately. A 1-percentage-point decline in the overall unemployment rate increased male mortality by 0.25 percent. But the effect on women was stronger: 0.40 percent; it was equally strong for women over age 65. Elderly women are typically retired and have little attachment to the labor force, indicating that mechanisms apart from their work explain why deaths rise when unemployment declines.

A second set of analyses tested changes in mortality among narrowly defined age groups consisting of one- and five-year age increments. Deaths among young adults proved most sensitive: a one-point decline in the unemployment rate sharply drove up their death rates. But while their mortality is sensitive to business cycles, aggregate deaths among young adults were not large enough to substantially increase

FIGURE 1. AGE COMPOSITION OF ADDITIONAL DEATHS CAUSED BY DECLINE IN UNEMPLOYMENT RATE, 2006



Source: Stevens et al. (2011).

mortality in the overall population. Working-age men and women accounted for just 9 percent of the 6,700 additional deaths in 2006 caused by a 1-point decline in the unemployment rate.

Instead, the elderly dominated here: Deaths among people ages 65 and older accounted for 75 percent of the 6,700 additional deaths (see Figure 1 on the previous page). Notably, women over 65 alone accounted for 55 percent of the additional deaths. These findings confirm that factors other than individuals' own work behavior influence overall mortality patterns.

Given this finding, it is not surprising that measuring the impact of an age-specific unemployment rate on mortality *within that same age group* did not generate significant effects. However, testing the relationship *across* different age groups in the sample turned up another important clue: changes in death rates for older people were primarily driven by employment changes among *younger* individuals.

This clue led to an examination of whether changing employment patterns in health-care facilities, which are heavily used by the elderly, might explain the connection. Elderly women typically outlive their husbands and are more likely to reside in nursing homes or other care facilities at the end of their lives.¹⁰ Putting all of this evidence together, the health-care labor force, and perhaps nursing-home staffing, emerged as places to look for why more of the elderly die when unemployment is falling.

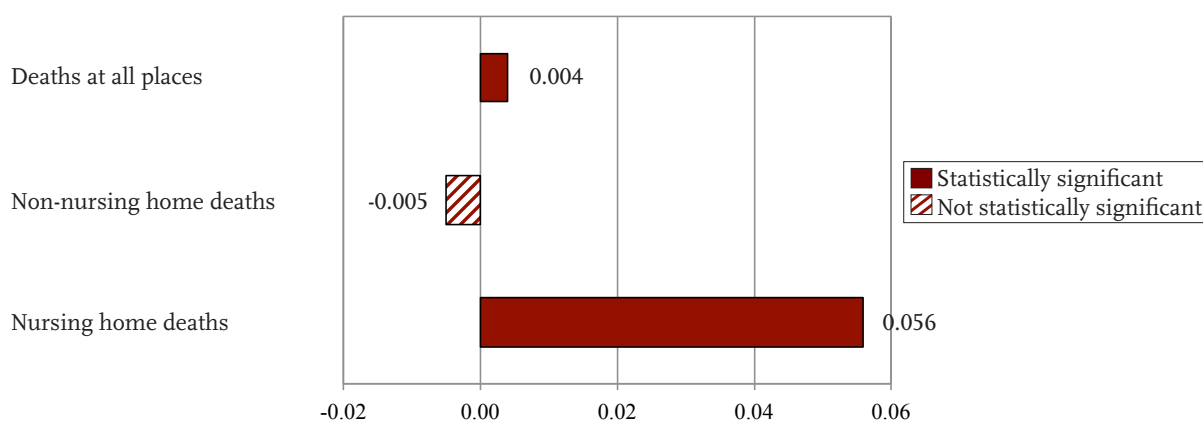
Nursing Homes and Mortality

Past research has shown that the ability of health care facilities to hire staff is particularly sensitive to the economy. For example, employment levels in the health-care sector decline during economic expansions as low-paid, low-skill health workers find better jobs elsewhere. This migration worsens perennial shortages of direct caregivers, such as nursing aides and home health workers.¹¹ Also, the elderly heavily utilize hospitals, where labor shortages also occur during strong job markets.¹² Perhaps a connection can be found among health care workers, employment levels in the economy overall, and deaths among the elderly.

