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# Introduction

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This is the ninth in a series of volumes on the economics of aging. The previous ones were *The Economics of Aging*, *Issues in the Economics of Aging*, *Topics in the Economics of Aging*, *Studies in the Economics of Aging*, *Advances in the Economics of Aging*, *Inquiries in the Economics of Aging*, *Frontiers in the Economics of Aging*, and *Themes in the Economics of Aging*.

Most of the papers in this volume pursue areas of research begun in earlier volumes. For example, the work in this volume emphasizes the spread of personal retirement accounts and macrodata on the implications of the diffusion of these accounts. Prior work emphasized the net saving effects of personal retirement accounts based on microdata. Work in this volume also revisits the implications of housing wealth for the financing of general consumption as households age. The current work confirms previous findings that households typically do not withdraw equity from housing to finance general consumption, but such withdrawal is more likely when a spouse dies or enters a nursing home. In addition to discussion of the personal retirement plans and home equity, the first five papers in this volume consider other aspects of wealth accumulation and compare asset accumulation in the United States and the United Kingdom.

Trying to understand the explanation for the very strong relationship between health and wealth is one of the most challenging research issues in the economics of aging. Perhaps the most vexing issue that arises in this analysis is the direction of causality. Is it from health to wealth or from wealth to health, or perhaps both? There have been several papers on this

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issue in past volumes. The next six papers in this volume continue analysis of several aspects of the relationship between health and wealth, with the general aim of advancing our understanding of the reasons for the relationship. The analyses include consideration of the decline in mortality in the United States and the United Kingdom and the relationship between medical care and mortality. The relationship between pension income and health in South Africa also contributes to our understanding of the health–wealth relationship. This volume also includes more formal discussion of econometric methodology to determine the direction of causality. This introduction provides a summary of the papers and draws heavily on the authors’ own language.

## **Personal Retirement Plans**

### Implications of the Transition to Personal Accounts

Retirement saving in the United States has changed dramatically over the last two decades. There has been a shift from employer-managed defined benefit pensions to defined contribution retirement saving plans that are largely controlled by employees. In 1980, 92 percent of private retirement saving contributions were to employer-based plans, and 64 percent of these contributions were to defined benefit plans. Today, about 85 percent of private contributions are to plans in which individuals decide how much to contribute to the plan, how to invest plan assets, and how and when to withdraw money from the plan. In “The Transition to Personal Accounts and Increasing Retirement Wealth: Macro- and Microevidence,” James M. Poterba, Steven F. Venti, and I use both macro- and microdata to describe the change in retirement assets and in retirement saving. We give particular attention to the possible substitution of pension assets in one plan for assets in another plan, such as the substitution of 401(k) assets for defined benefit plan assets.

Aggregate data show that between 1975 and 1999 assets to support retirement increased about fivefold relative to wage and salary income. This increase suggests large increases in the wealth of future retirees. The enormous increase in defined contribution plan assets dwarfed any potential displacement of defined benefit plan assets. In addition, in recent years the annual *retirement plan contribution rate*, defined as retirement plan contributions as a percentage of National Income and Product Accounts (NIPA) personal income, has been over 5 percent. This is much higher than the NIPA total personal saving rate, which has been close to zero.

Retirement saving as a share of personal income today would likely be at least one percentage point greater had it not been for legislation in the 1980s that limited employer contributions to defined benefit pension plans and the reduction in defined benefit plan contributions associated with the

rising stock market of the 1990s. It is also likely that the retirement plan contribution rate would be much higher today if it were not for the 1986 re-trenchment of the Individual Retirement Account (IRA) program.

Rising retirement plan contributions, as well as favorable rates of return on retirement plan assets in the 1990s, explain the large increase in these assets relative to income. Employee retirement saving under a defined contribution plan is easily measured and quite transparent to the employee. On the other hand, annual employee saving under a defined benefit plan is more difficult to measure. It is also less likely to be clearly understood by employees. The average annual saving rate under a typical 401(k) plan is roughly twice as high as the average saving rate under a typical defined benefit plan, when properly measured. In addition, the early retirement incentives inherent in the provisions of most defined benefit plans will tend to reduce the aggregate accumulation of defined benefit retirement assets relative to defined contribution assets because defined contribution participants are likely to work longer and contribute for more years.

The microdata show no evidence that the accumulation of 401(k) assets has been offset by a reduction in defined benefit assets. Because annual saving is much greater under 401(k) than under defined benefit plans, assets at retirement after lifetime employment under a 401(k) plan typically would be much higher than under a defined benefit plan. In addition, a large fraction of new 401(k) enrollees retained defined benefit coverage, which probably further increased their retirement saving.

### The Importance of Plan Features

In the last several years, dozens of employers have automatically enrolled new employees in the company 401(k) plan. Employees can opt out of the 401(k), but few choose to do so. In “For Better or for Worse: Default Effects and 401(k) Savings Behavior,” James J. Choi, David Laibson, Brigitte C. Madrian and Andrew Metrick analyze three years of 401(k) data from two firms that have experimented with automatic enrollment. They find that automatic enrollment has a dramatic impact on retirement savings behavior.

Under automatic enrollment (also called *negative election*), employees are automatically enrolled in their company’s 401(k) plan unless the employee elects to opt out of plan participation. This contrasts with the usual arrangement in which employees actively elect to participate in their employer’s 401(k) plan.

The institution of automatic enrollment manipulates the way the savings decision is framed. In theory, the existence of automatic enrollment should not influence the employee’s decision; automatic enrollment doesn’t change the economic fundamentals of the planning problem. But automatic enrollment nonetheless increases participation in 401(k) plans. Opting out requires workers to actively make a decision and then act on that

decision. It is easier to follow the path of least resistance and passively accept the default.

Choi, Laibson, Madrian, and Metrick find that automatic enrollment has a dramatic impact on participation rates. Under automatic enrollment, 401(k) participation rates exceed 85 percent regardless of the tenure of the employee. In the absence of automatic enrollment, employees exhibit participation rates of only 25 percent after six months of tenure and 60 percent after three years at the firm.

They also find that automatic enrollment has a dramatic impact on savings rates and asset allocation choices. Under automatic enrollment, approximately 80 percent of plan participants save at the default saving rate and invest exclusively in the default fund. This percentage declines slowly over time, falling to 50 percent after two or three years of tenure.

Automatic enrollment encourages participation, but it anchors participants at a low savings rate and in a conservative investment vehicle. Higher participation raises average wealth accumulation, but low savings rates and conservative investments undercut accumulation. In the sample, the two effects are roughly offsetting. Controlling for income and tenure, they compare total 401(k) balances for employees who joined the firm before automatic enrollment and employees who joined the firm after automatic enrollment. They find that automatic enrollment has a positive impact on long-run wealth accumulation in one of the firms and no impact on long-run wealth accumulation in the other firm.

Although automatic enrollment does not have a dramatic impact on the mean level of balances, it does have a large impact on the distribution of balances. The high participation rate associated with automatic enrollment drastically reduces the fraction of employees with zero balances, thereby thinning out the bottom tail of the distribution of employee balances. In addition, anchoring on low savings rates and conservative investments sometimes shrinks the upper tail of the distribution of balances. Hence, automatic enrollment reduces the variance of wealth accumulation across all employees.

### The Financial Implications of Housing Equity as People Age

Home equity is the principle asset of a large fraction of elderly Americans and can have important implications for the well-being of elderly households. In "Aging and Housing Equity: Another Look," Steven F. Venti and I have used Health and Retirement Study (HRS) and Asset and Health Dynamics Among the Oldest Old (AHEAD) panel data, as well as Survey of Income and Program Participation (SIPP) data, to understand the change in the home equity of households as they age. We give particular attention to the relationship between changes in home equity and changes in household structure.