The first step is to pinpoint the primary locations of elderly deaths using Vital Statistics data to distinguish people who died in nursing homes – where women typically out-number men – from those who died in other locations.¹³ The analysis again used deaths as the dependent variable, but broke them down by deaths in nursing homes compared with deaths at other locations. The effect of a 1-point decline in the unemployment rate on nursing home deaths was large – a 0.56 percent increase – and statistically significant (see Figure 2). The impact of the unemployment rate on deaths at locations other than nursing homes was not statistically significant.¹⁴

A second piece of information might shed additional light on the importance of nursing-home

FIGURE 2. IMPACT OF 1-PERCENTAGE POINT DECLINE IN UNEMPLOYMENT RATE ON DEATHS, BY LOCATION, 1983-2002



Source: Stevens et al. (2011).

deaths on overall mortality: the share of each state's population living in nursing homes. If changes in nursing-home staffing can cause higher mortality, then states with larger nursing home populations would see more deaths in an improving economy and job market. The U.S. Census does not report on nursing home residents *per se* but provides a good proxy for each state: the number of individuals over age 65 living in group homes or facilities.

The analysis found that, indeed, mortality does increase more in states with larger shares of their populations in nursing homes. This finding indicates that nursing homes may be key to answering the central question: why does falling unemployment cause death rates to rise?

Nursing Home Workforce and the Economy

So, what is occurring inside nursing homes that might cause more elderly deaths? One possible explanation is that the quality of care declines in a strong economy when demand for workers grows throughout the economy. Using nursing-home staffing levels as a proxy for quality of care, the analysis explored two potential effects of a tight labor market that would bear directly on elder care: 1) total employment in all nursing homes; and 2) employment levels for various occupations found in nursing homes.

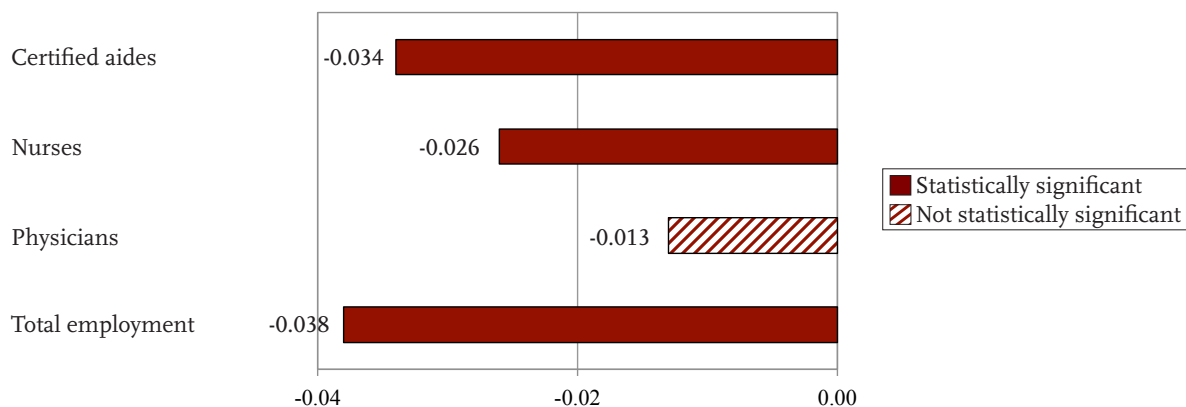
Medicare data provide employment levels in virtually all U.S. hospitals and nursing homes.¹⁵ They also include categories of workers in these facilities: physicians, nurses (registered nurses and licensed practical nurses), and certified aides.