There are two ways for households to change home equity: by discon-

tinuing home ownership or by selling and moving to another home. We find that, overall, households are unlikely to discontinue home ownership. Ownership terminations are most likely to occur following the death of a spouse or the entry of a family member into a nursing home. But, even in these circumstances, selling the home is the exception and not the rule. In the absence of a precipitating shock, it is much more likely that a family will sell and buy a new home than discontinue ownership. And households that sell and buy again tend to increase rather than reduce home equity. That is, assets are transferred to housing.

Overall—combining the effects of discontinuing ownership and moving to another home—we find that housing equity of HRS households increases with age, and the equity of AHEAD households declines somewhat. The overall decline in the housing equity of the older AHEAD households is about 1.76 percent per year, which is accounted for primarily by a 7.84 percent decline among households experiencing precipitating shocks to family status. Families that remain intact reduce housing equity very little, only 0.11 percent per year for two-person households and 1.15 percent per year for one-person households.

We use two approaches to determine whether households wish to reduce home equity as they age. One approach is to compare the change in the home equity of movers with the change for stayers. If households withdraw equity when they sell and move to a new home, the reduction in the equity of the movers typically will be greater than the change for stayers. These comparisons, however, are confounded by the tendency of the self-assessed home values to exceed actual values, as measured by selling prices. A comparison of the selling prices of homes with the prior self-assessment of home values shows that home values reported prior to a sale far exceed realized sales prices. Comparing the change in the home equity of movers and stayers, but accounting for this bias, we conclude that families who sell and buy a new home increase home equity on average.

The second approach is based on the comparison of the selling price of the old home (minus the mortgage on the home) with the reported equity value in the newly purchased home. We believe that these are the most reliable data on the change in home equity when families move from one home to another. Based on these sale price data, we find that *on average* households increase home equity when they move to a new house. We also find, however, that equity-rich and income-poor families tend to reduce home values when they sell and buy a new house, whereas equity-poor and income-rich families tend to increase home equity. For continuing two-person HRS households, for example, we estimate that the between-wave reduction for those at the 80th equity quantile and at the 20th income quantile is  $-\$15,422$ . On the other hand, we estimate that households at the 20th equity quantile and the 80th income quantile increase equity by  $+\$54,778$ .

These results suggest that in considering whether families have saved enough to maintain their preretirement standard of living after retirement, housing equity should not, in general, be counted on to support nonhousing consumption. Families apparently do not intend to finance general retirement consumption by saving through investment in housing, as they might through a 401(k) plan or through some other financial form of saving. Rather, we believe the findings here, as well as our earlier findings, suggest that families purchase homes to provide an environment in which to live, even as they age through retirement years. In this case, the typical aging household is unlikely to seek a reverse annuity mortgage to withdraw assets from home equity. It may be appropriate, however, to think of housing as a reserve or buffer that can be used in catastrophic circumstances that result in a change in household structure. In this case, having used the home equity along the way—through a reverse mortgage, for example—would defeat the purpose of saving home equity for a rainy day.

Although these results are based largely on new HRS and AHEAD data files and are based on different methods of analysis, the findings correspond closely to the conclusions we reached in our earlier papers, based on different data sources. These conclusions also correspond closely to the findings of a recent survey of older households sponsored by the American Association of Retired Persons (AARP), showing that the preponderance of older families agree with the statement: What I'd really like to do is stay in my current residence as long as possible. Like our findings, the results of the AARP survey also imply that most households do not intend to liquidate housing equity to support general nonhousing retirement consumption as they age.

### How Is Wealth Accumulated?

Economists generally agree that there are two possible sources of household wealth: households can engage in life-cycle saving by not consuming all of their income, or they can receive bequests or inter vivos transfers from individuals outside of their household. For at least two decades, however, there has been an ongoing debate about the relative magnitude of these two sources of wealth.

In "Intergenerational Transfers and Savings Behavior," Jeffrey R. Brown and Scott J. Weisbenner present further evidence of the importance of these two routes to wealth accumulation.

The source of household wealth is important for many reasons. The behavioral effects of many government programs, such as Social Security, the taxation of savings, and targeted savings programs, likely depend upon the source of wealth. Debates about the fairness of the wealth distribution in the United States, and the extent to which there is intergenerational mobility across this distribution, depend on whether wealth is primarily earned or inherited.

Brown and Weisbenner reach three conclusions. First, using the 1998 Survey of Consumer Finances, they provide evidence suggesting that transfer wealth accounts for approximately 20–25 percent of current household net worth, suggesting a large role for life-cycle savings.

Second, the authors examine the variation in the size of transfers received and expected. They find that while in aggregate, transfer wealth does not appear to be as large as some prior estimates suggest; it is important for a small subset of the population. They find that approximately one-fifth of households report receiving a transfer, and one-eighth expect a substantial transfer in the future. For those households that have received transfers, transfer wealth accounts for, on average, half of current net worth. For lower-wealth households (those with less than \$75,000), transfer wealth on average exceeds current wealth.

Third, Brown and Weisbenner examine whether past transfers and expected future transfers cause people to save less from their labor income to reduce life-cycle saving. They find evidence that the receipt of transfers reduces life-cycle saving, with point estimates suggesting slightly less than dollar-for-dollar crowd-out. But expected future transfers do not reduce life-cycle saving, perhaps suggesting that a bird in hand is indeed worth more than a bird in the bush.

### Wealth at Retirement in the United States and the United Kingdom

The accumulation of personal wealth differs substantially across countries. So does the distribution of wealth among assets. In “Wealth Portfolios in the United Kingdom and the United States,” James Banks, Richard Blundell, and James P. Smith discuss a “housing equity puzzle”: why do younger households in the U.K. accumulate so much of their wealth in housing equity compared to their U.S. counterparts?

In trying to address this puzzle the authors have built up a detailed picture of housing choices and wealth accumulation in both countries. Using microdata sources, they document how the difference in housing equity has evolved for different age groups, for different demographic groups, and for different education groups in both countries. They show that young adults in the United Kingdom leave their parental home later than in the United States, and when they do leave they are much more likely to accumulate wealth in housing equity rather than in other investment instruments.

Why? Is it just the differential tax treatment of mortgages or the different institutional structures of the housing and stock markets in the two countries? The authors argue that these differences explain some of the difference in housing equity, but the higher volatility of house prices in the United Kingdom is the key reason. They derive a modeling framework that explains the higher price volatility in the United Kingdom and use the model to explain the differences in housing equity and stock holdings across the countries.



The inefficient rental market, the authors say, places many more U.K. households in the owner-occupier sector at an earlier age than in the United States. The higher volatility of house prices in the United Kingdom adds to this incentive because, for those expecting to move up the house-size ladder, housing equity is an efficient insurance vehicle for house-price uncertainty. The only way to invest in housing equity is to become an owner. Once an owner, this insurance mechanism increases the incentive to hold a higher proportion of wealth in housing equity rather than in some other asset. Where house prices are less volatile, as in the United States, this incentive is much reduced. Consequently, as households age and wish to accumulate wealth, they will do this more through housing equity in the United Kingdom than in the United States.

### **Health and Wealth**

A striking empirical regularity is the strong, positive relationship between wealth and health. Several papers discuss different aspects of this relationship and use different methods to understand the relationship. The last chapter in the volume presents formal methods to test for causal links between socioeconomic status and health.

#### **Mortality, Income, and Income Inequality**

In both the United States and Britain, for both men and women and for most age groups, there has been a very substantial decline in mortality rates since 1950. In “Mortality, Income, and Income Inequality over Time in Britain and the United States,” Angus Deaton and Christina Paxson use cohort data from the two countries to understand the relationship between income and the decline in mortality.

The comparison between the two countries is interesting in part because of the different systems of health care—one country with universal coverage and the other with private provision until Medicare coverage at age sixty-five. Comparative analysis is also useful because there are both similarities and differences in patterns of income in the two countries. Although changes in income inequality are similar in Britain and the United States, patterns of income growth are not. According to purchasing power parity estimates, incomes are higher in the United States than in Britain, but, in recent years, real incomes have been growing more rapidly in Britain. Both countries experienced historically large increases in income inequality in the 1980s.