In the next set of regression analyses, nursing-home employment – not the mortality rate – became the dependent variable; the unemployment rate remained the main independent variable. The analysis revealed that a 1-percentage-point decline in the unemployment rate causes more than a 3-percent drop in overall full-time employment at nursing homes. Looking at specific occupations, a 1-point drop in the unemployment rate caused employment to decline by 3 percent for aides and by more than 2 percent for nurses (see Figure 3).¹⁶

In tight labor markets, it is easier for nurses and aides in nursing homes to migrate to better jobs elsewhere, and the impact could be large when the economy is growing and jobs are plentiful. For example, amplifying the results of the first analysis, a 4-point drop in the overall unemployment rate – which approximates the change that accompanies an economic boom to bust cycle – could cause nursing-home staff to decline by about 12 percent.

Taken together, these findings point to a connection between falling unemployment rates and more deaths. Specifically, tight labor markets constrain the already scarce number of workers available for hire by nursing homes, where older people in vulnerable

FIGURE 3. EFFECT OF 1-PERCENTAGE-POINT DECLINE IN UNEMPLOYMENT RATE ON EMPLOYMENT IN NURSING HOMES, BY OCCUPATION, 1983-2002



Note: These results are from a linear regression model that includes year and state fixed effects and state-specific trends. All models are weighted by number of beds. While the impact on physician employment was not statistically significant, doctors make up an extremely small percentage of nursing home employment.
 Source: Stevens et al. (2011).

health require direct and constant care. A greater scarcity of these front-line caregivers may have a direct impact on the elderly, causing them to die in greater numbers when the unemployment rate is declining.

Conclusion

This research reaffirms a robust link between mortality and the unemployment rate, but offers an alternative explanation for the cause. The analysis found that rising mortality during good economic times is largely driven by additional deaths among people over age 65 in nursing homes, particularly women. To find the cause, the analysis explored the impact of a falling unemployment rate on nursing home staffing and found significant declines in the number of nurses and health aides caring for the elderly during economic booms. This finding suggests that such shortages may be an important focus of future efforts to improve the quality of health care.

Endnotes

- 1 Sullivan and von Wachter (2009).
- 2 Stevens et al. (2011).
- 3 Ruhm (2000, 2003, 2005a, 2005b).
- 4 Job-related health problems may also result from hazardous working conditions. In addition, people migrate geographically to new jobs when the economy is strong, which may increase crowding or lead to other lifestyle changes that could raise mortality. See Ruhm (2000).
- 5 Ruhm analyzed 1972-1991 using unemployment rates from the Bureau of Labor Statistics, mortality data from Vital Statistics publications, and control variables from the U.S. Census.
- 6 The new Vital Statistics measure of the mortality rate provides micro-record “multiple cause of death” files with a denominator from population counts collected by the National Cancer Institute’s Surveillance Epidemiology and End Results (Cancer-SEER) program. Cancer-SEER estimates are based on an algorithm that incorporates information from Vital Statistics, IRS migration files, and Social Security data; this method makes them more accurate than population estimates interpolated from between years in U.S. Census surveys.
- 7 Monthly data from the *Current Population Survey* (CPS) were pooled to construct employment and unemployment rates by state and demographic group; estimates for states prior to 1978 are unavailable in the CPS. Demographic controls include education, race, and the fraction of the population who are less than 5 years old and greater than 65 years old. A vector of year-specific fixed effects captures national time effects and a vector of state-specific indicator variables controls for time-invariant state characteristics. State-specific time trends are also included.
- 8 Using population weights is appropriate to estimate the degree to which economic conditions contribute to overall fluctuations in U.S. mortality. On the other hand, the unweighted regressions address the impact on a typical state’s mortality rate.

9 For a more detailed discussion of the methodology and results, see Stevens et al. (2011).

10 Murtaugh, Kember, and Spillman (1990).

11 Yamada (2002) cites a New York State study that suggests that between 70 percent and 90 percent of home health care agencies and nursing homes are short on direct-care staff.

12 Goodman (2006).

13 Vital Statistics data show whether deaths occurred in hospitals, nursing homes, personal residences or other locations; non-nursing home locations were grouped together into "other locations." This analysis, for the time period 1983-2006, found that the coefficient for nursing-home deaths was large but was not statistically significant. Dropping the years after 2002, when the overall effect of unemployment on mortality weakens and when a change in data coding occurred, substantially increased the magnitude of the coefficient for the full sample.