In both Britain and the United States, for men and for women and for most age groups, there has been a very substantial decline in mortality rates since 1950. The authors’ examination of these rates, by sex and age group and in relation to the evolution of incomes and income inequality,

does not suggest any simple relationship between income growth and the decline in mortality, or between income inequality and mortality rates. In the United States, the period of slowest income growth saw substantial accelerations in the rate of mortality decline, particularly among middle-aged and older men and women. In both the United States and Britain, the increase in income inequality took place at the same time as a deceleration in mortality decline at the younger ages, including infant mortality. But there are previously slow rates of decline when nothing was happening to income inequality, and the later rise in income inequality was associated with the acceleration in mortality decline among middle-aged and older adults in both countries. Deaton and Paxson conclude that a more plausible account of the data is that, over time, declines in mortality are driven by technological advances or by the emergence of new infectious diseases, such as AIDS. These advances and retreats are associated with specific conditions and specific treatments, and so affect men and women differently and different age groups differently. They also happen first in the United States, with the British experience following with a lag of several years. The authors say that this hypothesis needs a great deal more investigation, for example, by looking at more countries.

Deaton and Paxson then compare these results with their prior analysis, suggesting that if changes in mortality over time are driven by technology and not by income, there must be some doubt as to whether their previous analysis came to the correct conclusions about the role of cohort incomes in the decline of cohort mortality. Their prior results cannot be replicated on the British data. They suspect—but have not been able to demonstrate decisively—that the cohort analysis is flawed by the necessity to make the almost certainly invalid assumption that age effects in mortality are constant through time. This is contradicted, for example, by the spread of AIDS, which has almost certainly raised the early life relative to later life mortality rates among recently born men and women compared with their seniors. If this is a serious problem, the cohort method may not be useful in this context, or it will at least require substantial modifications in order to give sound results.

The authors conclude that this comparative international work is a productive direction for future research. Even so, they say, there remains a major puzzle about the role of income. Income growth seems to play little role in decline of mortality at the national level. At the cohort level the same is possibly true as they argue in this paper. Yet in the individual-level data from the National Longitudinal Mortality Study, as from many other data sets, income is protective against mortality, even when education and other socioeconomic variables are controlled. Why there should be such a contrast between the individual and national effects of income is a topic that requires a good deal of further thought and analysis, the authors conclude.

## Money and Health in South Africa

In “Does Money Protect Health Status? Evidence from South African Pensions,” Anne Case approaches the relationship between health and wealth by considering the effect on health status of an exogenous increase in income.

Case quantifies the impact on health status of the large increase in income associated with the South African state old age pension. Elderly black and colored men and women who did not anticipate receiving large pensions in their lifetimes, and who did pay into a pension system, are currently receiving more than twice median black income per capita. These elderly men and women generally live in large (three, four, or five generation) households, and this paper documents the effect of the pension on the pensioners, on other adult members of their households, and on the children who live with them. She finds, in households that pool income, that the pension protects the health of all household members, working in part to protect the nutritional status of household members, in part to improve living conditions, and in part to reduce the stress under which the adult household members negotiate day-to-day life. The health effects of delivering cash provide a benchmark against which other health-related interventions can be evaluated, Case concludes.

## Socioeconomic Status, Nutrition, and Health

Robert Jensen explores the relationship between “Socioeconomic Status, Nutrition, and Health among the Elderly.”

In his paper, Jensen uses data from a nationally representative household-level survey to explore the relationship between health and socioeconomic status (SES) for the elderly in Russia.

Jensen has two main objectives: first, to explore the basic relationship, which is valuable because there has been little evidence on the health-SES relationship for transition economies; and second, to present evidence from a variety of measures of health status, including measurements of blood pressure, weight and height conducted by trained enumerators, as well as nutrient intake, derived from twenty-four- and forty-eight-hour food intake diaries. Jensen uses these data to show that the relationship between health and SES in Russia can't be adequately described by simple statements, such as the poor are less healthy than the rich; although on net the rich are healthier than the poor in some overall sense, there are important ways in which the rich face greater health risks.

In the study of the relationship between health and income, the biggest challenge, Jensen says, is to decompose the health differentials into the root causes. There are numerous channels through which the two could be linked.

Jensen narrows the focus to one particular mechanism—nutrition—through which SES may affect health. The role of nutrition as a factor in

the differential health status between rich and poor is often overlooked when examining middle- and upper-income countries, because widespread hunger and starvation, even among the poorest, have largely been eliminated and, in fact, widespread obesity is considered a greater public health concern. However, nutrition must be viewed as more complex than hunger or simply sufficient caloric intake. In particular, there are important micro-nutrients beyond calories that are important for good health, especially for the elderly. And the intake of these nutrients may be sensitive to income, as the lowest cost staple foods in most countries (for example, bread or rice) may yield sufficient ‘bulk’ or calories, but (unless fortified) may have low levels of vitamins, minerals, and protein. On the other hand, these foods tend to be low in fat, cholesterol, and sodium, compared with foods that may be more expensive and eaten in larger quantities by the rich, for example, meat. Therefore, Jensen concludes, it is quite possible that nutrition plays a role in the relationship between health and SES, even in countries where calorie malnutrition is scarce and obesity is widespread.

Jensen uses data on food intake to provide a detailed analysis of nutrient intake for the elderly, how it varies with income, the consequences of nutritional intake for health, and the relationship between health and SES. He does this by exploring differences in the diets of the rich and poor, how differences in diet translate into differences in nutrient intake, and the impact of nutrient intake on health.

## **Mortality**

### Mortality and Changes over the Twentieth Century

Mortality rates declined extremely rapidly in the United States over the twentieth century, as they did in all developed countries. In 1900, 1 in 42 Americans died annually. On an age-adjusted basis, the share in 1998 was 1 in 125 people, for a cumulative decline of 67 percent. Given such a substantial improvement in mortality, it is natural to ask how we achieved such gains in health and which innovations or policies contributed most to these gains. David M. Cutler and Ellen Meara do this in “Changes in the Age Distribution of Mortality over the Twentieth Century.”

Cutler and Meara start by considering major trends in mortality over the century, noting how mortality declines differ by age and cause of death. By providing detailed information on which demographic groups experienced the largest mortality improvements and for what causes of death, these analyses motivate hypotheses to explain the overall improvement in mortality in the twentieth century.

The mortality decline is approximately linear over the time period. Mortality decreased at a relatively constant rate of 1 percent per year between 1900 and 1940. There was then a period of rapid decline from 1940 to 1955

in which mortality declined 2 percent per year, followed by essentially flat mortality rates until 1965. Since 1965, mortality rates have fallen at roughly 1 to 1.5 percent per year. This relative constancy of mortality decline suggests that perhaps a single factor can explain the trend in longer life.

But the aggregate trends mask as much as they reveal. While mortality declines have been relatively continuous over the twentieth century, the age distribution of mortality decline has not. Cutler and Meara start by highlighting a basic fact about mortality declines in the past century: mortality reduction used to be concentrated at younger ages but is increasingly concentrated among the aged. In the first four decades of the century, 80 percent of life expectancy improvements resulted from reduced mortality for those below age forty-five, with the bulk of this for infants and children. In the next two decades, life expectancy improvements were split relatively evenly by age. In the latter four decades, about two-thirds of life expectancy improvements resulted from mortality reductions for those over age forty-five; only one-third was from the younger population.

This change has been accompanied by several important epidemiological trends. Throughout the first half of the twentieth century, infectious diseases were the leading cause of death. Changes in the ability to avoid and withstand infection were the prime factors in reduced mortality in the first part of the century. This disease-fighting ability was not predominantly medical. Nutrition and public health measures were vastly more important in reduced mortality over this time period than were medical interventions, as substantial research documents. Nutrition and public health were particularly important for the young, and so mortality reduction was concentrated at younger ages.