14 Repeating the analysis using U.S. Census data, which supplies another measure of the place of death, confirmed a relationship between the unemployment rate and nursing home deaths: a 1-percentage-point decline in the unemployment rate caused mortality to increase by 0.03-0.06 percent.

15 Medicare data, taken from the Online Survey Certification and Reporting Database (OSCAR), cover employment in 97 percent of U.S. hospital facilities, which include skilled nursing facilities.

16 Using Medicare data, a similar exercise for hospitals found little evidence that changes in hospital staffing levels were related to the business cycle. A separate analysis, using CPS data, was also used to test the connection between the unemployment rate and health care staffing patterns. This analysis included all types of employers, not just nursing homes, and found that employment levels of health and nursing aides followed a similar pattern indicated by the Medicare data presented in Figure 3.

References

- Goodman, William C. 2006. "Employment in Hospitals: Unconventional Patterns Over Time." *Monthly Labor Review* 129 (6):3-14.
- Murtaugh, Christopher, Peter Kember, and Brenda Spillman. 1990. "The Risk of Nursing-Home Use in Later Life." *Medical Care* October 28 (10): 952-962.
- Ruhm, Christopher J. 2000. "Are Recessions Good for Your Health?" *Quarterly Journal of Economics* May 115(2): 617-650.
- Ruhm, Christopher J. 2003. "Good Times Make You Sick." *Journal of Health Economics* 22(4): 637-658.
- Ruhm, Christopher J. 2005a. "Mortality Increases During Economic Upturns." *International Journal of Epidemiology* 34(6): 1206-1211.
- Ruhm, Christopher J. 2005b. "Healthy Living in Hard Times." *Journal of Health Economics* 24: 341-363.
- Stevens, Ann Huff, Douglas L. Miller, Marianne Page, Mateusz Filipowski. 2011. "The Best of Times, the Worst of Times: Understanding Pro-cyclical Mortality." Working Paper 17657. Cambridge, MA: National Bureau of Economic Research.
- Sullivan, Daniel and Till von Wachter. 2009. "Job Displacement and Mortality: An Analysis Using Administrative Data." *Quarterly Journal of Economics* August 2009: 1265-1306.
- Yamada, Yoshiko. 2002. "Profile of Home Care Aides, Nursing Home Aides, and Hospital Aides: Historical Changes and Data Recommendations." *The Gerontologist* 42(2): 199-206.

CENTER *for*
RETIREMENT
RESEARCH
at BOSTON COLLEGE

About the Center

The Center for Retirement Research at Boston College was established in 1998 through a grant from the Social Security Administration. The Center's mission is to produce first-class research and educational tools and forge a strong link between the academic community and decision-makers in the public and private sectors around an issue of critical importance to the nation's future. To achieve this mission, the Center sponsors a wide variety of research projects, transmits new findings to a broad audience, trains new scholars, and broadens access to valuable data sources. Since its inception, the Center has established a reputation as an authoritative source of information on all major aspects of the retirement income debate.

Affiliated Institutions

The Brookings Institution
Massachusetts Institute of Technology
Syracuse University
Urban Institute

Contact Information

Center for Retirement Research
Boston College
Hovey House
140 Commonwealth Avenue
Chestnut Hill, MA 02467-3808
Phone: (617) 552-1762
Fax: (617) 552-0191
E-mail: crr@bc.edu
Website: <http://crr.bc.edu>

The Center for Retirement Research thanks AARP, InvescoSM, LPL Financial, Mercer, MetLife, MFS Investment Management, National Reverse Mortgage Lenders Association, Prudential Financial, Putnam Investments, State Street, TIAA-CREF Institute, T. Rowe Price, and USAA for support of this project.

© 2012, by Trustees of Boston College, Center for Retirement Research. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that the authors are identified and full credit, including copyright notice, is given to Trustees of Boston College, Center for Retirement Research.

The research reported herein was supported by the Center's Partnership Program. The findings and conclusions expressed are solely those of the authors and do not represent the views or policy of the partners or the Center for Retirement Research at Boston College.