Between 1940 and 1960, infectious diseases continued to decline, but was due more to medical factors. Antibiotics, including penicillin and sulfa drugs, became important contributors to mortality reduction in this era. Antibiotics help the elderly as well as the young, and so mortality reductions became more widespread across the age distribution.

Since 1960, mortality reductions have been associated with two new factors: the conquest of cardiovascular disease in the elderly and the prevention of death due to low birth weight infants. While it is not entirely clear what factors account for the reduction in cardiovascular disease mortality, the traditional roles of nutrition, public health, and antibiotics are certainly less important, the authors conclude. Taking their place are factors related to individual behaviors, such as smoking, diet, and high-tech medical treatment. Cutler and Meara term this change the *medicalization* of death: Increasingly, mortality reductions are attributed to medical care and not social or environmental improvements.

The medicalization of death does not imply that medicine is the only factor influencing mortality. For several important causes of death, income

improvements and social programs have had and continue to have a large impact on mortality. For example, Medicare likely has a direct impact on mortality by increasing elderly access to medical care, but it also may have important income effects since it reduced out of pocket spending by the elderly for medical care. Social security and civil rights programs may also be important in better health. The authors do not quantify the role of medicine, income, social programs, and other factors in improved mortality in the last half-century, but they do show examples where each is important as a first step in their ongoing research.

### Mortality and Age Differences in Medical Care

Perhaps the two most important, most enduring questions in health economics are “What are the determinants of expenditures?” and “What are the determinants of health?” Extensive research over the last thirty-five years has produced a variety of answers to these questions, depending in large part on the specific context within which the questions are posed. One crucial distinction is between explaining changes over time and explaining cross-sectional differences at a given time. With regard to secular changes in the United States in recent decades, most health economists now believe that advances in medical technology provide the major explanation for both increases in expenditures and improvements in health. With regard to cross-sectional differences, there is less agreement. Victor R. Fuchs, Mark McClellan, and Jonathan Skinner consider cross-sectional differences in “Area Differences in Utilization of Medical Care and Mortality among U.S. Elderly.” By exploiting a rich body of data from the Centers for Medicare and Medicaid Services [formerly the Health Care Financing Administration (HCFA)], the U.S. Census of Population, and other sources, the authors hope to narrow that disagreement, at least with respect to area differences in utilization of care and mortality of the elderly.

Their focus on the elderly is motivated in part by the fact that the elderly account for a disproportionate share of national health care expenditures and an even greater share of government health care expenditures. Moreover, the elderly experience the bulk of the major health problems of the population. Approximately one-half of all deaths occur between ages sixty-five to eighty-four, and another one-fourth occur at ages eighty-five and above. These shares are based on the current age distribution of the U.S. population. For a stationary population experiencing current age-specific mortality rates, deaths at ages sixty-five to eighty-four would still account for almost one-half the total; the share at age eighty-five and above would rise to one-third. The focus on the elderly is facilitated by the fact that the Medicare program generates a large, detailed body of data on utilization and mortality.

One reason for focusing on area differences is that the large number of metropolitan and nonmetropolitan areas in the United States provides a

convenient framework for aggregating individual data in the search for variables that may be related to utilization and mortality. Moreover, many health policy analysts believe that an understanding of area differences may suggest opportunities to limit expenditures and/or improve health.

The paper has two main sections: utilization and mortality. In most markets an interest in expenditures would require attention to prices as well as quantities, but given universal insurance coverage through Medicare and administrative price setting by HCFA, utilization is a natural subject for study. Mortality is only one of many possible measures of health, but there are several reasons to concentrate on it. First, mortality is by far the most objective measure. Secondly, it is, for most people, the most important health outcome. Thirdly, it is probably significantly correlated with morbidity since most deaths are preceded by illness.

In this paper, Fuchs, McClellan, and Skinner focus on whites ages sixty-five to eighty-four, or more specifically, those not identified as African American. They exclude blacks because at those ages both utilization and mortality of blacks are higher than for whites, and the percentage of blacks in an area is correlated with other variables of interest. Moreover, other research suggests that the relationship between those other variables and utilization and mortality may be significantly different for blacks than for whites. They exclude anyone aged eighty-five and over because it is more difficult to obtain accurate measures for self-reported variables, such as education and income. About one-half of the population aged eighty-five and over suffer from some form of dementia and about one-fifth are in nursing homes where measurement of income is particularly problematic. Moreover, most nursing home utilization is not covered by Medicare, the source of the data on utilization.

The authors find wide variation in the utilization of health services across regions. It is not simply that some regions are higher along all dimensions of care, but that in some regions there is much more diagnostic testing, even while per capita inpatient services are comparable to the national average. In general, utilization is strongly positively associated with mortality across areas—in other words, areas with more sick elderly use more health care, other things being equal. There remains, however, substantial variation in utilization after controlling for factors such as education, income, and mortality.

Cross-area variations in mortality rates among this elderly group are not as large as variations in utilization, but they are still substantial. The 10 percent of metropolitan statistical areas (MSAs) with the highest mortality (age-sex adjusted) have an average death rate 38 percent greater than the 10 percent of MSAs with the lowest mortality. The comparable differential between the high and low utilization areas is 49 percent.

Education, real income, cigarettes, obesity, air pollution, and the percentage of blacks account for more than half of the variation in mortality

across areas, but there are still substantial differences across regions unexplained by these variables. Florida, in particular, has death rates significantly below the national average; the differential is particularly large for areas in the southern portion of the state. The final section of the paper explores two puzzles—why Florida is so different from the rest of the country with respect to utilization and mortality, and why the presence of more blacks in an area should be associated with higher mortality among elderly whites. The authors consider several possible solutions to these puzzles, including differential migration patterns of the elderly, but ultimately they arrive at conjectures rather than robust explanations.

### **Health and Wealth—Econometric Analysis of Causal Links**

In their paper “Healthy, Wealthy, and Wise? Tests for Direct Causal Paths between Health and Socioeconomic Status.” Peter Adams, Michael D. Hurd, Daniel McFadden, Angela Merrill, and Tiago Ribeiro test for the absence of causal links from socioeconomic status to health and mortality, and from health to wealth.

This paper is in large part a technical discussion of how econometrics test for causal links. The authors use innovations in health conditions and in wealth in the AHEAD panel to carry out tests for causality from SES to health, and from health conditions to wealth. By advancing beyond the detection of association to a framework in which there is some possibility of detecting the absence of causal links, this paper is an advance on much of the literature on this subject.

The authors conclude that for mortality and for accidents, the hypothesis of *no* causal link from SES is accepted, and for incidence of mental problems the hypothesis is rejected. The results for chronic and degenerative diseases are not definitive, but using the preferred test procedure, the hypothesis is marginally rejected in both cases. The hypothesis appears to be accepted for acute conditions, but the necessary invariance property fails, so the possibility that this is an artifact is not ruled out. The pattern of results suggests that incidence of acute, sudden onset health conditions does not exhibit a significant SES gradient, whereas incidence of chronic, mental, and degenerative conditions appears to have an association to SES due to some combination of direct causal links and common unobserved behavioral or genetic factors. Specifically, there may be an SES gradient in seeking treatment for the second class of conditions that may influence detection, or for maintaining preventative regimens that may maintain some conditions below the reporting thresholds. Adams, Hurd, McFadden, Merrill and Ribeiro’s findings are not inconsistent with the possibility that for mental and chronic illnesses where the acute care procedures covered by Medicare are often inapplicable, ability to pay may be a causal factor in seeking and receiving treatment.



The technique put forth in this chapter has been applied to the Whitehall data in the United Kingdom with results very similar to the results found using U.S. AHEAD data. This chapter includes not only the technical paper but comments from many experts in econometric analysis as well. The authors are pursuing their line of investigation based on alternative models and using subsequent waves of AHEAD.